2—554

SCIENTIFIC LIBRARY

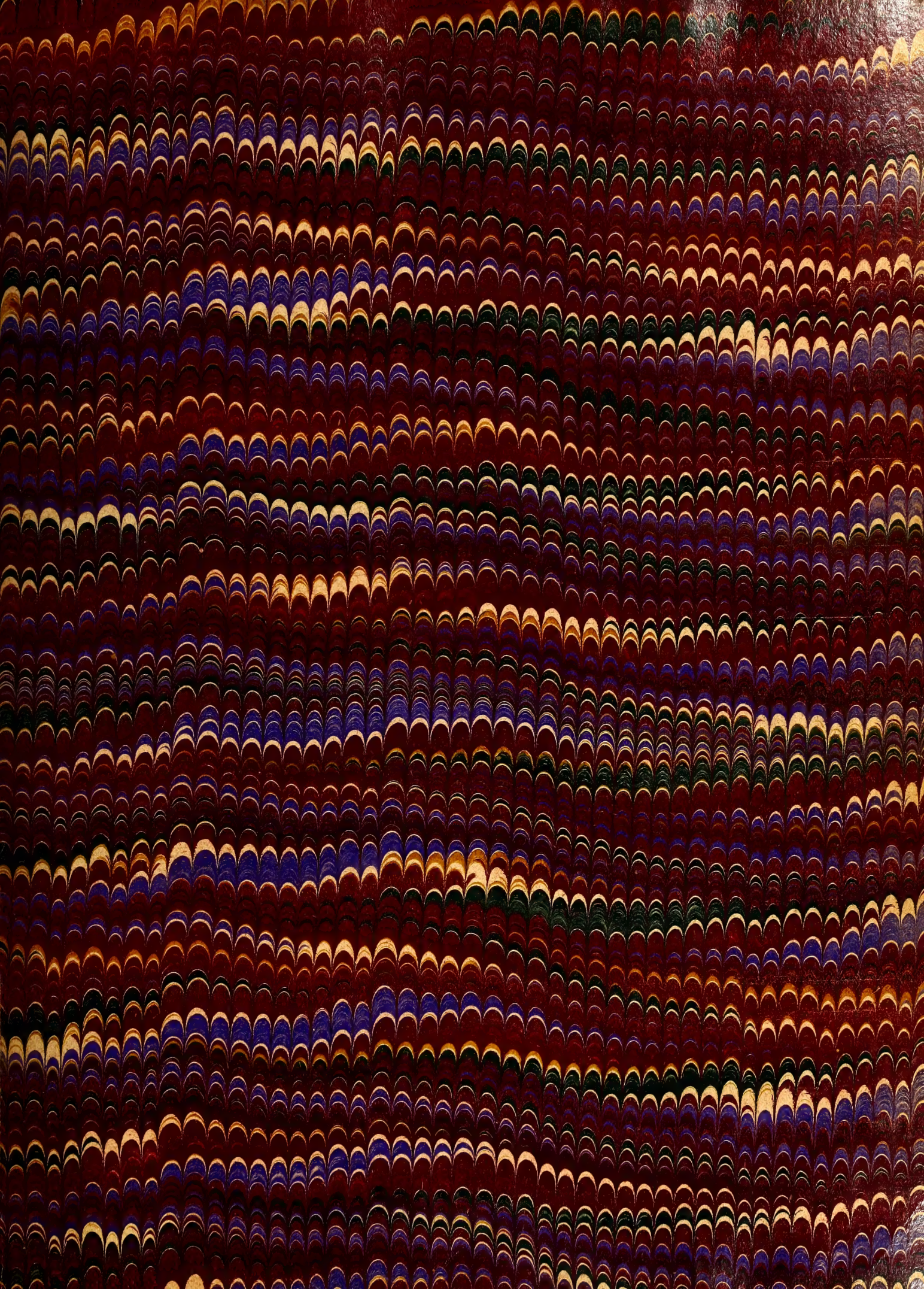


UNITED STATES PATENT OFFICE

CASE _____ SHELF _____

L. M. R.

6—3899



THE

Electric Railway Journal

LIBRARY
SEP 29 1914
U. S. PATENT OFFICE

12626

INDEX TO VOLUME XXXVIII

July to December, 1911

McGraw Publishing Company
239 West 39th Street
New York

TE
701
T75

INDEX TO VOLUME XXXVIII

JULY TO DECEMBER, 1911

PAGES BY WEEKS.

July 1	pages	1	to 72
July 8	"	73	to 102
July 15	"	103	to 142
July 22	"	143	to 180
July 29	"	181	to 214
Aug. 5	"	215	to 264
Aug. 12	"	265	to 302
Aug. 19	"	303	to 338
Aug. 26	"	339	to 376
Sept. 2	"	377	to 414
Sept. 9	"	415	to 450
Sept. 16	"	451	to 482
Sept. 23	"	483	to 518
Sept. 30	"	519	to 554
Oct. 7 (Convention)	"	555	to 638
Oct. 7	"	639	to 684
Oct. 10 (Daily)	"	685	to 716
Oct. 11 (Daily)	"	717	to 758
Oct. 12 (Daily)	"	759	to 796
Oct. 13 (Daily)	"	797	to 842
Oct. 14	"	843	to 936
Oct. 28	"	937	to 972
Nov. 4	"	973	to 1016
Nov. 11	"	1017	to 1048
Nov. 18	"	1049	to 1086
Nov. 25	"	1087	to 1132
Dec. 2	"	1133	to 1184
Dec. 9	"	1185	to 1224
Dec. 16	"	1225	to 1264
Dec. 23	"	1265	to 1302
Dec. 30	"	1303	to 1334

A

Acceleration of train speed, Measurement of [Mailloux], 1152
Accident claim department:
——Campaigns against accidents:
Boston Elevated Ry., 1259
Chicago, *998
Lexington, Ky., 1043
Louisville & Northern Railway & Lighting Co., 550
New Orleans, Pamphlet of suggestions, 679
New York, 9, 67
Philadelphia, 273
——Committees of employees on safety, 1050
——Education of the public [Boynton], 870; [McDougall], 1204; Discussion, 1209
——Humane side of accident work [Johnson], 1029
——Investigation of accidents, Prompt, 519
——Medical testimony in accident cases, Discussion at Tacoma, Wash., 663
——Pay-as-you-enter car and the prevention of accidents [Casey], 1201; Discussion, 1207
——Popularizing accident data, Germany, Exhibit at Dresden Exhibition, 391; Comment, 378
——Prevention of accidents [Whitehead], 869; [Carpenter], 872
——Public Service Ry., 636
——Reducing number of accidents, Possible means for [Johnson], 654
——Report and classification blank, 310
——Selection and instruction of trainmen, 844 [Beck], 870; [Walsh], 871
——Settlement of claims out of court, 451
Accidents:
——Burlington, N. J., Bridge collapse, 1289; Comment, 1305
——Collision between steel motor cars, Effect of, *1283
——Detroit United Ry., Head-on collision, 296
——Filing reports of, with Connecticut Public Utilities Commission, 1010
——Germany, Statistics, 1905-1909, *391; Comment, 378
——New York, May, 257
——Philadelphia Rapid Transit Co., 442
——Precautions in signal system operation, 215
——Statistics, Interstate Commerce Commission, 1080
——Warren, Me., 332
Accountants' Association:
——Accounting system for a small electric railway [Gault], 748; Discussion, 731; Comment, 718
——Address of President Forse, 751
——Associate membership amendment to constitution, 815, 816
——Committee on car miles and car hours, Report, 744; Discussion, 732
Accountants' Association: (Continued)
——Committee on engineering accounting, Report, 778; Discussion, 766; Comment, 760
——Committee on express and freight accounting, Report, 785; Discussion, 790; Comment, 798
——Committee on interline accounting, Report, 745; Discussion, 732
——Committee on life of railway physical property, Report, 818
——Committee on standard classification of accounts, Report, 819
——Committees for current year, 1320
——Convention sessions, 731, 737, 766, 790, 815
——Get-together luncheon, 737
——Officers for 1912, 819
——Overhead charges [Cooley], 877; Comment, 897
——Prepayment fare collection [Boylan], 737
——President P. S. Young, *890
——Statistics of cost of electric operation of steam railways [Bierck], 830
Accounting:
——Cost of electric operation of steam railways [Bierck], 830
——Depreciation:
Definitions of depreciation terms [Floy], 21
Great Britain, Depreciation reserves in [Rodgers], 661
Interborough Rapid Transit Co., 280
Kokomo, Marion & Western Traction Co., Account of, 156
Nebraska rules, 973, 990
Relation to electrical properties [Floy], 21; Comment, 1; Discussion, 49
(See also Appraisal of railway property)
——Engineering, Report of joint committee of Accountants' and Engineering Associations, 778; Discussion, 766; Comment, 760
——Express and freight, Report of Accountants' and Transportation & Traffic Association, 785; Discussion, 790; Comment, 798
——Fares on prepayment cars, Discussion by Accountants' Association, 737
——Freight accounts, Report of Central Electric Accounting Conference, 533
——Illinois Traction System's methods, 184
——Interline, Report of Accountants' Association, 745; Discussion, 732
——Legislation affecting accounting [Davies], 26
——Life of railway physical property [Ingle], 1205; [Bagg], 1205; Discussion, 1210
Accountants' Association report, 818
——New Jersey Public Utility Commission hearings, 1206, 1250
——Public Service Ry. methods, *627
——Small electric railway [Gault], 748; Discussion, 731; Comment, 718
——Standard classification, Report of Accountants' Association, 819
——Storeroom and stockkeeping, Mobile Light & Railroad Co. [Glover], *423
——Suit of Kansas City Southern Ry. against classification of additions and betterments, 1067
——(See also Central Electric Accounting Conference; Central Electric Railway Accountants' Association)
Accounting department, Relations with traffic department [Neereamer], 1278
Adrian (Mich.) Street Ry., Signs, 947
Advertising:
——Boston Electric Ry. exhibit, *906
——[Buffe], 495
——Car construction, Advertising of, 265
——Complaint department, Rochester, N. Y., *1274
——Hudson & Manhattan R. R., 1090
——Newspaper, Report of American Electric Railway Transportation & Traffic Association, 702; Discussion, 697
——Publicity as a factor in electric railroading [Rockwell], 1105
——Traffic posters, London Underground Electric Ry., *387
——(See also Traffic promotion)
Air-brakes. (See Brakes, Air)
Air compressor for brake equipments (Allis-Chalmers), *1034
Akron, Ohio, Northern Ohio Traction & Light Co.:
——Power and other improvements, 1098
——Protest against stock issue, 367
Albany, N. Y., United Traction Co.:
——Agreement with employees, 967
——Freight and express traffic, 283
——Seating order, 1219
——Transfer, New form, 550
Albany Southern R. R. (See Hudson, N. Y.)
Albia (Ia.) Interurban Ry., Bond issue, 367
Allentown, Pa., Lehigh Valley Transit Co.:
——Dividend, 678
Allentown, Pa.:
Lehigh Valley Transit Co.: (Continued)
——Voting trust agreement expires, 928
Alton, Jacksonville & Peoria Ry. (See Jerseyville, Ill.)
Aluminum car panels and fittings, Zurich, 246
American Cities Railway & Light Co. (See New Orleans)
American Electric Railway Accountants' Association. (See Accountants' Association)
American Electric Railway Association:
——Address of President Brady, 722; Comment, 717
——Brill prize, Report, 802
——Circulars on work of associations, 1033
——Committee on buildings and structures, Report, 820; Discussion, 803; Comment, 844
——Committee on compensation for carrying United States mail, 360; Report, 840
——Committee on determining proper bases for rates and fares, Report, 840, 1154; Comment, 843, 1134
——Committee on education, Report, 752; Comment, 797; Plans, 1109
——Committee on federal relations, Report, 812
——Committee on insurance, Report, 838
——Committee on subjects, Meeting, 1096
——Committee on taxation matters, Report, 827
——Company sections urged [Duffy] c85
——Convention:
Athletic carnival, 763, *800
Aviation exhibition, 357, 762, *811
Badges, 690
Bulletin on Atlantic City hotels, 152
Chicago special train, 690
Conventionalities, 687, 719, 761, 799
Delegates, Advice to new, 520
Exhibits, 218, 243, 286, 357, 705, 706, 707, 711, 747, 754, 755, 791, 792, 796, 841, 842; Comment 686
Program and notes, 432, 542, 664, 685; Comment, 451
Publicity the keynote, 845
Reception to association officers, 688
Reports of committees, Method of compiling, 686
St. Louis special train, 689
Sessions, 727, 763, 802
Social events 688, 720, 721, 762, 769
——Convention location [Brady], 724
——Effect of electric railway operation on taxable city property [Harries], 777; [Winsor], 879
——Electric railway dictionary supervising committee, Report, 834
——Headquarters activities [Brady], 723
——Hudson River tunnels [Davies], 789
——Interurban, The [Henry], 739
——Membership, Plans for increasing associate, 161, 1018
——Midyear conference, Date of, 1213, 1322
——Officers for 1912, 802
——Physical valuations [Crosby], 874
——President T. N. McCarter, *800
——Report of secretary and treasurer, 730
——Toledo street railway situation [Lang], 775
——Welfare of employees [Pierce], 773
American Electric Railway Claim Agents' Association. (See Claim Agents' Association)
American Electric Railway Engineering Association:
——Address of President Harvie, 691
——Association policy, Discussion by executive committee, 1110
——Central Electric Railway Association standardization committee, Meeting with, 117, 119
——Committee on block signals, Report, 742; Discussion, 735; Comment, 718
——Committee on education of engineering apprentices, 3; Report, 703; Discussion, 696; Comment, 797
——Committee on engineering accounting, Report, 778; Discussion, 766; Comment, 760
——Committee on equipment, Meeting, 115; Comment, 104; Report, 851; Discussion, 866
——Committee on heavy electric traction, Report, *746; Discussion, 734; Comment, 717
——Committee on power distribution, Report, 704; Discussion, 698; Comment, 759
——Committee on power generation, Report, *781; Discussion, 768; Comment, 760, 798
——Committee on rules of procedure of committee on standards, Report, 849; Comment, 843
——Committee on standards, 464; Report, *850; Discussion, 867; Meeting, 1031
——Committee on way matters, 122; Report, 828; Discussion, 805
——Convention program, Comment on, 686
——Convention sessions, 696, 734, 766, 768, 803, 866

American Electric Railway Engineering Association: (Continued)
——Crossings of transmission lines, Proposed specifications, Comment, 1088
——Executive committee, Report, 696; Meeting, 1110
——Officers for 1912, 867
——President E. O. Ackerman, *890
——Question Box, 192; Answers for, 215; Selected questions and answers, 859
——Report of secretary-treasurer, 696
——Standards, Letter ballot on, 909, 997; Comment, 1080
——Subjects for standing committees of coming year, 1111
American Electric Railway Manufacturers' Association:
——Annual meeting, 770
——Committee on exhibits, 159
——Convention bulletin, 503
——Officers, New, 1249
American Electric Railway Transportation & Traffic Association:
——Address of President Page, 692
——Committee on block signals, Report, 742; Discussion, 735; Comment, 718
——Committee on city rules, Report, 788; Discussion, 764
——Committee on construction of schedules and timetables, Report, 835; Discussion, 808
——Committee on fares and transfers, Report, 832; Discussion, 807; Comment, 797
——Committee on freight and express accounting, 158; Report, 785; Discussion, 790; Comment, 798
——Committee on freight and express traffic, Report, 787; Discussion, 765
——Committee on interurban rules, Report, 753; Discussion, 736; Comment, 2, 760
——Committee on passenger traffic, Report, 702; Discussion, 695; Comment, 685
——Convention sessions, 694, 736, 764, 790, 807
——Executive committee, Meeting, 1167
——President J. N. Shanahan, *890
——Report of secretary-treasurer, 693
——Training of employes, Discussion, 694
——Two-car train operation for city and suburban travel [Franklin], 839; Discussion, 809
American Institute of Electrical Engineers:
——Annual convention, 49; Comment, 4
——Depreciation of electrical properties [Floy], 21
——Going value of public utilities [Fowle], 1115
——Power transmission convention papers, Comment, 4, 182
——Responsibilities of electrical engineers in making appraisals [Byllesby], 16; Discussion, 49
——West Jersey & Seashore R. R., Electrical operation [Wood], 19; Discussion, 50; Comment, 75
American Light & Traction Co. (See New York City)
American Railway Engineering Association, Convention notes, 1001
American Railways Company. (See Philadelphia)
American Society of Civil Engineers, Electrical features of Pennsylvania tunnels [Gibbs], Discussion, 918
American Society of Mechanical Engineers:
——Annual meeting, 1213
——Discussion of welding, 1067
American Society for Testing Materials, Annual meeting, 84
American Traction & Power Co. (See Indianapolis)
Anderson, Ind., Indiana Union Traction Co.:
——Fast trains, *200
——Poles, Reinforcing of, 468
Angola (Ind.) Light & Power Co., Incorporation, 1177
Annual report, The ideal, 1049
Appraisal of railway property:
——Buffalo, N. Y. [Arnold], 911, 991; Comment, 976
——Compensation for promoter, Plea for [Crosby], 48, 874; Comment, 74
——Cost to reproduce physical property, Methods used by B. J. Arnold to determine, 991; Comment, 976
——Eastern Wisconsin Railway & Light Co., 193
——Going value [Fowle], 1115
——Life of physical property from the accounting and engineering standpoints [Ingle], [Bagg], 1205; Discussion, 1210
——Life of physical property, Report of Accountants' Association, 818
——Metropolitan Street Ry. [Connette], 240
——Milwaukee, Wis., 160; Comment, 143
——Overhead charges [Cooley], 877; Comment, 897; Discussion, 816
——Physical valuation legislation 812
——Physical valuations [Crosby], 874
——Report at convention of National Association of Railway Commissioners [Bassett], 1026
——Responsibilities of electrical engineers in making valuations [Byllesby], 16; Discussion, 49
——Seattle, Renton & Southern Ry., 61
——Toledo, 59, 131, 168, 253
——Uses of an appraisal [Gillette], 948
Apprentice courses:
Apprentice courses: (Continued)
——Difficulty of creating, 3
——Education of engineering apprentices, Report of American Electric Railway Engineering Association, 703; Discussion, 696; Comment, 797
Arbitration in strikes, 267
Arc lamps, Inclosed, for street car headlights [Baldwin], *531
Arkansas Valley Interurban Ry. (See Wichita, Kan.)
Arkansas Valley Railway, Light & Power Co. (See Pueblo, Col.)
Armature shaft welding:
——Thermit process [Cuntz], c*504
——Without removal, San Francisco, *388; Comment, 377
Atlanta, Ga.:
——Georgia Railway & Electric Co.:
Bond issue, 256, 1042
Payment of bonds, 1257
——Georgia Railway & Power Co.:
Incorporation, 511, 1009
Leases, 677
Stock and bond issues, 1293
Atlantic City convention. (See American Electric Railway Association)
Augusta-Aiken (Ga.) Railway & Electric Corporation, 1256; Dividend, 1326
Aurora, Elgin & Chicago R. R. (See Chicago)
Austin (Tex.) Street Rys., Payment of mortgage bonds, 407
Australia:
——Statistics of street railways, 868
——Victorian Rys., Gasoline motor cars, *1285
Aviation exhibitions for electric railways, 924
Aviation meet, Rockford, Ill., 363
Axles:
——Chicago Rys., Standard, *653
——Heat-treated, standard specifications of American Society for Testing Materials, 84
——Specifications, Discussion by Engineering Association, *734

B

Baggage bearing for door rollers, *281
Baggage agents' troubles [Anthony], 355
Baggage rules:
——Dayton, Ohio, 549
——New York State Street Railway Association, Recommendations, 1240
Ballast. (See Track construction.)
Baltimore:
——United Railways & Electric Co.:
Bonds, 929
Note issue, 64, 172, 367
Baltimore & Ohio R. R., Committee of employees on safety, 1050
Bangor (Me.) Railway & Electric Co.:
——Dividend, 1326
——Purchase of property, 255
——Reorganization plans, 367
Bartlesville (Okla.) Interurban Ry., Bond issue, 888
Batteries, Statistics of manufacture, 427
Battery cars. (See Storage battery cars.)
Bay State Street Ry. (See Boston, Mass.)
Bearings:
——Chuck for boring, *160
——Roller bearings on suburban cars, Frankford, Tacony & Holmesburg Street Ry., 669
Ben Hur Route. (See Crawfordsville, Ind.)
Berkshire Street Ry. (See Pittsfield, Mass.)
Berlin, Germany:
——Cable order, the largest, c286
——Souvenir album of street railway system, 1002
——Subway construction, Schönberg-Berlin Underground Ry., *229; Comment, 216
Binghamton (N. Y.) Ry., Dividend, 475
Birmingham (Ala.) Railway, Light & Power Co., Fare to suburbs, 1011, 1080; Dividend, 1326
Blackpool, England, Semi-convertible car, *248
Blanks and forms:
——Accident claim department, Public Service Ry., 637
——Accident report, Aurora, Elgin & Chicago R. R., 310
——Accounting department, Public Service Ry., 627
——Baggage record, 355
——Car defect records, Boston, 425
——Car-loading records, 563
——Car maintenance, Public Service Ry., 610
——Car mileage report, Aurora, Elgin & Chicago R. R., 226
——Car service record, 1270
——Chartered car service, Boston, 360
——Complaint department, Rochester, 1272
——Distribution department, Public Service Ry., 597
——Express order blank, 282
——Illinois Traction System's accounting methods, 184
——Inoperative register report card, Providence, R. I., 1321
——Interline accounting, 745
——Line crew's report, Public Service Ry., 595
——Passenger accounts, Report, Central Electric Railway Accountants' Association, 1277
——Printing department, Milwaukee Electric Railway & Light Co., 1023
Blanks and forms: (Continued)
——Purchasing and storeroom departments, Public Service Ry., 623
——Route card used by conductors, Brooklyn, 1270
——Schedules, Public Service Ry., 560, 562, 565
——Sleeping and parlor car diagrams, Illinois Traction System, 525
——Storeroom records, Mobile, Ala., 423
——Transportation department, Public Service Ry., 620
——Way department daily work report, Public Service Ry., 579
Block signals. (See Signals.)
Bloomsburg (Pa.), Millville & Northern Ry., Incorporation, 928
Boilers, Use of large units [Jacobus], 1213 Comment, 1187
Boise (Idaho) & Interurban Ry., Reported change in control, 1256
Boise (Idaho) Railroad Co., Reported change in control, 1218
Bonds. (See Rail bonds.)
Boone (Ia.) Electric Co., Transfer of property, 63, 94
Boston, Mass.:
——Bay State Street Ry.:
Bond purchases, 1326
Carhouse, *418
Exhibit, *906
Express service, 431, *1023
Fare reduction, 930
Hearing on improvements, in Malden, 326
Officers, 206
——Electrification of terminals, New Haven Road protests, 59
——Elevated Ry.:
Accident campaign, 1259
Annual report, 1041
Bond issue, 547, 888, 964
Car defects, Reporting and checking [Dana], 425
Cars, Pay-within, *54
Chartered car service [Dana], 360
Coasting recorder, 858
Consolidation with West End Street Ry., 172, 206, 228, 255, 295, 329, 367, 407, 441
Employees, Training of, 694
Exhibit, 906
Express plans, Hearing on, 1163
Extensions, 510
Instructing trainmen in the economical use of power, 1025
Owl service, 1043
Power generation and distribution system, *1313; Comment, 1304
Stockholders, 63
Substation at Brookline, Mass., *398
Track scrapers, Pneumatic (Root), *56
——Massachusetts Electric Companies:
Annual report, 1292
Dividends, 1178
——Railway & Light Securities Co., Stock increase, 256, 367
——Subways and tunnels, 228, 251, 675, 1251
Boston & Eastern R. R.:
——Certificate of necessity granted, 61
——Hearings on locations in Lynn, 927
——Progress, 364
Boston & Maine R. R. (See North Adams, Mass.)
Boston & Northern & Old Colony Street Rys.:
——Increase in capital stock, 172
——Merger bill passed, 228
——(See also Boston, Bay State Street Ry.)
Boston & Worcester Electric Companies:
——Annual report, 1076
——Dividend, 1293
Bowling Green, Ohio, Lake Erie, Bowling Green & Napoleon Ry., Improvement, 678
Brackets, Catenary line, Coating of, 1266
Brake rigging:
——Foundation, New South Wales cars, 15
——(Pahler), *923
Brake-shoe adjuster, Cam-type, Detroit United Ry., *959
Brake shoe and holder, Removable (Malcolm), *321
Brake shoes:
——Aurora, Elgin & Chicago R. R., Standards, 308
——Test of cars equipped with coasting time recorders, 1199
Brakes, Air:
——Development and classification [Turner], *35
——Electric control [Turner], *38
——Governor synchronizing system [Turner], *39
——New York City, Hearings, 131, 196, 503, [Connette], c919; 960, 1007, 1096
——Pittsburgh, 169, 204
——Public Service Ry., 604
——Standards of Central Electric Railway Association, *31
——Terre Haute, Ind., 296
——Test case in Ohio, 321
——Tests on Third Avenue R. R., 543; [Stowe], c1118
Brakes, Electro pneumtaic [Turner], 38
Brakes, Hand:
——[Connette], 503, c919
——Staffless (Ackley), *55
——Tests on Third Avenue R. R., 543; [Stowe], c1118

Brantford, Ont., Grand Valley Ry., Receivership, 1078
Bridgeport, Conn., Connecticut Company, Carhouse and shop, *146
Bridges:
——Aurora, Elgin & Chicago R. R., *222
——Burlington, N. J., Collapse, 1289; Comment, 1305
——Public Service Ry., *582
Bridges, Catenary. (See Catenary construction.)
Brill prize awards, 802
Bristol (Tenn.) Belt Line Ry., Change of name, 678
Bristol (Tenn.) Traction Co., Stock increase, 678, 1078
British Columbia Electric Ry. (See Vancouver, B. C.)
Brookline, Mass., Substation, *398
Brooklyn:
——Coney Island & Brooklyn R. R.:
Fare case, 174, 181, 198, 1114
Strike, 284, 328, 1057; Comment, 267, 1050
——Rapid Transit Co.:
Annual report, 509
Bond issue, 255
Car for subway service, *1322
Comparison of operations with Interborough Rapid Transit, 643
Coney Island fares, Hearing on, 198; Comment, 181
Coney Island single-fare zone extension, 409
Cost of maintaining motor car equipment, 159
Creosoted ties, 345
Handling equipment, Efficiency and economy, *1268
Letter on courtesy to employees, 929
Mileage per day unit of equipment, Increased, 1268
Passenger tabulating device, *1269
Proposal to build subway, 58, 75, 167, 218
Substation, Thirty-eighth Street, *1228; Comment, 1226
Transfers, Hearing on, 208
Brooklyn Bridge:
——Railway traffic, Statistics, 679
——Rush-hour conditions, 303
Brunswick, Ga., City & Suburban Ry., Annual report, 94
Brunswick (Me.) & Yarmouth Street Ry., Incorporation, 1326
Brushes, Motor (National Carbon Co.), 672
Buenos Aires, Electric railways of, Statistics, 239
Buffalo, N. Y.:
——Buffalo, Batavia & Rochester Ry., Proposed, 1256
——Buffalo & Lackawanna Traction Co., Purchase of equipment, 134
——Buffalo & Lake Erie Traction Co.:
Maintenance of way practice. [Alderman], 42; Discussion, 53
Receivership matters, 1078
——International Traction Co.:
Annual meeting, 1009
Cars, Near-side single-platform, 512, 954
Hearing on reorganization, 511, 910; Arnold report, 911, 991; Comment, 976
Interest and bonds, 94, 1327
Proposed new railway, 431
Track improvements, 1029
Buffalo, Lockport & Rochester Ry. (See Rochester, N. Y.)

C

Cables:
——Largest order, c286
——Laying a 60,000-volt, Prussian-Hessian State Rys., *1097
——Specifications for, discussed by Engineering Association, 699
Caldwell (Idaho) Traction Co., Cars, *400
California constitutional amendments, 917
California Midland Ry. (See San Francisco)
California public utility bill, 1253, 1324
Camden, N. J.:
——Public Service Ry. (See Newark, N. J.)
——Riverside Traction Co.:
Accident, 1289
Assessment on stock, 330
Lease, 1009
Labor changes, 1037
——West Jersey & Seashore R. R.:
Bond issue, 64
Comparison of operating features with Aurora, Elgin & Chicago R. R., 304
Electrical operation [Wood], 19; Discussion, 50; Comment, 75
Cañon City, Col., Colorado Light & Power Co., Sale, 928
Cape Town, Africa, Car meters in [Giles], 880
Capitalization of railways:
——[Brady], 725
——Capital needed for development of railways, Report of Railroad Securities Commission, 1246; Comment, 1225
——Companies of 1910, 311; Comment, 303
——Compensation for promoter, Plea for [Crosby], 48, 874; Comment, 74
Capitalization of railways: (Continued)
——Report of National Association of Railway Commissioners, 1026; Comment, 1018
Car building, Experiments in, 937
Car capacity:
——Minneapolis cases, 410
——St. Paul, Ordinance, 208
——Seattle, Ordinance, 208
Car cleaning. (See Cleaning of cars)
Car construction, Developments, 975
Car defects, Reporting and checking, Boston [Dana], 425
Car design:
——Arch roof cars, Chicago Rys., *648
——Center-entrance cars, 5
——Combination passenger and baggage cars, Peoria, Ill., 77
——Prepayment car, Public Service Ry., *605
——Report of Engineering Association, 851, 855; Discussion, 866
——Sleeping cars, Illinois Traction System, *523
——Subway, Brooklyn Rapid Transit, *1322
Car destination signs. (See Destination signs)
Car detentions. (See Detention of trains)
Car distribution, Efficiency system in Brooklyn, 1268
Car failures:
——Classification of, 379
——Reduction of [Barnes], 34; Discussion, 53
Car framing:
——Arch roof car, Chicago Rys., *649
——Arkansas Valley Interurban Ry., *247
——New South Wales, *14
——Public Service Ry., *605
Car lighting. (See Lighting of cars)
Car-loading records, Public Service Ry., 563, 564
Car maintenance:
——Alternating versus direct-current equipment, Milwaukee, 1143
——Aurora, Elgin & Chicago R. R., *306
——Public Service Ry., 608
Car miles and car hours, Report of Accountants' Association, 744; Discussion, 732
Car painting. (See Painting of cars)
Car platforms, Ramp for, Kansas City, *1004
Car propulsion, Cost of, Coasting tests, Chicago Rys., *1192; Comment, 1186
Car-roof nomenclature, 103; [Hanna], c161
Car side, Metal unit sections, New York, Westchester & Boston Ry., *670
Car steps, Height of:
——Comment and review of situation, 341
——Hartford, Conn., Lower steps, 966, 1011
——Hearing before New York Public Service Commission, 196, 503
——Philadelphia, Lower steps, 966
Car weights:
——Chicago Rys., 648
——Discussion by committee of Engineering Association, 116
——New South Wales, 16
——Reduction of, Comment, 975
——Universal standard of comparison, Report of Engineering Association, 851
Carhouses:
——Bridgeport, Conn., *146
——Brockton, Mass., Bay State Street Ry., *418
——Economy in, 105
——Los Angeles, Cal., *771
——Lunchrooms and barber shops in, 340
——Public Service Ry., *586
——Report of Engineering Association on buildings and structures, *820; Discussion 803; Comment, 844
——Richmond, Va., *998
——Shifting of cars, Overhead contact device, Berlin, *234
Cars:
——Aluminum panels, roof members, etc., Zurich, 246
——Arch roof:
Chicago Rys., *648
Freeport, Ill., *363
Oklahoma City, *924
Savannah, Ga., *1284
Texarkana, Tex., *363
——Berlin subway, *233
——Caboose, Puget Sound Electric Ry., *837
——Closed:
Arkansas Valley Interurban Ry., *247
Aurora, Elgin & Chicago R. R., *306
Caldwell, Idaho, *400
Illinois Traction System, 706
Indiana Union Traction Co., *200
Milwaukee, Single-phase equipment, *1138, 1139
Vancouver, B. C., *164
——Combination:
Baggage and refrigerator, Lexington & Interurban Ry., *56
New South Wales, *13
Passenger and baggage, Peoria, Ill., *76
Passenger and smoking, Walla Walla, Wash., *1001
——Crane, Public Service Ry., *580
——Dining, Aurora, Elgin & Chicago Ry., 227
——Double-deck, in England, 415
——Express-freight, Michigan United Ry., *126
——Funeral, Aurora, Elgin & Chicago R. R., 227
——Gas-electric. (See Gasoline-electric cars)
——Gasoline. (See Gasoline cars)
——Manager's office, Public Service Ry., *607
Cars: (Continued)
——Near-side, single-platform:
Buffalo, 512, 954
Philadelphia, 164, *915, 1213, 1232, 1275; Comment, 899
——Oil tank, Milwaukee, *538
——Parlor:
Aurora, Elgin & Chicago Ry., 227
Illinois Traction System, 522; Comment, 521
——Pay-as-you-enter:
Advantages [Casey], 1201; Discussion, 1207
Louisville, Ky., 966
Operation of, in Syracuse [Duffy], 1202; Discussion, 1207
——Pay-within:
Boston Elevated Ry., *54
Milwaukee, 297, 477
Single-end car, Dayton City Ry., *543
——Prepayment:
Chicago Rys., *648
Contracts for licenses and door devices, 1000
Hutchinson, Kan., *505
Kankakee, Ill., *127
Kansas City, Mo., *665
Public Service Ry., *603
San Francisco, Oakland & San Jose Consolidated Ry., *162
Savannah, Ga., *1284
Side-rod, Cincinnati, 173
——Semi-convertible:
Blackpool, Eng., *248
Great Falls, Mont., *323
——Semi-steel, Houston, Tex., *882
——Side-rod, light-weight, Cincinnati Traction Co., *502
——Single-deck vs. double-deck, in Great Britain [Hooghwinkel], 199
——Single-end interurban, Fort Worth, Tex., *925
——Single-end vs. double-end car operation [Hicks], 45
——Sleeping, on Illinois Traction System, *522
——Spiez-Frutigen Ry., *644
——Sprinkling, Milwaukee, *289
——Steel:
Effects of collision, *1283
Newark extension of Hudson Tunnel, *274
Philadelphia elevated service, *960
Unit-sections, New York, Westchester & Boston Ry., *670
——Storage battery. (See Storage battery cars)
——Subway, Brooklyn Rapid Transit, *1322
——Trailer, of Ben Hur Route, *530
——Utility, Denver City Tramway Co., *539
——Weed burning (Lamb), *124
——Work cars:
Public Service Ry., *581
Toledo Railways & Light Co., 1070
Catenary construction:
——Chicago, Ottawa & Peoria Ry., *1308
——Connecticut Co., D. C. experiences with six different types of construction, *1052; Comment, 1051
——Dessau-Bitterfield Ry., *982; Multiple catenary, *1145
——Hoosac tunnel, *7
——Southern Pacific Co., *900, *940
——(See also Overhead construction; Transmission lines)
Catskill, N. Y.:
——Catskill Traction Co., Bond issue, 94
——Upper Hudson Electric & Railroad Co., 206
Cattle guard, Chicago, Ottawa & Peoria Ry., *1309
Census reports:
——Cross ties purchased, 400
——Manufacture of electrical machinery, apparatus and supplies, 427, 1212
——Poles purchased in 1910, 537
Central Electric Accounting Conference:
——Affiliation with Central Electric Railway
——Committee on passenger accounting, 1069
——Freight accounts, Report of committee, 533
——June meeting, 28
——Legislation affecting electric railway accounting [Davies], 26
——September meeting, 533
——(See also Central Electric Railway Accountants' Association)
Central Electric Railway Accountants' Association:
——Address of President Elkins, 1276
——Annual meeting, 1276; Comment, 1266
——Committee on passenger accounts, Report, 1277
——Departmental co-operation [Peck], 1276
——Officers, 1279
——Relations between the traffic and accounting departments [Neereamer], 1278
——(See also Central Electric Railway Accounting Conference)
Central Electric Railway Association:
——Affiliation with Central Electric Accounting Conference, 534
——August meeting, 292; Comment, 265
——Cedar Point meeting, 358
——Committee on standardization; Report, *31
——Convention, 1099, 1119
——Electric locomotives for interurban freight haulage [Wynne], 1103
——Headlights for interurban service [Dorticos], *349; Discussion, 358
——Insurance [Staats], 356; Discussion, 358
——June meeting, 29

Central Electric Railway Association: (Continued)
——Lightning protection [Burdick], 1101
——Little things that count [Schade], 353; Comment, 339
——Overhead standardization [Schlessinger], 347; Discussion, 359
——Protection of linemen, Committee to draft code of rules for, 1120; Comment, 1133
——Publicity [Van Zandt], 25
——Publicity as a factor in electric railroading [Rockwell], 1105
——Standardization committee meeting with Engineering Association, 117, 119
——Substation operation [Cochran], 1099
——Timber treatment plants, Co-operative, Proposed investigation, 183
——Traffic [Keys], 354; [Norviel], 1107
——Trailer operation versus multiple-unit trains [Renshaw], 350; Discussion, 359
——Troubles of a baggage agent [Anthony], 355
Central Pennsylvania Traction Co. (See Harrisburg, Pa.)
Chartered car service:
——Boston [Dana], 360
——[Keys], 354
——New York State Street Railway Association committee report, 1241
——Public Service Ry., 564
Chattanooga (Tenn.) Railway & Light Co., Owl service, 1258
Cheyenne (Wyo.) Electric Ry., Sale, 1256
Chicago, Ill.:
——Aurora, Elgin & Chicago R. R.:
Annual report, 1254
Comparison of operating features with West Jersey & Seashore R. R., 304
Construction and operation, *220
Maintenance of rolling stock and other operating features, *306
Passenger station at Wheaton, Ill., *1280
Power station and distribution system, *268
Traffic promotion [Breckinridge], 494
——Calumet & South Chicago Ry., Sale of bonds, 1256
——Chicago City Ry.:
Accident prevention cards, *998
Acquiring of property of Chicago & Southern Traction Co., 63, 1078, 1293
Bond sale, 255
Dividend, 1293
Rail, Romapac compound. Trial of, *505, *1286
Resignation of T. E. Mitten, 1232, 1325
——Chicago City & Connecting Rys., Dividend, 1327
——Chicago Elevated Rys.:
Bond issue, 367
Developments, 293
Note issues, 134
Officers and directors, 329, *444
——Chicago & Joliet Electric Ry., Wage increase, 174
——Chicago & Oak Park Elevated R. R.:
Complaint against dismissal, 364
Deposit of stock, 329
Judgment against, 1256
Receivership, 1078, 1177
Track elevation, 472
——Chicago Rys.:
Annual report, 134
Bonds, 510, 1218, 1294
Campaign against team interference, 182, 207
Cars, Arch roof, *648
Coasting recorders, 858, 1120, *1192; Comment, 1186
Notes paid, 1327
Rail, Romapac compound, Trial, *505
Receivership of Union Traction Co., 255
Tantalum lamps on cars, twelve months' investigation, 501
——Chicago & Southern Traction Co., Sale, 1041
——Competition with steam road, 1303
——Consolidation of surface and elevated railways proposed, 94, 206, 963, 1036, 1089, 1290
——Electrification, Right to compel, 58; Investigation, 1164, 1214
——Electrolysis, Reports of Board of Supervising Engineers, and Bureau of Public Efficiency, 242; Report [Palmer], 1153
——Elevated loop, Reduction of noise by novel track construction, 469
——Elevated railway valuation committee, 1253
——Illinois Central terminal changes, 1251
——Metropolitan West Side Elevated Rys., Use of pocket tracks, *224
——Northwestern Elevated R. R.:
Annual report, 1176
Bond issues, 63, 476
——Paving, Creosoted wood, 161
——Public Service Company of Northern Illinois, Merger, 1125
——Smoke abatement, Investigation of, 1164
——South Side Elevated Ry., Dividend, 172
——Standard Gas & Electric Co., Stock increase, 1078
Chicago, Ill.: (Continued)
——Subway commission, 199, 252, 545, 885
——Subway progress 129, *157, 961, 996
Chicago, Lake Shore & South Bend Ry. (See Michigan City, Ind.)
Chicago & Milwaukee Electric R. R.:
——Bonds of Wisconsin division, 255
——Earnings for six months, 407
——Fee allowance fixed by court, 928
——Foreclosure case, 1041
——Reorganization, 511, 1177
——Thompson suits, 1294
——Validity of bond issue, 172
Chicago, Ottawa & Peoria Ry. (See La Salle, Ill.)
Chicago, South Bend & Northern Indiana Ry. (See South Bend, Ind.)
Children, Small, must be accompanied, Columbus, Ind., 173
Chuck for boring bearings (Stevens), *160
Cincinnati, Ohio.:
——Cincinnati, Georgetown & Portsmouth R. R.:
Officers, 511
Sale of controlling interest, 172
——Cincinnati Traction Co.:
Car, light-weight side-rod, 173, *502
Sale of notes, 407
——Ohio Electric Ry.:
Bond purchase, 1125
Substation operation [Cochran], 1099
Circuit breakers:
——Dispatcher's control of, Scottsburg, Ind., 81
——Horn-gap type (Railway and Industrial), 674
——Outdoor oil (Westinghouse), *165
Citizens' Railway Co. (See Waco, Tex.)
Citizens' Railway & Light Co. (See Fort Worth, Tex.)
Citizens' Light & Transit Co. (See Pine Bluff, Ark.)
City & Suburban Ry. (See Brunswick, Ga.)
Claim agent should study convention exhibits, 759
Claim Agents' Association:
——Address of President Drown, 733
——Convention gathering, 689
——Convention sessions, 733, 774
——Educating the public in the prevention of accidents [Boynton], 870
——President H. K. Bennett, *890
——Prevention of accidents [Whitehead], 869; [Carpenter], 872
——Selection and instruction of trainmen [Beck], 870; [Walsh], 871
Claim department. (See Accident claim department)
Cleaning of cars, 864
——Combined suction and pressure apparatus for [Conley], *276
——Public Service Ry., 613
Cleveland, Ohio:
——Cleveland Ry.:
Open doors on pay-within cars, 159
Ordinance changes, 60, 130, 197, 926, 1068, [Smith], 1113, 1185
Association, 534
——Cleveland, Southwestern & Columbus Ry., Freight traffic, 96
——Cleveland & Youngstown Ry., Proposed improvements, 1006
——Fare question, 293, 406, 885
——Lake Shore Electric Ry., Freight traffic, 96
——Package agency, 1320
——Service, Need of increased, 1289
——Terminal, Interurban, 506
——Ticket frauds, 962
Cleveland, Painesville & Eastern Ry. (See Willoughby, Ohio)
Coal:
——Briquetting of lignite, 289
——Burning wet or dry, 863
——Purchase of bituminous coal under b.t.u. specifications [Crecelius], 784; Discussion, 769
——Testing, Berthier method, London Underground Electric Rys., 390
Coal handling:
——Hoosac Tunnel power station, *458
——Public Service Electric Co., Power stations, *591
——Worcester Consolidated Street Ry., *342
Coal meter, *781
Coal storage losses, Tests by United States Bureau of Mines, Comment, 1225
Coasting time recorders:
——Boston Elevated Ry., 858
——Chicago Rys., 858, 1120, *1192; Comment, 1186
——Third Avenue, New York, 1322
Colorado Railway, Light & Power Co. (See Trinidad, Col.)
Columbia (S. C.) Railway, Gas & Electric Co., Bond sale, 255
Columbus, Ind., Indianapolis, Columbus & Southern Traction Co., Small children must be accompanied, 173
Columbus, Ohio:
——Columbus, Delaware & Marion Ry.:
Annual report, 964, 1217
Receivership and sale, 172, 206, 295, 329, 441, 1256
——Columbus Interurban Terminal Co., 295
——Columbus Railway & Light Co.:
Investigation, 547, 1077
Stock increase, 94, 134, 255, 441
——Columbus, Urbana & Western Electric Ry., Issue of stock and bonds, 1256
Columbus, Ohio: **(Continued)**
——Scioto Valley Traction Co., Annual meeting, 511
Complaint department, New York State Rys., Rochester lines, 1272; Comment, 1266
Complaints, Handling of, 639
Concord (Mass.), Maynard & Hudson Street Ry. (See Maynard, Mass.)
Concord, N. C., Salisbury & Spencer Ry., Operating statistics of storage battery car, 44
Condensers, Spray cooling for water, North Adams, Mass., *454
Conduit:
——Fiber (J-M), Special uses of, 1282
——Tile and fiber, Comparative costs, *1250
Coney Island & Brooklyn R. R. (See Brooklyn)
Conference of Governors (See Governors' conference)
Connecticut Co. (See New Haven)
Connecticut, Legislation, 92, 169
Connecticut Public Utilities Commission:
——Accidents, Instruction in regard to reports of, 1010
——Fare hearing, 1033
——Organization, 472
——Public utilities law, 273
——Statement of policy, 1253
Connectors, Standard location for lighting, C. E. R. A., *33
Construction trains:
——Hoosac tunnel electrification work, 9
——Southern Pacific Co., *946
Contract form of agreement, Public Service Ry., 579
Control for multiple-unit train, Public Service Ry., *660
Controller diagrams, Simplified [Parham], *246
Controllers, Overhauling of, 1087
Co-operation between departments [Peck], 1276
Copenhagen, Strike in, 990
Copper, Advance in price, 1271
Corona effects. (See Transmission lines)
Corporations and supervision, 974
Corrugation. (See Rail corrugation)
Cost of materials, Government bulletin, 241
Couplers:
——Automatic car and air couplers, Subway cars, Interborough Rapid Transit Co., *1003
——Janney radial, Test at Indianapolis [Mason], c*200
——M. C. B., Illinois Traction System, *116
——Standard:
Discussion at meeting of Engineering Association Committee, 117; Comment, 104
Report of Engineering Association, 851; Discussion, 866
Covington, Ky.:
——Franchise case, 328
——Overcrowding ordinance upheld by Circuit Court, 331
Crane cars. (See Cars, Crane)
Crawfordsville, Ind., Indianapolis, Crawfordsville & Western Traction Co. Trailer cars, *536
Crossings, Grade in New York State, 1075
Crossings, Third-rail highway, Aurora, Elgin & Chicago R. R., 272
Crossings, Transmission line:
——Southern Pacific Co., *945
——Standards, Proposed, of Engineering Association, Comment, 1088
Crossings, Trolley wire, North Adams, Mass., *11
Crossover, Portable (Cleveland), *1004
Culverts, Concrete, Collapsible steel forms for, *245
Current clocks, Experiments in Manchester [Cunliffe], 658; Comment, 642
Curves, Elevation in paved streets, 862

D

Dallas, Tex., Electric Corporation, Dividend, 678
Dam, Keokuk, Ia., Progress, 1246
Danville (Va.) Railway & Electric Co., 964
Davenport, Ia., Tri-City Railway & Light Co., Annual report, 93
Dayton, Ohio:
——Baggage rules, 549
——Single-end pay-within cars, *543
Definitions:
——Cable and strand, 705
——Desirability of uniform, 379
——Maintenance, 779
Dennison, Ohio, Twin City Traction Co., 64
Denver (Col.) City Tramway Co.:
——Car horse, *422
——Fares for vacuum cleaners, 361
——Power plant extension, *1188
——Protests tax assessment, 886
——Sale of notes, 1256
——Utility car, *539
Department co-operation [Peck], 1276
Depreciation. (See Accounting)
Derailing track. (See Sanded tracks)
Des Moines (Ia.) City Ry.:
——Arbitration agreement with employees adopted, 406
——Improvements, 427
——Strike 284, 320, 406 [Snyder], *1060; Comment, 267, 1050

Dessau-Bitterfeld Ry:
——Locomotives, electric, *1020
——Power and transmission methods, *978, *1097, *1145; Comment, 974
Destination signs:
——Need of indicators, 639
——Station signs, 639
Detention of trains:
——Aurora, Elgin & Chicago R. R., 308
——West Jersey & Seashore R. R., 20
Detroit, Mich.:
——Detroit United Ry.:
Accident near Dearborn, head-on collision, 296
Arbitration of differences with platform men, 96, 440
Brake-shoe adjuster, cam-type, *959
Current consumption of interurban cars, *1094
Fare agreement, Tentative, 950; Comment, 937
Freight service, 984
Library of engineering books, 938
Lightning protection [Burdick], 1101
Ordinance provisions, 1144, 1244; Letter to stockholders, 1319
Rental suit, 167
Testing laboratory [Rogers], *345
Wage scale, 546
——Municipal ownership, 204, 1036
Devils Lake (N. D.) & Chautauqua Transfer Co., 1041
Dictionary, Electric Railway, Report of supervising committee, 834
Dining-car service on Aurora, Elgin & Chicago R. R., 227
Direct-curernt railways. (See High-tension direct-current railways)
Discipline. (See Employees)
Dispatching trains:
——Dispatcher's control of line circuit breakers, Scottsburg, Ind., *81
——Selective signal and telephone equipment (Western Electric), *85
——Telephone switchboard (Lafayette), *164
——Telephone system paralleling high-tension transmission line, New York, Westchester & Boston R. R., 668
Dixon, Ill., Sterling, Dixon & Eastern Electric Ry., Fare increase, 1237; Comment, 1226
Door-operating device, Pneumatic (Consolidated Car-Heating Co.), *674
Door rollers, Babbitt bearing for, *281
Double-car units. (See Multiple-unit trains)
Drawings of piping installations, Improving, 1137
Drill clamp, Portable, *958
Duplicator, Commercial, 758
Dust guards in journal boxes, 1017
Dutch West Indies, Gasoline car, *673

E

East St. Louis (Ill.) & Suburban Ry.:
——Annual report, 329
——Near side stops, 1011
Eastern Wisconsin Railway & Light Co. (See Fond du Lac), 726
Easton, Pa.:
——Easton Consolidated Electric Co., Annual report, 133
——Montgomery Traction Co., Sale, 1009
——Pennsylvania-Jersey Traction Co., Note issue, 135
Economy and efficiency, 1017
Edison, Thomas A., Letter on his storage battery, 802
Education, Report of American Electric Railway Association, 752; Comment, 797
——(See also Apprentice courses)
Edwardsville, Ill., Fare question, 1328
Efficiency engineering:
——Economies in materials and schedules, 73
——Economy and efficiency, 1017
——Report of Engineering and Accountants' Association joint committee, 778; Discussion, 778; Comment, 760
Ejectment case of Berkshire Street Ry., 1282
El Paso (Tex.) Electric Co., Bonds, 1009
Electric Railway Journal:
——Change of mailing date, 84
——Convention number, 555; Comment, 640
——Index, Value of to readers, 1303
Electrical machinery, apparatus and supplies, Census report on manufacture of, 427, 1212
Electrification. (See Heavy electric traction)
Electrolysis:
——Chicago, Investigation, 242; Report [Palmer], 1153
——Concrete poles, Electrolysis in, *700
——Return circuit installation, Public Service Ry., *596
Electrolytic hydrogen and oxygen generators (International), *249
Elmira (N. Y.) Water, Light & Railroad Co., Merger, 1078
Emergency repair crews on Public Service Ry., 595
Employees:
——Accident prevention, Instruction in, 844
——Accidents and the discipline of employees [Johnson], 654
——Agreement with, Albany, N. Y., 97
——Apprentices. (See Apprentice courses)
——Aurora, Elgin & Chicago Ry., 228
Employees: (Continued)
——Barber shops in car houses, 340
——Benefit funds, Penn. R. R., 81
——Benefits and pensions, Public Service Ry., 619
——Clubhouses, Portland, Ore., 319, 331
——Club rooms, Los Angeles, 931
——Committees on safety, 1050
——Compensation of workingmen and employers' liability, Discussion at conference of Governors of States, 465; Comment, 452
——Complaints against platform men, 639
——Conscience fund contribution, 689
——Co-operative wage plan and arbitration scheme, Proposed, Philadelphia, 393; Comment, 378
——Courtesy, 369
——Courtesy, Letter to Brooklyn employees, 929
——Discipline, Public Service Ry., 620
——Education in accident prevention [McDougall], 1204; Discussion, 1209
——Education of shop apprentices, 3
——Essay awards, St. Louis, 476
——Facilities for, Report of Engineering Association on buildings and structures, 820, 825; Discussion, 803; Comment, 844
——Fire protection, Instructions for, 821
——Instruction, Public Service Ry., *616
——Instruction methods, Second Avenue R. R., New York, *237; Comment, 216
——Instruction of trainmen in economical use of power, Boston Elevated Ry., 1025
——Kansas workmen's compensation act, 958
——Liability insurance legislation, 812
——Library of Public Service Corporation, *574
——Lunchrooms in carhouses, 340
——Manchester, Eng., Concessions, 504
——Medals for conductors, Chicago & Milwaukee Electric R. R., 258
——Merit system of Illinois Traction System, 430
——Milwaukee fare case, Interest in, 362
——Physician's examination, Public Service Ry., 615
——Prevention of accidents [Whitehead], 869; [Beck], 870; [Walsh], 871; [Carpenter], 872
——Prizes, Roadbed condition: Ft. Wayne & Northern Indiana Traction Co., 1290
——Protection of linemen against shocks, 1133
——Restaurant, Public Service Corporation, *572
——Service insignia, Danbury, Conn., 889
——Social activities, Public Service Ry., Newark, N. J., *153, 622; Comment, 144
——Strikes. (See Strikes)
——Substation operators, Questions for, 1100
——Training of, Boston Elevated Ry., 694
——Uniforms, wages and promotions, Public Service Ry., 618
——Wages:
Chester, Pa., Increase, 332
Chicago & Joliet Electric Ry., Increase, 174
Detroit United Ry., 546
Eastern Wisconsin Railway & Light Co., Increase, 1233
Effect of low fares on, 331
Omaha, Neb., Increase, 1258, 1298
Philadelphia, Co-operation plan, 393, 1329; Comment, 378
Pottsville, Pa., Increase, 65
Public Service Ry., Increase, 1296
Wisconsin Electric Ry., Increase, 1233
——Welfare measures [Pierce], 773
Employers' liability and workingmen's compensation, Discussion at conference of Governors of States, 465; Comment, 452
End connections on cars, Report of American Electric Railway Engineering Association, 747; Comment, 717
Energy consumption of one and two-car trains, Illinois Traction System, 527; Detroit, *1094
Engineers:
——Public functions of the engineer, 217
——Responsibility of, in making appraisals [Bylleshy], 16
Engines. (See Gas engines; Oil engines)
England. (See Great Britain)
Equipment trust securities [Brockway], 82; Comment, 74
Erie-Cambridge-Union & Corry Traction Co for sale, 928
Europe, Electric railways in, Data, 392
Evansville (Ind.) Rys., Improvements, 475
Excursion cars. (See Chartered cars)
Express. (See Freight and express)

F

Factory working hours and peak loads, 1227
Fare boxes, Public Service Ry., 621
Fare collection, Front door, in Kansas City, 737
Fare collection and registration, Rooke system, Providence, R. I., 1321
Fares:
——Accounting for, on prepayment cars [Boylan], 737
Fares: (Continued)
——Accounting methods of Public Service Ry., *627
——Appraisals as basis for fixing [Bylleshy], 17
——Aurora, Elgin & Chicago R. R., 226
——Berlin, Germany, 229
——Birmingham, Ala., 1011, 1080
——Cleveland, Interurban cars, 406, 885
——[Colt], 33
——Coney Island, Brooklyn Rapid Transit Co., 174, 181, 198, 1114
——Determining proper basis for, Report of American Electric Railway Association, 840, 1154; Comment, 843, 1134
——Detroit United Ry., Tentative arrangement for settlement of franchise situation, 950; Comment, 937
——Early fares in various cities, 1155
——Eastern Wisconsin Railway & Light Co., Increase, 193, 1223; Comment, 1226
——Effect of low fares on wages, 331
——European rates, 1156
——Factors which govern transportation rates, 1154
——Hudson & Manhattan R. R., Increase, 1094, 1113, 1134
——Long Island R. R., Hearings, 114
——Manchester to Hartford, Conn., 1033, 1080
——Middlesex & Boston Ry., Hearing, 120
——Milwaukee case. (See Milwaukee, Wis.)
——New Jersey hearings, 174, 207, 209, 1117
——No-seat-no-fare, San Francisco, 65
——Omaha, Neb., bridge case, 751
——Portland, Ore., 1126
——Reduction:
Bay State Street Ry., 930
Cleveland, 293
Lincoln, Neb., 930
New York & Long Island Traction Co., 1011
Old Colony Street Ry., 208
Puget Sound Electric Ry., 549, 929
Rockford & Interurban Ry., 96
Syracuse & South Bay R. R., 173
——Report of American Electric Railway Association, 840, 1154; Comment, 843, 1134
——Report of Transportation and Traffic Association, 832; Discussion, 807; Comment, 797
——Rules and regulations, New York State Street Railway Association committee report, 1240
——Schenectady Ry., 332
——School fares, New Jersey, 95
——Seattle-Tacoma fares reduced, 549
——Sterling, Dixon & Eastern Electric Ry., Increase, 1237; Comment, 1226
——Syracuse, Lake Shore & Northern R. R., Increase, 1127
——Taunton & Pawtucket Street Ry., Hearing, 152
——Vacuum cleaners, Denver, 361
——Wisconsin Electric Ry., Increase, 1233; Comment, 1226
——(See also Through routes and joint rates)
Fargo (N. D.) & Moorhead Street Ry., Sale, 475
Federal Light & Traction Co. (See New York City)
Federal relations. (See Public service corporations)
Feeder equalizer boxes, Public Service Ry., *598
Fenders:
——Hearing on, by Massachusetts Railroad Commission, 1168
——Tests by Massachusetts Railroad Commission, 549, 919
Ferries, Public Service Ry., *556, 557, 586
Field coil repair economy, Toledo, 286
Field testing device, Olean, N. Y., 124
Financial:
——Annual reports, Elements of, 1049
——Cost of construction, Electrification of West Jersey & Seashore R. R., 19
——Cost of maintenance:
Aurora, Elgin & Chicago Ry., 308
Motor car equipments, Brooklyn, 159
——Cost of operating and maintenance, Electric divisions of West Jersey & Seashore R. R., 19, 20; Comment, 75
——Cost of railway property, Buffalo, 993
——Cost of station equipped with high-pressure turbines [Bronsdon], 489
——Earnings of Public Service Corporation, Estimate, 536
——Eastern Wisconsin Railway & Light Co., Result of fare increase, 1235; Comment, 1226
——Equipment trust securities [Brockway], 82; Comment, 74
——Great Britain:
Cost of construction and maintenance, 199
Municipal tramways, Policy respecting renewals [Rodgers], 601
——Receipts of Public Service Ry., 569
——Sleeping-car trains, earnings and expenses, 526
——Sterling, Dixon & Eastern Electric Ry., Result of fare increase, 1238; Comment, 1226
——Wisconsin Electric Ry., Result of fare increase, 1235; Comment, 1226
Fire hazard and high voltage, 379
Fire insurance [Staats], 356; Discussion, 358
——Reduced rates, Richmond, Va., *998

Fire insurance: (Continued)
——Report of American Electric Railway Association Committee, 838
——Work of American Electric Railway Association [Brady], 723
Fire protection:
——Automatic sprinklers, Report of Engineering Association, *826
——Bridgeport car house, 149
——Decreasing fire hazards in old car shops, 416
——Importance of little things, 640
——Instructions to employees, 821
——Report of Engineering Association on buildings and structures, 820; Discussion, 803; Comment, 844
——Sprinkler system in open yard, Interborough Rapid Transit Co., New York, *277
Flooring, Sanitary car, "Hy-ge-nia," St. Louis, *321
Fond du Lac, Wis., Eastern Wisconsin Railway & Light Co., Fares increased, 193, 1233; Comment, 1226
Fonda, Johnstown & Gloversville R. R. (See Gloversville, N. Y.)
Forms, Collapsible steel, for concrete culverts, *245
Fort Dodge (Ia.), Des Moines & Southern R. R.:
——Automatic block signals, 1056, 1250
——Committee of employees on safety, 1050
——Issue of receivers' certificates, 547
——Sale, 407
Fort Wayne & Northern Indiana Traction Co., Roadbed condition prizes, 1290
Fort Worth, Tex.:
——Citizens' Railway & Light Co., Sale, 134, 255
——Northern Texas Traction Co., Single-end interurban cars, *925
Fostoria (Ohio) & Fremont Ry., 92
France:
——Midi Ry., Single-phase locomotive, *647
——Paris-Lyons-Mediterranean Ry., Electric locomotive with permutators, *385; Comment, 381
Franchises:
——[Crosby], 875
——Model street railway, Suggestions, National Municipal League, 1281
——(See also names of cities)
Frankford, Tacony & Holmesburg Ry. (See Tacony, Pa.)
Free transportation, New Jersey rules, 369
Freeport (Ill.) Railway & Light Co., Arch roof cars, *363
Freeport, Me., Portland & Brunswick Street Ry., Sale, 256, 547
Freight and express:
——Accounting for interline, 745
——Accounting methods of Illinois Traction System, 184
——Accounting, Report of Accountants' and Transportation & Traffic Associations, 785; Discussion, 790; Comment, 798
——Aurora, Elgin & Chicago R. R., 228, 307
——Bay State Street Ry., 431, *1033
——Boston Elevated Ry., Express plans, 1163
——Cleveland, Southwestern & Columbus Ry., 96
——Detroit United Ry., 984
——Illinois, Rate reduction, 477
——Interurban railways [Henry], 741
——Lake Shore Electric Ry., 96
——Locomotives, Electric, for interurban haulage [Wynne], 1103
——New York State interurban roads, *281
——Possibilities on interurban lines [Nevell], 1109
——Report of committee of Transportation & Traffic Association, 787; Discussion, 765
——Rochester, Syracuse & Eastern R. R., 477
——Truck service, New Albany, Ind., 966, 1011
——Warsaw, Ind., 967
——Worcester, Mass., 1258
Fuel. (See Coal)
Funeral cars. (See Cars, Funeral)
Funicular electric railway, Lookout Mountain Park, Denver, Col., 923
Fuse-testing clips of Milwaukee Electric Railway & Light Co., 527

G

Galco, car headlining, 128
Galena-Signal Oil Co., Annual convention of representatives, 504
Galveston-Houston (Tex.) Electric Co., Annual statement, 964
Gas, Electric & Railway Association of Oklahoma, Organization, 914
Gas engines:
——Comparison with steam turbine [Dreyfus], 657
——Johannesburg, Africa, Failure, 1088
Gasoline cars:
——Dutch West Indies, *673
——Line car, Milwaukee, *770
——Point Shirley, Mass., *959
——(Railway Motor Car Cor.), type C, *668
——Victorian Rys., Australia, *1285
Gasoline-electric cars:
——Germany, 1166
Gasoline-electric cars: (Continued)
——Operating and transportation statistics, Third Avenue R. R., New York, 490; Comment, 484
——[Potter], 41
——St. Louis & San Francisco R. R., *163, *287
——(Westinghouse), in Europe, *1002
Gates, Safety, on cars, Louisville, Ky., 549
Gears:
——Aurora, Elgin & Chicago R. R., 307
——Fitting pressure, 864
Generators, Electric:
——D. C. turbo-generators larger than 500 kw capacity [Dyer], 783
——Largest turbo-generator built, New York Edison Co., 1034
——Statistics of manufacture, 427
——Ventilating device (Baker), *125
——Ventilation of, 863
——Voltage and frequency for three-phase turbo-alternators [Crecelius], 782; Discussion, 768; Comment, 760
Generators, Electrolytic hydrogen and oxygen (International), *249
Georgia Light, Power & Railways, Incorporation, 1078, 1177, 1218
Georgia Railway & Electric Co. (See Atlanta, Ga.)
Georgia Railway & Power Co. (See Atlanta, Ga.)
German Street and Interurban Railway Association, Meetings, 646, 997
Germany:
——Accident statistics, 1905-1909, *391; Comment, 378
——Independent motor cars in, 1166
——Railway statistics for 1909, 868
——Sanded derailing track at Dresden-Alstadt [Köpcke], *397
——(See also Berlin, Germany)
Glasgow:
——Common good and the tramways, 689
——Electric railway exhibit, 534
——Strike, 378
Glens Falls, N. Y., Hudson Valley Ry., Freight and express traffic, 283
Gloversville, N. Y., Fonda, Johnstown & Gloversville R. R., Annual report, 1124
Going value of public utilities [Fowle], 1115
Governor synchronizing system [Turner], 39
Governors' conference:
——Discussion of employers' liability and workingmen's compensation, 465; Comment, 452
——Wisconsin commission law, Policies underlying, and results accomplished [McGovern], 497; Comment, 483
Grade crossings. (See Crossings)
Grand Rapids (Mich.), Grand Haven & Muskegon Ry., Sale, 1177
Grass Valley, Cal., Nevada County Traction Co., 407
Great Britain:
——Car meter experiments [Cunliffe], 658; Comment, 642
——Cars, Double-deck, in England, 415
——"Common Good," and the Glasgow tramways, 689
——Croydon Tramways, Energy saving, due to car meters, 362
——Finances and policy of English municipal tramways [Rodgers], 661
——Financial data, 199
——Manchester, Concessions to employees, 504
——Prepayment cars in, 664
——Single-deck vs. double-deck cars [Hooghwinkel], 199
——Strike in Glasgow, Scotland, 378
——Track practices, 738
——Trackless trolleys, *155
——Transfers in [Shepherd], 199
Great Britain, Tramways & Light Railways' Association, Convention, 199; Comment, 181
Great Falls (Mont.) Street Ry., Semi-convertible cars, *323
Green Bay (Wis.) Traction Co., Decision on old trackage agreement, 1094

H

H
Hagerstown (Md.) Ry., New interests, 1257
Halifax (N. S.) Electric Tramway Co., Annual report, 206
Harrisburg, Pa., Central Pennsylvania Traction Co., Annual report, 255
Hattiesburg (Miss.) Traction Co., Sale, 511
Haverhill, Mass., New Hampshire Traction Co.:
——Issue of securities, 441
——Sale of Portsmouth & Exeter Street Ry., 511, 1042, 1257
Haverhill (Mass.) & Amesbury Street Ry. (See Merrimac, Mass.)
Headlights:
——Inclosed arc lamps [Baldwin], *531
——Interurban service [Schlessinger], *349; Discussion, 358
——Standard plug recepticle and holder, C. E. R. A., *33
——(T. S. Co.), *166
Headlining:
——(Dietzgen), 249
——Galco, 128
Heater, Car, Forced-ventilation hot-air (Cooper), *1070
Heating of cars:
——Chicago Rys., Arch roof car, 651
——Comparative costs of three systems, 854; Discussion, 866.
——German report, 997
——New York City, Hearing, 1239
——Report of Engineering Association, 853; Discussion, 866
——Thermostatic control of electric heaters (Consolidated), *669
——[Thorn], 115; Discussion, 116.
——Tilting heat deflector (Consolidated), *669
Heavy electric traction:
——Cost of operation, need of publicity, 75
——Denmark, 49
——Dessau-Bitterfeld Ry., *978, *1097, *1145; Comment, 974
——Discussion at Chicago meeting of A. I. E. E., 49; at Turin meeting, 1147
——Hoosac tunnel, *6, *454; Comment, 1
——Hoosac tunnel locomotive, *881
——Midi Ry., Locomotive, *647
——N. Y., N. H. & H. R. R., Experience [Murray], Discussion, 50
——Norway, Report on possible electrification, 659
——Prussian State Railways, Reasons for choice of 16 2-3 cycles, 1025
——Report of American Electric Railway Engineering Association, *746; Discussion, 734; Comment, 717
——Rhoetian Ry., Switzerland, 31
——Single-phase locomotive for Loetschberg Ry., *190
——Single-phase versus three-phase [Calzolari], 1147; Comment, 1136
——Smoke abatement and electrification in Chicago, 1164
——Southern Pacific, Oakland lines, *900, *940
——Spiez-Frutigen Ry. motor cars, *644
——Statistics of cost of electric operation of steam railways [Bierck], 830
——Switzerland, 266
——West Jersey & Seashore R. R. [Wood], 19; Discussion, 50; Comment, 75
High-tension direct-current railways:
——Comparison of cost and performance, with alternating lines, Milwaukee System [Rau and Mullett], *1138; Comment, 1135
——[Gyáros], 1152
——Hungarian 1650-volt line, 392
High voltage and the fire hazard, 379
Hoosac tunnel. (See North Adams, Mass., Boston & Maine R. R.)
Horse, Car, in shops of Denver City Tramway Co., *422
Houston (Tex.) Electric Co., Semi-steel cars, *882
Hudson, N. Y., Albany Southern R. R.:
——Freight and express traffic, 283
——Promoting commutation traffic, *54
——Street sprinkler for destroying weeds, 435
——Timetable for summer, 123
Hudson & Manhattan R. R. (See New York City)
Hudson River tunnels. (See New York City, Hudson & Manhattan R. R.)
Hudson Valley Ry. (See Glens Falls, N. Y.)
Hungary, 1650-volt d. c. railway, 392
Huntington, W. Va., Ohio Valley Electric Ry., Control stock, 367
Hutchinson, Kan., Prepayment car, *505

I

Idaho Cedarman's Association, Convention, 1062
Identification of railway property, Central Electric Railway Association standard sign, *33
Illinois Electric Railways Association:
——Advertising [Buffe], 495
——Chicago meeting, 493
——Traffic promotion [Breckinridge], 494
Illinois Railroad & Warehouse Commission, Additional powers for, 136
Illinois Traction System. (See Peoria, Ill.)
Illinois Valley Gas & Electric Co. (See Streator, Ill.)
Indiana Railroad Commission news, 65
Indiana Union Traction Co. (See Anderson, Ind.)
Indianapolis, Ind.:
——American Traction & Power Co., 928
——Indianapolis & Cincinnati Traction Co., Simmen signals, 1034
——Indianapolis, Columbus & Southern Traction Co. (See Columbus, Ind.)
——Indianapolis, Crawfordsville & Western Traction Co. (See Crawfordsville, Ind.)
——Indianapolis & Louisville Traction Co. (See Louisville, Ky.)
——Terre Haute, Indianapolis & Eastern Traction Co., Switching locomotive, *463
Insignia for railway property, C. E. R. A. standard, *33
Inspection of rolling stock, Reduction of car failures [Barnes], *34
Instruction methods. (See Employees)
Insulators:
——Hoosac tunnel, 8, *10
——Suspension [Austin], Comment, 4
Insurance. (See Fire insurance)

Interborough Rapid Transit Co. (See New York City)
International Electrical Congress at Turin, 542, 1136, 1147
——Acceleration of train speed [Mailloux], 1152
——High-tension direct-current traction [Gyáros], 1152
——Single-phase and three-phase traction on lines of heavy traffic [Calzolari], 1147; Comment, 1136
——Single-phase traction motors [Kummer], 1151
——Working conductors for electric railroads [l'Hoest], 1151
International Street & Interurban Railway Association, Convention in Christiania, Norway, 1249
International Municipal Congress, Convention, 541
International Street & Interurban Railway Association, Convention, 1291
International Traction Co. (See Buffalo, N. Y.)
International Transit Co. (See Sault Ste. Marie, Mich.)
Interstate Commerce Commission:
——Annual report, 202, 1271
——Decision on commutation fares, 257
Interurban railways:
——Current consumption, Detroit United Ry., *1094; Illinois Traction System, *522
——Development [Henry], 739
——Freight haulage by electric locomotives, [Wynne], 1103

J

Jack, Ball-bearing (Duff), *435
Jackson, Mich., Michigan United Ry.:
——Bond issue, 1257
——Cars, Express-freight, *126
Japan, Electric railways in Tokio, 664
Jerseyville, Ill., Alton, Jacksonville & Peoria Ry., Receivership, 547
Johannesburg (Africa) gas engine failure, 1088
Joint rates. (See Through routes and joint rates)
Joint use of tracks, Award of Arbitrators in Richmond, Va., 158
Joints, Tests of nickel-steel riveted, 922
Joliet extension of Chicago, Ottawa & Peoria Ry. (See La Salle, Ill.)
Joliet (Ill.) & Southern Traction Co., Deposit of bonds, 330; Foreclosure, 1009, 1218
Journal boxes, Dust guards in, 1017

K

Kankakee, Ill., Cars with non-parallel axle truck, *127
Kansas City, Mo.:
——Kansas City Railway & Light Co. Annual report, 1255
Redemption of bonds, 1294
Substation, *957
——Kansas City Viaduct & Terminal Co., Receivership, 1253, 1294
——Metropolitan Street Ry.:
Composite wood and steel cars, *665
Earnings, 678
Front door fare collection, 737
Odd and even stops, 730
Operation under receivers, 437
Paving, 471
Ramp for car platforms, *1004
Receivership, 63, 926, 1009
Kansas workmen's compensation act, 958
Keokuk, Ia.:
——Dam across Mississippi River, Progress, 1246
——Keokuk (Ia.) Electric Co., 1294
Key Route. (See Oakland, Cal.)
Knoxville (Tenn.) Railway & Light Co., Change of stock, 1327
Kokomo (Ind.), Marion & Western Traction Co.:
——Depreciation account, 156
——Sale of bonds, 330

L

Labor organizations, Policy of the Philadelphia Rapid Transit Co. toward, 393; Comment, 378
Laboratory, Detroit testing [Rogers], *345
Lake Erie, Bowling Green & Napoleon Ry. (See Bowling Green, Ohio)
Lake Shore Electric Ry. (See Cleveland, Ohio)
Lake Superior Corporation. (See Sault Ste. Marie, Mich.)
Lamps, Electric, Statistics of manufacture, 427
——(See also Arc lamps)
Land values, Effect of railway operation on, Washington, D. C. [Harries], 777; Los Angeles [Winsor], 879
La Salle, Ill., Chicago, Ottawa & Peoria Ry., Joliet extension, *1306
Leather, Artificial, for car seats (Fabrikoid), 664
Leetonia, Ohio, Youngstown & Ohio River R. R., Dividend, 678
Legal:
——Ejectment case, Berkshire Street Ry., 1282
——Franchise sustained in Oklahoma City, 780
——Omaha bridge case, Decision, 751
——Wisconsin decision on old trackage agreement, 1094
Legal notes:
——Charters, ordinances and franchises, 290, 403, 1071, 1121
——Miscellaneous, 89, 1073
——Negligence, Liability for, 88, 290, 402, 436, 1072, 1121
Legislation affecting electric railway accounting [Davies], 26
Legislation affecting electric railways, 92, 169
——California, 917
——Massachusetts, 228
——Report of committee on federal relations, 812
Lehigh Valley Transit Co. (See Allentown, Pa.)
Lewiston, Me., Portland, Grey & Lewiston Ry., Electric locomotive, *924
Lexington, Ky., Kentucky Traction & Terminal Co.:
——Accident prevention campaign, 1043
——Combination baggage and refrigerator car, *56
Libraries of engineering books for railway companies, Desirability of, 938
Libraries, Technical, in New York City, 539
Life of railway physical property:
——Accounting standpoint [Ingle], 1205; Discussion, 1210
——Engineering standpoint [Bagg], 1205; Discussion, 1210.
——(See also Accounting; Appraisal)
Lighting of cars:
——Chicago Rys., Arch roof car, 651
——Comparison of different lamps, 865
——Tantalum lamps on Chicago Rys., year's test, 501
Lightning arresters:
——Discussion, Central Electric Railway Association, 359
——Grounding, 861
——Inspecting, 861
——Location on cars, 864
Lightning protection [Burdick], 1101
Lignite, Briquetting of, 289
Linemen. (See Employees)
Little Rock (Ark.) Railway & Electric Co., Transportation of mail carriers abandoned, 1279; Dividend, 1327
Locomotives, Electric:
——Dessau-Bitterfeld Ry., *1020
——Freight haulage on interurban lines [Wynne], 1103
——(G. E.) 35-ton, Woodward (Ala.) Iron Works, *86
——Hoosac tunnel, 11, *881
——Loetschberg Ry., Single-phase, *190
——Midi Ry., France, Single-phase, *647
——Paris-Lyons-Mediterranean Ry., Use of permutators, *385; Comment, 381
——Portland, Grey & Lewiston Ry., *924
——Single-phase, Data on, 957
——Switching, Terre Haute, Indianapolis & Eastern Traction Co., *463
Loetschberg Ry. (See Switzerland)
London letters, 57, 250, 404, 884, 1005, 1173
London Underground Electric Rys.:
——Advertising for traffic, *387
——Coal testing, Berthier method, 390
——Redemption of bonds, 330
London (Ont.) Street Ry.:
——Annual report, 62
——Stock issue, 1009
Long Island R. R.:
——Collision, 443
——Grade crossing order, 1122
——Hearing on fares, 114
Lookout Mountain Park, Denver Col., Funicular electric railway, 923
Los Angeles, Cal.:
——Franchise ordinance, 327, [Shoup], 437; 506
——Los Angeles Ry., Carhouse, *771
——McNamara case—responsibility of organized labor, 1185
——Pacific Electric Ry.:
Bond issue, 1125
Club rooms for employees, 931
Incorporation, 476
Terminal station design, 938
Uniforms, 174
——Transit conditions, Report by B. J. Arnold, *907, *1063; Comment, 1049
Lost articles in street cars, and the burden upon the company, 483
Louisville, Ky.:
——Crosstown railway ordinance, 1252
——Indianapolis & Louisville Traction Co.:
Line circuit breakers, Dispatcher's control of, *81
Receivership, 63, 1177
——Louisville Ry.:
Bond sale, 256
Pay-as-you-enter cars, 966
Safety gates reduce accidents, 549
Three-coupon transfer, *400
——Louisville & Interurban R. R., 206
——Louisville & Northern Railway & Lighting Co. (See New Albany, Ind.)
Lubrication, Raising the standard of, 519
Lubrication experts. (See Galena-Signal Oil Co.)

M

McCarter, Thomas N., *800
McKeesport, Pa., Pittsburgh, McKeesport & Westmoreland Ry., Receivership, 1125
McKinley System. (See Peoria, Ill., Illinois Traction System)
Macon (Ga.) Railway & Light Co.:
——Purchase, 1078
——Sale of securities, 1078, 1177
Mail, Compensation for carrying:
——Report of American Electric Railway Association, 840
——Washington conference, 360
Mail carriers, Transportation of, abandoned at Little Rock, Ark., 1279
Maintenance, Definition of, 779
Maintenance of buildings and structures, Report of Engineering Association, *820; Discussion, 803; Comment, 844
Maintenance costs of motor car equipments, Brooklyn, 159
Maintenance of rolling stock. (See Car maintenance)
Maintenance of way [Alderman], 42; Discussion, 53
——(See also Track construction; Way department)
Manchester, Eng., Concessions to employees, 504
Manila (P. I.) Electric Railroad & Light Co.:
——Baseball team, *837
——Dividend, 1294
Manufacturer and the railway man, 452
Maps:
——Aurora, Elgin & Chicago R. R., 220
——Berlin rapid transit lines, 229
——Boston Elevated Ry., 1314
——Buenos Aires railways, 239
——Chicago, Ottawa & Peoria Ry., 1306
——Cleveland, Package Agency, 1320
——Dessau-Bitterfeld Ry., 978
——Los Angeles, Cal., 908, 1064
——Public Service Ry., 559, 590, 591
——St. Louis to Cleveland, Trip of Illinois Traction office car, 395
——Southern Pacific Co., 900
——Spiez-Frutigen Ry., 644
——West Jersey & Seashore R. R., 19
——Wisconsin Electric Ry., and Eastern Wisconsin Railway & Light Co., 1233
Massachusetts:
——Hydroelectric development, 1249
——Legislation, 92
Massachusetts Electric Companies. (See Boston)
Massachusetts Northern Railways organized, 1177
Massachusetts Railroad Commission:
——Express plans of Boston Elevated Ry., Hearing on, 1163
——Fare hearing, Middlesex & Boston Street Ry., 120
——Fare hearing, Taunton & Pawtucket Street Ry., 152
——Fender and wheelguard tests, 549, 919
——Fenders, Hearing on, 1168
——List of street railways with bonds eligible for savings bank investments, 1326
Maynard, Mass., Concord, Maynard & Hudson Street Ry., Stock issue and consolidation, 134
Merit systems. (See Employees)
Merrimac, Mass., Haverhill & Amesbury Street Ry., Stock and bond issue, 511
Meters, Car:
——Cape Town, 880
——Energy saving due to, Croydon Tramways, 362
——Experiments in England [Cunliffe], 658; Comment, 642
Meters, Coal, *781
Meters, Steam flow, *781
Metropolitan Street Ry. (See Kansas City; New York City)
Mexico City, Mex., Strike, 132
Michigan City, Ind., Chicago, Lake Shore & South Bend Ry., Improvements, 123
Michigan United Rys. (See Jackson, Mich.)
Middlesex & Boston Ry. (See Newtonville, Mass.)
Midi Ry. (See France)
Milwaukee, Wis.:
——Milwaukee Electric Railway & Light Co.:
Bond issue, 1042, 1125
Cars, Pay-within, 297, 477
Fare case, Interest of employees in, 362
Fuse-testing clips, 527
Gasoline line car, *770
Near-side stops, 431
Oil tank car, *538
Printing shop, 1023
Reorganization plan, 1037
Shelter stations, *540
Sprinkling cars, *289
——Milwaukee Light, Heat & Traction Co., Comparative data for alternating and direct-current lines [Rau and Mullett], *1138; Comment, 1135
——Valuation of railway property by Railroad Commission, 160; Comment, 143
Minneapolis, Minn.:
——Minneapolis Street Ry., Car capacity cases, 410
——Twin City Rapid Transit Co., Stops and transfers, 1219

Mississippi Valley Interurban Ry. (See Springfield, Ill.)
Mitten, T. E., Resignation from Chicago City Ry., 1232
Mobile (Ala.) Light & R. R. Co., Storeroom accounting methods [Glover], *423
Montgomery County Rapid Transit Co. (See Norristown, Pa.)
Montgomery Traction Co. (See Easton, Pa.)
Montreal (Que.) Street Ry.:
——Annual report, 1009, 1040
——Merger, 964, 1078
——Purchase, 547
——Transfer of property, 928
Motormen. (See Employees)
Motors, Electric:
——Capacity of, for trailer operation, 939
——Chicago Rys., Arch roof car, 653
——Déri motor on Martigny single-phase railway, *235
——Effect of unequal wheel diameter, 863
——Interpole, Discussion by German engineers, 997
——Interpole, for light service (Westinghouse), *667
——Maintenance costs of Brooklyn Rapid Transit Co., 159
——Problem of old motors, 521
——Public Service Ry., 604
——Reduction of weight, 857
——Shop motors, direct-connected, at Salt Lake City, 958; Comment, 898
——Single-phase traction [Kummer], 1151
——Spiez-Frutigen Ry., *646
——Statistics of manufacture, 427
——(Westinghouse) interpole direct-current, type SK, *245
Multiple-unit control:
——Public Service Ry., *607, *660
——Train operation for city and suburban travel [Franklin], 839; Discussion, 809
——Trains in city service, 975
——Trains, Multiple-unit vs. trailer operation [Renshaw], 350; Discussion, 359
——(See also Train operation)
Municipal ownership:
——Detroit, 204
——Financial results in Great Britain [Rodgers], 661
——San Francisco project, 293, 365, 1007
——Toledo Mayor on, 203
——Winnipeg, 205, 254
Muskogee, Okla., Storage-battery cars (Federal), *324

N

Napa, Cal.:
——San Francisco, Napa & Calistoga Ry., Incorporation, 1125
——San Francisco, Vallejo & Napa Valley Ry., Suit for receiver, 408; Sale, 476, 1042
Nashville (Tenn.) Railway & Light Co., Annual report, 294
National Association of Railway Commissioners, Convention, 920; Reports, 1026; Comment, 1018
National Civic Federation:
——Conference on uniform public utility legislation, 60
——Report on regulation of interstate and municipal utilities, 320
National Electric Light Association:
——Joint use of poles, standard form of agreement, Comment, 144
——Membership plan [Duffy], *58
National Light & Power Co. (See St. Louis, Mo.)
National Municipal League, Plan for model franchise, 1281
Near-side stops. (See Stopping of cars)
Nebraska, Depreciation rules in, 973, 990
Nevada County Traction Co. (See Grass Valley, Cal.)
New Albany, Ind., Louisville & Northern Railway & Lighting Co.:
——Accident campaign, 550
——Track service, 966, 1011
New England Investment & Security Co. (See Springfield, Mass.)
New England Power Co., Developments in the Shelburne Falls district, 124
New England Street Railway Club:
——August outing, 431
——November meeting, 1191
New Hampshire Traction Co. (See Haverhill, Mass.)
New Haven, Connecticut Co.:
——Car steps, Lower, 966, 1011
——Carhouse at Bridgeport, Conn., *146
——Catenary experiences with six different types of construction, *1052; Comment, 1051
——Fare hearing, 1033, 1080
——Gas leases, 1256
New Jersey Public Utility Commission:
——Hearing on transportation rates, 443
——Hearings on fares and transfers, 174, 207, 209, 1147, 1324
——Hearings on uniform system of accounts for all utilities, 1206, 1250
——Rates for gas and electricity, Address on [McCarter], 535
New Orleans:
——American Cities Co., Organization, 94, 255
New Orleans: (Continued)
——American Cities Railway & Light Co.:
Dividend, 63
Sale, to American Cities Co., 94
——New Orleans Railway & Light Co., Merger with American Cities Railway & Light Co., 62
New South Wales Government Railways and Tramways:
——Annual report, 1177
——Car, Standard, *13
——Improvements in Sydney, *1146
New York Central & Hudson River R. R.:
——Acquiring of stock of New York & Harlem R. R., 1294
——New York waterfront tracks underground, 545
New York City:
——Accident prevention campaign, 967
——Accidents in May, 257
——American Light & Traction Co., Earnings, 134
——Brakes, Power, Hearings, 131, 196, 503 [Connette], c919; 960, 1007, 1096
——Car steps, Height of, Hearing on, 196, 503
——Central Park, North and East River R. R., Foreclosure and sale, 1293
——City Island R. R., Receivership, 1256
——Electric Properties Co., Annual report, 63
——Federal Light & Traction Co., Acquisitions, 964
——Forty-second Street, Manhattanville & St. Nicholas Avenue R. R., Sale, 295, 1294
——Freight terminal plans, 1216
——Heating and ventilating cars, Hearing on, 1239
——Hudson & Manhattan R. R.:
Fare increase, 1094, 1113, 1134, 1265, 1298
Forced draft system in power station, 1283
Newark extension, Steel cars, *274; Notes, 1093
Traffic promotion work, *1090
Tunnel traffic statistics, 1090
Tunnels [Davies], 789
——Interborough-Metropolitan Co., Exchange of stock, 63
——Interborough Rapid Transit Co.:
Annual report, 473; Comment, 451
Bond issue, 511, 547, 1293
Comparison of operations with Brooklyn system, 643
Couplers, Automatic car and air, for long trains, *1003
Depreciation accounts, 280
Dividend increase, 441
Elevated
Eight car trains, Hearings on, 914, 999
Hearing on improvements, 542
Sprinkler system in open yard, 277
Employees receive Christmas money, 1296
Interborough Bulletin, 513
Policy of betterments, 472
Proposal to build two subways, 58, 145, 167, 218
Subway:
Passenger traffic, 1010
Side doors on local trains, Hearing on, 320
Ventilating fans in cars, 257
——Libraries, Technical, 539
——Manhattan Bridge Three-Cent Line, Bond issue, 256
——Metropolitan Street Ry.:
Brief of Guaranty Trust Co. filed, 206
Car equipment instruction book, 166
Findings of special master, 441
Payment of claims, 1257
Receivership matters, 256, 1324
Reorganization, Cost of reproduction, and present value of physical property, 240, 1078, 1165
Sale, 511
——Pennsylvania R. R., New York tunnel extension, electrical features [Gibbs], Discussion, 648
——Public Service Commission:
Brakes, Hearings on, 131, 196, 503, 960, 1007, 1066
Brooklyn transfers, Hearings on, 208
Budget exhibit, 1047
Car steps, Height of, Hearings on, 131, 196
Coney Island fares, Hearings on, 174, 198; Comment, 181
Eight car elevated trains, Hearings on, 542, 914, 999
Heating and ventilating cars, Hearing on, 1239
Joint rates and through routes, 96, 103, 121, 279, 310; Comment, 266
Long Island R. R., Hearing on fares of, 114
Review of work of four years, 1288
Side doors for local subway trains, Hearing on, 320
Transfers, Hearings on, 96, 103, 121, 266, 279, 310, 399, 468, 500, 957, 999, 1096, 1168, 1242
——Rapid transit conditions, 90, 129, 203, 365, 438
——Republic Railway & Light Co., 62, 94, 172, 678
——Rowdyism and the "strong-arm brigades," 340
New York City: (Continued)
——Second Avenue R. R.:
Instruction methods, *237; Comment, 216
Receivers' certificates, 678
——Steinway tunnel, 507, 546, 962, 1289
——Subways, New:
Proposal of Brooklyn Rapid Transit Co., 58, 75, 167, 218
Proposal of Interborough Rapid Transit Co., 58, 145, 167, 218
Rea, of Pennsylvania R. R., counsels caution, 292
Supreme Court refuses to restrain work, 326
Terms of the proposals to build, 218
Work begun, 253, 1251
——Susquehanna Railway, Light & Power Co., Dividend, 1327
——Third Avenue R. R.:
Brake tests, Hand and air brakes, 543; [Stowe], c1118
Coasting clock savings, 1322
Gasoline-electric car, Operating and transportation statistics, 490; Comment, 484
Reorganization, 73, 548, 1112, 1165; 1324; Comment, 1087
Storage battery cars, *128
Third Avenue Bridge Co., 1257
——Transfers, Hearings on, 96, 103, 121, 266, 279, 310, 399, 468, 500, 957, 999, 1096, 1168, 1216
——Twenty-eighth & Twenty-ninth Streets Crosstown Ry., Reorganization, 135, 548, 1178, 1257, 1292
——Union Ry., Transfer, Multiple coupon, *127
New York Edison Co., 20,000-kw turbo-generator, 1034
New York & Long Island Traction Co., Fare reduction, 1011
New York, New Haven & Hartford R. R.:
——Annual report, 887
——Electrification at Boston, Protest, 59
——Statement by C. S. Mellen, 506
New York & North Shore Traction Co. (See Roslyn, N. Y.)
New York Railroad Club, Tool steel [Sullivan], 1062
New York State, Legislation, 92, 169
New York State Public Service Commission:
——Hearing on proposal of Buffalo corporation, 431
——Hearing on reorganization of International Traction Co., of Buffalo, 910; Arnold report, 911
——Order to stencil and number poles, 1144, 1249
——Report on transit conditions in Syracuse, 428
New York State Rys. (See Rochester, N. Y.)
New York State Street Railway Association:
——Accident prevention [McDougall], 1204; Discussion, 1209
——Air brake developments [Turner], *35
——Annual convention, Entertainments and banquet, 48; Proceedings, 51
——Committee on joint use of poles, report, *46, 1208; Discussion, 52; Comment, 144
——Committee on passenger traffic, Report, 1240; Discussion, 1211
——December meeting, 1207; Papers, 1201; Comment, 1186; Banquet, 1211
——Edison-Beach storage battery car [Beach], 43
Gasoline-electric cars [Potter], 41
——Life of railway physical property [Ingle], 1205; [Bagg], 1205; Discussion, 1207
——Maintenance of way matters [Alderman], 42
——Pay-as-you-enter cars:
Advantages [Casey], 1201; Discussion, 1207
Operation, in Syracuse [Duffy], 1202; Discussion, 1207
——President's address [Pardee], 40
——Reduction of car failures [Barnes], *34
——Report of committee on center-bearing rail law, 52
——Report of committee on interurban rules, 51, 53
——Single-end vs. double end car operation [Hicks], 45
——Tariffs [Colt], 33
New York, Westchester & Boston Ry.:
——Bond issue, 256
——Cars, steel, *670
——Progress, 204
——Telephone train-dispatching system, 668
New Zealand street railways, 868
Newark, N. J.:
——Life of railway physical property [Quigle],
——Public Service Corporation:
Gas and electric rates [McCarter], 535
Notes, Payment of, 441
Office building, *572
Organization and development, 566
——Public Service Electric Co., Power generation and distribution, *589
——Public Service Ry.:
Accident claim department, 636
Accounting department, *627
Capitalization, 570
Carhouses, *587
Cars, *603
Family tree, showing lines that were merged, 568

Newark, N. J.:
Public Service Ry.: (Continued)
Fares and transfers, Hearing on, 174, 1296
Ferries, *556, 557, 586
General description, *555
Map of system, 559
Mileage in large cities, 557
Multiple-unit train, Wiring of, *660
Officers, 571
Overhead construction, *594
Parks, *560
Passengers carried, 1904-1910, 556
Publicity department, 571
Purchasing and storeroom departments, *623
Revenues and expenses, 569
Rolling stock maintenance, *608
Schedules, 561
Signals, *602
Social activities of employees, *153; Comment, 144
Terminals, *586
Track construction, *583
Traffic conditions, 557
Transfers, Order of Commission, 174, 368
Transportation department, 614
Wage increase, 1296
Wagon elevators, *556, 583
Way department, *576
——Rapid Transit Line. (See New York City, Hudson & Manhattan R. R.)
Newburgh, N. Y., Orange County Traction Co., Bond issue, 135
Newspaper service, Aurora, Elgin & Chicago R. R., 227
Newton, Mass., Fender tests, 919
Newtonville, Mass., Middlesex & Boston Street Ry.:
——Bond issue, 511, 1327
——Fare hearing, 120
Noise reduction on Chicago elevated loop by novel track construction, 469
Norristown, Pa., Montgomery County Rapid Transit Co., Sale, 547, 1218
North Adams, Mass., Boston & Maine R. R., Hoosac tunnel electrification:
——General description, *6; Comment, 1
——Locomotives, 11, *881
——Power station and transmission line, *454
Northern Ohio Traction & Light Co. (See Akron, Ohio)
Northern Texas Traction Co. (See Fort Worth, Tex.)
Norway, Electrification studies, 659
Norwich (Conn.) & Westerly Ry., Sale, 63, 295
No-seat. (See Fares)

O

Oakland, Cal.:
——Key Route basin improvements, 439
——Oakland Rys., Note issue, 888
——San Francisco, Oakland & San José Consolidated Ry.:
Power plant extension on San Francisco Bay, *846
Prepayment cars, *162
——Southern Pacific Co., Overhead construction, *900, *940; Comment, 898, 1019
Ocean Shore R. R. (See San Francisco)
Ohio Electric Ry. (See Cincinnati, Ohio)
Ohio Public Service Commission, Jurisdiction of, 471
Ohio tax values, 253, 545
Ohio Valley Electric Ry. (See Huntington, W. Va.)
Ohmmeter (Queen), *325
Oil engines:
——Comparison with steam turbine [Dreyfus], 657
——Crude-oil engines, Diesel type (Atlas), *469
Oil tank car, Milwaukee, *538
Oklahoma City, Okla.:
——Oklahoma Ry., Terminal Arcade [Martin], *486
——Oklahoma (Okla.) City Traction Co., Single-truck arch-roof cars, *924
Oklahoma Gas, Electric and Railway Association, 914
Old Colony Street Ry. (See Boston, Bay State Street Ry.; Boston & Northern)
Olean, N. Y., Western New York & Pennsylvania Traction Co., Field testing device, 124
Omaha (Neb.) & Council Bluffs Ry.:
——Bond issue, 94
——Fare decision, 751
——Increase in wages, 1258, 1298
Oneida (N. Y.) Ry., Freight and express traffic, 282
Oneonta, N. Y., Otsego & Herkimer R. R., Freight and express traffic, 282
Orange County Traction Co. (See Newburgh, N. Y.)
Order holder, Illuminated, Aurora, Elgin & Chicago R. R., 309, *310
Orders. (See Train orders)
Organization diagrams:
——Claim department, Public Service Ry., 636
——Line department, Public Service Ry., 594
——Mechanical department, Public Service Ry., 608
——Transportation department, Public Service Ry., 614
Organization diagrams: (Continued)
——Way department, Public Service Ry., 576
Organization of electric division, West Jersey & Seashore R. R., 21
Oshkosh, Wis., Wisconsin Electric Ry., Fare increase, 1233; Comment, 1226
Oskaloosa (Ia.) Traction & Light Co., 1009
Otsego & Herkimer R. R. (See Oneonta, N. Y.)
Overhead construction:
——Anchoring trolley wire, 860
——Brackets, Coating of, 1266
——Chicago, Ottawa & Peoria Ry., *1308
——Connecticut Co., D. C. catenary experiences, *1052; Comment, 1051
——Crossing of 11,000-volt and 600-volt wires, North Adams, Mass., *11
——Dessau-Bitterfeld Ry., *978, *1145
——Discussion at International Electrical Congress at Turin, 1151
——[Heyden], Discussion, 30
——Hoosac tunnel electrification, *6, *454
——Painting cross-arms, 859
——Public Service Ry., *594
——Pulling off curves, 859
——Southern Pacific Co., *900, *940; Comment, 898
——Standard specifications, 704; Comment, 759
——Standardization [Schlessinger], 347; Discussion, 359
——Voltage drop limits and measurements, 860
——(See also Catenary construction: Trolley)
Owl service:
——Boston, 1043
——Chattanooga, Tenn., 1258
——Duluth-Superior Traction Co., 549
——Philadelphia, 137, 409
——Portland, Ore., 1081
——San Francisco, 1080
——Waterloo, Ia., 1258

P

Pacific Electric Ry. (See Los Angeles, Cal.)
Package Agency, Electric, at Cleveland, 1320
Painting of buildings and structures, Report of Engineering Association, *825
Painting of cars:
——Chicago Rys., 652
——[Copp], 1191
Panama-Pacific International Exposition, 1114
Paris-Lyons-Mediterranean Ry., Electric locomotive with permutators, *385; Comment, 381
Parks of Public Service Ry., *560
Parlor car service:
——Aurora, Elgin & Chicago R. R., 227
——Illinois Traction System, *522; Comment, 521
Passenger record made by tabulating device, Brooklyn Rapid Transit Co., *1269
Patchogue, L. I., Suffolk Traction Co., Storage-battery cars, *245
Paving:
——Alongside of track, 862
——Creosoted wood, in Chicago, 161
——Public Service Ry., *584
Pay-roll forms, Public Service Ry., 633
Peak loads on electric railways in industrial communities, 1227
Pen Argyl, Pa., Slate Belt Electric Street Ry., 1042
Pennsylvania-Jersey Traction Co. (See Easton, Pa.)
Pennsylvania R. R., Newark extension. (See New York City, Hudson & Manhattan R. R.)
Pennsylvania Street Railway Association, Convention, *1238
Peoria, Ill., Illinois Traction System:
——Accounting methods, 184
——Advertising matter [Buffe], 495
——Annual report for 1910, Comment on, 485
——Block signals, Operating results, 398, 1287
——Cars, *76, 706
——Couplers, M. C. B., *116
——Inspection tour by railway men, 1000
——Merit system, 430
——Parlor-car service, *522; Comment, 521
——Passenger station at St. Louis, *656
——Signs:
Along right-of-way, 500
Terminal electric, at St. Louis, 478
——Sleeping-car service, *522
——Trip of office car from St. Louis to Cleveland, 321, 358, *395
——Venice power station, *106
Permutator locomotive. (See Locomotives, Electric)
Philadelphia:
——American Railways Co.:
Annual report, 677
Bond issue, 172, 367, 1177, 1326
——Rapid Transit Co.:
Accident prevention campaign, 273
Accident statistics, 442
Annual meeting, 510
Annual report, 170
Car steps lower, 966
Cars:
Near-side, 164, *915, 1213, 1232 1275; Comment, 899
Steel, for elevated lines, *960
Co-operative wage plan and arbitration scheme, Proposed, 393, 1329; Comment, 378
Earnings for July, November and five months, 407, 1326
Philadelphia:
Rapid Transit Co.: (Continued)
Owl service on elevated lines, 137, 409
Trucks:
(Baldwin) single-motor, *666
Halsey, 201, *857
Wheel-guards, 409, 1043
Trenton, Bristol & Philadelphia Street Ry., Strike, 927
——Union Traction Co., Annual meeting, 510
Philadelphia Co. (See Pittsburgh, Pa.)
Pine Bluff, Ark., Citizens Light & Transit Co., 1218
Pinions:
——Aurora, Elgin & Chicago R. R., 307
——Cloth (G. E.), 672
——Standard taper for, 850; Discussion, 867
Piping installations, Improving drawings of, 1137
Pittsburgh, Pa.:
——Philadelphia Co., Bond matters, 256, 1078
——Pittsburgh Rys., Electric welding, 1059
——Pittsburgh, McKeesport & Westmoreland Ry. (See McKeesport, Pa.)
——Power brake ordinance, 169, 204
——Subway report, 1290
——West Penn Traction Co., Purchase, 135
Pittsfield, Mass., Berkshire Street Ry.:
——Ejectment case, 1282
——Stock issue, 547, 964
Platforms. (See Car platforms)
Point Shirley Street Ry. (See Winthrop, Mass.)
Pole-preserving machine (B. & E.), *544
Poles:
——Concrete and cedar, Comparative cost, 704; Discussion, 699
——Joint use of, Report of New York State Street Railway Association, *46, 1208; Discussion, 52; Comment, 144
——Joint use of, Standard form of agreement, 144
——Numbering and stenciling of, in New York State, 1144, 1249
——Purchases in 1910, Census report, 537
——Reinforcing of, by Indiana Union Traction Co., 468
——Tubular, Public Service Ry., *600
Portland (Me.) & Brunswick Street Ry. (See Freeport, Me.)
Portland (Me.) Grey & Lewiston Ry. (See Lewiston, Me.)
Portland (Ore.) Railway, Light & Power Co.:
——Building, for warehouse and clubhouse, 319, 331
——Fare decision, 1126
——Franchise application, 1007, 1252
——Owl service, 1081
——Power plant, 865
——Publicity campaign, 59
——Transfers used to secure co-operation of passengers, 408
——Two-car train operation [Franklin], 839; Discussion, 809
Porto Rico Rys., Dividend, 547
Pottsville, Pa., Wage increase, 65
Power, Rural sale of, Aurora, Elgin & Chicago R. R., 310
Power consumption:
——Interurban cars, Detroit United Ry., *1094; Illinois Traction System, *522
——City and interurban cars, Wisconsin Railroad Commission's investigation, 195
——Saving in, by use of coasting time recorders, Tests on Chicago Rys., *1192; Comment, 1186
——Single-phase cars with trailers, Milwaukee, 1144
Power distribution:
——Aurora, Elgin & Chicago R. R., *270
——Report of American Electric Railway Engineering Association, 704; Discussion, 698; Comment, 759
Power station practice:
——Boilers, Efficiency of large sizes, 1213; Comment, 1187
——Burning coal wet, 863
——Cleaning air for ventilation, 863
——Drawings of piping, Improving, 1137
——Fire protection methods, *640
——Forced draft system, Hudson & Manhattan R. R., 1283
——Improving old plants, 380
——Load dispatching, Public Service Ry., 593
——Load distribution, Boston Elevated Ry., 1316
——Prime movers for central stations [Dreyfus], 657
——Report of American Electric Railway Engineering Association, *781; Discussion, 768; Comment, 760, 798
Power stations:
——Aurora, Elgin & Chicago R. R., *268
Lighting business, 309
——Berne, Switzerland, 18
——Boston Elevated Ry., *1315
——Denver City Tramway Co., Extensions, 1128
——Dessau-Bitterfeld Ry., *978
——Hoosac Tunnel electrification, *454
——New South Wales Tramways, at Ultimo, 1146
——Output and cost, West Jersey & Seashore R. R. [Wood], 20
——Portland Railway, Light & Power Co., 865
——Providence, R. I., Rhode Island Co. [Bronsdon], *488, inset

Power stations: (Continued)
——Public Service Electric Co., *589
——Salt Lake City, *985
——San Francisco, Oakland & San José Consolidated Ry., Extensions, *846
——Venice, Ill., Illinois Traction System, *106
——Worcester Consolidated Street Ry., *342
Power transmission, High tension, Comment on papers of A. I. E. E., 182
Preservative treatment. (See Timber preservation)
Prime movers for central stations [Dreyfus], *657
——(See also Power stations)
Printing shop, Milwaukee Electric Railway & Light Co., 1023
Providence, R. I.:
——Investigation of surface railway conditions, Arnold report, 315
——Rhode Island Co.:
Fare collection and registration, 1321
Power plant extension [Bronsdon], *488, inset
Prussian-Hessian State Ry.:
——Laying 60,000-volt cable, *1097
——Reasons for choice of 16⅔ cycles, 1025
——(See also Dessau-Bitterfeld Ry.)
Public relations:
——American Electric Railway Association report, 812
——Functions of the engineer, 217
——Portland, Ore., 59
——Publicity for electric railways, 845
Public service commissions, Regulation of capitalization, 1027
——(See also names of states)
Public Service Company of Northern Illinois. (See Chicago)
Public Service Corporation of New Jersey. (See Newark, N. J.)
Public service corporations:
——Federal control, Report of American Electric Railway Association, 812
——Gas and electric rates [McCarter], 535
——Going value of public utilities [Fowle], 1115
——International Municipal Congress, Discussion of public utilities, 541
——Regulation by commission [Brady], 724; 1027
——Report of National Civic Federation on regulation, 320
——State control [McGovern], 497; Comment, 483
Publicity:
——Advantages [Van Zandt], 25
——[Arkwright], 729
——[Brady], 726; Comments, 717, 845
——Factor in electric railroading [Rockwell], 1105
——[McGraw], 727
Publicity departments:
——Public Service Corporation, 571
——Work of [Breckinridge], 494; [Buffe], 495
Puebla (Mex.) Tramway, Light & Power Co., Bond issue, 256
Pueblo, Col.:
——Arkansas Valley Railway, Light & Power Co., Incorporation, 1181, 1218
——Pueblo & Suburban Traction & Lighting Co., Control, 63
Puget Sound Electric Ry. (See Tacoma, Wash.)
Purchasing department, Public Service Ry., 623

Q

Quarry of Public Service Ry., *581
Quebec Railway, Light & Power Co., 929, 1327
Question box. (See American Electric Railway Engineering Association)

R

Rail benders:
——Portable (Watson-Stillman), *581
——Stationary (Long & Allstatter), *581
Rail bonding, Inspection and tests, 862
Rail bonds, Aurora, Elgin & Chicago R. R., *223
Rail corrugation, New theory of cause of [Pellissier], *528, c701; Comment, 520
Rail grinder (Kerwin-Detroit), *322, *581
Rail grinding, Cost of, 862
Rail joints, Public Service Ry., *584
Railroad Securities Commission, Report of, 1246; Comment, 1225, 1267
Railroad with spiral shaft for subways, Proposed, 492
Rails:
——Center-bearing rail law in New York State, 52
——Nickel-steel, in Rochester, 801
——Production of, in 1910, 394
——Report of Engineering Association, 828; Discussion, 805
——Romapac, in Chicago and elsewhere, *505, *1286
Railway & Light Securities Co. (See Boston)
Railway Signal Association, Convention, 848, 1001; Signaling committee, 1321
Ramp for car platforms, Kansas City, Mo., *1004
Rates, Electric railway. (See Fares: Through routes and joint rates)
Rates, Gas and electric [McCarter], 535
Reactance for track circuit, Automatic (G. R. S. Co.), *1120
Record forms. (See Blanks and forms.)
Registers, Coin, for prepayment cars (International), *671
Repair shop practice:
——Armature shaft welding, 377, *338, [Cuntz], c*504
——Car failure records, 379
——Car horse, Denver, *422
——Chuck for boring bearings, *160
——Control equipment, Overhauling, 1087
——Field coil repair economy, 286
——Fire hazards in old shops, Decreasing, 416
——Gear fit pressures, 864
——Inspection methods [Barnes], *34
——Minor conveniences in the shop, 453
——Motors, Direct-connected, at Salt Lake City, 958; Comment, 898
——Piecework system, Public Service Ry., 610
——Removing steel wheels, 865
——Removing trucks from cars, 863
——Snow-melter, South Bend., Ind., 422
——Stock distribution in carhouses, 105
——Tool steel, Treatment of [Sullivan], 1062
——Welding broken armature shafts without removal, San Francisco, *388; Comment, 377
——Welding, Electric, Pittsburgh Rys., 1059
Repair shops:
——Aurora, Elgin & Chicago R. R., *307
——Boston & Maine R. R., Hoosac tunnel, 12
——Bridgeport, Conn., *146
——Ottawa, Ill., *1312
——Public Service Ry., *608
——Rockford, Ill., *382
Republic Railway & Light Co. (See New York City)
Restaurants. (See Employees)
Return-circuit system, Public Service Ry., *596
Rheostat, Water, 2000-kw, Salt Lake City power station, 989
Rhode Island Co. (See Providence, R. I.)
Rhoetian Ry., Switzerland, Electrification, 31
Richmond, Va.:
——Richmond & Henrico Electric Ry.:
Single-motor truck (Baldwin), *666
Suits against, 330
——Virginia Railway & Power Co.:
Annual report, 1076
Award of arbitrators on joint use of track, 158
Dividend, 678
Merger with Norfolk & Portsmouth Traction Co., 64
Purchases, 408
Reduced insurance rates, 998
Sale of Seven Pines line, 1257
Rio de Janeiro Tramway, Light & Power Co., Increase of capital, 1257
Riverside Traction Co. (See Camden, N. J.)
Rochester, N. Y.:
——Buffalo, Lockport & Rochester Ry., Fare complaint dismissed, 512
——New York State Rys.:
Agreement with employees, 1329
Complaint department, New, 1272; Comment, 1266
Freight and express traffic, *281
Nickel-steel rails, 801
Single-end vs. double-end car operation [Hicks], 45
Stock issue, 1327
——Rochester Railway & Light Co., Bond issue, 1078
——Rochester, Syracuse & Eastern R. R. (See Syracuse, N. Y.)
Rockford (Ill.) & Interurban Ry.:
——Aviation meet, 363
——Fare reduction, 96
——Repair shops, *382
Rome (Ga.) Railway & Light Co., Dividend, 1327
Roof. (See Car roof)
Roof covering for repair shops, Milwaukee, 825
Roslyn, N. Y., New York & North Shore Traction Co., Issue of stocks and bonds, 1178
Rowdyism on electric cars or subway trains, 340
Rules for city railways, Transportation & Traffic Association, Report on, 788; Discussion, 764
Rules for employees of way department, Engineering Association report, Discussion, 806
Rules for interurban railways:
——American Electric Railway Transportation & Traffic Association, Report, 753; Discussion, 736; Comment, 2, 760
——New York State Street Railway Association, Report of committee, 51, 53
Rural sale of power. (See Power, Rural sale of)
Rush hour problem, Relation of employees' working hours to, 1227

S

St. Augustine, Fla., St. Johns Light & Power Co., Sale, 511, 929, 1327
St. Johns Light & Power Co. (See St. Augustine, Fla.)
St. Louis, Mo.:
——Electrification, Report of Civic Committee, 92
St. Louis, Mo.: (Continued)
——National Light & Power Co., Incorporation, 965
——St. Louis & San Francisco R. R., Gas-electric cars, *163, *287
——Terminal station, Illinois Traction System, *656
——United Rys.:
Bond issue, 295
Electric shovel for track trench excavation, *1171
Essay awards to employees, 476
Flooring, Sanitary car, *321
Transfer system, Report on, 1258
Salisbury (N. C.) & Spencer Ry., 1042; Storage battery cars, 43
Salt Lake City, Utah:
——Salt Lake & Ogden Ry., Bond issue, 678
——Utah Light & Ry. Co.:
Motors, Direct-connected shop, 958; Comment, 858
Power station, *985
Sign for yard tracks, *956
Wheel grinders, *873
San Joaquin Valley Electric Ry. (See Stockton, Cal.)
San Francisco, Cal.:
——California Midland R. R., Bond issue, 678
——Municipal railway project, 293, 365, 1007
——No-seat-no-fare ordinance, 65
——Ocean Shore R. R.:
Bond issue, 1257
Incorporation, 1009
——San Francisco, Oakland & San José Ry. (See Oakland, Cal.)
——San Francisco, Vallejo & Napa Valley Ry. (See Napa, Cal.)
——United Properties Co., Improvements, 438
——United R. R.:
Owl service, 1080
Welding broken armature shafts without removal, *388; Comment, 377
Sand dryer, Public Service Ry., 580
Sanded tracks in sidings for car retardation, Efficiency of, [Köpcke], *397
Sao Paulo (Brazil) Tramway, Light & Power Co., 678
Sault Ste. Marie, Mich., Lake Superior Corporation, 888
Sault Ste. Marie, Ont., International Transit Co., Bond sale, 441
Savannah (Ga.) Electric Co.:
——Flat-arch roof prepayment cars, *1284
——Service order, 1259, 1296
Schedules:
——Economy in construction, 2
——Investigation of, 73
——Public Service Ry., Newark, N. J., 561
——Report of Transportation & Traffic Association, 835; Discussion, 808
——Setting back cars, 416
Schenectady (N. Y.) Ry.:
——Freight and express traffic, 283
——Strike, 962
School fares in New Jersey, 95
School teachers, Reduced tickets for, is discrimination in New Jersey, 332
Scientific management. (See Efficiency engineering)
Scioto Valley Traction Co. (See Columbus, Ohio)
Scranton (Pa.) Ry., Bond sale, 1327
Scrapers. (See Track scrapers)
Seating capacity of cars, Computing, 851
Seattle, Wash.:
——Municipal railroads, Bonds to be sold for, 440
——Seattle Electric Co., Ticket ordinance, 1011, 1079
——Seattle, Renton & Southern Electric Ry.:
Officers and directors, 330
Physical value, 61; Sale to city, 132, 508, 546
Transfer decision, 408, 477
Seattle (Wash.) Electric Club, Uses of an appraisal [Gillette], 948
Securities, Equipment trust [Brockway], 82; Comment, 74
Securities, Report on. (See Railroad Securities Commisssion)
Sedalia (Mo.) Light & Traction Co.:
——Bonds, 888
——Foreclosure, 135
Set-back car problem, 416
Shaft drive for subway trains, 492
Shelter stations. (See Waiting stations)
Sherbrooke (Que.) Railway & Power Co., Bond issue, 442
Shovel, Electric, for trench excavation, St. Louis, *1171
Side bearing, Anti-friction (Stucki), *362
Signals:
——Aurora, Elgin & Chicago R. R., 225
——Automatic stops, Location of, *746; Comment, 717
——Block system:
Ft. Dodge, Des Moines & Southern R. R., 1056, 1250
Illinois Traction System, Operating results, 398, 1287
Report of joint committee of Engineering and Transportation & Traffic Associations, 742; Discussion, 735; Comment, 718
Rochester, Syracuse & Eastern R. R., 122
Tests in Indiana, 161
——Improvements in (Nachod), 1001

Signals: (Continued)
——Indianapolis & Cincinnati Traction Co., Simmen signals, 1034
——Precautions in operation of system, 215
——Public Service Ry., *602
——Selectively operated semaphore and telephone system (Western Electric), *85
——Track trips for signaling on interurban roads [Arkenburgh], 541
Signs, Advertising on right-of-way, Illinois Traction System, 500
Signs, Car:
——Aurora, Elgin & Chicago R. R., *309
——Philadelphia near-side car, *916
Sign, Terminal electric, St. Louis passenger station, 478
Signs, Track:
——Chicago, Ottawa & Peoria Ry., *1309
——Illuminated, Salt Lake City, *956
Single-phase apparatus, New parents on, 1120
Single-phase railways:
——Dessau-Bitterfeld Ry., Power and transmission methods, *978, *1097, *1145; Comment, 974
——Hoosac tunnel, *6; Power station and transmission line, *454; Comment, 1; Locomotive, *881
——Locomotive data, 957
——Loetschberg Ry., Switzerland, Locomotive, *190
——Midi Ry., Locomotives, *647
——Martigny, Switzerland, Déri motor, *235
——Single-phase versus direct-current interurban lines of the Milwaukee system, Comparative data [Rau and Mullett], *1138; Comment, 1135
——Single-phase versus three-phase for heavy electric traction [Calzolari], 1147; Comment, 1136
——Spiez-Frutigen Ry., *644
——Switzerland, 266
Slate Belt Electric Street Ry. (See Pen Argyl, Pa.)
Sleeping-car service, Illinois Traction System, *522
Sleet shoes for third-rail, Aurora, Elgin & Chicago R. R., 308
Smoke abatement in Chicago, Investigation, 1164
Snow melter, Home-made, South Bend, Ind., 422
Soap for car washing (Davies), 669
South Bend, Ind., Chicago, South Bend & Northern Indiana Ry., Home-made snow melter, 422.
Southern Pacific Co. (See Oakland, Cal.)
Spain, Barcelona, Statistics of railway, 425
Special track work. (See Track construction)
Spiez-Frutigen Ry. (See Switzerland)
Springfield, Ill.:
——Springfield Consolidated Ry., Leases, 64
——Mississippi Valley Interurban Ry., Receivership, 551, 1327
——Union Railway, Gas & Electric Co., Bond sale, 408
Springfield, Mass., New England Security & Investment Co., To sell holdings, 1255
Springfield (Ohio) & Xenia Ry., Dividend, 678
Springfield (Ohio) & Washington Ry. (See Washington C. H., Ohio)
Sprinklers. (See Fire protection)
Standard Gas & Electric Co. (See Chicago)
Standardization:
——Central Electric Railway Association committee, Report, *31
——Couplers considered by Engineering Association committee, 117; Comment, 104
——Engineering Association committee, Action on standards, 909, 997, 1031
——Engineering Association, Report, *850; Discussion, 867
——Rules of procedure of committee on standards of the Engineering Association, 849; Comment, 843
Stations, Passenger. (See Terminal stations; Waiting stations)
Statistics:
——Accidents on electric railways for year, 1080
——Accidents, Germany, 391
——Accidents, Philadelphia, 442
——Alternating versus direct-current systems, Milwaukee, 1138
——Australian street railways, 868
——Barcelona, Spain, railways, 425
——Brooklyn Bridge passenger traffic, 670
——Buenos Aires railways, 239
——Capitalization, cars and track in 1910, 311; Comment, 303
——Cost of materials, Government bulletin, 241
——Detentions to train service, West Jersey & Seashore R. R., 20
——Earnings of different classes of properties, Doherty charts, 1320
——Earnings per capita in Providence, R. I., 315
——Earnings of Ohio roads, 1077
——Earnings of six Stone & Webster properties, 1304
——Energy consumption of one and two-car trains, Illinois Traction System, 527
——Fares collected by surface railways in New York City, 121
——Gasoline-electric car operating and transportation statistics, New York City, 490
——German street railways for 1909, 868
——Joint rate passengers in New York City, 121
Statistics: (Continued)
——Locomotives, Single-phase, 957
——Manufacture of electrical machinery, 427
——Mileage, cars and capitalization for ten years, 314
——Mileage per day per unit of equipment, Brooklyn Rapid Transit Co., 1268
——New York City, Transfer data, 1243
——New Zealand street railways, 868
——Operating features of two third-rail roads, Comparison, 304
——Operation of cars with coasting time recorders, Chicago Rys., 1194
——Paris, Metropolitan Ry., Passengers carried, 189
——Passengers carried, Hudson Tunnel, 1090
——Passenger traffic in New York subway, 1010
——Passenger statistics of steam railroads, 1157
——Power consumption of interurban cars, Detroit United Ry., 1095
——Power consumption of single-phase cars with trailers, Milwaukee, 1144; Illinois Traction System, *522
——Power generation and distribution, West Jersey & Seashore R. R., 20
——Rail production, 394
——Revenue and transfer passengers, Public Service Ry., 556
——Single-deck vs. double-deck cars in Europe [Hoogwinkel], 199
——Single-end vs. double-end car operation [Hicks], 45
——Single-phase locomotives, 957
——Steam railroads in 1910, 202
——Switzerland, 1144
——Tasmanian street railings, 868
——Ties purchased, Census report, 400
——Value of electric railway properties in Washington and Wisconsin, 365
——Value of engineering statistics on small systems, 974
——Vienna Tramways, 236
——Steam flow meter, *781
Steel, Tool, Treatment of [Sullivan], 1062
Steps. (See Car steps)
Sterling, Dixon & Eastern Electric Ry. (See Dixon, Ill.)
Stock keeping. (See Storerooms)
Stockton, Cal., San Joaquin Valley Electric Ry., Bond issue, 330
Stops, Automatic train, Location of, Report of American Electric Railway Engineering Association, *747; Comment, 717
Stops of street cars:
——Near-side:
East St. Louis, Ill., 1011
Milwaukee, 431
——Odd and even stops, Kansas City, 730
Storage battery cars:
——Edison-Beach [Beach], 43; Discussion, 52
——(Federal), Muskogee, Okla., *324
——Germany, 1166
——Performance of, Suffolk Traction Co., *245
——Possible investigation of, 802
——Suffolk Traction Co., *245
——Third Avenue, New York, *128
Storerooms:
——Accounting and stock keeping methods, Mobile Light & Railroad Co. [Glover], *423
——Public Service Ry., *623
Streator, Ill., Illinois Valley Gas & Electric Co., Merger, 206
Strikes:
——Arbitration in, 267
——Coney Island & Brooklyn R. R., 284, 328, 1057; Comment, 267, 1050
——Copenhagen, 990
——Des Moines (Ia.) City Ry., 284, 320, 406, [Snyder], *1060; Comment, 267, 1050
——Glasgow, Scotland, 378
——Mexico City, 132
——Responsibility of organized labor—the McNamara case, 1185
——Schenectady Ry., 962
——Spartanburg, S. C., 676
——Texarkana, Tex., 1312
——Trenton, N. J., 168, 208
——Trenton, Bristol & Philadelphia Street Ry., 676, 927
Substations:
——Aurora, Elgin & Chicago R. R., *271
——Boston Elevated Ry., *1317
——Brookline, Mass., Boston Elevated Ry., 398
——Brooklyn Rapid Transit System, Thirty-eighth Street, *1228; Comment, 1226
——Chicago, Ottawa & Peoria Ry., *1309
——Economies in, 339
——Fire hazard in, 379
——Kansas City, Mo., *957
——Milwaukee interurban lines, *1139, *1141, *1143, 1144
——Operation [Cochran], 1099
——Operating and maintenance costs, West Jersey & Seashore R. R. [Wood], 20
——Public Service Electric Co., *591
——Worcester Consolidated Street Ry., *344
Subways. (See names of cities)
Suffolk Traction Co. (See Patchogue, L. I.)
Summer problems, 104
Surface contact railway system, Simplex [Hipple], *1238
Susquehanna Railway, Light & Power Co. (See New York City)
Switchboards:
——Brooklyn Rapid Transit substation, *1230
Switchboards: (Continued)
——Train dispatcher's (Lafayette), *164
——Zylonite, Mass., power station, *460
Switches:
——Oil (General Electric), *1035
——Track, Los Angeles, *771
Switzerland:
——Electrification of railways [Huber], Comment, 266
——Loetschberg Ry., Single-phase locomotive, *190
——Martigny single-phase railway, Déri motor, *235
——Spiez-Frutigen Ry., Motor cars, *644
——Statistics of electric railways, 1144
Sydney, N. S. W. (See New South Wales)
Syracuse, N. Y.:
——Rapid Transit Ry.:
Investigation by Public Service Commission, 1174
Pay-as-you-enter cars, Operation of [Duffy], 1202; Discussion, 1207
Report on transit conditions [Barnes], 428
Sale of stock proposed, 1125
——Rochester, Syracuse & Eastern R. R.:
Block signals, 122
Freight and express service, 477
——Syracuse, Lake Shore & Northern R. R.:
Fare increase, 1127
Stock increase, 408
——Syracuse & South Bay R. R., Fare reduction, 173

T

Tabulating device used in counts of passengers, Brooklyn Rapid Transit Co., *1269
Tacoma, Wash., Discussion on medical testimony in accidents, 663
Tacoma, Wash., Puget Sound Electric Ry.:
——Caboose car, *837
——Fares reduced, 549, 929
——Hoops for train orders, *714
Tacony, Pa., Frankford, Tacony & Holmesburg Street Ry., Roller bearings on suburban cars, 669
Tampa, Fla.:
——Tampa Electric Ry.:
Dividend, 330, 1009
Stock increase, 1257
——Tampa & Sulphur Springs Traction Co., Receivership, 256
Tantalum lamps on cars, Results of year's observation, Chicago Rys., 501
Tariffs, Report of New York State Street Railway Association, 1240
——(See also Fares; Through routes and joint rates)
Tasmania, Statistics of street railways, 868
Taunton (Mass.) & Pawtucket Street Ry., Hearing on fares, 152
Tax values:
——Ohio, 253, 545
——Wisconsin, 1215
Taxation:
——Governor Dix on, 130
——Ohio, 253, 545
——Report of American Electric Railway Association, 827
——Wisconsin, 1215
Team interference in Chicago, Campaign against, 182, 207
Telephone apparatus, Developments (Western Electric), 1284
Telephone protector for outdoor service (Western Electric), *288
Telephone train dispatching. (See Dispatching trains)
Terminal stations and terminals:
——Chicago, Illinois Central changes, 1251
——Cleveland interurban, 506
——Hudson & Manhattan R. R., Newark, N. J., *1093
——Oklahoma City, Okla., Terminal Arcade [Martin], *486
——Problems, 938
——Public Service Ry., *586
——Report of Engineering Association on buildings and structures, 820; Discussion, 803
——St. Louis, Illinois Traction System, *656
——(See also Waiting stations)
Terre Haute, Indianapolis & Eastern Traction Co. (See Indianapolis, Ind.)
Testing device for motor fields, Olean, N. Y., 124
Texarkana (Tex.) Gas & Electric Co.:
——Single-truck arch-roof cars, *363
——Strike, 1312
Texas public service corporations, Investigation of operation, 439
Thermostat for car heating (Consolidated), *669
Third-rail clearances, Report of Engineering Association, *746; Discussion, 734
Third-rail roads:
——Aurora, Elgin & Chicago R. R., 222, 272
——Comparison of operating features, 304
Three-phase versus single-phase for heavy electric railways [Calzolari], 1147; Comment, 1136
Through cars, Possibilities in the operation of, 417

Through routes and joint rates in New York City, Hearings, 96, 103, 121, 266, 279, 310, 399, 468, 500, 957, 999, 1096, 1168
Ticket frauds in Cleveland, 962
Tickets:
——Louisville, Ky., 296
——Public Service Ry., *635
——Six for 25 cents, Wilmington, Del., 1006
——Sleeping and parlor-car service, Illinois Traction System, *525, *527
——Workmen's book tickets, Athol, Mass., 409
Ties:
——Census statistics, 400
——Creosoted, Brooklyn, 345
——Reinforced concrete (Weber), *198
——(See also Track construction)
Timber preservation:
——Advantages of treated timber [Winslow], Discussion, 30
——Co-operative treatment plants, Possibilities of, 183
——Creosoted ties in Brooklyn, 345
——Painting cross-arms, 859
——Public Service Ry., *580
Timetables:
——Albany Southern R. R., 123
——Report of Transportation & Traffic Association, 835; Discussion, 808
Toledo:
——Municipal ownership, Mayor Whitlock on, 203
——Toledo, Ann Arbor & Jackson R. R., Incorporation and plans, 1042, 1178
——Toledo & Indiana R. R., Transfer of property, 95
——Toledo Railways & Light Co.:
Appraisal, 59, 131, 168, 253
Fare ordinance, 507
Fares, Investigation, 886
Field coil repair economy, 286
Franchise negotiations, 251, 292, 365, 405, 471 [Lang], 775
Franchise settlement proposal submitted to city, 1247, 1288
Rental proposal rejected, 438
Work and line car, *1070
Toronto, Ont.:
——Municipal lines in suburbs proposed, 91
——Toronto Street Ry.
Merger, 295
Stock increase, 172, 367
——Subway plans, 1215, 1253
Tower wagon, Gasoline, Milwaukee, *770
Track, Derailing. (See Sanded tracks)
Track construction:
——Aurora, Elgin & Chicago R. R., 222
——Ballast stone quarry, Public Service Ry., *581
——Berlin subway, 232
——Buffalo, International Ry., 1029
——Buffalo & Lake Erie Traction Co. [Alderman], 42
——Chicago elevated loop, Noise reduction, 469
——Chicago, Ottawa & Peoria Ry., *1308
——Crossover, Portable (Cleveland), *1004
——Curve elevation in paved streets, 862
——Electric shovel, St. Louis, *1171
——German report, 997
——Great Britain, 738
——Protecting rails against corrosion, 862
——Public Service Ry., *583
——Report of Engineering Association, 828; Discussion, 805
——Sanded track, *397
——Special work.
Foundations, 863
Los Angeles carhouse, *772
Public Service Ry., *585
——Sprinkling with oil, 863
——Statistics for 1910, 311; Comment, 303
——(See also Ties; Way department)
Track renewals, A time factor for, 415
Track scrapers, Pneumatic (Root), *56
Trackless trolleys in England, *155
Traffic department, Relations with accounting department [Neereamer], 1278
Traffic promotion:
——Advertising posters, London Underground Electric Ry., *387
——Albany Southern R. R., *54
——[Breckinridge], 494
——Detroit United Ry. [Keys], 354
——Fall and winter, 377
——Hudson & Manhattan R. R., *1090
——[Norvell], 1107
——Public Service Ry., 557
——Report of committee of American Electric Railway Transportation & Traffic Association, 702; Discussion, 697; Comment, 685
——Tourist traffic, Stimulating, 973
——(See also Advertising)
Trailer cars. (See Cars, Trailer; Train operation)
Train dispatching. (See Dispatching trains)
Train operation:
——Energy consumption, Illinois Traction System, 527
——Indianapolis, Crawfordsville & Western Traction Co., *530
——Trailer operation, Capacity of motors for, 939
——Trailer operation versus multiple-unit trains [Renshaw], 350; Discussion, 359
Train orders, Hoops for delivering, Puget Sound Electric Ry., *114
Transfers:
——Albany, N. Y., New form, 550
——Discussion in England [Shepherd], 199
——Louisville, Ky., Three-coupon transfer, *400
——Multiple coupon, Union Ry., New York, *127
——New Jersey order upheld, 1323
——New York City, Hearings, 96, 103, 121, 266, 279, 310, 399, 468, 500, 957, 999, 1096, 1168, 1216, 1242
——Portland, Ore., Use to secure co-operation of passengers, 408
——Public Service Ry., 368, *628
——Report of Transportation & Traffic Association, 832; Discussion, 807; Comment, 797
——Seattle, Wash., Complications, 408, 477
——Washington, D. C., 443
Transformers:
——(General Electric) 750,000-volt testing, *401
——Spiez Frutigen motor cars, *646
——Statistics of manufacture, 427
Transmission lines:
——Aurora, Elgin & Chicago R. R., 271
——Boston Elevated Ry., Alternating current, 1318; Comment, 1304
——Cost of maintenance, West Jersey & Seashore R. R. [Wood], 20
——Crossing of, *945, 1088
——Dessau-Bitterfeld Ry., *978
——Developments in the transmission of electric power, 484
——Electric strength of air [Whitehead], Comment, 4
——High-tension line construction, 641
——High voltage and the fire hazard, 379
——High-voltage transmission, Papers at American Institute of Electrical Engineers' convention, Comment, 4
——Hoosac Tunnel electrification, *454
——Laying 60,000-volt cable, Prussian-Hessian Street Ry., *1097
——Problems, 182
——Public Service Electric Co., *591
——Southern Pacific Co., *900, *940
——Span computation [Robinson], [Thomas], Comment, 4
——Suspension insulators [Austin], Comment, 4
——Worcester Consolidated Street Ry., 344
Transportation rules and regulations, Report of New York State Street Railway committee, 1240
Tread, Safety, Alundum-steel, called "Feralun," 883
Trenton, N. J.:
——New Jersey & Pennsylvania Traction Co., Strike, 168, 208
——Trenton, Bristol & Philadelphia Street Ry. (See Philadelphia)
——Trenton & Mercer County Traction Corporation:
Fare hearing, 96, 1117, 1265
Stock increase, 1042
——Trenton Street Ry., Bond sale, 548
Trestles. (See Bridges)
Tri-City Railway & Light Co. (See Davenport, Ia.)
Trinidad, Col., Colorado Railway, Light & Power Co., Sale, 295
Trip of office car of Illinois Traction System from St. Louis to Cleveland, 321, 358, *395
Trolley base:
——Milwaukee high-voltage cars, *1140
——Roller bearing (Trolley Supply), *166
Trolley ear frog, Replaceable (Gilbert), 435
Trolley ears:
——Aligning (Ohio Brass), *125
——(General Electric), *325
Trolley harp (Ohio Brass), *125
Trolley wire, Recommendation for standard grooved, 704
Trolley wire lift device, Bridgeport carhouse, *148
Trucks:
——Chicago Rys., Arch-roof car, 652
——Design of, Report of Engineering Association, *856
——Gasoline car, Dutch West Indies, *673
——Gasoline car (R. M. C. C.), *668
——(Halsey) radial, *201, *857
——Light weight, 116
——Light weight, Report of Engineering Association, 857
——New South Wales, *15
——Newark extension cars, Hudson tunnels, *275
——Non-parallel axle (Warner), Kankakee, Ill., *127
——Philadelphia Rapid Transit Co. (Baldwin), single-motor, *666
——Public Service Ry., Standards, 604
——Richmond & Henrico Electric Ry. (Baldwin), single-motor, *666
——Side-rod, Cincinnati, *502
——Spiez-Frutigen Ry., *648
——Storage-battery cars, New York, *128
Turbines, Steam:
——Comparison with gas and oil engines [Dreyfus], 657
——Low-pressure, Aurora, Elgin & Chicago R. R., *268
——Low-pressure [Fairbanks], 31
——Providence, R. I., Rhode Island Co. [Bronsdon], 488
——(Sulzer), *1169
Turbines, Steam: (Continued)
——(See also Power station practice)
Twin City Traction Co. (See Dennison, Ohio)
Twin City Rapid Transit Co. (See Minneapolis)

U

Uniforms, Pacific Electric Ry., 174
Union Railway, Gas & Electric Co. (See Springfield, Ill.)
United Properties Company of California. (See San Francisco)
United Rys. (See St. Louis)
United Railways & Electric Co. (See Baltimore)
United Rys. of San Francisco. (See San Francisco)
United Traction Co. (See Albany, N. Y.)
Upper Hudson Electric & Railroad Co. (See Catskill, N. Y.)
Utica (N. Y.) Mohawk Valley Ry.:
——Dividend, 1327
——Freight and express traffic, *282

V

Vacuum cleaners, Fares for, Denver, 361
Vallejo (Cal.) & Northern Ry., Bond issue, 1257
Valuations. (See Appraisal)
Vancouver, B. C., British Columbia Electric Ry.:
——Interurban cars, *164
——Stock issue, 295
Venice, Ill., Power station of Illinois Traction System, *106
Ventilation of cars:
——Chicago Rys., Arch-roof car, 651
——New York City, Hearing, 1239
——Report of Engineering Association, 853; Discussion, 866
——[Thorn], 115
Ventilation of generators, Blower for (Baker), *125
Viaducts. (See Bridges)
Vienna Tramways, Annual report, 236
Virginia Railway & Power Co. (See Richmond, Va.)

W

Waco, Tex.:
——Citizens Ry., Change in management, 63
——Waco Street Ry., 172
Wages. (See Employees)
Wagon elevators, Public Service Ry., *556, 583
Wagons. (See Emergency repair crews; Tower wagon)
Waiting stations:
——Aurora, Elgin & Chicago R. R., *223
——Chicago, Ottawa & Peoria Ry., *1307
——Combination depot and substation, Aurora, Elgin & Chicago R. R., *272
——Milwaukee, *540, *1140
——Oklahoma Railway [Martin], *486
——Public Service Ry., *558
——Simple design, 2
——Wheaton, Ill., Aurora, Elgin & Chicago R. R., *1280
——(See also Terminal stations)
Walla Walla (Wash.) Valley Ry.:
——Combination passenger car, *1001
——Officers, 295
Washington C. H., Ohio, Springfield & Washington Ry., Issue of stocks and bonds, 1178
Washington, D. C.:
——Capital Traction Co., Transfer question, 443, 1011
——Fare case before the Interstate Commerce Commission, 1081
——Public utility bill, 1253, 1289
——Washington Railway & Electric Co.:
Effect of operation on property values [Harries], 777
Resignation of G. H. Harries, 690
——Washington & Rockville Ry., Bond and stock issues, 548
——Washington, Baltimore & Annapolis Electric Ry:
New bonds, 207, 330
Receivership, 1009
Water power development in the United States, Statistics of, 1249
Watered stock, Merits of [Crosby], 48, 874; Comment, 74
Waterloo (Ia.), Cedar Falls & Northern Ry.:
——Bond issue, 135
——Owl service, 1258
Waterville (Me.) & Oakland Street Ry., Change of name, 1218
Waukegan (Ill.), Rockport & Elgin Traction Co., Proposed sale, 64
Way department:
——Public Service Ry., *576
——Should eliminate rule-of-thumb construction, 304
——(See also Track construction)
Weed destroying:
——Gasoline car (Lamb), *124

Weed destroying: (Continued)
——Sprinkler on flat car, Albany Southern R. R., *435
Welding, Electric:
——American Society of Mechanical Engineers, Discussion by, 1067
——Pittsburgh Rys., 1059
Welding, Fuel oil and compressed air, of armature shafts, without removal, San Francisco, *388; Comment, 377
Welding, Thermit, Process on armature shafts [Cuntz], c*504
Welfare work. (See Employees)
West Jersey & Seashore R. R. (See Camden, N. J.)
West Penn Traction Co. (See Pittsburgh, Pa.)
Western New York & Pennsylvania Traction Co. (See Olean, N. Y.)
Western Society of Engineers, Going value of public utilities [Fowle], 1115
Wheaton, Ill., Passenger station of Aurora, Elgin & Chicago R. R., *1280
Wheel grinder, Salt Lake City, *873
Wheel guards:
——Philadelphia, 409, 1043
——Tests by Massachusetts Railroad Commission, 549
Wheels:
——Public Service Ry., Standards, 604
——Removing steel wheels, 865
——Squealing of steel wheels, 867
——Standards proposed, Engineering Association, *850
Wheeling (W. Va.) Traction Co., Dividend, 1327
Wichita, Kan.:
——Arkansas Valley Interurban Ry., Cars, *247
——Wichita Railroad & Light Co., Bond issue, 1042
Willoughby, Ohio, Cleveland, Painesville & Eastern R. R.:
——Annual report, 133
——Bond issue, 1294
Wilmington, Del.:
——Wilmington City Ry., Bond sale, 476
——Wilmington & Philadelphia Traction Co., Ticket question, 1006
Winnipeg, Man.:
——Municipal ownership, 205, 254
——Winnipeg Electric Ry. Sale, 367, 965, 1079
Winona (Minn.) Railway & Light Co., Receivership, 256, 367
Winthrop, Mass., Point Shirley Street Ry., Gasoline car, *959
Wire gage, Standard steel, 1034
Wisconsin Electric Ry. (See Oshkosh, Wis.)
Wisconsin Railroad Commission:
——Fares of Eastern Wisconsin Railway & Light Co. approved, 193
——Policies underlying commission law, and results accomplished [McGovern), 497; Comment, 483
——Trackage agreement, Discussion of, 1094
Wisconsin tax values, 1215
Wood preservation. (See Timber preservation)
Worcester (Mass.) Consolidated Street Ry.:
——Freight service, 1258
——Power station at Millbury, Mass., *342
Work cars:
——Public Service Ry., *581
——Toledo Railways & Light Co., Work and line car, *1070
Working hours in factories, Effect of a peak load, 1227
Workingmen's Compensation. (See Employees)

Y

Yards, Fire protection, sprinkler system, Interborough Rapid Transit Co., New York, *277
Yonkers (N. Y.) R. R., Issue of receivers' certificates, 548
Youngstown & Ohio River R. R. (See Leetonia, Ohio)

Z

Zurich, Switzerland, Aluminum car panels and fittings, 246

AUTHOR INDEX

A

Alderman, C. A. Maintenance of way matters, 42
Anthony, O. E. Troubles of a baggage agent, 355
Arkenburgh, W. H. Signaling with track trip control, 541

B

Bagg, F. A. Life of railway physical property from the engineering standpoint, 1205
Baldwin, A. T. Inclosed arc lamps for street car headlights, *531
Barnes, J. P. Reduction of car failures, 34
Beach, R. H. Edison-Beach storage battery car, 43
Beck, E. A. Selection and instruction of trainmen in order that complete and intelligent accident reports may be obtained, 870
Bierck, A. B. Statistics of cost of electric operation of steam railways, 830
Boylan, M. R. Prepayment fare accounting, 737
Boynton, B. F. How can the public be educated in the prevention of accidents? 870
Brady, A. W. Address, 722
Breckinridge, Richard. Traffic promotion, 494
Brockway, W. B. Equipment trust securities, 82
Bronsdon, M. H. The power plant extension of the Rhode Island Company, *488
Buffe, F. G. Electric railway advertising, 495
Burdick, E. J. Lightning protection, 1101
Byllesby, H. M. Responsibilities of electrical engineers in making appraisals, 16

C

Carpenter, E. C. Prevention of accidents, 872
Casey, T. W. Advantages of the pay-as-you enter car, 1201
Cochran, J. E. Substation operation, 1099
Colt, R. M. Tariffs, 33
Connette, E. G. Hand brakes, c919
Cooley, M. E. Overhead charges, 877
Copley, C. H. Combined suction and pressure apparatus for car cleaning, *276
Crecelius, L. P. Purchase of bituminous coal under b.t.u. specifications, 784
Three-phase turbo-alternators, 782
Crosby, O. T. Physical valuations, 874

D

Dana, Edward. Handling chartered car service in Boston, 360
Reporting and checking car defects in Boston, 425
Davies, H. J. Recent legislation affecting electric railway accounting, 26
Davies, J. V. Hudson River tunnels, 789
Dorticos, C. Headlights for interurban service, *349
Duffy, C. N. Plan of membership in the N. E. L. A., c 85
Duffy, J. E. Operation of pay-as-you-enter cars in Syracuse, 1202
Dyer, R. A. D. C. turbo-generators larger than 500 kw capacity, 783

F

Floy, Henry. Depreciation as related to electrical properties, 21
Forse, W. H., Jr. Address, 751
Fowle, F. F. Going value of public utilities, 1115
Franklin, C. J. Two-car train operation for city and suburban travel, 839

G

Gault, E. D. Accounting system for a small electric railway, 748
Gillette, H. P. Uses of an appraisal, 948
Glover, M. W. Electric railway storeroom accounting methods, *423

H

Hanna, J. A. The archroof, c 161
Harries, G. H. Effect of electric railway operation on taxable city property, 777
Harvie, W. J. Address, 691
Henry, C. L. The interurban, 739
Hicks, H. E. Single-end vs. double-end car operation, 45

I

Ingle, W. O. Life of railway physical property from the accounting standpoint, 1205

J

Johnson, F. W. Accident work of the future, 654
Humane side of accident work, 1029

K

Keys, J. F. Traffic, 354

L

Lang, A. E. Toledo street railway situation, 775

M

McDougall, R. E. Prevention of accidents, 1204
Martin, H. C. Electric terminal arcade of the Oklahoma Railway Company, *486
Mason, S. C. Test of couplers at Indianapolis, c*200
Mullett, H. A. (See Rau, O. M.)

N

Norviel, F. D. Traffic, 1107

P

Page, H. C. Address, 692
Pardee, J. H. Address, 40
Parham, E. C. Simplified controller diagrams, *246
Pellissier, G. E. A new theory of the cause of rail corrugation, *528, c 701
Pierce, D. T. Measures for welfare of employees, 773
Potter, W. B. Gas-electric motor cars, 41

R

Rau, O. M., and H. A. Mullett. Alternating and direct-current interurban lines of the Milwaukee system, *1138
Renshaw, Clarence. Trailer operation versus multiple-unit trains, 350
Rockwell, J. J. Publicity as a factor in electric railroading, 1105
Rogers, C. M. Detroit testing laboratory, *345

S

Schade, J. C. Little things that count, 353
Schlessinger, A. Overhead standardization, 347
Snyder, C. L. Strike siege in Des Moines, Iowa, *1060
Staats, H. N. Insurance, 356
Stott, H. G. Developments in the generation of steam, 1910-1911, *781
Stowe, J. A. Brake tests in New York, c 1118

T

Turner, W. V. Steps in the solution of the problem of adequately controlling electrically propelled vehicles, 35

V

Van Zandt, A. D. B. Let the public know, 25

W

Walsh, E. P. Selection and instruction of trainmen in order that complete and intelligent accident reports may be obtained, 871
Whitehead, F. J. Prevention of accidents, 869
Winsor, Paul. Effect of electric railway operation on taxable city property, 879
Wood, B. F. Electrical operation of the West Jersey & Seashore Railroad, 19
Wynne, F. E. Electric locomotives for interurban freight haulage, 1103

PERSONAL

Adams, F. W., 333
Adams, J. L., 97
Adamson, George W., 931
Aker, John W., 1012
Alderman, C. A., 1081
Ambler, James M., 1330
Anderson, James, *259
Andrews, C. H., 333
Antibus, Roy, 1180
Archer, H. H., 209
Armstrong, Russell, 1220
Arnold, W. L., 137
Austin, John B., 209
Ayres, Milan V., 138, 1044
Bacon, J. Cortlandt, 371, 410, 680
Baker, Newton D., 1330
Ballard, W. P., 1128
Barber, H. L., 1044
Barley, W. I., 175
Barnes, D. C., 410, 968
Baukat, John G., 97
Baumann, Charles A., 333
Beach, Ernest J., 1260
Beames, C. F., 333
Beardsley, H. M., 1180
Beebe, C. D., 891
Beidenbender, August, 1012
Bell, D. C., 137
Bell, Thomas K., 1081
Benton, John E., 66
Bentson, George H., 514
Bernsmeyer, G. E., 1044
Biegler, Prof. Phillip S., 1260
Billings, Warren C., 967
Bishop, E. A., 97
Bixler, H. C., 1081
Brinkerhoff, J. H., 410
Brixey, William Richard, 67
Broderick, Patrick, 410
Brooks, C. B., 371
Brown, Arthur K., 371
Brown, C. E., 1330
Brown, Lyman K., 1260
Bruce, W. F., 97
Buchanan, C. B., 97
Buchanan, W. T., 175
Budd, Britton I., *298
Bullock, George, 298
Burch, Edward P., 891
Burke, W. H., 680
Burns, Joseph M., 209, 333
Burton, Frank, 1260
Burton, George W., 1082
Busby, Leonard A., 1330
Butler, D. B., 478
Butler, L. E., 371
Butterfield, J. H., 1044
Buttrick, W. A., 1330
Butts, Edward, 137
Campbell, A. M., 680
Campbell, J. M., 478
Cargill, Walter N., 371
Carley, R. F., 1260
Carlisle, L. W., 446, 967
Carpenter, Charles H., 371
Carpenter, E. C., 550
Chambers, F. C., 1128
Chiles, R. T., 97
Choate, Joseph K., *67
Christie, James, 446
Clader, W. A., 1180
Clark, Angus, 137
Clark, E. W., 297
Cleveland, John A., 66, *138
Coates, Frank R., 1220, 1297
Cochran, Joseph W., Jr., 1297
Collette, B., 1081
Colburn, C., 97
Collins, J. C., *98
Coolidge, C. A., 97
Coryell, A. B., 1044, 1180
Coupland, A. A., 371, 446
Cox, W. F., 371, 446
Craig, John, 333
Craven, Alfred, 680
Crooks, C. D., 932
Culbertson, S. A., 371
Culp, Sherman, 1012
Cunningham, E. R., 259
Cutlip, W. M., 97, 446
Daggett, H. C., 297
Dallow, C. H., 209
Daly, K. W., 333
Dame, F. L., 297
Daniels, Thomas R. H., 371
Davidson, Charles J., 514
Davidson, W. G., 371
Davies, Wm. B. S., 333
Davis, A. J., 446
Davis, Ernest H., 1297
Deems, J. F., 1081
Delano, F. A., 297
Derth, E. C., 298
Dickey, H. S., 209
Dickie, G. A., 297
Dillon, S. E., 1044
Dineen, P., 1297
Dorman, J. A., 680
Dougherty, Hugh, 333, 410
Douglas, Egbert, 967
Dowhower, W. H., 333
Downs, E. E., 138
Doyle, J. J., *175
Draper, N. C., 333
Droppers, Prof. Garret, 967
Dryden, John F., 1181
Duffy, C. Nesbit, 1180
Dunlap, George W., 931, 1012
Dunn, Sherman W., 259
Easton, C. L., 333
Eick, Richard, 175
Elwell, C. C., 514, 550
Ely, E. S., 97
Emerson, E. J., 1180
Empey, James R., 66
Erwin, W. E., 967
Espy, J. C., 446
Evans, J. D., 680
Evans, Walter H., 1044
Fairchild, H. A., 968
Fairchild, J. R., 297
Farrel, Frank, 1297
Fehr, Harrison R., *1297
Fernald, B. W., 478
Ferrier, J. J., 1181
Finlayson, F. W., 1082
Fisher, F. E., 680
Fisher, John H., 1330
Fitzpatrick, F. E., 1297
Fledderjohann, W. H., 1330
Ford, Charles W., 97
Foster, E. C., 1330
Fox, James W., 1220
Fox, W. A., 478
Franklin, W. S., 1220
Frost, Frank W., 175
Fuller, H. W., *1128
Fulton, C. B., 1260
Funk, J. T., 371
Gardner, Addison L., 1044
Garland, Charles P., 1128
Garretson, John D., 478
Gebhart, Henry, 333
Gerke, Jacob W., 66, 97
Godwin, R. S., 1297
Goodyear, R. B., 298
Graham, Edgar M., 1044
Graves, Jay P., 176
Gray, Carl Raymond, 97
Gray, James K., 1012
Greims, Howard E., 1082
Grenshaw, C. G., 297
Griffith, Charles J., 175
Grimmett, R. B., 175
Haas, E. M., 1082
Halsey, N. W., 98
Ham, William F., 1330
Hamilton, James F., 1044
Hambleton, J. S., 371
Hardin, Edward, 967
Hardy, F. I., 209
Harlan, James S., 1297
Harries, Gen. George H., 550, *690, 1081
Harrington, O. C., 371
Harrsen, Harro, 967
Harton, William H., Jr., 514
Hasbrouck, Daniel B., 932
Haskins, Caryl D., 1128
Hathaway, E. C., 97
Havell, John E., 97
Hebard, George W., 1128
Hedley, Frank, 259, 931
Hegarty, D. A., *176, 259
Hemming, R. N., 891
Hendee, M. H., 1128
Henderson, C. A., 259, 446
Henderson, Edwin, 1330
Herrell, Samuel L., 66
Hertzog, Robert R., 259, 446
Higgins, Samuel, 1180
Hill, Arthur R., 298
Hill, M. J., 175
Hinckley, B. S., 371
Hintsdorff, D. C., 680
Hogarth, J. B., 259
Hopkin, George A., 297
Hottell, F. B., 1298
Howard, R. M., 680
Howe, R. C., 333
Hubbell, Charles H., 97
Hughey, J. B., 259
Husselman, D. Y., 259
Hutchins, R. G., Jr., 478, 514
Ingersoll, I. B., 514
Jeffords, J. W., 137
Jenks, G. W., 333
Johann, Charles S., 932
Johnson, Charles C., 97
Johnson, Charles W., 891
Johnson, Ensign, 514
Johnson, H. A., 410
Johnston, E. R., 97
Jones, Morgan, 1082
Jones, T. Norman, Jr., 97
Kelso, Charles D., 1081
Kilpatrick, B. L., 371
Kimmett, A. D., 66, 97
King, Clarence P., 175
Kingman, A. C., 1044
Knox, George W., *260
Kuemmerlin, George, 1081
Kulp, Monroe H., 968
Lambert, John F., 931
Lang, Albion E., 1220
Latshaw, W. H., 446
Lenhart, Charles E., 1220
Lewis, C. H., 1044
Linden, John J., 1260
Lord, Henry F., 1298
Lund, Eugene N., 259
Lytle, J. H., 259
Macleod, Frederick J., 333
Mailloux, C. O., 259
Maize, F. P., 297
Marble, John H., 137
Marsh, F. E., 1220
Martin, W. H., 891
Mather, Robert, 968
Mathes, L. D., 1044
May, Francis, 1220
Mayer, Joseph B., 298
Maynes, J. D., 1128
McAfee, John Blair, 66
McCarter, Thomas Nesbitt, 800
McCarthy, P. O., 1297
McClosky, David M., 333
McCrea, James A., 1082
McDonald, Malory, 1128
McDowell, J. D., 514
McGee, Wm. N., 98
McGowan, Hugh J., 1298
McGrath, J. C., 446
McIntyre, Robert, 1297
McKeon, F. M., 1331
McKinley, W. B., 298, 514
McLain, Llewellyn H., 680
McMeen, S. G., 1128
McPherson, N. B., 680
Miley, Thomas F., 259
Mills, E. M., 1260
Miner, D. P., 297
Mitchell, H. A., 137
Mitten, T. E., 1232
Moffatt, George B., 1220
Moffett, James McG., 97
Mooney, J. Frederick, 1220
Moore, A. G., 1260
Moore, C. E., 1081
Moore, Joseph H., 333
Moran, W. M., 478
Morrison, W. R., 1044
Mosely, Earl L., 371
Mountney, L. H., 209
Mulhern, George G., 1180
Mullin, Bernard F., 333
Murdock, H. D., 259, 478
Murphy, W. H., 209
Newhouse, W. H., 371
Newman, F. R., 478
Niles, Edward C., 66
Noe, E. C., 297
Northrop, H. G., 297
Norton, E. C., 1260
O'Bryan, Francis L., *1297
O'Hara, Joseph, 1982
O'Hearn, Owen, 514
Ong, J. R., 1044
Ostendorf, Joseph, 1298
Page, Henry C., 680
Page, R. K., 891
Page, W. K., 371
Palmer, C. E., 891
Pape, W. H., 891
Parker, W. G., 931
Parks, Frank, 446
Pasho, Herbert A., 967
Patten, A. M., 298
Patterson, H. C., 259
Pattison, Hugh, 175, 259
Paxton, C. M., 333
Pelgrim, F. J., 210
Pepin, David E., 680
Peurring, J. P., 259
Phelps, George W., 1297
Phenicie, Carroll R., 1180
Phillipp, C. D., 297
Place, George M., 514
Plaice, Frank H., 514
Pollard, H., 97
Potter, John E., 371
Price, Edward R., 298
Pumfrey, Thomas, 931
Quisenderry, H. C., 371
Raber, W. F., 97
Ralston, J. E., 514
Ramsaur, Fleming, 446
Randolph, George E., 1012
Ransom, William L., 137
Read, H. H., 333
Reed, Louis F., 1128
Reel, C. Gordon, 298
Reid, William, 371
Richards, F. L., 371
Ridgway, Robert, 1297
Ridlon, Frank, 1220
Riedel, Edward, 209
Riegle, J. W. S., 297
Rodenhouse, H. E., 371
Roehry, L. A., 1260
Roosevelt, James Alfred, 550
Ross, George H., Jr., 333
Rowland, C. H., 446
Ruddall, F. William, 371
Rudisill, W. H., 297
Russell, Clyde, 680
Russell J. Beckett 446
Russell, W. A., 137
Ryder, S. J., 1260
Sallee, John D., 1220
Samuelson, Frank, 371
Sanders, Owen, 371
Sanford, W. J., 297
Sargent, William S., 1180
Sawyer, P. B., 1181
Schmidt, Emil G., 410
Shannahan, John N., 97, 137
Shepard, Edward M., 298
Sherman, Albert, 1044
Shonts, Theodore P., 175, 967
Sisk, Thomas F., 297
Sims, J. M., 297
Skiff, Frederick James Volney, 1260
Slocum, B. W., 137
Smith, Charles H., 1044
Smith, Dow S., 175
Smith, E., 478
Smith, G. K., 371
Smith, J. Brodie, 1331
Smith, J. M., 298
Smith, H. L., 97
Snider, W. F., 297
Snyder, William H., 371
Stanley, Albert H., 1128
Starring, Mason B., 138, 891
Stavenow, August, 891
Stearns, R. B., 260
Stevens, F. J., 66
Stewart, J. B., Jr., 680
Storrs, Lucius S., 66
Stowe, Fred A., 137
Straut, John T., 1044
Sucese, J. B., 209
Sullivan, J. L., 931, 968
Sutherland, John, 931
Suyama, Masami, 333
Swenson, Sidney O., 931
Taggart, John A., 1220
Tanzar, Arnold, 1331
Taurman, Ray, 137
Taylor, C. G.,1260
Taylor, Leander F., 210
Taylor, R. C., 97
Tennis, Charles C., 891
Thompson, C. F., 371
Thompson, S. B., 550
Thompson, W. E., 1260
Thompson, W. J., 297
Thompson, Wm. E., 1082
Thornton, Henry W., 1081
Thornton, J. S., 1012
Threedy, Frederick L., 210
Torner, J. V. H., 175, 371
Townley, Calvert, *67, 259, 680
Trask, George K., 67
Trowbridge, E. D., 967
Vail, J. F., 98
Vance, H. J., 680
Vandewater, C. C., 297
Van Leuven, John P., 1260
von Schilling, F., 66
von Schrenk, Arnold, 1044
Walker, I. B., 967
Walker, James, 478
Ward, D. C., 259, 298
Warfield, H. R., 333
Watson, G. G., 371
Webster, Ernest C., 514
Wegner, A. C., 298
Weimer, James, 514
Weisiger, Cary N., Jr., 446
Weller, Royal H., 446
Welch, James D., 1081
Welch, J. E., 514
Weston, C. V., 371
Wharff, E. M., 66, 298
Wheeler, F., 333
Whitfield, George H., 66
Whiting, I. H., 297
Whitney, W. A., 97
Wilcox, J. A., 680
Wilder, George W., 1330
Williams, J. W., 1012
Williams, Sydney Alfred, 137
Wilson, F. W., 446
Wiry, E. A., 333
Witt, C. M., 1331
Wood, F. E., 1012
Wood, T. I., 1180
Worthen, Prof. Thomas W., 66
Wynn, R. D.
Yoakum, Jesse, 1297
Young, A. M., 1220

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVIII NEW YORK, SATURDAY, JULY 1, 1911 No. 1

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.
HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.
CURTIS E. WHITTLESEY, Secretary and Treasurer.
TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

HENRY W. BLAKE, Editor.
L. E. GOULD, Western Editor.
Associate Editors:
RODNEY HITT, FREDERIC NICHOLAS, WALTER JACKSON.
News Editors:
G. J. MACMURRAY, FRANK J. ARMEIT.

CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1021 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE.....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Tuesday noon of the week of issue.

Copyright, 1911, by MCGRAW PUBLISHING COMPANY.

Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL 8500 *copies are printed.*

LIBRARY SEP 29 1914 U. S. PATENT OFFICE

NEW YORK, SATURDAY, JULY 1, 1911.

CONTENTS.

The Hoosac Tunnel Electrification..... 1
The Language of Depreciation..... 1
Action on the Interurban Code..... 2
Passenger Shelter Stations..... 2
Car Schedule Economies..... 2
The Question of Shop Apprentices..... 3
Studies in High-Voltage Transmission..... 4
Center-Entrance Cars..... 5
Electrification of the Hoosac Tunnel..... 6
Standard Car of the New South Wales Government Tramways..... 13
The Responsibilities of Electrical Engineers in Making Appraisals..... 16
Electrical Operation of the West Jersey & Seashore Railroad..... 19
Depreciation as Related to Electrical Properties..... 21
Let the Public Know..... 25
Recent Legislation Affecting Electric Railway Accounting..... 26
Meeting of the Central Electric Accounting Conference..... 28
June Meeting of the Central Electric Railway Association..... 29
Report of the Standardization Committee of the Central Electric Railway Association..... 31
Tariffs..... 33
Reduction of Car Failures..... 34
Steps in the Solution of the Problem of Adequately Controlling Propelled Vehicles..... 35
President's Address at Cooperstown..... 40
Gas-Electric Motor Cars..... 41
Maintenance of Way Matters..... 42
The Edison-Beach Storage Battery Car..... 43
Single End vs. Double End Operation..... 45
Report of Committee on Joint Use of Poles..... 46
Annual Meeting of New York State Association..... 49
Annual Meeting of American Institute of Electrical Engineers..... 53
Electrical Equipment of Boston Pay-Within Car..... 54
A Staffless Hand Brake..... 55
Pneumatic Track Scrapers in Boston..... 56
London Letter..... 57
News of Electric Railways..... 58
Financial and Corporate..... 61
Traffic and Transportation..... 65
Personal Mention..... 66
Construction News..... 68
Manufactures and Supplies..... 71

The Hoosac Tunnel Electrification

The electrification of the Hoosac Tunnel of the Boston & Maine Railroad is a notable achievement. In less than a year from the time that the New Haven interests took over the control of the Boston & Maine the directors had authorized the change of motive power, all the engineering work was done and the construction work was completed under most difficult conditions without interrupting the operation of trains for a day. When the time came to turn on the current from the new power house and begin regular operation with electric locomotives nothing went wrong or had to be done over. Electric operation has proved an engineering success and undoubtedly it will prove an economic success. The Hoosac Tunnel has long been the neck of the bottle for freight traffic and the fly in the ointment for passenger traffic. The Fitchburg division of the Boston & Maine parallels its only competitor for through traffic, the Boston & Albany, and except for the tunnel has as favorable a location across the State of Massachusetts. Yet it never has been able to obtain its share of the passenger traffic or handle its share of the freight. Electric operation through the tunnel will avoid all discomfort to passengers and will greatly reduce the congestion of freight. The project has not been expensive as railroad improvement work is judged, and the saving in time to freight trains alone in its effect on the whole road should more than pay the interest on the investment which has been made in the electric equipment.

The Language of Depreciation

A fairly large part of the paper by Mr. Floy in regard to depreciation, presented before the American Institute of Electrical Engineers this week, is devoted to definitions of terms. In our abstract, published elsewhere in this issue, we give the essence of the definitions of the author, which he made unusually full in order to emphasize the need of uniformity in the use of these terms. The real reason why there has not been a more general agreement upon the language of depreciation is that the question of depreciation has generally been treated as one of academic interest rather than as one of practical importance. This fact militates against the consideration of precise terms to describe conditions the existence of which is denied by many. If the costs of depreciation are recognized universally as fair charges against earnings, authoritative definitions of terms will follow as a matter of course, but where there is no agreement as to the practical aspects of the subject itself it becomes difficult to secure concerted action on words and phrases. There is no unanimity of action even as to the real meaning of maintenance, which is construed by some companies to comprise no more than current repairs. Mr. Floy's study of the subject is based upon court and commis-

sion decisions rather than upon company practice. His citations of rulings in important cases in which depreciation is regarded as an element in the cost of the service support his earnest plea for a thorough consideration of the whole subject.

Action on the Interurban Code

Advance publication of the report of the committee on interurban rules of the American Electric Railway Transportation & Traffic Association gives to the member companies an opportunity which they ought not to neglect. The early action of the committee places in the hands of all operating officials of member companies a copy of the revised code, together with a compilation in convenient form of the rules in which changes are made, the changes proposed and the reasons therefor. Now the committee asks for criticisms of its work. It has made a unanimous report, representing the combined judgment of officials of companies located in various and widely separated sections of the country. Its code is one under which the different members of the committee presumably are satisfied to operate. Other companies will undoubtedly be willing to accept the recommendations of the committee without change. If they approve the code as it stands with the recommended changes they should so notify the committee. It is reasonable to ask that legitimate criticisms of any rule be sent to the committee without delay in order that further revision, if desirable, may be facilitated at the convention next October. We have no doubt that the committee, in furtherance of its aim to develop a workable code that shall be acceptable to all interurban roads, will welcome criticisms from non-member companies. Since the need of a uniform code is urgent, there is no reason why suggestions from sources outside of the association should not be made freely. The recommendation of the code by a committee of the Street Railway Association of the State of New York and the resultant approval of that association at its annual meeting this week constitute a support which the committee that is responsible for the revision must appreciate.

Passenger Shelter Stations

At a recent conference of interurban electric railway managers there was a rather ardent discussion on the subject of shelter stations. No one of the gentlemen present was inclined to dispute the value of such stations, but many feared the supposed high expense of such conveniences for intending passengers. It is true, of course, that the average interurban railway cannot afford to put up at every crossing a windowed structure with heating and toilet facilities. Even if the first cost of such buildings was low, they would involve a considerable charge for attendance. Furthermore it would be practically impossible to keep them free from the mutilations, defacements and nuisances to which isolated buildings are subject. But it is not necessary that a shelter station should be anything more than a rain and wind shield, since people do not expect to spend more than a few minutes in such a station while waiting for a car. Simple shelters of this kind can be erected for very little money. In fact, if a company wished to do so, it could usually arrange with a local merchant to install them at no expense to the company because of their billboard or advertising sign value. One Pennsylvania railway worked out a plan of this kind and it proved so popular with both the merchants and the public that similar shelters were installed at every other stopping place on the line. No doubt other companies would prefer to install their own shelter stations, as the expense is not great when the station is built of wood and but slightly more when of concrete. Many architecturally attractive designs have been worked out, among them several whose plan would be represented by an "x" or cross, rather than one with three or four inclosing walls. The "x" type of shelter, when provided with a roof with broad eaves, furnishes as complete protection from the weather as the rectangle, and has the additional advantage that it is easier to keep clean and is less subject to nuisance. The ordinary suburban and interurban road does not require elaborate shelters, but some such buildings are extremely convenient at times for waiting passengers. They also also undoubtedly shorten station stops.

CAR SCHEDULE ECONOMIES

The maintenance of car schedules at the lowest cost consistent with good service is an omnipresent problem to the transportation departments of all but the smallest systems. The search for economy in schedule construction has many resemblances to a game of golf. A man may be proud of the good work that he has done, but he can never justify the claim that he has reached perfection. He no sooner attains one low record than he begins to consider whether by a little closer calculation of the various factors with which he has had to deal he could not improve his performance so as to do better next time. There are so many controllable elements in the game as well as so many that are uncontrollable that the lowest possible score for each individual seems always to lie just beyond the point already gained. In the game of schedule making the street railway manager, his timetable specialist and his division superintendent have a problem which is even more interesting and involved than that confronting the player on the links, because the changing volume and distribution of traffic constantly require new investigations of the problem of how closer to fit the service to the patronage.

The most successful line of attack on inefficiency in handling traffic must be purely local. It usually represents long study of conditions on given divisions, including limitations of topography, power supply, location of stopping and passing points, track layouts of carhouses, signaling, the system of assigning work to trainmen, etc. Out of this host of factors, however, it is possible to emphasize certain sources of inefficiency or excessive expense which are common to operating companies generally without regard to local conditions.

Irregularity of running and the necessity of filling gaps at route termini by extra or set-back cars are probably the two chief sources of financial loss involved in schedule making to any large company serving an extended area. Irregularity of headway leads to the overcrowding of some cars and the underfilling of others. The latter means waste

of money and the former means loss of fares both because conductors cannot make prompt and accurate collections and because would-be patrons desert the service and walk when the gaps in headway are excessive. These gaps also result in complaints on the part of the public that the company does not operate a sufficient number of cars, a charge which is untrue in the majority of cases, because the total number of trips per day is seldom greatly influenced by temporary interruptions. But these interruptions do require the introduction of extra cars and thus a larger service than is necessary if the regular cars are moved properly.

The difficulties we are considering may sometimes be overcome, at least in part, by closer attention to the operation of cars along the entire route, but the fundamental trouble is more often in the schedules themselves. Assume, for instance, the frequent case of two lines which branch from a common point some distance from a downtown terminus and that the traffic demands a shorter headway on one line than on the other. In such case the schedule should be planned so as to approximate as closely as possible an even headway of all cars between the downtown terminus and the junction point. It may not be possible to attain close harmony of movement in all cases, but as a rule the greater density of service on the inward side of a junction point tends to offset slight irregularities of movement there.

In dealing with the headway of outbound cars a new problem arises, chiefly from the fact that the running times may be different between an outlying terminus of two routes whose in-town destinations are not the same. Under such conditions an even headway between cars leaving the suburban terminus becomes distorted at the point where the routes join on the return trip. One remedy for this condition, if it is serious enough to be rectified, is to shorten or lengthen the headway on one of the two routes so as to get the alternate movement desired at the suburban terminus. Another plan is to consolidate the service to the suburban terminus as far as practicable. With liberal transfer arrangements this latter change might be made a source of economy.

Other factors bearing on the question of train service economy are the enforcement of discipline in connection with running time, the elimination of an excessive number of stopping points, increased punctuality in starting cars, the reduction in time required to change crews, efficient coaching of new men by inspectors, the selection and maintenance of motive power suitable to the requirements of specific routes, and the more extended use of the telephone between street inspectors and carhouse starters. The latter remedy is especially worth considering in connection with cutting out set-back trips of perhaps a mile or two at the ends of lines, where time can in part be made up. There is no question that the use of set-back cars has been an important factor in retaining the patronage on many systems in which sharply competitive conditions are found, but they are expensive as compared with regular car movements and practically duplicate the service. Hence any means to reduce their number deserves thorough investigation from the standpoint of economical management.

THE QUESTION OF SHOP APPRENTICES

The creation of a committee on engineering apprentices by the American Electric Railway Engineering Association represents the first step in a praiseworthy attempt to raise the standard of shop labor. It is too much to expect, however, that the first report of this committee should be much more than a preliminary survey of the conditions which would aid or hinder the development of workmen who are to be specifically trained for service in electric railway shops and carhouses. There are many reasons why this must be so, because the subject is far more complex than any in which the factors of economics, sociology and human nature are not of controlling importance. Even the training of cadet engineers is simple by comparison.

The first difficulty which would have to be overcome would be that of inducing parents or guardians to indenture their boys for such an extended period as three or four years. Apprenticeship contracts are more common in European countries where traditions of the medieval trade guilds are still strong, but they have never had much chance for development in a young country with such rapid industrial changes as the United States. To overcome this prejudice it will probably be necessary to offer better wages than the prevailing rate for beginners in office or factory positions, to lay stress on the permanence of the work offered, and to assure the pupil that he will be trained to become a skilled, well-paid workman. The second difficulty relates to the employer's side of the contract. He can, of course, insist upon a clause which will permit him to discharge an apprentice who proves incompetent after say three months' or six months' trial, but he must also be able to keep the competent graduate from being tempted away by higher wages from other employers just as soon as he has become of real value to his instructors. Possibly this difficulty could be overcome by a plan by which a certain part of the apprentice's salary would be in the form of a bonus or of several bonuses, to be paid by him after the completion of his course or parts of it. The third difficulty is that involved in the ultimate aim of the courses, namely, will they lead to a foremanship or simply to the standing of master workman? Doubtless it would be easier to get and retain applicants if the higher position was promised to them, but this would be a ruinous policy since no one could tell in advance whether the boy would develop into a man with the necessary executive ability. The fourth difficulty is the unfriendly attitude of American boys, especially in cities, toward any career which calls for much manual labor. For this the boys are far less to blame than their parents. It is not unusual for fond but foolish fathers who are earning good wages as mechanics to insist that their children study for professional callings for which they have no aptitude. The inevitable consequence is that many ill-trained youngsters drift into uncertain clerkships at salaries which are generally below the earnings of the mechanic, who becomes self-supporting at a much younger age.

The foregoing comments are not intended to discourage the efforts to create a shop apprentice system, but rather to point out some of the ramifications of this

problem. The present big percentage of riff-raff shop labor can be eliminated only by training men for the special needs of the electric railway business. If this object is to be accomplished, the work must be taken in hand seriously, preferably by several companies at once, and under conditions which will attract the service of boys who are ambitious to learn a trade with ever-widening opportunities.

STUDIES IN HIGH-VOLTAGE TRANSMISSION

The convention of the American Institute of Electrical Engineers just held furnished important material for the electric railway engineer. More and more he has to deal with long-distance transmissions of power at steadily increasing pressures, and he is vitally interested in the precautions which must be taken to secure that continuous operation without which electric railroading is a cripple. It is not altogether easy to say what the actual condition of electrical power transmission at the present time really is with respect to continuous operation. Some plants within our knowledge have been kept in absolutely continuous operation for a year at a time and for twenty-four hours per day, though at a cost which one hardly dares to estimate. Other plants have broken down so often as to cause bitter complaints among the users of transmitted energy. On some systems there have been three or four breakdowns a week. Of these, it is true, most were not of long duration, and many, perhaps, were only of a few minutes' interval, but others put the system out of business for one or several hours. Even a few minutes' interruption in railway business is serious; an hour or two is a disaster to the public service. Nothing but correct design and scrupulously careful construction can secure in a high-voltage transmission anything like complete continuity of service.

Three of the papers in particular presented at the Chicago convention deal with subjects which are vital to the matter in hand. One of these is Professor Whitehead's beautiful study of the electric strength of air, which will repay careful reading. As most engineers know, the limiting factor in the increase of transmission voltage is not the dielectric strength of insulators so much as it is the failure of the air itself. The point at which this failure of the air occurs depends upon numerous factors but chiefly upon the maximum electric stress encountered and on the size and spacing of the wires. One of the things which Professor Whitehead's paper brings out with particular clearness is the fact that the critical voltage above which coronal discharge freely takes place may exist and be observed in existence only at the very peak of the wave, so instantaneous is the phenomenon, yet it responds in the fullest manner to the momentary peaks of voltage which may appear in generally smooth wave forms or may be superimposed upon them by even minor surges. Where the ultimate top of the electromotive force wave is, there one finds the real danger point as respects this coronal effect. When the coronal discharge begins there is a breakdown in the dielectric strength of the air and trouble is imminent. Another point carefully investigated was the effect of using stranded cable on the critical voltage at which the coronal discharge begins. Theory would indicate that a stranded cable presenting small surfaces of very rapid curvature would break down and show coronal discharge more easily than a smooth round wire of equivalent capacity. Such proves to be the experimental fact, although the effect varies considerably in magnitude according to the character of the cable and the absolute dimensions of its elements. Roughly one may generalize the data by saying that cables of moderate size show coronal discharge at a voltage in which it would appear on a solid conductor of about three-quarters the cable diameter. A curious point brought out in the research was that the critical voltage at which the air begins to break down falls only comparatively slightly with increasing frequency, the difference between 25 and 60 cycles being only 2 per cent.

Another paper of interest to the constructor is that of Mr. Robinson, on the computation of spans with relation to stress and sag, a thoroughly worked-out study with many important diagrams for the practical constructor's information. From a theoretical standpoint a very interesting portion of the work is the study of the actual curve of a suspended conductor. This is ordinarily treated as a parabola, although technically it is a catenary if the span is long and the conductor reasonably flexible. The ellipse and the circle have also been used as tentative curves for computation. Mr. Robinson shows that from a practical standpoint all of these curves, except the circle, represent the facts with substantial accuracy on a span of moderate length, say 80 ft. It would be interesting to know at what point of length the curves begin to diverge, although we are inclined to the opinion that for all practical cases the parabola, which has the advantage of a simple equation, meets the requirements sufficiently well.

In another paper Mr. Thomas goes over the sag calculations by a different method, involving the application of the catenary, and his work also indicates pretty close similarity between the results obtained from this curve and from the parabola.

Finally, a long and important paper by Mr. Austin on the suspension insulator comes to the front, too long even for adequate abstract, but it should be carefully studied by those planning high-tension lines. One of the most important points brought out in it, however, is the great effect of the testing time upon the endurance of insulators at high pressures. There is a species of surging effect due to prolonged stress which may not appear at all under ordinary conditions of testing, but must be taken into account if a high factor of reliability is expected upon the resulting line. Mr. Austin's conclusions are strongly in favor of the suspension type of insulator, which now seems to have passed completely out of the experimental stage and to have reached a point at which it is to be considered a practical necessity in dealing with extreme voltages. The critical condition of all high-voltage insulator practice is that encountered in stormy weather, when the surface gets thoroughly wet, and this in particular is best met by the suspension type of insulator. In one of Mr. Austin's tables tests are reported in which the insulators held up to more than one-quarter of a million volts wet before flashing over and had double this insulating capacity when dry. These figures seem preternaturally high, but 2.5 is certainly not too large a factor of safety to allow on a line important enough to be worked on 100,000 volts.

CENTER-ENTRANCE CARS

The design of cars for city service is not alone a matter of structural details and general dimensions. Great progress has been made along these lines in recent years, particularly as regards reduction of weight, but the operating features of modern cars have been subject to far more radical changes, and the end is not yet in sight. Nearly every progressive street railway manager is studying the problem, and new ideas are being brought out almost daily. The most recent innovation, and one of the most radical, in operating features is the "near-side" car, which was illustrated and described in this paper last week. The center-entrance car is another departure from ordinary practice, which, while it is not new, seems to be gaining steadily in favor, as its many advantages are being recognized more generally.

Perhaps the most extended use of the center-entrance is being made in Denver, where it has long been the standard. Many railway men who attended the Denver convention saw cars of this type in operation for the first time, and their comments were almost universally favorable. At that time Seattle was the only other large city in which center-entrance cars were in use, but during the past two years a number of center-entrance cars have been built and placed in operation by several different companies. Among them may be mentioned the Oklahoma Railway, Pittsburgh Railways, West Penn Railways, Port Arthur Traction Company and Shore Line Electric Railway, not to mention a few other instances in surface traction and the center-entrance subway and elevated cars in Boston, New York and Philadelphia.

From an operating standpoint the center-entrance car has several marked advantages. The car is divided by the steps into two halves, and in loading and unloading the congestion at the entrance and exit is greatly reduced by reason of the fact that passengers have only half as far to move as in the ordinary end-entrance car. The prepayment principle and, if desired, gates or doors over the steps can be applied to center-entrance cars quite as easily as to end-entrance cars. While the conductor stands all the time at the entrance and exit, he is inside the car, where he is protected from the weather and has a clear view in both directions, so that he can see the signal of any passenger who wishes to alight. By the use of doors to close the step opening a center-entrance car can be kept much warmer in cold weather than is possible with a car having end doors, which frequently are opened while the car is in motion.

The seating capacity of a center-entrance car is proportionately larger than that of an end-entrance car of the same over-all length, by reason of the elimination of the end platforms. For cars which are operated always in one direction the entrance and exit passageways are required on one side only, and the entire length of the car body with the exception of a step opening on one side, not exceeding 6 ft. wide, can be utilized for seats. For double-end operation, of course, an entrance and exit must be provided on the opposite side of the car, but by using trap-doors to cover the step opening and folding seats such as are used in the New York subway cars this space can also be utilized for seats, as in cars operated in one direction only.

The center-entrance car has another advantage in preventing accidents which is attained also in the "near-side" car, described last week. The passenger who alights must wait for the car to proceed half its length before crossing in the rear and running the risk of being struck by a car or vehicle passing on the opposite track. In the matter of speed of operation it has been found by experience in the New York subway that, no matter how wide the end doors are made, passengers will leave the car in a single line and will board the car in the same way. A center-entrance car with a railing dividing the steps in the center affords two separate passages for entrance or for exit. In leaving the car the passengers move toward the center in two converging streams and in boarding they move up the steps and toward opposite ends of the car in two separate lines. Except at transfer points, where the operation of collecting ticket fares is always done more quickly than cash fares can be handled, the usual conditions in street railway operation are that most of the passengers board the car at points where few passengers alight, and vice versa. The advantage of having widely separated exits and entrances, therefore, is more apparent than real.

One possible disadvantage of the center-entrance car is the fact that if the stops are made at street intersections so that the step is opposite the crosswalk, either the front end or the rear end of the car projects beyond the curb line of the intersecting street, depending upon whether the stop is made at the near side or the far side. Where the streets are paved this objection is not a serious one, and as a rule the unpaved streets in most American cities are in the outskirts, where traffic on the intersecting street would not be obstructed.

Structurally the center-entrance car is more difficult to build and maintain without sagging at the center than the end-entrance car. With most steel cars the lower half of the side is designed as a plate girder and is depended upon to carry a large part of the load between the bolsters. Even in wooden car construction the side sill and the posts and braces below the belt rail form a structure which has considerable stiffness and will carry a good part of the load. If the entire side of the car from the sill to the plate is cut away at the center to form entrance and exit passages the strength of the side framing is largely destroyed. By lowering the top of the step opening somewhat below the level of the side plate it is possible to reinforce the side framing around the step opening in such a way that its strength is only slightly diminished. Still another method of getting around the difficulty is to use deep center sills to carry the entire load and make the sides of the car just as light as possible. The entire floor load and the weight of the body framing may then be transmitted to the center sills through transoms and cross bearers in much the same way as is done in the Long Island Railroad steel cars, which were described in the ELECTRIC RAILWAY JOURNAL of June 17. On the other hand, if the side sill should be left intact, one or two steps like those supplied by the running boards of open cars could be used, or folding steps might be employed.

Electrification of the Hoosac Tunnel

The Hoosac Tunnel of the Boston & Maine Railroad Is the Longest Railroad Tunnel in the United States. All Trains Are Now Being Hauled Through It by Electric Locomotives Receiving Single-Phase Alternating Current at 11,000 Volts from Overhead Trolley Wires. The Catenary Construction, Repair Shops and Operating Features Are Described in This Article.

On May 27 the Boston & Maine Railroad began operating all freight and passenger trains through the Hoosac tunnel with electric locomotives. In a little more than eight months from the time the electrification work was authorized by the directors both tracks in the tunnel and the yards and approaches on each side, a total of 21.31 miles of single track, were equipped with overhead trolley wires, a power house of 6000-kw capacity was designed and constructed, a high-tension transmission line 2.42 miles long was erected and five electric locomotives were built. At no time during the construction work was the operation of trains through the tunnel by steam locomotives interfered with, although the installation of the wires and supports in the tunnel was carried on under the most trying and dangerous conditions.

The Hoosac tunnel is the longest railroad tunnel in the United States. It pierces the range of high hills between the valleys of the Hoosac and Deerfield Rivers, and is 25,031 ft. long from portal to portal. It was begun in 1851 by the Troy & Greenfield Railroad and it took twenty-four years to complete the work. The first train went through the tunnel on Feb. 9, 1875. As it forms part of the main line of the Fitchburg Division of the Boston & Maine Railroad connecting Boston with Albany and Troy, N. Y., the traffic passing through it is very heavy, averaging 95 to 100 trains per day in both directions. With steam locomotives hauling trains the twelve minutes required to pass through the tunnel cause great discomfort to passengers, and the longer time required for freight trains results in frequent blockades at the portals and long delays. When the Boston & Maine passed into the control of the New York, New Haven & Hartford Railroad in the summer of 1910, one of the first official acts of President Mellen of the New Haven was to order the immediate electrification of the Hoosac tunnel and the approaches at each end, including the North Adams yard.

The single-phase alternating-current system with overhead catenary construction and 25-cycle, 11,000-volt current was adopted in view of the marked success of this system on the main line of the New York, New Haven & Hartford Railroad between Woodlawn, N. Y., and Stamford, Conn.



Hoosac Tunnel—Cross-Catenary Construction in North Adams Yard

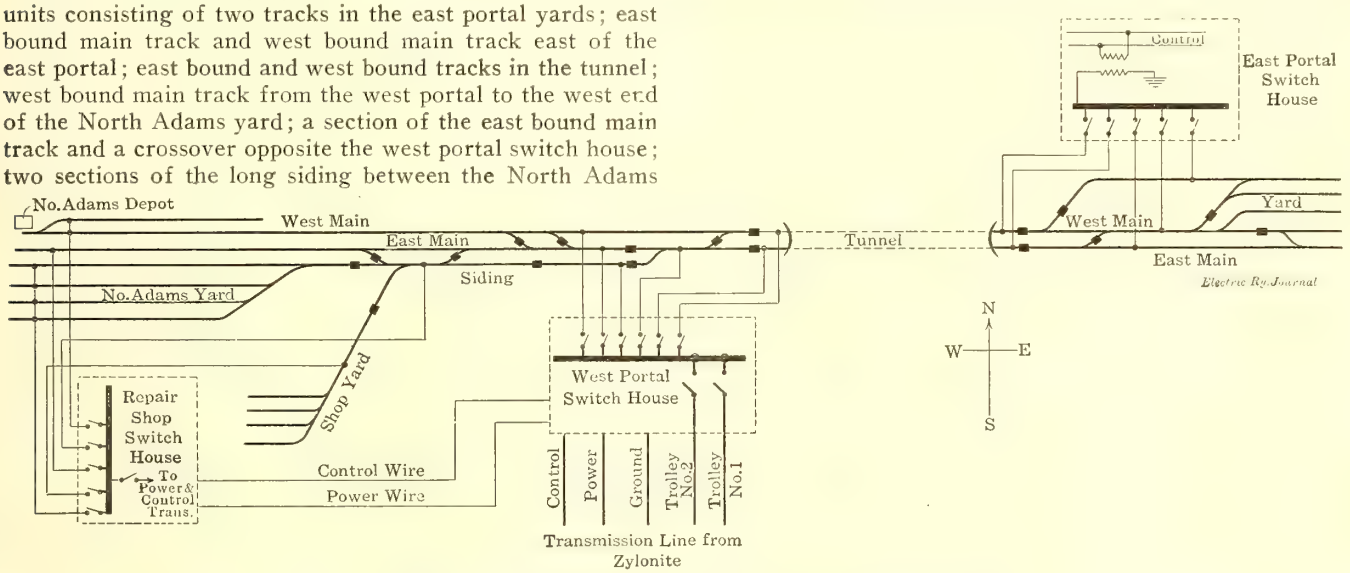
The electrification project was assigned to the engineering department of the New York, New Haven & Hartford Railroad, of which E. H. McHenry is vice-president and W. S. Murray electrical engineer; all plans involving policy of electrical operation and details of construction being there developed. The firm of L. B. Stillwell was retained as engineers locally in charge of the work, H. S. Putnam being placed in immediate charge of making many of the detail working plans, placing contracts and supervising the construction. A contract covering the installation of the overhead trolley and transmission line and the erection of the power house building, repair shop and switch house buildings was made with F. T. Ley & Company, Inc., Springfield, Mass., as general contractor, and actual construction was begun on Nov. 1, 1910.

GENERAL PLAN OF ELECTRIFICATION

The electrified zone, which is 7.92 miles long, begins at the west end of the North Adams yard, 2.09 miles from the west portal of the tunnel. Just east of the North Adams depot is a yard with five side tracks in addition to the two main tracks, all of which have a trolley wire above them. Between the east end of this yard and the west portal are three tracks. Through the tunnel are two tracks and just outside of the east portal is a yard about ¾ mile long consisting of from three to five tracks. Single catenary construction is used throughout. Where more than three tracks are covered the wires are supported by cross-catenary cables attached to steel A-frame towers. For the two and three-track sections outside of the tunnel trussed steel bridges are used to support the wires. In the tunnel the messenger cables are suspended on insulators supported on special hanger brackets carried by bolts in the rock roof.

Current is generated at 11,000 volts, single-phase, at the Zylonite power station and is transmitted at that potential to a switch house at the west portal of the tunnel, a distance of 2.42 miles, over a double-circuit transmission line, consisting of five wires carried on steel towers. Two wires carry the trolley current, one is a ground wire, one carries current for power and lighting, and the remaining wire supplies energy for the operation if the remote-control high-tension switches in the switch houses.

The overhead trolley system is sectionalized into twelve units consisting of two tracks in the east portal yards; east bound main track and west bound main track east of the east portal; east bound and west bound tracks in the tunnel; west bound main track from the west portal to the west end of the North Adams yard; a section of the east bound main track and a crossover opposite the west portal switch house; two sections of the long siding between the North Adams yard and the west portal switch house; the shop yard; four tracks in the North Adams yard, and the east bound main track from the west end of the North Adams yard to the west portal switch house.



Hoosac Tunnel—Diagram of Trolley Feeders and Sectionalization

The trolley bus in the west portal switch house feeds the two tunnel sections, the east bound and west bound main tracks west of the portal, the easterly section of the long siding and the short section of the east bound main track and the crossover opposite the switch house. At the east portal of the tunnel both trolleys in the tunnel are connected to a trolley bus in the east portal switch house, from which three sections beyond the tunnel are fed. In the repair shop switchhouse the east bound and west bound main track sections, which are fed from the west portal switch house, are connected to a trolley bus from which are fed in turn the North Adams yard, the shop yard and the westerly section of the long siding track. It will be seen therefore that the switch houses at the east and west ends of the system are not connected to the main transmission line but are fed through the trolley wires of one or both main tracks. As long as current is on either one of the main track trolley wires the remainder of the system can be operated.

A control wire and power wire connect the west portal switch house and the repair shop switch house, but no separate high-tension wires are run through the tunnel, and the control circuits, lights and motors in the east portal switch house are fed through a transformer connected directly to the trolley bus.

CATENARY CONSTRUCTION

The supporting bridges and cross-catenaries in the yards are spaced 150 ft. apart on tangents and curves of moderate radius. The messenger cable over each track is stranded steel ⅝ in. in diameter. Below it is a No. 0000 grooved copper conductor wire suspended by rigid hangers of varying lengths at intervals of 10 ft. The contact wire, which is No. 0000 grooved Phono-electric, is carried 1¾ in. below the copper conductor wire by double clips attached in the center of the 10-ft. spans between hangers. On curves the conductor and contact wires are both suspended from the messenger by inclined hangers having double clamps which hold the two wires in a vertical plane. This construction was illustrated in the ELECTRIC RAILWAY JOURNAL of April 16, 1910. These hangers offset the contact wire toward the inside of the curve a sufficient distance to compensate for the deflection of the pantograph shoe due to the super-elevation of the outer rail. Outside of the tunnel the normal height of the contact wire above the rails is 22 ft.

In the tunnel the catenary span is reduced to 100 ft. and two No. 0000 Phono-electric contact wires are carried in the same horizontal plane by twin hangers. In order to provide maximum conductivity a ⅝-in. stranded copper cable is used for the messenger. Owing to the limited clearances under the roof of the tunnel the two Phono-electric contact wires over each track, which are mounted in the same horizontal plane 5 in. apart, are lowered to 15 ft. 6 in. above the rails and the messenger cables are suspended 14 in. inside the center line of each track. This gives a minimum clearance of 12 in. between the messenger and the roof of the tunnel. The brackets which support the messenger insulators are in turn carried on secondary insulators resting on hangers dropped from the roof. The position of the hangers is adjustable vertically by varying the length of the hanger bolts, and the primary insulators can be adjusted horizontally on the lateral brackets to provide for slight changes in alignment.

The twin contact wire hangers used in the tunnel are of special design to allow some vertical movement of the trolley wires. They consist of a yoke carrying the two trolley wire clips and a suspension rod ½ in. in diameter on the top of which is screwed the messenger cable clamp. The suspension rod passes through a tapered hole in the center of the yoke, and a spherical faced nut is screwed on

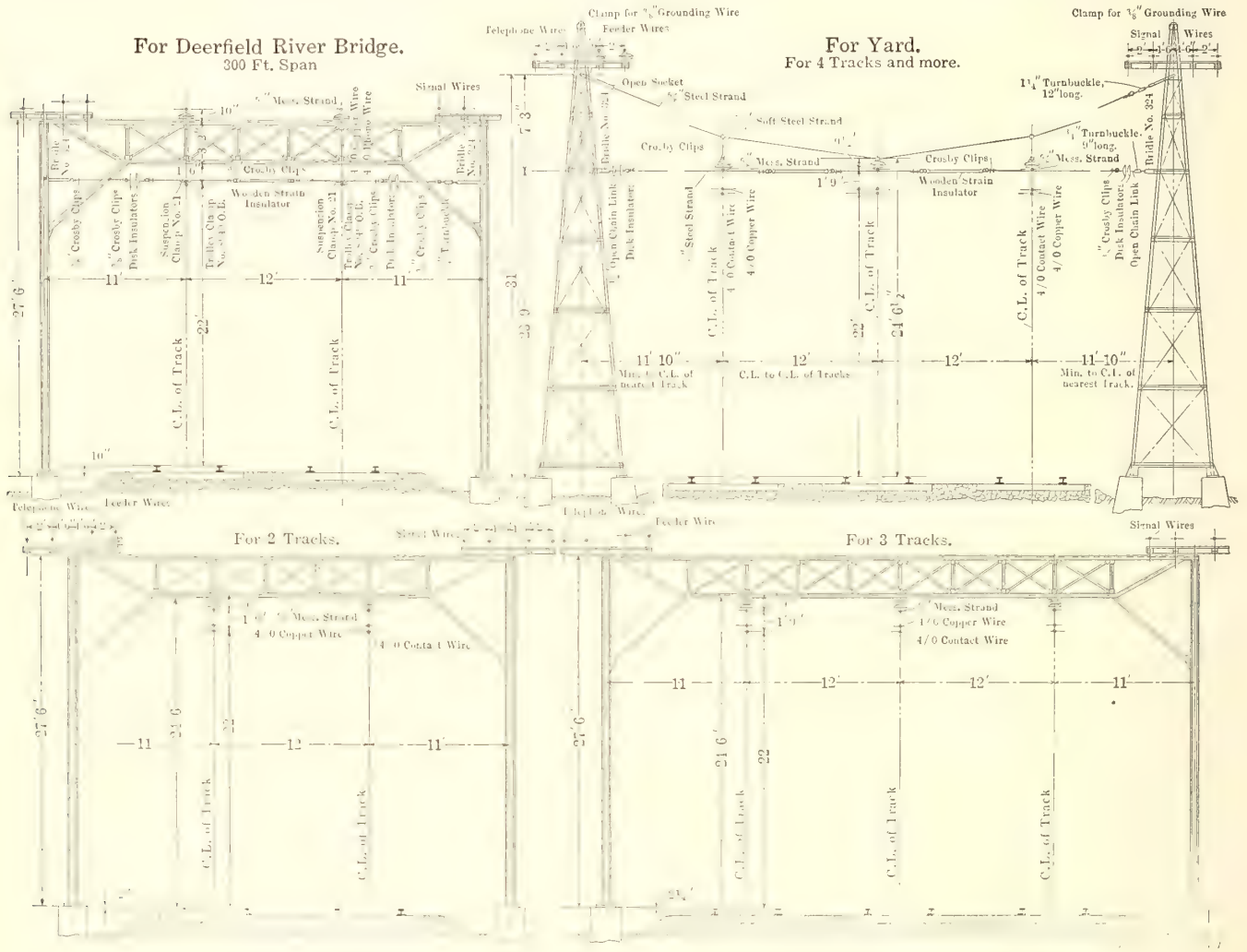
the bottom of the rod. The yoke is slotted and the nut on the end of the suspension rod is free to move in this slot through a vertical distance of about 1½ in. All parts of the tunnel hangers are made of bronze.

INSULATORS

In the tunnel the primary and secondary insulators are of brown porcelain of the triple petticoat pin type. Each insulator is capable of resisting 150,000 volts to ground, and as the primary and secondary insulators are in series the combined dielectric strength is 300,000 volts. The outside insulators are of the suspended type. They consist of an upper petticoat with the concave side turned up in the shape of the brim of a hat and a lower semi-spherical petticoat 15 in. in diameter with the concave side down. A hollow malleable iron pin is cemented into the lower petticoat and the malleable iron cap by which the insulator is suspended is cemented on the outside of the upper petticoat. These insulators were all required to stand a dry test of 110,000 volts, or ten times the normal working voltage. The strain insulators used for dead-ending the messenger cables and contact wires are of porcelain of the spool type and each one was tested to 110,000 volts under 35,000 lb. mechanical strain before erection. They have an ultimate tensile strength of 50,000 lb. For cross-catenary steady strain wire attachments two disk insulators in tandem were used at each anchorage. Impregnated hickory wooden strain insulators are inserted in the steady strain cables between each pair of tracks where required to preserve the sectionalization of the trolley wires.

BRIDGES AND CROSS-CATENARY CONSTRUCTION

The supporting bridges for the two and three-track sections outside of the tunnel are built-up trusses formed of 7-in. and 8-in. channel top and bottom chords with light angle posts and double diagonal rod braces in each panel. The two-track bridges have a span of 34 ft. and the three-track bridges a span of 46 ft. They are supported at each end by A-frame towers constructed of two 8-in. channels braced with light angles. The plane of these towers is parallel to the center line of the tracks. The channels have bed plates riveted on the bottom for bolting them down on the concrete foundation piers. An angle cross arm for supporting the feeder, telephone and signal power wires is attached at each end to the top channel of the bridge truss. In the yards where more than three tracks are equipped with overhead wires the cross-catenary span wires are suspended from A-frame steel towers built of 8-in. channels. The legs of these towers, however, lie in a plane at right angles to the track. The cross-catenary cable, which is stranded steel, ⅝ in. in diameter, is attached either at the apex of the towers or just below the single steel cross arm. From it are suspended the messenger cable insulators by 5/16 in. stranded steel wires of suitable length. The steady strain cable is stranded steel ⅜ in. in diameter and is attached to the tower on each side by a bridle and two disk strain insulators in tandem. Each tower is grounded with a ⅜-in. cable running up to the apex, where it is securely clamped. The anchor bridges are box trusses supported on heavy A-frame towers with latticed legs stiffened with double diagonal braces.



Hoosac Tunnel—Types of Supporting Bridges and Cross-Catenary Construction

TUNNEL VENTILATION

The erection of the hanger brackets and stringing of wires in the tunnel was carried on under the most difficult working conditions. Only one track at a time was given up to the contractors and trains were operated constantly on the other track at intervals as frequent as safety permitted. At all times when work was being done in the tunnel

the air was very bad because of the smoke and gases from oil and coal-burning locomotives passing through on the single track in use. After the passage of a train, all work had to be suspended for ten to twenty minutes, sometimes longer, to allow the worst of the smoke to clear out. It was found necessary to construct air compartments on the train supplied with cleaned air from the compressor car to serve as refuges for the men during such periods. Owing to atmospheric and traffic conditions, the construction force was able to utilize less than one-half the time in actual work. These factors more than doubled the time that would otherwise have been necessary for the construction work in the tunnel. The tunnel is ventilated from a central shaft 1100 ft. deep, at the top of which is a large suction fan which draws fresh air into the tunnel from both portals and exhausts the smoke and gases up through the shaft. With a strong wind from the east or west the far end of the tunnel is sometimes very poorly ventilated.

CONSTRUCTION TRAINS

The railroad furnished and equipped for the contractor two special tunnel work trains, each consisting of an oil-burning locomotive, two locomotive tenders, a box car containing an engine-driven generator, a box car containing three blacksmiths' forges and anvils, an air compressor car, thirteen platform cars, a coach fitted up as a dining car and a freight caboose. The platform cars were ordinary flat cars on which were built working platforms 11 ft. above the rail with low sides to prevent the workmen from falling off. Posts 6 in. x 4 in. were set in each stake pocket and cross beams of the same size were framed across to support the 2-in. plank floor. The car floors and the working platforms were made continuous throughout the train by steel aprons at the ends. Trap doors were built in each working platform so that the men could reach the car floor by ladders. A 1½-in. air pipe for the compressed air supply was run along each side of the working platforms and globe valves were inserted at frequent intervals for attaching the drills. On the floor of every third platform car a wooden air lock 14 ft. x 5 ft. x 4 ft. was built, into which the men could retreat during and after the passage of a train. An air valve was provided inside these locks which when partially opened created sufficient pressure to keep out the surrounding smoke and gases and provided fresh air for the men in the lock.

The equipment on each train for drilling the roof holes for the hanger bolts consisted of seven H.C.-12 Ingersoll-Rand hammer drills and several pneumatic hammers which were used for drilling holes in the side walls for the attachment of signal cable brackets. In the compressor car, which was placed next to the locomotive, was mounted a steam-driven class A-1 compressor with a capacity of 285 cu. ft. of free air per minute. It received steam from the locomotive at 90 lb. pressure and delivered the air at 90 lb. pressure into a receiving tank of 77 cu. ft. capacity. A small steam pump was used for pumping cooling water from the tenders through the compressor jacket and back to the tenders. The compressor intake was carried down close to the rails, where the air was purest, and was covered with a fine-mesh wire screen to keep out as much dust and dirt as possible.

The generator was a 28-kw direct-current machine, and was driven by a marine engine supplied with steam from the locomotive. In spite of the moisture and dirt in the tunnel at all times neither of the generators on the two trains failed in any way during the time they were in use. The trains were wired throughout and six sockets for attaching five-light reflector clusters were placed along the railings of the working platform on each car. Strings of incandescent lights were also run along the sides of the cars for general illumination of the tunnel walls. Each train was also equipped with a system of signal lights in the caboose, locomotive cab and compressor car by means of which the conductor could signal the engineman to move the train forward or back and signal the compressor attendant to start or stop the compressor.

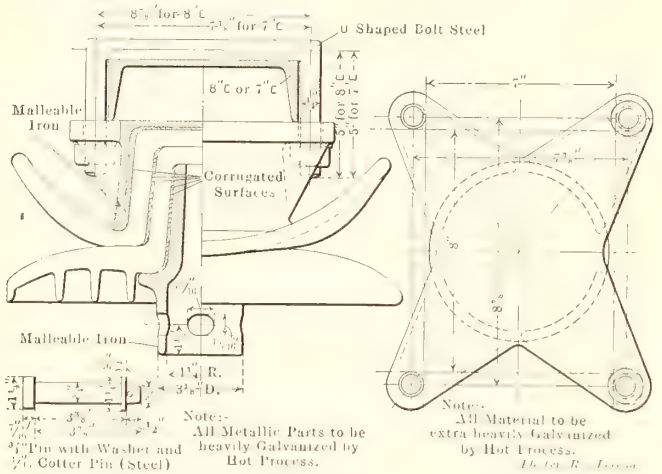
The coach, which was fitted up as a dining car, was used to supply the men with hot coffee and sandwiches and to heat any other food the men brought with them. In order to stand the effects of the smoke and gases it was found necessary to keep the men well supplied with food, and they were alowed to go back to the dining car at frequent intervals to get food or coffee. The dining car was fitted with an air valve the same as the locks on the platform cars so that the air was kept fresh at all times. A complete outfit of surgical and first-aid-to-the-injured supplies was kept in the dining car, as also were an oxygen tank and air helmet for rescuing any one overcome by gas out in the tunnel. These helmets were never needed, however,



Hoosac Tunnel—Three-Track Bridge Supports on Tangent

although a number of men were overcome during the construction work.

About forty men were employed on each train. These included a foreman in charge, four sub-foremen, one steam engineer, one electrician, one carpenter, one cook, one blacksmith and helper, and thirty laborers, in addition to the locomotive engineer and fireman, brakeman and con-



Hoosac Tunnel—Suspension Insulator for Outside Catenary

ductor. In spite of the trying conditions under which the men worked not a single man employed on the tunnel trains quit work while the construction was in progress. The construction forces of the contractor were directed by M. J. Daly, general foreman in charge of the work.

CONSTRUCTION WORK IN THE TUNNEL

The construction work in the tunnel included the drilling of 1000 holes 2½ in. in diameter and 18 in. deep in the roof of the tunnel for the catenary hangers; 1500 holes 1¾ in. in diameter and 6 in. deep in the side walls for telephone and signal cable hangers; drilling and blasting down the rock roof of the tunnel in many places to obtain the necessary clearances and erecting the catenary and trolley wires. A preliminary survey of the tunnel was made to determine the height of the roof at the hanger locations so as to prepare in advance the hanger rods of proper length. This survey also showed that the roof would have to be blasted down in many places to obtain the necessary clearance.

The first work train was run into the tunnel on Nov. 6,

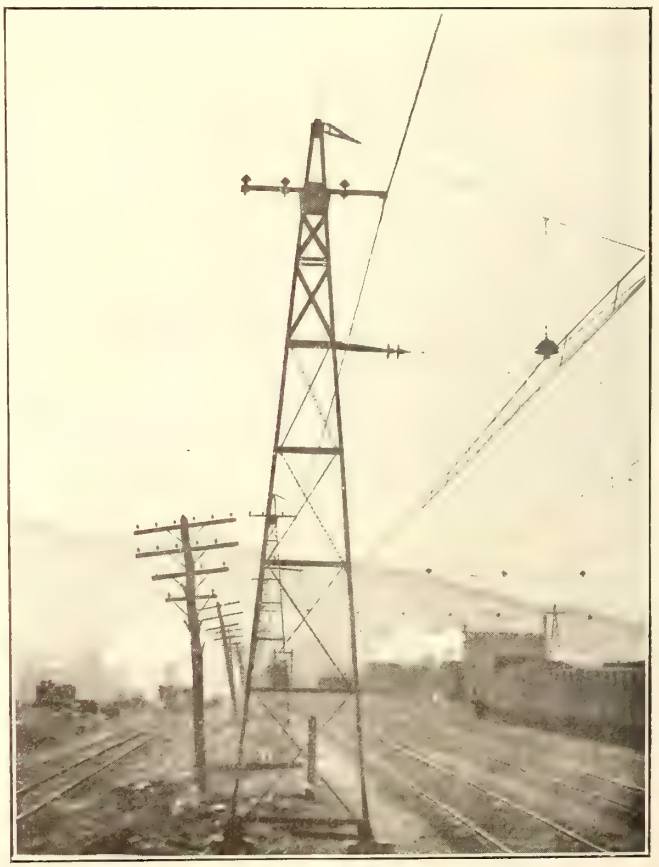


Hoosac Tunnel—Erecting Tunnel Catenary Brackets

1910, and the second was equipped and put in use on Nov. 29. Both trains were stored in the North Adams yard when not in the tunnel. The work of drilling the roof and side wall holes was carried on from both ends of the tunnel, with the two trains progressing toward the central shaft. It was necessary to keep the two trains on opposite sides of the central ventilating shaft with the locomotives always coupled to the ends of the trains nearest the shaft so that the men on the platform cars would not be bothered by the gas of either locomotive. One track was given over to the work trains for periods of from nine to twelve hours, beginning at 5:30 a. m.

The drilling of holes for the roof bolts was carried on simultaneously at five locations 100 ft. apart above each train. The train was spotted by manipulating the conductor's valve on the caboose and was moved only as required by the progress of the drilling. The time required to drill each hole varied from twenty minutes to four hours. Some of the rock was very hard and at one location 65 drills were required to drill three holes each 18 in. deep. A large stock of drills was carried on each train and one or two blacksmiths and helpers worked continuously in the forge car sharpening the drills as they were removed from the drilling machines. All holes required for blasting down the roof were drilled from the work trains, but the blasting and cleaning up was done by the force of miners regularly employed in the tunnel by the railroad company.

The drilling above the west-bound track was completed before the east-bound. As the roof holes were drilled the bolts were set as the work progressed. In the brick portion of the tunnel 1½-in. double extra-heavy wrought-pipe bolts were used and in the rock portion 1¼-in. solid wrought-iron bolts. In both cases the bolts were split at the upper end and were hammered home on a wedge. Prior to setting the bolt the hole was filled with a plastic mixture of neat cement, the surplus cement being forced out as the bolt was driven home. To fill the holes with cement a brass tube was first filled and inserted into the hole. As it was



Hoosac Tunnel—Tower for Cross-Catenary Span

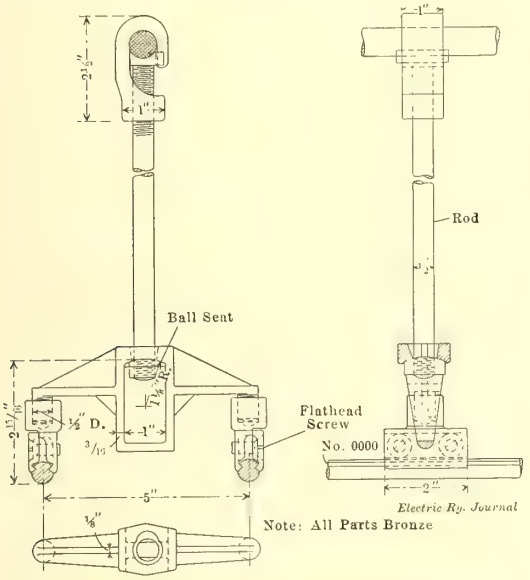
withdrawn a rammer or plunger was used to ram the plastic mixture into the bottom of the hole to make sure that no air pockets were left. The cement rather than the wedge was relied upon to hold the bolt securely. Though these bolts were afterward subjected oftentimes to severe strains in the erection of the brackets and catenary material, not a single bolt showed any signs of weakness. The bolts

are threaded at the lower end to receive a bronze coupling, which in turn receives a bronze nipple of the proper length for the support of the special bracket to bring the trolley wires 15 ft. 6 in. above the rail. Each bronze coupling is provided with a flange on its lower side for the support of a cement cone, which protects the support from corrosion at the point of contact with the roof of the tunnel.

The U-shaped hangers which are parallel to the rails were then attached over each track and leveled up, after which the secondary insulators were applied and the cross hangers put up. The messenger cable and both trolley wires over each track were strung simultaneously. The messenger was pulled up to the proper sag and the trolley wires were adjusted as to tension with a dynamometer at every fifth hanger, where they were clamped preparatory to clipping.

OUTSIDE CONSTRUCTION

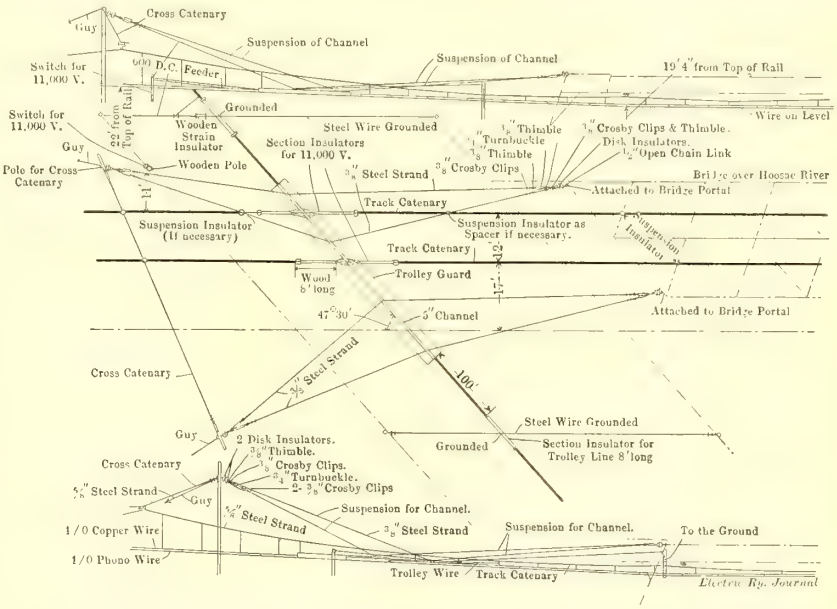
The steel towers and bridges outside of the tunnel were all erected with a derrick car furnished by the railroad. A train of platform cars was equipped at each end of the tunnel for stringing the wires. These cars had platforms 17 ft. high above the rails for convenience in working on the trolley wires, which are suspended 22 ft. above the rails in the open. The steel messenger cable and the trolley wires for the open sections were received from the manufacturer in lengths of about 1 mile and were run out simultaneously as in the tunnel. All of the steel catenary bridges, cross-catenary towers and transmission line towers were fabricated by the Archbold-Brady Company, Syracuse, N. Y.



Hoosac Tunnel—Twin Hanger for Tunnel Trolley Wires

TROLLEY CROSSING IN NORTH ADAMS

An interesting detail of the overhead construction is a crossing of the two 11,000-volt a.c. trolley wires with a single 600-volt d.c. trolley wire of the Berkshire Street Railway on State Street, North Adams, just west of the passenger station. The crossing is at an angle of 47 deg. 30 min., and the high and low-tension wires are in the same horizontal plane. The 600-volt trolley is sectionalized with wooden section insulators 8 ft. long at a distance of 100 ft. on each side of the crossing, and is carried over the crossing under an inverted 5-in. channel which is supported by four ⅜-in. stranded steel cable span wires. The 11,000-volt trolley wires are sectionalized with similar section insulators inserted on each side of the channel, so that the d.c. trolley wire normally carries no current of any kind. On the north side of the crossing a feeder is taken off the 600-volt trolley wire and carried to a switch mounted on top of a wooden pole set just outside the curb line. The other side of this switch is connected to one of the steel span wires supporting the crossing channel. A wooden rod runs down the pole from the switch and by pushing up on this rod the switch may be closed and 600-volt direct current fed to the crossing channel and trolley wire so as to permit a street car to pass over the crossing with current on. As soon as the switch rod is released it drops by gravity and opens the switch again. The section insulators in the 600-volt trolley are grounded at the center of their length so that the 11,000-volt current cannot leak past them to the d.c. trolley in case of breakdown of any of the 11,000-volt section insulators. The only combination by which 11,000-volt current can be fed to the d.c. trolley is that the pole switch be closed while a locomotive is on the crossing with one pantograph on the trolley wire and the other on the crossing channel.



Hoosac Tunnel—Crossing of 11,000-Volt and 600-Volt Trolley Wires in North Adams

OPERATION OF TRAINS DURING CONSTRUCTION

While the construction trains were at work on one track in the tunnel freight and passenger trains were operated in both directions over the other track with the use of a train staff, the 5-mile tunnel section constituting an absolute block. As soon as the work trains emerged from the tunnel after a day's shift normal operation was restored on both tracks. Right-of-way was given to passenger trains at all times and as a consequence freight trains often filled the yards at both ends. In order to pass the maximum number of cars through the tunnel while both tracks were open, from three to five freight trains frequently were coupled together with all the locomotives at the head end. During the time construction work was in progress the traffic was the heaviest ever handled on the Fitchburg division. In January 52,000 cars passed through the tunnel in both directions.

ELECTRIC LOCOMOTIVES

Five electric locomotives have been built for hauling freight and passenger trains. Two of these locomotives have a high-gear ratio and are intended for hauling passenger trains through the tunnel. Otherwise they are of the same size, weight and design as the three locomotives which will haul freight trains. The locomotives are of the articulated truck type, each truck consisting of two pairs of driving wheels 63 in. in diameter and a pair of radial pony wheels. The general design is the same as locomotive No. 071, of the New York, New Haven & Hartford Railroad, which was described in the ELECTRIC RAILWAY JOUR-

nal for Sept. 25, 1909, and May 7, 1910. To each pair of driving wheels is geared a single-phase motor of 396 hp, normal hourly rating. The motors are spring-supported on the truck frames. The freight locomotives will each haul a trailing load of 1600 tons up the 0.5 per cent grade in the tunnel at a speed of 20 m.p.h.

It is expected that the five locomotives will be able to handle all trains through the tunnel for some time to come. By coupling and uncoupling the electric locomotives at the tunnel portals and not running them through the yards at each end, considerable time can be saved in the event of very heavy traffic movement or temporary breakdown of one of the locomotives. The intention, however, is to haul all trains from end to end of the electric zone by electric locomotives so as to give the crews of the steam locomotives ample time to get their fires in the proper condition to give off the minimum smoke and steam while drifting through the tunnel. The steam locomotives of all trains will be hauled through the tunnel.

TRAINING OF CREWS

Twenty electric locomotive crews were selected from among the oldest locomotive engineers and firemen on the division, who were given an opportunity to apply for the positions. These crews were sent to Stamford, Conn., for a period of three weeks or longer to study the operation of the New Haven electric locomotives. Their salaries and expenses were paid by the railroad during this instruction period. The men were instructed in the practical details of operation and emergency repairs under the direction of H. Gilliam, electrical superintendent at Stamford, and were given a thorough examination before returning to North Adams. Practice runs were made by all the men in the North Adams yard for several weeks prior to beginning regular operation.



Hoosac Tunnel—Anchor Bridge at East End of North Adams Yard

LOCOMOTIVE REPAIR SHOPS

A brick building, 109 ft. 4 in. x 78 ft. 4 in., has been built at the east end of the North Adams yard for use as a locomotive house and repair shop. Four tracks enter the building at the east end; a fifth track for storing wheels is built between two of the entrance tracks in the south bay, which is spanned by a 15-ton electric traveling crane. The two tracks in the north bay have pits 50 ft. long and extend beyond the ends of the pits 29 ft. In the south bay the two entrance tracks have pits 36 ft. long, which are connected at the west end by a cross pit 6 ft. wide, used for wheel changing. In a one-story brick lean-to, 10 ft. 4 in. x 87 ft. 5 in., on the south side of the building are a washroom, office for the electrical superintendent, tool room, store room and heater room. A switch house, 24 ft. x 24 ft., adjoins the locomotive house on the northwest corner. The tool equipment includes a shaper, drill press, 42-in. lathe, 14-in. lathe, and two grinders. These tools are all belt driven from shafting mounted on the west wall above the windows, which in turn is driven by a 15-hp motor mounted on a wall shelf. A motor-driven air compressor supplies compressed air, which is piped into each pit for blowing out motors and other apparatus on the locomotives.

In the cross pit in the south bay are three hydraulic jacks, one under each track. These jacks have been installed for wheel changing and other heavy repairs requiring the lifting of the locomotive trucks. The floor of the cross pit is 5 ft. 4 in. below the shop floor, and the jack cylinders, which are 16 in. in diameter inside and 9 ft. long, are sunk flush with the floor of the pit. The jack plungers are 6½ in. in diameter and are roughened on top. With 220 lb. water pressure supplied by a motor-driven pump, a load of 22 tons can be lifted by each jack. Two 90-lb. rails are laid in the floor of the cross pit to a gage of 3 ft. 4 in., so that wheels can be moved to one side on two small trucks.

OPERATING ORGANIZATION

The operation and maintenance of the overhead and transmission lines and electric locomotives is in charge of L. C. Winship, electrical superintendent. The power house is in charge of C. H. Baker, chief engineer. In all matters relating to locomotive repairs the electrical superintendent reports to the division master mechanic and in the maintenance of the overhead lines to the engineer of maintenance of way. J. D. Tyter, assistant superintendent in charge of the western district of the Fitchburg division, has authority over the electric locomotive crews and all other matters pertaining to operation of trains through the tunnel.

POWER HOUSE AND TRANSMISSION LINE

The new power house at Zylonite, 2½ miles south of North Adams, and the transmission line connecting the power house and the switch house at the west portal of the tunnel will be described in a second article which will be printed in an early issue.

Standard Car of the New South Wales Government Tramways

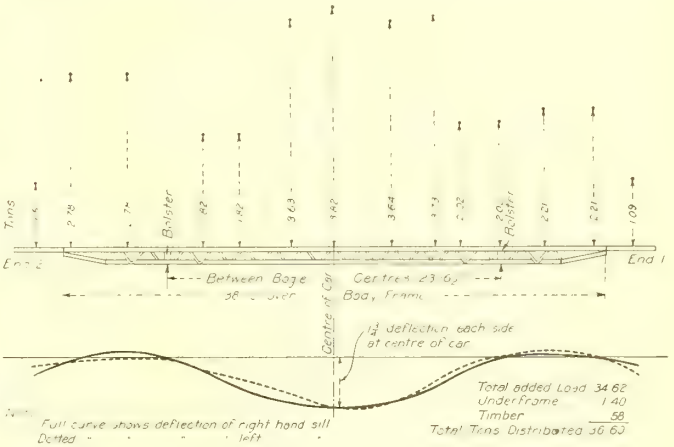
This Type of Car Combines Large Seating Capacity with Exceptionally Light Weight. The Body Is Framed Separately from the Structural Steel Underframe and Is Bolted Down on the Underframe.

The New South Wales Government Railways & Tramways has in service in Sydney 195 double-truck cars of an interesting design which has been adopted as standard by the tramways department. They are of the combination open and closed type and seat eighty passengers in sixteen cross seats arranged back to back. The inclosed section of the car body, which is 19 ft. long, contains eight cross seats and is entered from the running boards through four double sliding doors in each side. The open sections at each end are inclosed by canvas curtains which are stiffened with galvanized iron strips sliding in grooves in the posts. Glass-inclosed motormen's vestibules are provided at each end of the cars. These vestibules are narrower than the car body, and are tapered to allow proper clearance between two cars passing on a curve of 66-ft. radius with tracks on 12-ft. centers.

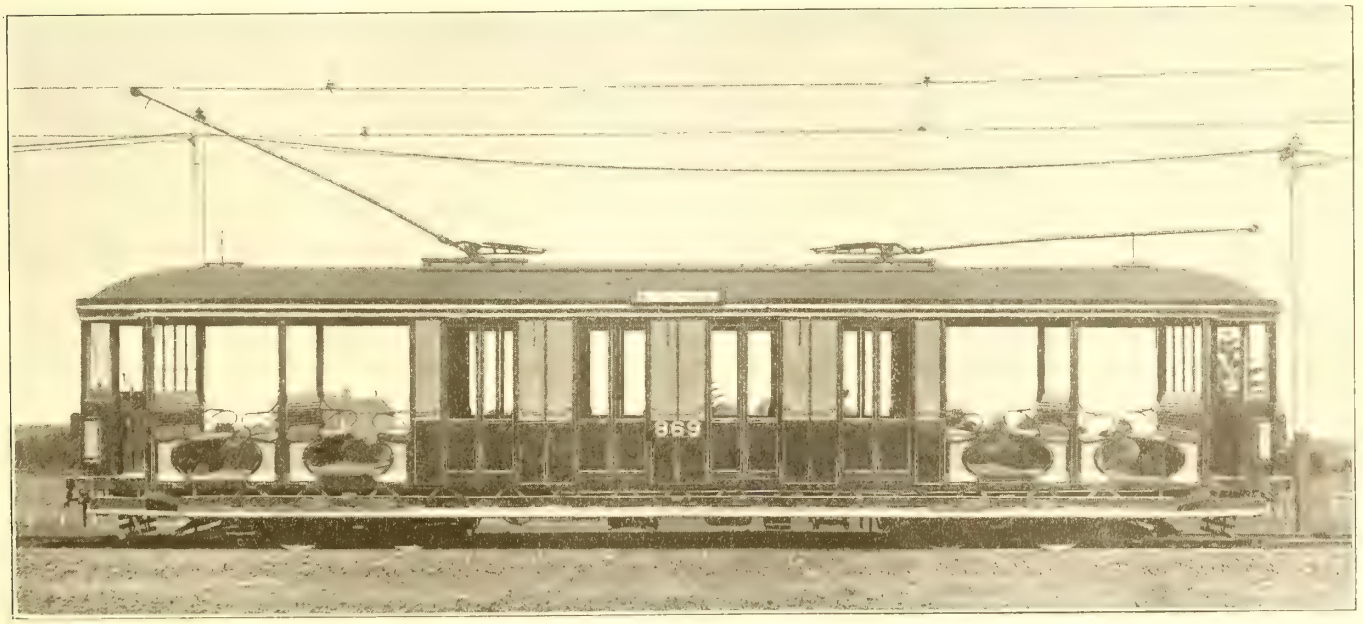


New South Wales Car—End View

The car body is built separately from the steel underframe, and is bolted down on the top flanges of the side sills. The two principal members of the underframe are the latticed girder side sills. These are built up of two 3-in. x 3-in. x ⅜-in. angles and 1½-in. x ⅝-in. lattices. Each piece of lattice is continuous for four or five panels in order to reduce the number of rivets in the top member, so as not to interfere with the bolts used for attaching the car body. The girders are stiffened at the bolsters with a ¾-in. flat



New South Wales Car—Deflection Test of Underframe



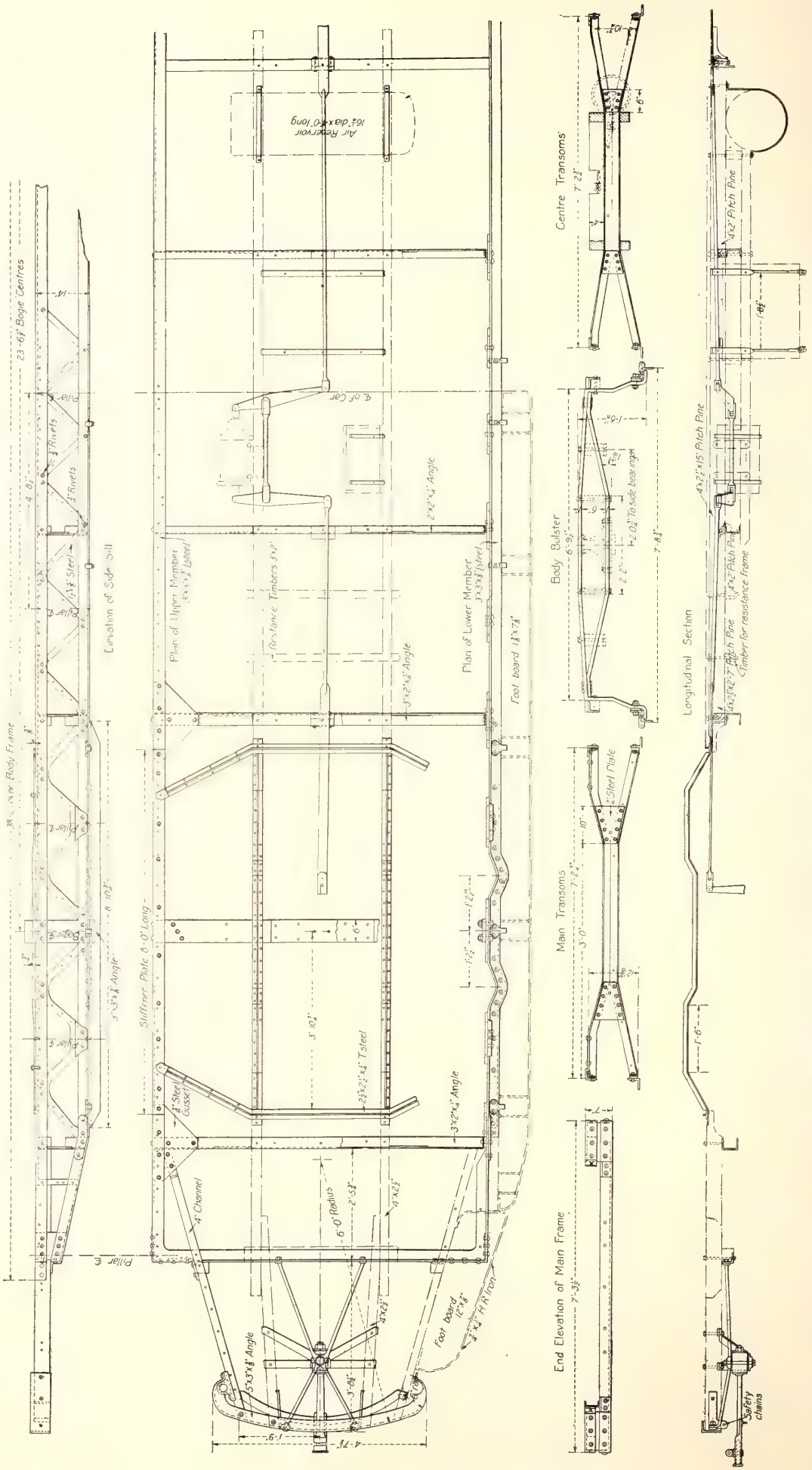
New South Wales Car—Side View

plate, 8 ft. long, riveted to the top member, and an angle 3 in. x 3 in. x ⅜ in. x 10 ft. long, riveted to the bottom member.

The body bolsters are built up of two 1-in. x 6-in. plates. The top plate is bent down inside of the top angles of the side sills. Six angle iron transoms connect the two side sills and support the central longitudinal filling pieces on which the car body rests. On each side of the bolsters light T-irons are riveted across between the side sills to support the ends of two similar longitudinal members which rest on top of the bolster and carry the motor trap doors in the car floor. The end sills are 3-in. x 3-in. x ⅜-in. angles, bent around the corners and riveted to the bottom angles of the side sills.

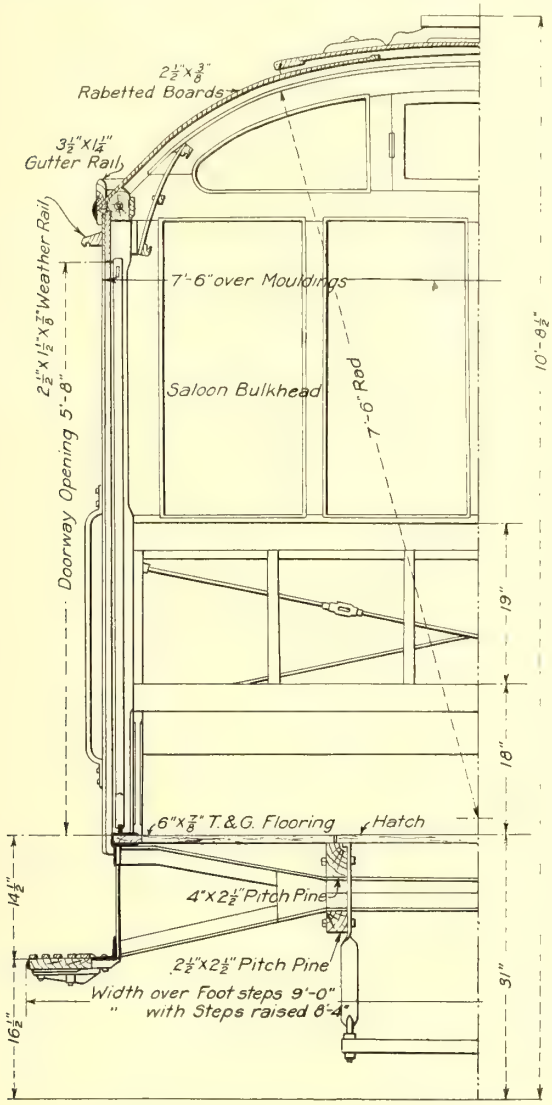
The platform underframing consists of two 4-in., 7-lb. channels, bolted under the gusset plates of the transom nearest the end sill and resting on top of the end sill. These channels support the 5-in. x 3-in. angle-iron bumper. The platform floor is supported in the center by two wooden sills, 4 in. x 2½ in., which rest on the body end sill but are not bolted or otherwise fastened to the body flooring. This platform construction was employed in order to minimize the damage to the car body and underframing in the event of collisions, and it has proved entirely successful, for in three severe collisions the platforms have been the only parts damaged in either car.

The steel under-



New South Wales Car—Plan, Elevations and Sections of Steel Underframe

frame weighs only 3140 lb., but it is very rigid. Assuming a maximum load of 160 passengers, the uniformly distributed load on each sill is 33 lb. per inch of length. The diagram on page 13 shows the deflection of a complete underframe under a test load of 82,000 lb., which is equivalent to 72.5 lb. per inch per sill. With this load the maximum deflection at the center of the car was 1¾ in., and the two side sills showed approximately uniform bending at all points. In riveting up the latticed girders they are given a camber of ¼ in. at the ends and 3/16 in. in the center.

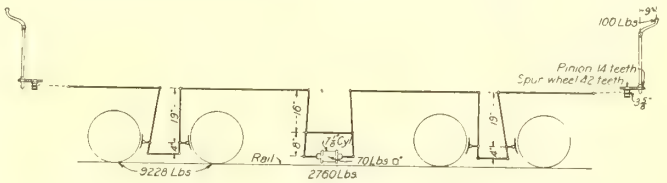


New South Wales Car—Half Cross Section

The car body is built almost entirely of wood, and is a separate structure from the steel underframe to which it is bolted. It has an arched roof, the interesting feature of which is the gutter, which is continuous around the eaves. The water which collects in this gutter is carried down to the roadbed through a 1½-in. iron pipe, which forms one of the end stanchions for the motorman's vestibule. The seats in both the open and closed sections of the car are made of hardwood slats. The floor of the car is only 31 in. above the rails, except in the two compartments immediately over the body bolsters, where it is raised to 34 in. The two seats in each of these compartments are raised 2 in. higher than the other seats to offset the rise in the car floor. Pressed steel seat end frames weighing 9¾ lb. each are used on the open compartment seats.

Of the 195 cars in service 144 are equipped with General Electric Type M multiple-unit control and the remaining fifty-one cars have K-6 platform controllers. Four interpole motors of 30 hp each are applied on 174 of the cars, and the other twenty-five cars have motors of the same size without interpoles. The interpole motors were furnished by Dick, Kerr & Company, Ltd., and the motors without interpoles by the General Electric Company. One hundred and thirty additional cars of the same type are now being built. They will be equipped with 30-hp motors without interpoles and multiple-unit control.

The cars are fitted with Allis-Chalmers air brakes and Sterling geared hand braes. The air and hand brakes are

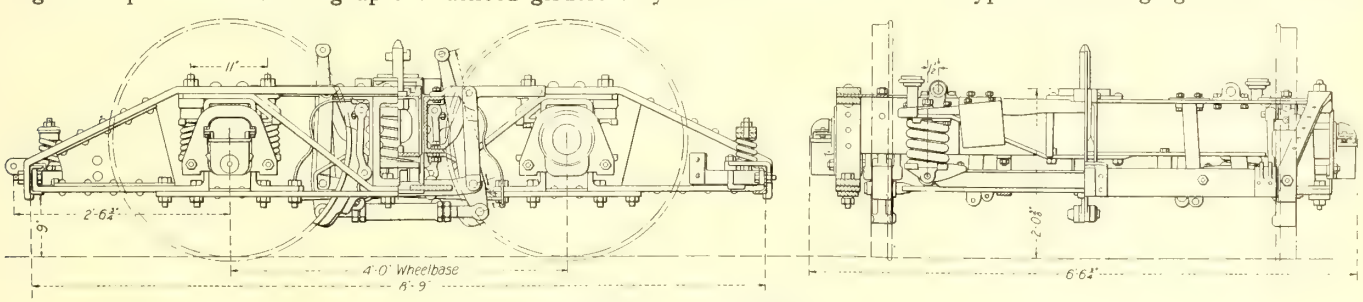


New South Wales Car—Diagram of Brake Leverage

connected to the truck brake rigging independently; that is, the air brake rods are connected to the two inside truck brake levers and the hand brake rods are connected to the outside truck brake levers. When the air brake is applied the truck brake levers to which the hand brakes are attached act as dead levers, and their upper ends bear against the truck transoms. The wheels cannot be locked by the cumulative pressure of both air and hand brakes, nor can the breaking of any one part cause the entire braking power to be lost. The ratio of the foundation brake gear is 11½ to 1, and while this is slightly higher than is generally considered good practice the gear has been used satisfactorily for more than three years. The gear hand brake multiplies the pressure on the brake handle 14.9 times, so that with 100-lb. pressure on the handle the total braking force at the shoes is 34,270 lb. With the air brake and 70-lb. cylinder pressure a total braking force of 31,740 lb. is obtained.

TRUCKS

The trucks used under these cars are a modified design of the diamond arch bar type with swinging bolster. The bolster is supported at each end by a double coil spring instead of the usual elliptic spring, and the load on the side frames is transmitted to the journal boxes through two small coil springs supported on a yoke which straddles the journal box. The axle journals are only 3½ in. x 3¾ in. The trucks, as well as the car bodies, were built by the Meadowbank Manufacturing Company, Sydney, New South Wales.



New South Wales Car—Motor Truck

WEIGHT

The following table gives the detail weights of one car with interpole motors and multiple-unit control:

	Pounds.
Car body, including running boards	7,503
Underframe, including drawbar	4,798
Motors, gears and gear cases	9,824
Control, conduit, trolley bases, etc	3,028
Brakes	1,153
Trucks	4,852
Wheels and axles	5,104
Miscellaneous, including headlights, etc	649
Total	36,911

This is equivalent to 461 lb. per seat, 812 lb. per foot of length and 108 lb. per square foot of floor area. The cars with K-6 control and motors without interpoles weigh only 33,851 lb., which is equivalent to 423 lb. per seat, 743 lb. per foot of length and 99 lb. per square foot of floor area.

The New South Wales Government Railways & Tramways are managed by a commission of three members headed by T. R. Johnson. The chief officers of the tramway department are J. Kneeshaw, traffic superintendent, who has supervision over the conductors and motormen; G. R. Coudrey, tramway engineer, who is in charge of buildings and track, and O. W. Brain, electrical engineer, who is in charge of power generation and distribution, and the construction and maintenance of the rolling stock. The new standard cars were designed in the office of Mr. Brain.

THE RESPONSIBILITIES OF ELECTRICAL ENGINEERS IN MAKING APPRAISALS*

BY H. M. BYLLESBY, CHICAGO

In the brief period of from thirty to thirty-four years, the profession of electrical engineering as applied to the generation of, the transmission of and the utilization of large quantities of electricity has come into existence. In the broadest sense of the term this development has required the creation of a new art.

The development of electrical engineering has been a continued series of advances, step by step and leap by leap. There has been more obsolescence and more retirement of electrical machinery and tools and devices far in advance of their natural life, due to the continuing improvement, than has taken place in the history of any other art.

In our profession one has to read the daily press and carefully study the columns of the technical press at all to keep pace with the new developments, the new achievements and the new victories of the profession from which we all make our livelihoods. This tremendous growth from the dynamo of 50 hp to the generator of 30,000 hp; from the incandescent lamp as a luxurious curiosity to the incandescent lamp which is as much a feature of our modern civilization as our running water; from the transmission distances of a mile or two to transmission distances of 200 miles; from the electric motor existing as a laboratory toy to the electrical motor of universal use and of 10,000 to 15,000 hp has taken place within the span of years conventionally covered by the term a "generation."

It is probable the annals of civilization do not contain a parallel, but along with this proper pride, with the feeling of well-merited satisfaction, let us not forget that collaterally and a part of it, something without which it could not have taken place, has been the work of the promoter and the banker. No new industry can be established or when established can continue and no art can grow to the dimensions of ours without the continued presence of the individual who supplies the capital, the money, the financial resources to the inventor and the engineer. Large and continuing supplies of capital are required for research, for producing inventions, for the carrying out of the inventions and the development through their period of incipiency, of temporary failures and disappointments.

We should give to the promoter, to the capitalist, to the man who is able to influence capital and to place it at the disposal of the men of our profession, the credit that is properly due him. The achievement of the electrical engineer would not have been possible if it had not been for the presence of the man with money who believed in the commercial possibilities of our art as from time to time developed and who produced the capital with which to continue development of that art.

Our profession has indeed been fortunate in having had associated with it from its inception men who were sufficiently intelligent, courageous and far-sighted to see the merit of the inventions and developments which from time to time were produced and who had withal the faith and the ability to continue to stand behind these inventions and developments with their capital during that period which we all know has taken place, when these inventions and these developments were under criticism, were temporary failures, and while only disappointing results were being reached. During this period of disappointment, of hazard, during this period of modifications from the original plans and disappointments and changes, the man or corporation with money was present to tide the infant invention or industry over the shoals and hazards which surrounded it, and except for the presence of men of the type of which I am speaking, with their courage, their faith and their capital, many of the inventions and developments of our profession would have been buried in the grave of permanently disappointed hopes and non-fulfilment.

To-day our art is developed. The products of the brains of the electrical engineers are so well known, their commercial utility is so thoroughly established, particularly in the principal lines of our achievements, as to lead us to be forgetful, perhaps, of that period which the older of us recollect so clearly. This period, due partly to the crudity of our own devices and the undeveloped condition of our own inventions, due partly to the unstable condition of the collateral features upon which we depended, such as steam engines, boilers, water wheels and manufactured articles, was a period attended with heart-breaking anxieties not only to the inventor and engineer, but do not forget that it was also a period of heart-breaking anxieties and disappointment to the man who had invested his capital in those things.

FRANCHISE TERMS

To-day there is a world of discussion regarding the value of a franchise, the terms of a franchise, the privileges it affords, the obligations it carries and the fraud which in the minds of the public is supposed always to be inseparably connected with anything bearing that name. There is much comment, nearly always unfavorable, regarding the conditions under which franchises for electric light and power transmission companies and trolley roads have been issued. If those who, probably with the best intentions possible, are criticising these matters had gone through the experience of the earlier days, they would change their opinions.

In those days franchises were given freely. Anyone who applied for a franchise would receive it and, as a rule, without burdensome restrictions. The community which was favored by having capital build for its service an electric light plant to furnish what it believed to be a luxury and which otherwise it would not have had, or a community which was favored by a company which in return for a franchise would spend the money necessary to change the cruel and totally inadequate intramural animal transportation of that town or city to an electric transportation system, was properly and deservedly welcome.

Until recently the laws governing the ownership of the

*Abstract of a paper read at the annual convention of the American Institute of Electrical Engineers, Chicago, Ill., June 27, 1911.

power in the stream were believed to be pretty fairly understood along the lines handed down from our Anglo-Saxon ancestors. The company or individual who came into the community and produced the capital to develop these streams was royally welcome and he was viewed generally with some wonderment regarding his financial obliquity. If a brief and unprejudiced study is made of the history of these earlier electric light, trolley and water-power companies, it will be impossible to depart from the conviction that the persistence and courage of the promoter and the capitalist who carried them through their earlier periods of disaster and lack of credit is quite as notable an achievement as that of the inventors and engineers who introduced the physical and scientific part of these enterprises.

This enterprise and this courage which heretofore have been wisely fostered by the commonwealth have given the United States of America the most universally extended, the best operated public utility plants in the world. In the vast majority of cases the service rendered by the corporations is furnished to the public—with superior service with its wide extensions—at less cost than in any other country. Various contributing causes have produced this result. Among these causes has been the natural inherent courage and enterprise of the American. In addition to this, however, have been the liberal franchise grants issued in the past and the freedom from onerous restrictions both for occupancy of streets and the purchase and development of water-powers. A broad and liberal construction which has justified the issuance of stock which would eventually pay to the projectors and developers of these enterprises when they became successful something in addition and beyond a mere fair interest return on their investment has also had a profound influence upon giving to our country the best utility corporations of the world. Without these features this development with its low charge to the public could not have taken place.

ABUSES OF THE PAST

Abuses have taken place in the past on the part of the corporations, on the part of the public served by the corporations and on the part of the legislative and law administering bodies. At the present time my opinion is that both the public and corporations are reaching a common meeting ground, requiring public service corporations to be protected and regulated monopolies; these corporations to be governed as to their rates and to be protected from competition by so-called "public service commissions." With this doctrine as such, the public service engineer and operator has no quarrel. We do file a plea, however, that these public service commissions be composed of men of character, men of ability, men who have accomplished something in the world; that these commissions be composed of men who while fair and upright are conversant with the business which, under the laws governing their action, they are controlling.

The abuses which have undoubtedly taken place in the dealings between the municipal bodies and the public service corporations have been as distasteful to the corporations as to the public, and the cry of the corporations is for a fair hearing, for an intelligent hearing, for fair recognition of the benefits they have conferred and a demand to be relieved from the hardships and frauds which in many cases they have suffered at the hands of politicians, a partially educated public sentiment and the municipal governing bodies. It is believed that properly constituted public service commissions, appointed for "good behavior," composed of high-class men, suitably paid and operating under broad and liberal laws, will accomplish this much-to-be-desired object.

The public should recognize that the so-called public service corporations should be encouraged and fostered instead of being strangled and discouraged. The widest latitude should be afforded the operations of public service corporations under monopoly and protection, and fair laws administered by conservative and able public service commissions.

The electrical engineer must recognize that in addition to the multiplicity of duties he has been called upon to discharge, he is now confronted with a new class of responsibilities from which he cannot shrink. To these responsibilities he must give the best that is in him of experience, of fair-mindedness, of wisdom and of justice.

Old methods and old standards are passing away; new methods and new standards are demanded. It will be a shame if the present crisis fails of a solution more rational and with less hardship and destruction than has attended previous solutions of economic and social crises. Out of the present controversies we must endeavor manfully and fairly to bring a condition of justice to all concerned, and in our share of duty in these matters we must make every effort to be intelligent and not to be found wanting in fair dealing and honesty between man and man, between corporations and the public and between governing bodies and corporations. Principal among these new responsibilities which are being rapidly thrust upon our profession is making appraisals to determine the value of the property of a public service corporation.

APPRAISAL AS A BASIS FOR RATES

These values, in accordance with the unmistakable present trend of the times, are to be made a basis upon which are fixed the maximum rates which these corporations are to be allowed to charge for service rendered. In the majority of cases the property to be appraised represents a continuing growth or a construction period from its inception. Much of the construction work we are called upon to value is concealed from view, such as foundations of buildings, foundations for machinery, submerged portions of hydraulic construction, conduit systems and gas pipes. In every case the structures or plants have been built in "piecemeal" fashion. Almost every public service corporation has started from a small beginning and added to its plant continuously, and the finished structure to-day represents construction work which has been continued from the time the original property was created. In meeting the questions to which the spirit of the times is demanding answers, very properly a demand is made by all parties to the controversy that absolute and entire frankness and complete candor pervade the negotiations. Properly a period has been put to the practice of dissimulation and trickery and misrepresentation on the part of the public, the governing body and the corporation. From a long experience I can state for my part that trickery and dissimulation and unfair dealing in the past have been fully as great on the part of the public and the governing bodies, if not greater, than on the part of the corporations. Following this proper demand for candor, I desire to call attention to the painful fact that it is extremely rare for a professional engineer or constructor in any branch of industry, in any branch of construction, to estimate the cost of such construction with accuracy and that the practically uniform experience has been that all such estimates have proved woefully less than the cost of the completed project.

Every one of us whose duties require him either as a principal or in an auxiliary capacity to be responsible for the furnishing of capital to build any given public service construction or to develop any given enterprise knows full well from a long and painful experience that unless he provides for indefinite excess charges or leaves some other avenue of escape, the enterprise or construction when finished will be burdened with a floating debt which seldom is of small relative proportion. This debt is the difference between the estimated cost of building the undertaking and the actual cost as developed after the event. I believe there has not been a considerable piece of public

service construction in recent years where the finished cost complete has not overrun the estimated cost by a minimum in a few cases of 10 per cent to 15 per cent to a maximum in a majority of cases of a dangerously large percentage which not infrequently has gone to an excess cost of 100 per c

RESPONSIBILITY OF APPRAISAL

How careful, therefore, how fair-minded and liberal should be the point of view of the professional engineer in appraising the value of another man's or another corporation's property for the solemn and serious purpose of having based upon his appraisal the return which that man or that corporation is to be allowed to receive upon his investment! It is unfair that an engineer or appraiser who recognizes at the bar of his own conscience that his own estimates have been uniformly overrun should make his appraisals without taking into consideration and manfully applying to his estimate his own factor of individual inaccuracy, his own personal factor of nearly unfailing underestimating.

If the profits to be allowed public service companies were to be on a broad and liberal basis this feature would be of less importance. The spirit of the times, brought around partly by mistakes, by selfishness, by unfairness, on the part of all parties to the contract, the tendencies of the times, actuated to a degree by certain irresponsible magazine writers, magazines and papers, and by certain politicians, all tend to reduce the return of the public service corporation to a low point. At best it would indicate allowing the public service corporation, after paying its operating expenses and depreciation charges, a distributable sum equivalent to from 7 per cent to a possible 10 per cent upon its reproduction value, the higher percentage being rather hoped for than indicated. I think the situation is one of the most momentous which confronts our profession to-day. A large part, I presume 90 per cent, of the activities of our profession have resulted from the continuing growth and existence and development of public service corporations.

Capital will leave any given field with great speed if it finds that it is receiving an unfair or unjust recompense or other fields offer greater inducements. Without capital modern enterprise is impossible. The most beneficial use of capital is to have it employed in developing new enterprises, extending existing enterprises, which in turn develop and add to the wealth of the communities served. The profession in which the members of this association are engaged could not exist at all if capital withdrew its support from enterprises depending upon the genius and ability and conscientious effort of the electrical engineer.

Avoid the influence of the idea that the professional engineer can get along without the services of capital. Capital on its part must treat the public, the laboring man and the professional man with fairness and liberality, with more fairness and liberality than it has in the past. On the other hand, the professional man, who from the nature of his calling and its dignity carries a large influence in the community in which he operates, must not forget the close correlation between brains, labor and capital, and neither through professional indifference or professional jealousy allow himself to give capital an unfair hearing or an unjust decision.

We must avoid the fallacy that only the physical portion of a corporation's property is entitled to a value. Beyond the naked physical value there is required a very large and material sum to change that naked inert mass of physical construction into a live, progressive, earning entity. The omission of the cost of making a going concern in addition to its naked physical value has been the root and cause, in my judgment, of a large proportion of the disasters which have overtaken enterprises in the field in which we operate.

These remarks and more to the same effect apply to the question of intangible values, and I hope the fullest consideration will be given to them. These intangible values generally embrace interest during construction, accidents and insurance during construction, engineering charges, supervision charges, and they should include proportionately the tremendously large sums expended by public service corporations in developing the business, in educating the public, and producing a sale of their commodity, whose reflex effect in subsequent reduction of the operating charges should be considered as proper cost in the value of the property. Further proper charges, of an absolutely legitimate nature, to the intangible value account include the legal expenses of organization and of putting the enterprise on its feet, the discounts on securities sold or brokerage paid for finding of the capital, and, particularly in the case of the older companies, the large sums spent in absolute good faith in what was really a period of experimenting to obtain the best apparatus, the best systems and methods adapted to the requirements of the company that happens to be in question. Due regard should always be given to the added cost of piecemeal construction which has been an unfailing incident of all of these corporations. In all fairness it should include the losses due to obsolescence and the discarding of workable machinery long before its life had been exhausted, this discarding being for the purpose of keeping pace with the times and in the last analysis for the better serving of the public.

There is a tendency, I hope a diminishing tendency, to be unfair to public service corporations and to be entirely oblivious of the hazards and risks they have incurred in the building of their business and to be forgetful of the profound importance and great benefit they have been to the communities they serve.

A recent example, and a very pertinent one, of this tendency to be unfair has occurred in the appraisal of the value of one of the largest utilities in a large Western city. It was found that a material part of the distributing system of this company was now under paved streets, but that, due to the enterprise or necessity of the company in the past, a part of its underground system had been placed in the streets in question before they were paved; that is, the paving above this underground system on a material portion of the company's property had taken place after its distribution system was in the ground. The ruling of the body making this appraisal was that this company was not entitled as a part of its value to the cost to which it would have been put of placing this distribution system under the paved streets, and the difficulty of sustaining this ruling is plainly evident from the fact that wherever this company has put its distributing system underneath paved streets, or where it is doing it to-day, the cost of that paving has applied to this company and is allowed as a part of the value of the plant. It would be hard to conceive of a more direct effort to discourage enterprise than this particular ruling.

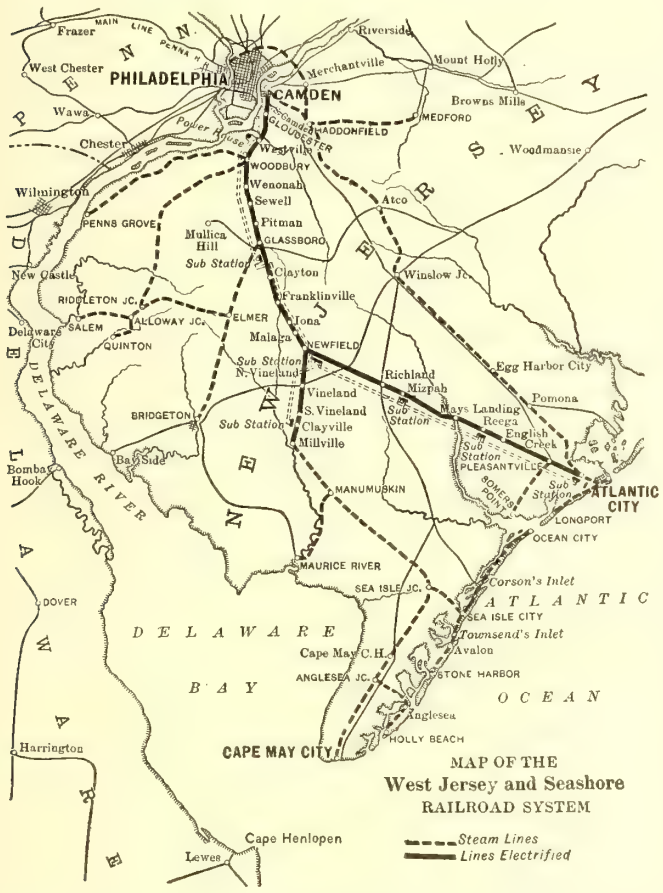
We all believe we are approaching a far better understanding between all parties concerned on these questions than has existed in the past. The effort of all of us must be by conscientious effort, by candor and sincerity to bring around this better condition.

The Berne power station in the Berne Highlands has just been put into operation. The water power of the Kander River is utilized for the operation of turbo-generators of from 9000 to 12,000 hp. It is intended to use the power in the form of high-pressure single-phase alternating current for the working of the Lotschberg Railway, and perhaps also for other lines. It is assumed that the federal railway authorities will soon approach the question of the conversion of the St. Gothard Railway to electric traction, as otherwise the stream of tourist traffic will presumably be diverted to the new Lotschberg-Simplon Railway.

ELECTRICAL OPERATION OF THE WEST JERSEY & SEASHORE RAILROAD *

BY B. F. WOOD

A general impression prevails that operating officers of railroads will not consent to the publication of their operating costs. This to some extent may be true, but where such figures are correctly understood and properly used there should be no objection to their publication. When the question of presenting certain data pertaining to the operation of the electrified portion of the West Jersey & Seashore Railroad before the American Institute of Electrical Engineers was discussed with the management of the Pennsylvania Railroad, the reply was made that not only would the information be furnished, but that it would be a pleasure to have such information made public through the proceedings of the Institute. The data included in this paper were taken direct from the operating records



West Jersey & Seashore—Map of Steam and Electric Divisions

and no effort was made to curtail or to modify them in any respect. No attempt has been made to analyze or compare the data with any that have heretofore been presented.

No detailed description of the construction used in the electrification of the West Jersey & Seashore Railroad was thought necessary for the purpose of this paper. A complete description was published in the STREET RAILWAY JOURNAL for Nov. 10, 1906, and Oct. 12, 1907. The accompanying map shows the electric lines and the steam lines which are operated by the West Jersey & Seashore Railroad.

The portion of the line which is electrically operated extends from Camden, via Newfield, to Atlantic City, a distance of 64.6 miles; and from Newfield to Millville, a distance of 10 miles. With the exception of the Millville branch, which is a single-track railroad, the line is double-tracked, with a third-track extending for a distance of about 6 miles north from Woodbury.

This portion of the West Jersey & Seashore Railroad was originally operated by steam and was a single track line south of Newfield. In the latter part of the year 1905 it was decided to electrify. The work was undertaken in

TABLE I.—COST OF CONSTRUCTION

Power Stations:		
Building, stacks, coal and ash handling machinery	$354,000	
Equipment	640,900	
Total		$994,900
Transmission line		241,500
Substations:		
Buildings	$72,000	
Equipment	419,560	
Total		491,560
Third-rail		557,636
Overhead trolley		80,500
Track bonding		102,659
Cars		1,135,900
Car repair and inspection sheds		46,674
Right-of-way, additional		592,100
Reconstructing tracks		763,800
Constructing new tracks		2,071,000
Terminal facilities and changes at stations		252,400
Signals and interlocking plants		561,900
Changing telegraph and adding telephone facilities		105,100
Fencing right-of-way, cattle guards, etc		88,400
Miscellaneous items		44,200
Total		$8,130,229

UNIT COST OF ELECTRIFICATION.

Power station, cost per kw	$110.00
Transmission line, cost per mile	3,485.00
Substations, building and equipment cost per kw	28.90
Third-rail, cost per mile	4,235.00
Overhead trolley, cost per mile	4,120.00
Track bonding, cost per mile	684.50
Cars, including electrical equipment each	12,214.00

December, 1905, and had progressed to such a point that in the early part of July, 1906, the first train was moved electrically. Regular operation by electric service was estab-

TABLE II—COST OF OPERATION OF ELECTRIC LINES IN CENTS PER CAR MILE, 1909-1910

Year 1909

	Repairs, Electric Equipment of Cars.	Repairs Passenger Cars.	Other Maintenance of Equipment Costs.	Electric Power at Car Shoes.	Yard Service Shifting Costs	Motormen	Trainmen.	Train Supplies and Expenses.	Total.	Other Expenses	Total Expenses.	Car Miles, Total.	Average Cars per Train.
January	1.06	2.05	0.48	4.78	0.51	0.93	1.53	1.20	12.53	10.25	22.78	279,210	3.113
February	1.07	2.42	0.38	4.63	0.51	0.91	1.49	1.22	12.63	10.99	23 62	258,130	3.163
March	1.18	1.97	0.35	4.99	0.52	0.99	1.65	1.18	12.83	10.17	23.00	279,193	3.092
April	1.26	2.03	0.25	4.43	0.46	0.89	1.40	0.61	11.32	9.14	20.46	317,963	3.483
May	0.84	1.73	0.26	3.98	0.44	0.88	1.45	0.45	10.03	9.18	19.21	318,006	3.482
June	0.40	0.68	0.31	3.58	0.25	0.86	1.41	0.42	7.91	9.35	17.26	339,294	3.530
July	0.33	0.44	0.12	2.82	0.20	0.80	1.25	0.40	6.36	6.95	13.31	478,203	3.669
August	0.28	0.40	0.14	2.75	0.20	0.75	1.18	0.36	6.06	6.29	12.35	517,223	3.921
September	0.43	0.67	0.14	2.75	0.25	0.83	1.32	0.42	6.81	6.87	13.68	428,571	3.584
October	0.64	0.71	0.24	3.84	0.31	0.92	1.53	0.62	8.81	10.21	19.02	307,825	3.046
November	0.52	0.39	0.29	3.85	0.29	0.95	1.70	0.82	8.81	9.30	18.15	291,816	3.327
December	0.87	1.08	0.29	12.31	0 30	1.00	1.72	1.30	18.87	15.05	33.92	292,175	3.318
Avg. per mo.	0.68	1.10	0.25	4.30	0.33	0 88	1.44	0.69	9.67	9.08	18.75	4,107,609	3.457

Year 1910

January	0.86	1.03	0.67	4.59	0.46	0.96	1.64	2.24	12.45	7.22	19.67	292,523	3.169
February	0.79	1.78	0.33	5.38	0.50	0.97	1.48	1.07	12.30	12.44	24.74	262,488	3.137
March	1.04	1.13	0.28	3.87	0.48	0.88	1.51	0.89	10.08	12.91	22.99	333,252	3.445
April	0.62	0.76	0.31	4.57	0.49	0.97	1.62	0.70	10.04	11 55	21.59	302,463	3.344
May	0.57	0.78	0.24	2.78	0.48	0.89	1.41	0.44	7.59	9.92	17.51	351,994	3.651
June	0.79	0.67	0.24	2.80	0.45	0.97	1.62	0.58	8.12	10.13	18 25	375,023	3.406
July	0.44	0.46	0.18	2.47	0.34	0.89	1.39	0.36	6.53	6.66	13.19	565,787	3.641
August	0.29	0.57	0.15	2.48	0.33	0.85	1.38	0.37	6.42	5.62	12.04	594,852	3.811
September	0.37	0.54	0.21	2.71	0.39	0.85	1.42	0.42	6 91	7.34	14.25	487,543	3.771
October	0.73	1.19	0.28	3.05	0.47	0.91	1.69	0.52	8.84	12.34	21.18	339,789	3.564
November	1.40	2.45	0.47	3.71	0.51	0.96	1.71	0.54	11.75	10.58	22.33	311,882	3.379
December	0.63	1.94	0.21	3.93	0.51	0.93	1.71	0.74	10.60	12.13	22.73	334,936	3.494
Avg. per mo.	0.66	1.01	0.27	3.33	0.43	0.91	1.52	0.67	8.80	9.39	18.19	4,552,532	3.518

lished in September of the same year. The direct-current over-running third-rail system operating at 675 volts was chosen for this installation.

CONSTRUCTION DETAILS

In order that the accompanying statements of cost of operation and detentions to train service may be more readily understood, the following general data relating to the electrified sections are given:

*Abstract of a paper read at the twenty-eighth annual convention of the American Institute of Electrical Engineers, Chicago, Ill., June 26-30, 1911.

The track consists of 100-lb. and 85-lb. rails. The total length of single track, including sidings, is 150 miles. The power station is located at Westville, N. J., on Big Timber Creek, 5.6 miles from Camden Terminal. Its rated capacity is 8000 kw. It contains four 2000-kw, 6600-volt, three-phase, 25-cycle Curtis turbo-generators with separately driven exciters, and three blowers, with a capacity of 20,000 cu. ft. of air per minute each. The boiler room contains sixteen Stirling water-tube boilers of 358 hp each, equipped with superheaters. Fourteen of the boilers are equipped with Roney stokers and two are equipped with Taylor stokers.

The alternating current, which is generated at 6600 volts, is stepped up in the power house by means of twelve 700-kw single-phase transformers to 33,000 volts. It is transmitted to the substations over transmission lines 69.3 miles long, which consist of two duplicate circuits, Y connected and having the neutral phase grounded. The wires are No. 1 B. & S. gage, hard-drawn solid copper. The transmission line poles are chestnut, 45 ft. high and spaced 125 ft. apart. A ground wire for lightning protection is strung on the top of the poles 4 ft. above the nearest wire. The signal line and the lighting circuit also are carried on the transmission line poles.

There are eight substations between Camden and Atlantic City. These substations contain from two to three rotary converters and their total rated capacity is 17,000 kw. They convert the alternating current into direct current at 675 volts.

Of the 150 miles of single track, 141.73 miles are equipped with third rail, which is Pennsylvania Railroad standard

TABLE III—COST OF MAINTENANCE OF TRANSMISSION SYSTEM, 1910

	High tension		Overhead trolley		Third rail		Running track bonding	
	Total	Per mile	Total	Per mile	Total	Per mile	Total	Per mile
January	$142 96	$2 04	$690 84	$35 32	$492.96	$2 74	$26 67	$1.51
February	409 74	5 85	266 38	13 62	580 80	4.41	562.82	3 75
March	198 62	2 84	381.28	19 49	495.55	3 76	39 26	0 26
April	403 44	5 76	446 57	46 71	745.16	5 26	30 24	0.20
May	256 14	3 66	291 51	30 49	1,126.40	7 95	190.05	1 27
June	123 21	1 76	864.62	90 44	957.42	6 75	312 08	2 08
July	167 90	2 40	393 62	41 17	818 29	5 77	494.79	3.30
August	357.20	5 10	317 49	33 21	1,631 72	11 51	32.99	0 22
September	508 51	7 26	389 73	40.77	838.87	5.92	202.05	1 35
October	604 93	8 64	245 75	25.70	647 27	4.57	98 66	0 66
November	171.58	2 45	363 35	38 01	11,062.98	7 50	189.83	1.26
December	100 34	1 43	244 02	25 52	1,466 71	10 35	125.03	0.83
Year	3,444.57	4.10	4,895 16	36 70	10,864 13	6 46	2,445.72	1.36

†Credit for scrap 58.75

TABLE IV—DETENTIONS TO ELECTRIC TRAIN SERVICE, 1909

Causes	Train detentions, number, time and per cent for various causes				
	Number of detentions		Minutes detention		
	Total	Per cent of total	Total	Per cent of total	Car miles per minute detention
Transportation.					
Boat connection	51	0 553	180	0.403	22,815.36
Baggage, express and mail	1898	20.575	8373	18 749	490.47
Heavy travel	1232	13.355	4612	10 328	890 45
Collecting tickets	72	0.781	334	0 748	12,295.70
Train connections	977	10.591	5517	12 354	744 38
Traffic ahead	1723	18 677	7842	17 561	523.68
Held at signal	1390	15 068	4767	10 675	861 50
Stops on order	73	0.791	165	0.369	24,889 49
Fast schedule	34	0 368	57	0.128	72,048.50
Picking up and cutting off cars	411	4.455	1312	2 938	3,130.15
Fog	41	0.444	127	0.284	32,336.73
Signal failure	208	2.255	860	1 926	4,775.31
Accidents	26	0.282	261	0 584	15,734.73
Obstructions	33	0.358	194	0 434	21,168.89
Miscellaneous	283	3 068	1427	3.196	2,877.90
Total transportation	4852	91.621	36028	80 677	113.98
Motive power.					
Power house trouble	15	0 163	69	0.155	59,518.30
High tension line trouble	14	0.152	81	0.181	50,700 80
Lightning	12	0.130	47	0.105	87,377 90
Overloads in substations	11	0.119	61	0.137	67,324 00
Third rail shorts	3	0.032	14	0.031	293,340.40
Third rail out of place	1	0.011	8	0.019	513,345.13
Third rail anchor on fire	1	0.011	5	0 011	821,353.00
Third rail protection out of place	1	0.011	1	0.002	4,106,765.00
Trolley wire trouble	253	2.742	1920	4.299	2,138.94
Train equipment	237	2.569	1568	3.511	2,619.11
Total motive power	548	5.940	3774	8.451	1,088.17
Weather Conditions.					
Snow, head winds, wet rail	178	1.929	4043	9.054	1,015.77
Sleet on third rail	47	0.510	812	1.818	5,057.59
Total weather condition	225	2.439	4855	10.872	845.88
Grand total	9225	100.00	44657	100.00	91.26
Total car mileage					4,106,765
Car miles per detention					445.18
Car miles per minute of detention					91.96

TABLE V—OPERATING AND MAINTENANCE COSTS OF SUBSTATIONS, 1910

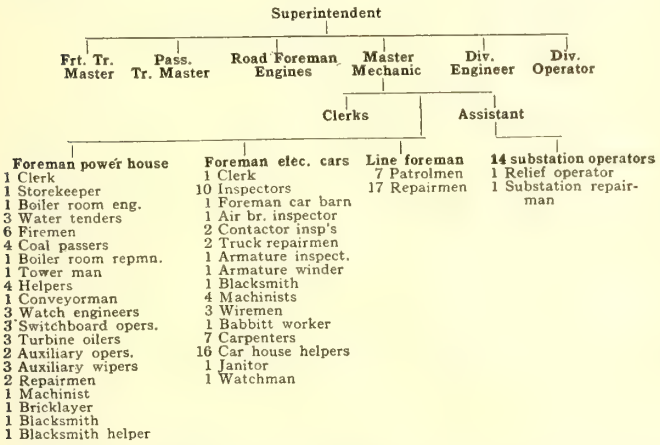
	Total for eight substations				
	Operation	Maintenance	Total	Cost per kw-hr.	Substation output kw-hr. 675 volts direct-current
January	$1,573.82	$373 10	$1,946.92	$0 001136	1,655,800
February	1,601 78	147.39	1,749 17	0 001157	1,460,200
March	1,618.16	174.27	1,792 43	0 001035	1,678,400
April	1,728 98	275.64	2,004 62	0 001251	1,554,900
May	1,760 46	370.91	2,131 37	0 001267	1,635,900
June	1,794 44	432.55	2,226 99	0 001310	1,655,600
July	2,006.97	317.62	2,324.59	0 001047	2,175,700
August	1,751.03	194.13	1,945.16	0 000811	2,349,000
September	1,776.14	903.45	2,679.59	0 001285	2,035,200
October	1,744.23	145.99	1,890 22	0 001069	1,712,100
November	1,750.62	142.23	1,892 85	0 000986	1,860,100
December	1,745.68	130.02	1,875 70	0 000829	2,199,400
Year	$20,852.31	$3,607.30	$24,459 61	$0 001082	$21,972,300

TABLE VI—POWER GENERATION AND DISTRIBUTION DATA, 1907-1910

	1907				1908			
	Alternating Current Kw-hr. Power Station Output	Cost in Mills per Kw-hr. Output	Lb. of Coal Kw-hr. Output	Efficiency Power Sta. Bus to Substation Bus	Alternating Current Kw-hr. Power Station Output	Cost in Mills per Kw-hr. Output	Lb. of Coal Kw-hr. Output	Efficiency Power Sta. Bus to Substation Bus
January	1,911,600	8 83	3 91	72.6	2,009,600	6.10	3 49	73.3
February	1,691,500	7 95	3 63	74.5	1,913,100	6.35	3.55	73.6
March	1,583,000	7 76	3 96	71.5	1,873,300	6.17	3.46	72 3
April	1,464,300	7 43	3 95	74.0	1,836,200	5.86	3.45	71.8
May	1,400,400	6 81	3 53	72.1	1,744,900	6 06	3 40	69.6
June	1,395,700	7 65	3 98	70.6	1,707,500	5.91	3.52	74.8
July	1,938,100	6 05	3 65	71.6	2,104,300	5.43	3.37	75.6
August	2,082,000	6 00	3 43	71.6	2,268,000	5.43	3 18	75.8
September	1,855,300	6 07	3 46	71.7	1,849,200	5.76	3.18	74.7
October	1,849,800	5 99	3 53	82.8	1,786,700	5.78	3.25	72.8
November	1,893,600	5.86	3 51	71.3	1,802,000	5.78	3.35	74.7
December	2,053,600	6 00	3 51	72.5	1,993,000	5.80	3 25	76.2
Av. for year	1,759,900	6.80	3 67	72.2	1,907,300	5 92	3.37	73.8
	1909				1910			
January	1,939,700	5 67	3.23	76 1	2,131,000	5 15	3.31	81.8
February	1,756,500	5 71	3 25	76 1	1,865,300	5 73	3.46	82 4
March	1,903,600	6 04	3.33	76 1	2,168,600	5 42	3.27	81 3
April	1,869,300	5 90	3.27	75 0	2,031,400	5 62	3.22	80 1
May	1,788,800	5 63	3.26	75 5	2,115,900	5 25	3.27	79 5
June	1,749,200	5 77	3.22	77 7	2,167,500	5 68	3.14	80.3
July	2,426,000	5 21	3.25	78.0	2,784,300	5 88	3.16	82.5
August	2,324,400	5 27	3.34	81 5	3,088,300	5.11	3.06	80 7
September	2,056,100	5 28	3.34	80 3	2,590,400	5.17	3.31	82.9
October	1,836,600	5.40	3.27	80 1	2,229,000	5 48	3.17	80.8
November	1,869,500	5 49	3.41	80 7	2,381,500	5.19	3.29	81.9
December	2,154,800	5 42	3 41	81 0	2,759,300	5.31	2.39	83.4
Av. for year	1,962,600	5 55	3 30	78.4	2,359,400	5.42	3.25	81.6

section and composition, weighing 100 lb. per yard. The third rail is of the top contact type and for the most part is unprotected. It has a conductivity equal to 1,200,000 circ. mil of copper. No feeders are used in connection with the third-rail. In the approach of the Camden terminal 9.55 miles of single track are equipped with overhead trolley. A No. 0000 grooved copper wire supported 22 ft. above the rails with span wire construction is used.

The car equipment consists of 79 motor coaches having a seating capacity of 58 passengers each; two combination passenger and baggage motor cars, having a seating capacity of 36 passengers each; six baggage and mail motor cars and six baggage motor cars. The coaches weigh 94,500 lb., or 1630 lb. per passenger seat. The electrical equipment of each car consists of two 200-hp G.E. motors



West Jersey & Seashore—Organization of Electric Division

with type M multiple-unit automatic control. The gear ratio is 29:46. Fifteen steel coaches having a seating capacity of 72 passengers have recently been authorized. These cars will weigh 103,500 lb., or 1445 lb. per passenger seat.

Table I on page 19 shows the cost of construction in connection with the electrification and includes the cost of work made necessary by electrification. It will be noted that the electrification costs represent less than half of the total cost involved in the change of motive power.

ORGANIZATION

With the introduction of electric service the organization of the road was not changed, but was expanded to provide for the new duties. A chart of the motive power organization is reproduced, which shows the number of employees engaged in the various departments.

COST OF OPERATION AND MAINTENANCE

The cost of operation and maintenance of the Westville power station for the year 1910 was $153,449.79. The total net output of the station was 28,312,500 kw-hours, making the total cost per kw-hour equal to 0.542 cent. The cost of operation alone was $136,324.66, or 0.481 cent per kw-hour. The largest items of operating expenses were labor, $29,170.42; and coal, $102,715.31. The coal used cost $2.235 per ton of 2000 lb. and one kw-hour was produced from 3.246 lb. of coal. The maximum monthly output of the station was 3,088,300 kw hours in August and the minimum was 1,865,300 kw-hours in February.

Table II shows the cost of operation of electric train service for the years 1909 and 1910 in cents per car mile. The table also shows the total car miles per month and the average number of cars per train. The heading "Other Expenses" in this table includes the cost of maintenance of way and structures, dispatching trains, telephone and telegraph, crossing gatemen and all traffic and general expenses.

Table III shows the cost of maintenance of the transmission system, which includes the high tension lines, overhead trolley, third-rail and track bonding.

Table V shows the operating and maintenance costs of the substations, together with their total output in kw hours. The total substation output for the year is only 21,972,300 kw-hours, as compared with a power station output of 28,312,500 kw-hours.

DETENTIONS TO TRAIN SERVICE

A detailed statement of the detentions to electric train service for the year 1909 is given in Table IV. This table includes detentions to trains from all causes. The column headed "Number of Detentions" shows the number of trains delayed, while the column headed "Minutes' Detention" shows the total train minute detentions for each cause.

In 1909 the failures of car equipment were responsible for total delays of 1568 minutes. The number of car miles per detention in that year was 17,328 and the number of car miles per minute detention was 2619. In 1910 the total number of delays due to failures of car equipment was 314 and the total detentions were 1694 minutes. In the latter year the car miles per detention were 14,497 and the car miles per minute of detention 2687.

(A complete tabulation of the causes and duration of delays due to failures of car equipment for the years 1909 and 1910 was included in the paper, but is not reproduced.—Editors.)

The paper also included a complete tabulation of the renewals of such parts as third-rail shoes, brake shoes, fuses and other details of equipment. From this table it appears that the average life of third-rail shoes was 24,020 miles and the average life of brake shoes was 5976 miles.

Table VI shows by months for the four years from 1907 to 1910 inclusive some data relating to the generation and distribution of power. An improvement will be noted in the reduction of cost of power as well as a reduction in the coal consumption per kw-hour. The most marked improvement, however, is shown in the efficiency of transmission and conversion, which is accounted for by the fact that the operation of the substations is followed up with care so as to minimize the idle operation of rotaries.

DEPRECIATION AS RELATED TO ELECTRICAL PROPERTIES*

BY HENRY FLOY

The courts repeatedly use "fair value" as the only one which should be recognized, and it is this value that the engineer must bear in mind when estimating depreciation. Fair value includes something in addition to physical values, in which the engineer is primarily interested.

There is much evidently sincere but nevertheless mistaken opposition to the application of any principle of depreciation in determining the value of going properties; and yet a consideration of what depreciation—if any—has taken place in the physical property of every corporation must be had, in order to obtain a safe—though it may be only approximate—indication as to proper or improper capitalization.

APPLICATION OF TERMS

Depreciation.—Webster defines "depreciation" as the "act or state of lessening the worth of," and in this sense it will be used by the writer regardless of the source or method of worth reduction, or by what means it may or may not be removed.

Physical Value.—This includes primarily "those things which are visible and tangible, capable of being inventoried"; but, secondarily, certain non-physical charges "which are an inseparable part of the cost of construction but which do not appear in the inventory of the completed property." These secondary values are expenditures for such items as engineers' and architects' fees, administra-

*Abstract of paper read at the twenty-eighth annual convention of the American Institute of Electrical Engineers, Chicago, Ill., June 27, 1911.

tion expenses chargeable to construction and provision for various incidentals and contingencies, incomplete inventories, unforeseen requirements, etc.

Development Expenses, Intangible or Overhead Values.—Development expenses generally cover most or all of the following expenditures:

1. Legal and other expenses of preliminary promotion, incorporation and organization, procuring consents of property owners, condemnation proceedings, obtaining franchises, consents and certificates from public service commissions and other public bodies, title examinations and insurance.

2. Technical expenses in connection with preliminary work, surveys, expert estimates, etc.

3. Interest on capital and bond issues, wages of superintendence and administration not chargeable to construction ordinarily necessary in connection with putting a property in going order; and also sometimes the deficiency in operating expenses and taxes until the property is put on a paying basis.

4. Taxes which must be paid until the property is completely a "going concern."

5. Discounts on securities, brokerage or other customary and necessary expenditures in connection with financing such an undertaking and marketing securities.

6. Reasonable promotion profit, possibly also compensation for risk of capital, estimated at 5 per cent to 10 per cent of the cash investment.

Development expenses are not ordinarily depreciated in the same way as the physical property, though some authorities have indicated that such procedure is proper. Development expenses may well be amortized. The rate of amortization might well be based on the life of the securities, whereas the depreciation of the physical property would have to be based on its rate of deterioration through life, which the Wisconsin commission reports to average for electric lighting properties 17.46 years, telephone plants 11.24 years, and electric railways 18.02 years.

Original Cost.—This refers to the actual amount of money paid for the physical property including original construction plus all additions since that time.

Cost to Reproduce New, or Cost of Reproduction.—These terms refer to an estimated value based on the cost of reproducing the physical property new, on the basis of prices current at the time of estimate—prices that fluctuate considerably are averaged for five years preceding—and includes everything that can be inventoried.

Scrap Value.—All physical property unless offset in whole or in part by cost of removal, has a certain scrap or junk value beyond which there is no depreciation.

Wearing Value.—If from the cost—taken on whatever basis is determined to be the correct one—there is subtracted "scrap" or "salvage" value of given physical property, the remainder is a value known as "wearing value," which will deteriorate and entirely pass away.

Service Value.—Physical property honestly and intelligently purchased with a view to its suitableness for the service intended, aside from some hidden defect or untoward accident, maintains its original value practically throughout its life except for such deterioration as results from wear and tear or deferred maintenance. Going value may or may not accrue in addition to and over and above service value. Going value relates to establishment of earnings while service value exists regardless of earnings.

Present Value.—The more frequent application of the term is to that value obtained by deducting from "original cost" or "cost to reproduce new" the accrued depreciation, which may be either absolute depreciation or the sum of both absolute and theoretical depreciation. Appreciation as well as depreciation must be considered in determining "present value" as indicated by the Supreme Court. (Wilcox vs. Consolidated Gas Company, 212 U. S., page 52.)

Going Value.—This refers to an estimated worth recognized by the highest courts and ingeniously figured and allowed for by at least one State commission in connection with a wise expenditure made in increasing the business of an established plant.

Good Will.—A monopoly, as is generally admitted, has no good will which can be evaluated, and the courts have sustained this view.

Franchises.—The present tendency, largely by reason of legislative enactments, is to prohibit the capitalization of franchises beyond the absolute expenditures made in good faith in obtaining said franchises.

Classes of Depreciation

The subject of depreciation from an engineering standpoint practically divides itself as follows:

Wear and Tear, or Maintenance.—This includes such depreciation as may ordinarily be removed or offset by proper expenditures at such time as the worn-out parts may be economically replaced.

Age or Decrepitude.—Depreciation of this sort is due to the aging of apparatus that usually has a life extending over a period of years.

Inadequacy or Supersession.—When street railway service has increased to such an extent that many and frequent small single-truck cars are required to do the work that can be done by larger double-truck cars at less cost and with less interference with street traffic, both economy and necessity compel superseding the smaller equipment by the larger, and thus, through inadequacy, investment in the smaller equipment is depreciated before the property is worn out or becomes decrepit. Furthermore, the introduction of heavier cars may make inadequate the rails and carhouses.

Obsolescence.—Obsolescence means the depreciation of property through the development of something newer and either more economical or more of a fad. By reason of rapid advance and development in the art, obsolescence has heretofore probably caused the greatest expenditure for depreciation account, unless it is wear and tear; but as time goes on obsolescence may become a less important factor, though it would probably be at the cost of improvements and development.

Deferred Maintenance.—The several classes of depreciation hereinbefore referred to assume that the property will be kept in good operating condition and efficiency. Deferred maintenance is only another term for neglect and always reflects to the discredit of the management or the financial ability of a corporation.

"Absolute" and "Theoretical" Depreciation

Where property is no longer of service it must be depreciated down to the value at which it may be sold, even though that value is as low as scrap value. On the other hand, apparatus that is in use and rendering a service economically may, for the purpose for which it was intended, be as valuable as when originally installed, although its age may be approaching the limit of its life.

The erroneous application of rates of depreciation in the attempt to determine present commercial values is fairly common, one of the most notable cases, because of the large amounts of money involved, being that of the Public Service Commission of New York, First District, in the matter of the Third Avenue Railroad reorganization.

The "straight-line" method of depreciation has been more largely used than any other, probably because the life of much apparatus is brief; and, furthermore, the application of this method is the most simple, direct and easily understood, and hence favored by the legal fraternity and a large proportion of the members of public utility commissions, many of whom, not technical men, naturally incline toward the more easily appreciated elements of the questions which they are compelled to consider and discuss.

As indicating the possible error in attempting to estimate "theoretical" depreciation, it is frequently found that the length of life assumed has been greatly surpassed by apparatus which is still giving reliable and satisfactory service. For apparatus still giving satisfactory service after the expiration of its assumed life it is only fair in estimating theoretical depreciation to allow a value greater than scrap value. The minimum value of all types of engines, boilers, pumps, heaters, condensers, line transformers and shafting is, at present being taken by the Wisconsin commission, for example, at 25 per cent; generators, motors, rotaries, arc lamps, wood and iron poles, 20 per cent; station transformers, 40 per cent; storage batteries, 35 per cent, and switchboard instruments and electric meters, which must be kept in a high state of repair, 80 per cent, as the minimum percentage of reduction in cost for apparatus still in use though theoretically "dead."

DEPRECIATION ACCOUNTS OR RESERVE FUNDS

For a small company or where relatively large proportions of the invested capital are locked up in few or single pieces of property, it is preferable to accumulate, in advance out of operating income, reserve funds from which to provide for all classes of depreciation. But such method may be unnecessary and possibly an inexpedient accounting complexity with large corporations, where the investments in any single piece of physical property are small relative to the total investment. In brief, where the properties are large enough depreciation becomes only normal wear and tear, but in any case operating expenses should be made to provide for ultimate loss in value, whether reserve funds are accumulated or all depreciation is charged to the "wear and tear account." It is on this theory that, a large property having numerous physical elements, all deterioration becoming simply "wear and tear" and a part of operating expenses, the receiver of the Third Avenue Railway in New York City declines to obey the order of the Public Service Commission and provides no depreciation fund whatever, simply removing deterioration when it occurs and charging it as maintenance in operating expenses.

It has been the too frequent practice in the past to regard wear and tear as the only elements of depreciation chargeable to the operating expense and to charge capital account in whole or in part with expenditures for age, inadequacy and obsolescence. The error of this procedure is now almost universally recognized and the injustice of such improper handling of depreciation to both the investor and the public served is clear.

APPLICATION OF DEPRECIATION

There has been such marked development and improvement in all mechanical appliances, particularly along electrical lines, that inadequacy and obsolescence have usually come into effect before age, and, in consequence, knowledge of the depreciation of all electrical properties due to age has not yet been fully established.

The determination of depreciation due to inadequacy and obsolescence is a particularly delicate matter, it depends so largely on local conditions and especially upon individual judgment and equipoise. Inadequacy and obsolescence usually develop so quickly that very frequently the property in question becomes inadequate or obsolete within a few weeks or months, and has depreciated to scrap value almost as soon as these classes of depreciation are recognized; a space of time entirely too brief in which to apply ordinary methods of offsetting depreciation.

Information should be collected so as to make clear the causes of depreciation and the rate at which it has progressed. For example, wear and tear would probably have to become subdivided into maintenance and accident. Obsolescence might be divided so as to show whether the obsolescence was caused by city ordinance or the invention of new apparatus. In obtaining age depreciation, care must be exercised that the apparatus is abandoned through exhaustion of life, not through inadequacy or obsolescence.

In determining the total amount of deterioration due to inadequacy and obsolescence, only those elements of the property which have clearly and unequivocally so depreciated should be written off to this account. On the other hand, in determining the rate of depreciation for making provision covering inadequacy and obsolescence, the engineer should be sure to provide a rate high enough to take care of these classes of depreciation out of the operating income.

As the United States Bureau of Internal Revenue provides that reduction in value authorized for depreciation "shall include all expense items under the various heads acknowledged as liabilities," it will be seen that the proper understanding of the question of depreciation is a vital one for those connected with corporation management, because if no depreciation fund is set up nothing can be included in the cost of operation as necessary to provide for depreciation, as would be essential in a case involving rate regulation, for example. Moreover, the State public service commissions are now generally requiring depreciation accounts and reserves on a basis to be decided by each corporation itself.

The manner of determining the amount to be set aside for annual depreciation varies, there being three general methods recognized.

a. An estimate based on a percentage of the cost of the property being depreciated. The special master in the Columbus (Ohio) case held that the amount of operating expenses chargeable to depreciation should be "5 per cent of the total cost of the plant including real estate, real estate constituting but 7 per cent of the total valuation." The present laws of Massachusetts provide in respect to municipally owned gas or electric plants that there shall be included an amount for "depreciation equal to 3 per cent of the cost of the plant exclusive of land and water-power appurtenant thereto."

b. A fixed percentage of the gross earnings. This method is sometimes taken to include wear and tear and sometimes not. The practice in this regard is illustrated by the following companies:

Name of Company.	Per Cent. of Gross Revenue Expended or Appropriated for Maintenance.	Depreciation.
Milwaukee companies:		
Railway departments	11.3	9.9
Gas, electric light and steam heat departments	6.15	8.12
United Railways Company of St. Louis	13.67	10.0
Union Electric Light & Power Co., St. Louis	4.95	16.0
Suburban Electric Light & Power Co	7.10	10.85
Detroit Edison Company and subsidiaries	6.45	10.23
Omaha & Council Bluffs Street Railway Co	...	10.0
Chicago street railways	6.0	8.0

c. On the basis of kw-hours output or car miles run. The New York Edison Company charges monthly for renewals and replacements, etc., one cent per kw-hour on current sold to general consumers in addition to wear and tear. In Cleveland 5 cents per car mile is provided to cover both maintenance and other deterioration. In Brooklyn the subsidiaries of the Brooklyn Rapid Transit System allow amounts varying from 2.7 cents to 4.4 cents per car mile for equipment of surface roads and from 1.4 cents to 2 cents per car mile for equipment of either elevated or partly elevated railways; from 2.2 cents to 2.4 cents per car mile for way and structures for surface roads; from 1.1 cents to 1.8 cents for elevated or partly elevated railways, to cover not only obsolescence, inadequacy, renewals and replacements, but also repairs and maintenance.

Total Depreciation.—From the cost should be deducted the absolute depreciation in order to obtain the present real or service value of the property. If it is desired to go further than this and obtain a theoretically depreciated value, the absolute depreciation must be increased by a theoretical depreciation determined by the use of estimated amounts to cover assumed deterioration for age and nonexistent, but expected, inadequacy or obsolescence.

Very many authorities agree that in making an estimate of the amount of depreciation effective in any property, "used or useful," there should at least be included in the amount to be deducted an estimate of the amount of wear and tear, deferred maintenance, if any, also scrap value of property that has been worn out or superseded as well as inadequate or obsolete property provided it is still inventoried.

The only allowable exception to the inclusion of inadequate or obsolete property as a part of depreciation is where inadequacy or obsolescence has so suddenly and largely affected a property that its earnings have not permitted the writing off at the time or since such developed depreciation; then in such cases it may be that capitalization or earning basis should not be reduced by taking account of any such depreciation.

Whether or not "theoretical depreciation" should be included as part of the total depreciation in determining fair value of physical property is a mooted question. The public service commissions have rather leaned to the opinion that such depreciation should be considered in determining fair value. On the other hand, many, if not all, of the court decisions are against such inclusion of theoretical depreciation.

Provided a property is kept in good order and at 100 per cent working efficiency so as to render service to the public equivalent to that of a new plant, the question of rates or value of property in its service to the public has absolutely nothing to do with the amount of reserve funds the corporation may or may not have accumulated. While the engineer must be quick to recognize loss of value where it actually exists and to make deductions for property that has been worn out or superseded, he should not be misled into including purely hypothetical or academic values.

The confused state of mind that prevails with regard to the application of depreciation in determining present value results largely from the misapplication of principles established by the courts in rate cases. These decisions expressly provide that allowances to cover the deterioration of all sorts, including ultimate replacement, are to be provided out of operating income.

FIFTY PER CENT METHOD

A quick and it seems to the writer a very fair method of obtaining the theoretical depreciation of certain classes of physical property has been used in some utility appraisals and may be called the "50 per cent method." It has been used by Prof. M. E. Cooley in connection with his figuring of depreciation in the Michigan State appraisal; H. P. Gillette in the appraisal he conducted for the State of Washington; B. J. Arnold in appraisal work for the Public Service Commission of the First District of New York, and the writer in connection with the reorganization of the Third Avenue Railway in New York City. It has, I understand, also been approved by the Master Car Builders' Association in connection with the appraisal of rolling stock. It will be seen that this method of determining depreciation will be fallacious if the installation does not consist of a large number of similar elements or has not been in use for a sufficient length of time to permit the repair account reaching its normal maximum, which it would not do unless practically all parts have been renewed once and renewals are constantly taking place; hence it could not be applied to the buildings of a corporation which owned few buildings and probably not even to engines or generators because usually they would be too few in number—except for the very largest organizations—to permit their being replaced without abnormally affecting the amount annually appropriated on account of depreciation. The net result of the application of the 50 per cent method is at once apparent; 50 per cent of the cost, less salvage, will be immediately written off as depreciation.

DEPRECIATION OF CONTINGENT PERCENTAGES

The percentages added to structural costs to cover engineering, incidentals, contingencies, etc., in order to obtain physical values have usually been considered an inherent part of the cost of the physical property and treated as such in connection with the depreciation of the physical property. With certain parts of the property this is undoubtedly a correct procedure and for the sake of simplicity and consistency may be recommended; but, as a matter of fact, the original engineering investment in certain parts of the physical equipment, for example, roadbed and track, still remains there and is as much a part of the property as the real estate, although the rails and ties, which have been cited, may have been many times relaid and paid for as a part of operating expenses. It would be no more unreasonable to leave such investment percentages undepreciated than it is to depreciate the physical property entirely independent of development expenses or going value, which seldom, if ever, has been practised. It has been held by some that the discount on securities should be written off at the same rate as depreciation of the physical property; but the more usual plan is to amortize such costs at a lower rate, determined by the life of the bonds. In some cases it may not be advisable to amortize investments of this character at all.

SUMMARY AND CONCLUSIONS

1. The necessity for a more general agreement on and uniform use of the terms used in considering and discussing depreciation.

2. The rate of depreciation adopted for accruing depreciation must not be confused with the total sum of depreciation in physical property, which is an estimate for a given time.

3. The difference between absolute and theoretical depreciation should be recognized and the amounts separately considered.

4. Theoretical depreciation must be assumed and provided for as operating expenses if capital is to remain unimpaired and rates are to give maximum service at minimum expense.

5. Service value, determined from consideration of the "absolute" not the "theoretical" depreciation of physical property, is to be used, in connection with certain proper non-physical values, as the basis on which rates are to be fixed, capitalization allowed and taxes assessed.

6. While usually preferable, there exists no necessary reason for always writing off certain costs such as engineering, incidentals, etc., at the rate at which the physical property of which they are an inherent part is depreciated.

7. Development expenses bear no fixed relation to the cost of the physical property and their amortization has no necessary relation to the rate of depreciation of the physical property.

8. The amount of depreciation of physical property can be accurately determined only by inspection on the part of competent and conscientious engineers.

9. There exists an urgent demand for co-operation among engineers, manufacturers and service corporations for the intelligent collection and correlation of data on which properly to base estimates of depreciation.

Mr. Dalrymple, general manager of the Glasgow Corporation Tramways, Glasgow, Scotland, has submitted an interesting report to the Town Council on the question of equipping the Glasgow cars with vestibules. Several years ago various devices were tried to protect the motormen, but these were all unsuccessful. The present vestibule incloses the whole platform including the steps. After its experience of twelve months with the present vestibule the committee has decided to equip every car in service with the full vestibule.

LET THE PUBLIC KNOW*

BY A. D. B. VAN ZANDT, PUBLICITY AGENT DETROIT UNITED RAILWAY

Let the public know; tell them all about yourselves. It is a duty you owe not only to the people but to yourselves as well.

Of all the modern inventions of urban and suburban life developed within the past half century none has been so wonderful in its growth and ramifications as the electric street railway. Yet because of the misrepresentation of those with ulterior motives, supplemented by the non-presentation of the real facts by those who know, abuse is heaped upon the electric railways.

To-day you introduce to a municipality this wonderfully comfortable means of annihilating time and space and you are hailed as a giver of new life, but a year from to-day the same people will not be greatly adverse to placing you on the cross of craping criticism. To-day you invest all the money at your command, adding to it all the credit you can obtain, in rails, cars and power, all the best products of the art, and then give a service far beyond the wildest dream of the most optimistic citizen, but a year from now your track, your cars, your power and your service are condemned as being antiquated: Your critic continues to live in the same house, use the same furniture, eat from the same dishes, content in the belief that he is doing what is proper. He can readily see the financial folly of wiping out his investment, but he doesn't understand why you should not scrap a $5,000 car. The average citizen goes to his butcher and asking the worth of meat is told and believes; he goes to his tailor and asking the worth of clothing is told and believes. But when this citizen comes to you asking what it costs to make his street car ride possible and is told, thereupon you are made chief in the Ananias club.

The prevailing opinion of the public had its origin in your own lack of comprehension of what you started out to do. In the beginning all you planned was the substitution of motors for horses. You could give, you believed, the same service—perhaps a little better service—at a less cost. Your original cars and their duplicates would do; to them you would fasten motors and string up some wires from which to secure the current of electricity. You would save the cost of feed and the loss of dollars by sickness, old age, or death of animal power. Coupled with these was the certainty of somewhat shortening the running time, so you figured it out that you could perform the public service of transportation not only better but cheaper. You proceeded by contractual relations to perform this service at rates that have since proven to be far less than they should have been. Others, lured by the pot of gold at the end of the rainbow and with less knowledge than you, entered the field with even rasher promises than you believed you could fulfil. You found that the mystifying motors required larger cars and then the larger cars required larger motors. With larger cars and more powerful motors came greater speed, which required rails and roadbeds of costly design. The development of the industry has been a constant succession of putting in new capital and still more capital, with the scrap heap growing apace long before even a fractional portion of the original investment has been returned.

The people have been served lavishly. You have made it possible for them to live far from the smoke and noise of shop and factory; you have given them a means of transportation within the city faster, more frequent and more certain than human mind ever thought possible. You have spread the cities out into the country. You have done all these things, but so intent have you been upon your work that, even though through bitter experiences you have learned that deficits are not surpluses and depreciation must some time be met, you have not set about to tell the user of your street car that every five-cent piece he pays is far from being all profit. You have not gone about it scientifically. To-day your car shops are scientifically organized; you employ engineers to do your track building; you make use of chemists; operating departments are in the hands of men of wide knowledge of the public's needs; you are quick to locate defects in your internal organization, but you have not yet brought to an equally high standard a public information department.

To-day several of the states and provinces have begun a scientific study of the art of transportation through trained men in the employ of the railway commissions. There is deeper investigation of the problem than ever before and eventually the knowledge gained will seep through to the minds of the people. This knowledge should not all be theoretical; the difficulties besetting practical men must be made known in order that there be a clear comprehension. Each railway should do an active work in properly educating the public with which it is in immediate and constant touch.

No public utility receives so much attention to-day in the press as is given to electric railways. Day after day and year after year the name of your railway appears in public print, often with words of truth, often with words of falsity. Occasionally you are being given credit for doing something for the public good and more often you are being accused of crimes you never committed. If a nagged conductor and a crabbed passenger have a quarrel, headquarters are given the blame; if a transfer is wrongfully issued, it is done on the advice of the president of the company after months of consultation with the directors, and should some one coming around the rear end of one car be run over by the car going in the opposite direction it is, of course, all deliberately planned by the general manager. Your patron may oversleep and perforce have to snatch an unsatisfactory breakfast, but you must have the car ready for him when he reaches the corner. Similarly you are to blame because you do not buy cars enough and build tracks enough and have an abundance of car crews on hand to take back the armies from the shop, the factory and the ball game within the space of five minutes or less. That the butcher and the grocer cannot assuage one's wants promptly is no excuse for you.

Why not intelligently try to direct the information that goes out broadcast among the people whom you transport? They are entitled to know what you are doing and why you are doing it. You should tell them that your prosperity means their good service and their prosperity means still better service. Let them see that there is a proper, decent relationship between you as the common carrier and them as the riders. Take them into your confidence.

No matter what may be the motive of the man higher up in newspaper control, it should be remembered that the reader believes in what his paper tells him. His newspaper is the source of his information and his school of instruction. The very fact that a man reads a certain paper is the best evidence that he believes it it from first column to last, including, sometimes, the advertisements. Your average citizen believes his newspaper is published primarily to furnish him with local and world information, and so he necessarily believes he is being honestly dealt with, but on the real purposes of the man higher up he has never had occasion to ponder. Make the giving of news a definite department of organization with the same attention to it as to other departments. Let the public know what you have done and what you are doing. Let the public know of your new appointments and of your accidents. Let the public know of your schedule changes, of where you add to the service and where you take off and why.

*Abstract of a paper read at the twenty-eighth annual convention tion, Windsor, Ont., June 6, 1911.

Municipal corporations, through clerks and departments, let the public know what is going on because the public is interested. You should do no less. Don't be afraid of printer's ink. Let the public know.

RECENT LEGISLATION AFFECTING ELECTRIC RAILWAY ACCOUNTING.*

BY HENRY J. DAVIES, SECRETARY AND TREASURER CLEVELAND RAILWAY

Two general classes of laws have been enacted within the past few years affecting the accounting of electric railway and lighting companies: First, laws providing for the creation of railroad commissions, or public service commissions, having jurisdiction not only over steam railroad companies, but also over electric railway and other public service corporations, and for the making of annual reports to those commissions containing more or less minute details of earnings and expenditures; and, secondly, laws providing for the taxation of such corporations and the making of reports of securities outstanding and the value of properties owned, as a basis for the assessment of taxes.

These laws have a tendency to induce accurate, clear, open, simple accounting that can be understood by investors and that will lead to more accurate knowledge on the part of the public generally of the real cost of electric railways and the expense of maintaining and operating them.

Under these new laws the accountant becomes as important an officer of the State or the public service corporation as the lawyer or the engineer. He takes equal rank with them. His advice is as necessary as theirs.

In addition to these laws, some of the States—Illinois, for illustration—have passed laws to authorize cities to acquire by purchase or condemnation the property of existing street railway companies; and some cities, in States where municipal ownership of street railways is not authorized by law, notably Cleveland, have granted franchises, or are contemplating the grant of franchises, containing options to the municipalities to purchase the properties of the companies. When cities are making plans to buy street railways at the cost of producing them, and when, at the same time, the taxing officers of cities, counties and States are reviewing the railways for the purpose of placing upon them as high a valuation as possible for taxation, there is little inducement or temptation for street railway companies to place upon them any value but their actual value; and they may, in returning their properties for taxation or in optioning them to the public, safely produce their books, which, of course, should show not only the cost of the physical property, but its present condition as indicated by maintenance reserves to provide for depreciation from wear, and sinking funds to provide for the amortization of that difference that always exists between the par of the outstanding securities of a corporation, even though the capitalization be equal only to the exact cost of constructing the road and the actual value of the plant in average working condition.

If the work of the accountant does not show accurately the cost of production and the relation of outstanding securities to property accounts, it may be difficult to explain why the officers of the company present arguments to taxing officers that are apparently inconsistent with arguments advanced in support of a high valuation of physical property, if the property is to be bought by the franchise-granting authority, or if dividends are to be limited to a fixed rate upon that value. Of course, there will be differences in opinion as to what should be included in the price that a municipality ought to pay for a railway property, even when the basis for fixing the value is agreed upon, and as to what should be included in the taxable value of such a property. Overhead charges are unquestionably a proper part of the cost of producing a railway, and should be included in the purchase price. They should not be included in the value placed upon street railway properties for the purpose of taxation unless they are included also in the value placed upon the properties of all other corporations, firms and individuals. They are more difficult of ascertainment in negotiations for placing a value upon an old property, the cost and current value of which are not definitely shown upon the books, than in the case of new properties, or additions to old properties, the cost of which, under the standard system of accounting, is properly shown in the company's accounts.

Laws providing for the appointment of railway commissions and for the taxation of public service corporations should be as fair and just to the corporations as the corporations are expected to be to the State. This remark is suggested by the title of the Michigan law for the creation of a railroad commission, viz.:

"An act to define and regulate common carriers, and the receiving, transportation and delivery of persons and property, prevent the imposition of unreasonable rates, prevent unjust discrimination, insure adequate service, create the Michigan Railroad Commission, define the powers and duties thereof, and to prescribe penalties for violations thereof."

This title seems to accuse the railroad companies of being unreasonable in the making of their tariffs, partial, unfair and unjust to their patrons, and disposed to give the people inadequate service. Of course, these conditions should be prevented; but a law that defines its purpose to be to insure reasonable rates, adequate service and justice, not only to the public, but to the corporations that serve the public, will accomplish every purpose of the act referred to, and do it without reflection on those citizens of the State who are lawfully and honorably engaged in the transportation business.

OHIO

Under recent Ohio laws electric railway companies of that State are required to file three annual reports, two with the Tax Commission, one of which must contain a statement of the company's gross earnings, on which a tax of 1.2 per cent is collected by the State. The other must show the number of shares of capital stock, the par and market value thereof, the amount of capital stock subscribed, the amount of capital stock actually paid in on stock subscriptions; a detailed statement of the real estate owned by the company in Ohio, where situated, and the value thereof as assessed for taxation; a full and correct inventory of the personal property, including moneys, investments and credits, owned by the company in Ohio, where situated, and the value thereof; the value and a general description of the real estate owned by the company and situated outside of Ohio, and a description or inventory of the personal property owned by the company outside of the State, giving the location thereof and its value; the total amount of bonded and other indebtedness; the gross receipts; the gross expenditures in detail; the length of line within and without the State, its character and value; the character, classes, number, values, locations, ownership or control and use of rolling stock; the actual value of depots, station houses, section houses, freight houses, machine and repair shops, and all other buildings, structures and appendages connected thereto, including machinery and tools; all telegraph and telephone lines, and their value; and the gross earnings for the year, within and outside of the State.

The elaborate blanks prepared by the Tax Commission for these reports have, because of their detail, and because they call for information that has not in many cases been on the books of the railway companies, re-

*Abstract of paper read before Central Electric Accounting Conference, Springfield, Ill., June 24, 1911.

quired a great deal of work on the part of the accounting departments of the electric railway companies. They seem to call for more information than is necessary for the purpose of carrying out the provisions of the law, and the arrangement of the statistics is illogical. A revision of the form will probably be made within the current year.

The third report is required by the new public service commission law. The form of report has not yet been prepared.

Section 12 of the new law provides that a system of accounts shall be established by the commission which, when practicable, shall conform to the system provided by the Tax Commission of Ohio. It is likely, therefore, that the report required by the Tax Commission will answer the purpose of the reports that the Public Service Commission will ask the railway companies to file. Section 12 is as follows:

"The commission may establish a system of accounts to be kept by public utilities, or classify utilities and prescribe a system of accounts for each class, and prescribe the manner in which such accounts shall be kept. Such system shall, when practicable, conform to the system prescribed by the Tax Commission of Ohio. It may, also, in its discretion, prescribe the form of records to be kept by public utilities, and the commission may require that no other records be kept, except as may be required by the laws of the United States or as may hereafter be required by the laws of this State. The commissioner shall at all times have access to all accounts kept by public utilities, and may designate any of its officers or employees to inspect and examine any and all such accounts. The commission may, if it shall determine that any expenditures or receipts have been improperly charged or credited, order the necessary changes in such accounts."

The report to the Tax Commission takes the place of the returns of personal property for taxation heretofore made by public service companies to county auditors.

MICHIGAN

The laws of Michigan require reports from common carriers, including electric railway companies, similar to the reports required by the Interstate Commerce Commission, on blanks prepared by the Railroad Commission.

PENNSYLVANIA

The laws of Pennsylvania provide for a tax at the rate of 5 mills upon each dollar of the actual value of the entire capital stock, common, special and preferred, of street railway companies and other corporations; and, for the purpose of determining the amount of this tax, corporations must file with the State a report for each year ended the first Monday of November, showing the amount of capital stock authorized, the amount of stock sold in the year, the amount and rate of dividends paid, the earnings, the expenditures, the amount of funded and floating debt, the amount set aside for sinking funds, the surplus, the cost of the road or line, the cost of equipment, of real estate and buildings, of securities of other companies, the amount of cash and current assets, etc. The president and the secretary or treasurer of each company are required to take an oath to estimate and appraise the capital stock of the company at its actual value in cash, and then to make such estimate and appraisal of the actual value in cash of the capital stock "as it existed beween the first and fifteenth days of November, not less, however, than the average price which said stock sold for during said year, and not less than the price or value indicated or measured by net earnings or by the amount of profit made and either declared in dividends or carried into surplus or sinking fund, and not less than the actual value indicated or measured by the intrinsic value of its tangible property and assets, the extent and value of its good will and franchises and privileges, and the material results of their exercise."

ILLINOIS

I have not had an opportunity to study, or even see, the latest law of Illinois on this subject. The law of that State authorizing municipal ownership and operation of street railways requires a great deal of accounting work.

INDIANA AND KENTUCKY

I wrote to the railway commissioners of Indiana and Kentucky some weeks ago for a copy of the laws of those States relating to the taxation of electric railway companies and the making of reports by them, so as to be able to incorporate in this paper the provision of the laws of the six States represented in the conference, but have received no reply to my letters.

UNIFORM ACCOUNTING

It would seem desirable that the laws of all the States on the subject of public service accounting be uniform, that the system used as to street and electric railways be the standard system of the American Electric Railway Accountants' Association and the Intersate Commerce Commission, and that one or more of the members of every public service commission be a public service accountant, or a man of practical experience, familiar with the accounts that he is to check.

CHICAGO

The franchises that have been most widely discussed within the past few years are those granted to the Chicago railway companies in 1907, and the Cleveland Railway in 1909. They illustrate or indicate the modern tendency toward government control of railways, containing provisions by which the councils of the two cities may require operation at lower rates of fare than the maximum rates prescribed by the franchises. In the grants of both cities unusual recognition is given to accounting. In the Chicago franchises the most important features, perhaps, are those providing for a board of supervising engineers; in the Cleveland franchise the most important are those relating to accounting.

CLEVELAND

The Cleveland ordinance contains many provisions on the subject of accounting.

In a paper read before the American Electric Railway Accountants' Association last year, I called attention to some of the accounting features of this franchise. It contains one imperfection, from an accounting point of view, that was not mentioned in that paper. The grant provides that the property of the company shall be maintained in such good order and condition that it shall at all times be worth 70 per cent of the cost of reproducing it, and provision is made for a maintenance fund of about 5 cents per car mile for this purpose, but if the value of the property, plus the amount accumulated in the maintenance and renewal fund, shall at any time aggregate more than 70 per cent of the reproduction value of the entire system, the maintenance allowance may be diminished.

These provisions protect the stockholders as to the property that existed at the time the capitalization, or "capital value," to use the phrase of the franchise, was fixed, it having been fixed at the depreciated value of the physical property, plus the value of franchises and one or two other intangible items. But the same provisions apply to property acquired since Jan. 1, 1908, the date of the valuation of the property in existence at the time of the passage of the ordinance, and all that may be added from the present time to the end of the term of the grant, and no provision is made by the ordinance, or permitted by it, for a sinking fund to take care of the difference between the cost of the new property and the 70 per cent of its value, which is assumed to represent its average working condition. The grant contains an option to the city to purchase the property at its termination at a price to be agreed upon between the city and the company, or to be fixed by a board of arbitrators, the price to be the cost of the reproduction of the physical property, less a reasonable amount

for depreciation, and plus 10 per cent. Nothing is to be paid for the company's franchises.

This means that in case of purchase by the city at the end of the grant the stockholders will receive but 70 per cent of their investment, if the new property has depreciated in value 30 per cent. If, during the remainder of the life of the grant, the company should spend $20,000,000 for extensions, betterments and permanent improvements, and if then the city should elect to purchase, having obtained power from the State to do so, it will obtain for $14,000,000 property which cost the stockholders $20,000,000, and the stockholders will lose $6,000,000 of their investment, less, of course, the 10 per cent bonus. This is on the assumption that all of the new property will have depreciated 30 per cent. The company has asked that the ordinance be amended so as to permit it to accumulate a sinking fund to take care of this 30 per cent depreciation, and has pointed out that a tenth of a cent per passenger will be sufficient for the purpose. Another tenth of a cent per passenger would provide for the value placed by Judge Tayler in his capitalization of the company upon the franchises held by the company on Jan. 1, 1908, for which the company is to receive no compensation in case of purchase by the city at the termination of the franchise. The city so far has declined to consent to the suggested amendments. The city street railroad commissioner, however, has recommended the adoption of an amendment changing the price to be paid at the end of the grant to the par value of all outstanding bonds, floating debt and capital stock. This would protect the investment if there were any way of compelling the city to pay the price; but it is not likely that the city will be willing to pay the company the entire cost of physical property that is worth but 70 per cent of its cost, and to pay in addition nearly $4,000,000 for franchises that expired twenty-four years earlier.

The franchise contains provisions indicating that it was the intention of the city and the company that the capitalization should be equal only to the value of the company's physical property, and that the investment should be fully protected. The preamble, for illustration, declares it to be the purpose of the ordinance "to secure to the owners of the property invested in street railroads security as to their property and a fair and fixed rate of return thereon"; and Section 47 contains this provision: "The purpose of this ordinance is to establish and settle the relations between the city of Cleveland and the Cleveland Railway Company by a contract which will secure to the Cleveland Railway Company, unimpaired, the capital value."

But the ordinance makes inadequate provision for the carrying out of the purpose so declared. I have confidence enough in the people, however, to believe that before the expiration of the grant an amendment will be made that will protect the entire principal of the stockholders, or that, if the city should elect to purchase at the end of the franchise, the declaration, frequently made in the ordinance and in the discussion that preceded its passage, of intention to make the investment of capital safe and secure, will be treated as a moral, if not a legal, obligation on the part of the city to pay, or to require its nominee to pay, for the property its whole capital value.

The Illinois act of 1903 "to authorize cities to acquire, construct, own, operate and lease street railways" contains somewhat better provision on this subject. In that act the City Council of any city that may decide to operate street railways is given power to fix rates and charges, "but such rates and charges shall be high enough to produce revenue sufficient," among other things, "to permit the accumulation of a surplus or sinking fund to meet outstanding bonds." And if the city shall purchase any street railway property, it may include in the price to be paid therefor "the value of any earning power of such property, or of the unexpired portion of any franchise granted by said city."

STANDARD CLASSIFICATION OF ACCOUNTS

The classification of accounts adopted by the American Electric Railway Accountants' Association in 1897 was the first attempt by the electric railway companies of the country to form a standard system of electric railway accounting. It was the product of many months of work of a committee appointed by the association for the purpose. The value of the work of the committee was recognized at once, not only by electric railway officers, but by the Interstate Commerce Commission and by State railroad and public service commissioners. By frequent conferences and correspondence with public officials, steam railway accountants and others, the committee on standard classification of accounts has kept fully abreast of the times, and has produced a system of accounting that, for simplicity and clearness, without disregard of details, is probably equal to, if not better than, any system of accounting in any other business, and that, if reports based upon it are properly made and carefully studied by the managers of electric railways, will result in economies that could not be brought about without such standard systematic accounting. The reports may be made still more valuable when opportunity exists to compare them with like reports of other corporations in the same business.

The Central Electric Accounting Conference has done good work along the same line. Such meetings as the conference holds quarterly and the American Electric Railway Accountants' Association annually educate not only the members who attend the meetings, but the other officials of the companies directly interested, and indirectly the general public.

The rulings or decisions of the Interstate Commerce Commission, the Public Service Commissions of New York and the steam and electric railway commissioners of other States on questions of accounting, published in bulletins or pamphlets, constitute a valuable and informing record of present day accounting that should be in the library of every electric railway company, and railway accountants should avail themselves of the opportunity of submitting to these bodies any important question about which they have doubt, or as to which they are in disagreement with municipal or State authorities.

MEETING OF THE CENTRAL ELECTRIC ACCOUNTING CONFERENCE

The seventeenth regular meeting of the Central Electric Accounting Conference was held at the St. Nicholas Hotel, Springfield, Ill., Saturday, June 24, 1911.

The morning session was called to order at 9 o'clock by President Elkins. After the routine business of the conference was disposed of, the members listened to the address of H. J. Davies, secretary and treasurer of the Cleveland Railway, an abstract of which is printed elsewhere in this issue under the title "Legislation Affecting Electric Railway Accountants." At the conclusion of this paper Mr. Davies answered many questions touching the subject of accounting features of the recent statutes governing electric railroads. He asked permission of the conference to present at some future date more information on this line as a result of investigations into the subject.

C. B. Baker, auditor Toledo, Bowling Green & Southern Railway, tendered his resignation as a member of the executive committee, and the vacancy was filled by the appointment of J. D. Maynes, auditor of receipts Illinois Traction System.

The question of affiliation with the Central Electric Railway Association was informally discussed, and the matter of official action deferred, on account of the fact that a representative number of accountants were not present at the meeting. The next regular meeting will probably be held at the same time and place as the meeting of the Central

Electric Railway Association. The report of the subcommittee on affiliation was referred to the full committee, with instructions to report again at the next meeting. This committee is as follows: A. F. Elkins, chairman; E. L. Kasemeier, Walter Shroyer, H. B. Cavanaugh, L. T. Hixson and J. D. Maynes.

After adjournment of the morning session, the members of the conference were guests of the Illinois Traction System officials at an informal luncheon. In the afternoon President McKinley's private car was placed at their service and the members and friends were given a special run into St. Louis over the new McKinley Bridge.

JUNE MEETING OF CENTRAL ELECTRIC RAILWAY ASSOCIATION

The annual outing meeting of the Central Electric Railway Association was enjoyed by more than 100 railway and supply men. The meeting was held at the Edgewater Club, St. Joseph, Mich., where most of the railway men were entertained. St. Joseph is one of the most popular summer resorts on the Great Lakes and entertainment was provided in abundance by the local street railway and the Business Men's Association, the Graham & Morton Transportation Company and the Edgewater Club. About thirty ladies attended the convention.

LONG-DISTANCE TROLLEY TRIPS

A noteworthy feature of this convention was the traveling of practically all of the railway men and their wives to and from St. Joseph in special cars of the Terre Haute, Indianapolis & Eastern, Indianapolis, Crawfordsville & Western and Louisville & Northern Railway & Lighting companies. The first long-distance trolley party to arrive at the convention city consisted of fifty-three persons in the car of the Indianapolis, Crawfordsville & Western, which left Indianapolis at 7 a. m. and reached St. Joseph, 234 miles distant, at 3 p. m. This long run was made over the Indiana Union Traction line from Indianapolis to Peru, the Winona Interurban from Peru to Goshen and the Chicago, South Bend & Northern Indiana from Goshen to St. Joseph.

The second car to arrive was the private car, No. 600, of the Terre Haute, Indianapolis & Eastern Traction system in charge of E. B. Peck, vice-president and comptroller, who is also president of the Central Electric Railway Association. This car left Indianapolis at 6 o'clock in the morning and was routed via Anderson, where Mr. Peck's party was joined by Arthur W. Brady, president, and H. A. Nicholl, general manager, of the Indiana Union Traction Company. At Peru the car was met by William D. Frazer and C. F. Franklin, who escorted the party over their 69-mile road, the Winona Interurban Railway. At some points on this line speeds exceeding a mile a minute were sustained for several miles. At noon, while en route, Mr. Peck entertained his fourteen guests with an elaborate dinner served from the very complete kitchen on this fine private car. The party reached St. Joseph at 3:15.

On the return trip from St. Joseph to Indianapolis private car No. 600, of the Terre Haute, Indianapolis & Eastern Traction Company, made the 234-mile run in 8 hours and 27 minutes. The time over the different roads making up the interline route was as follows: St. Joseph to Goshen (Chicago, South Bend & Northern Indiana), 58 miles, 2 hours and 45 minutes; Goshen to Peru (Winona Interurban Railway), 69 miles, 2 hours and 10 minutes; Peru to Indianapolis (Indiana Union Traction), 107 miles, 3 hours and 22 minutes.

The longest trolley trip made in reaching the convention was that of the Louisville & Northern Railway & Lighting Company's party, which left Louisville at 7 o'clock in the morning and made the run of more than 350 miles in less than twelve hours' time. Twenty-two railway men and their guests made up the party.

ENTERTAINMENT FEATURES

On Wednesday afternoon the convention visitors were guests of the Graham & Morton Transportation Company for a two-hour steamer ride on Lake Michigan. In the evening of the same day the Benton Harbor-St. Joseph Railway & Light Company entertained with a trolley ride from St. Joseph through Benton Harbor to the Springs of Eden and the summer park owned by a peculiar religious sect, the headquarters of which are known as "The House of David." On Thursday, while the meeting was in session, the ladies of the party were tendered an interurban car ride on the Benton Harbor-St. Joe Railway to Paw Paw Lake, and on their return at 1 o'clock were given a luncheon at the Edgewater Club. About forty ladies were thus entertained.

CONVENTION SESSION

The single business session of the convention was held on Thursday morning, with E. B. Peck, president, in the chair. At the opening of the session Colonel W. W. Bean, who has long been interested in electric railway affairs, welcomed the railway men to St. Joseph in a fitting speech in which he called attention to the recently completed through interurban routes from St. Joseph to all parts of Ohio and Indiana and to Northern Kentucky. A. W. Brady and Charles L. Henry replied in fitting speeches, expressing the association's appreciation of the hospitality of the local people.

STANDARDIZATION REPORT

The minutes of the Columbus meeting were read by A. L. Neereamer, secretary, and approved. H. H. Buckman, chairman of the standardization committee, then presented tthe report of that committee, which will be found on page 31 of this issue. When questioned Mr. Buckman said that the manufacturers of air brakes approved the recommendations made in the committee report. Some general discussion was had on the advisability of approving the suggestion of the committee regarding the use of electropneumatic conductors' train signals and as a result it was voted that this section be eliminated from the report at this time, and that the matter be considered further by the committee. With this exception the standardization committee report was adopted.

Thirteen new supply members were voted into the association. Mr. Neereamer read a letter from H. C. Donecker, secretary of the American Electric Railway Association, expressing his regret at not being able to attend the meeting and urging close co-operation between the two associations.

REMARKS OF MR. BRADY

The president then called upon Arthur W. Brady, president of the American Electric Railway Association, who spoke of the American Association affairs and cited the work of the block signal committee and the insurance committee as among the most important features now being carried forward for the benefit of the member companies. Mr. Brady said that the joint signal committee of the Engineering and Transportation & Traffic Associations had just held a successful meeting at Pittsburgh and was preparing a report on block signaling as applied to electric railways which would contain very valuable material not heretofore presented in available form. Until ten months ago no real study had been made of the subject of block signaling for cross-country interurban railways. Druing this year, however, considerable progress had been made and practical results might be expected from the forthcoming report.

Mr. Brady called attention to the organization of the Bureau of Insurance of the American Association. This bureau was expected to procure practical and financial results. Insurance work had been especially well handled

under the guidance of H. J. Davies, of Cleveland, as chairman of the insurance committee. Before the insurance committee began its work it seemed that traction property insurance had been unduly profitable to the insurance companies, notwithstanding numerous large fire losses. The successful work of the insurance committee under Mr. Davies' guidance had resulted in the formation of the bureau, which would be in charge of Henry N. Staats, of Cleveland.

Mr. Brady next spoke of the policy of the American Association, which was not to duplicate any work done by sectional bodies, and was to work in harmony with each association. If any friction had existed in the past it had been eliminated.

Mr. Peck announced that the executive committee of the Central Electric Railway Association had approved the appointment of Henry N. Staats to the same position with it and with the same duties that he now has in connection with the American Association. His services will now be available to member companies and plans under which work may be carried forward will soon be issued by Secretary Neereamer.

Mr. Peck also called attention to the forthcoming visit to Indiana and Ohio of the equipment committee of the American Electric Railway Engineering Association, which would be for the purpose of inspecting rolling stock practices in the Central Electric Railway Association territory. He also announced that through the courtesy of the Graham & Morton Transportation Company those attending the convention would be tendered free transportation and free berths on the night boat to Chicago.

WOOD PRESERVATION

A paper on the advantages of the use of treated timber was next presented by C. P. Winslow, of the Forest Service Department, United States Department of Agriculture, Madison, Wis. This paper, which was printed in abstract in the Electric Railway Journal of June 24, page 1110, was illustrated with numerous lantern slides. At the beginning of the discussion Mr. Winslow, when questioned, replied that probably the most satisfactory timber treatment for the ties of the traction lines in the Central States would be the use of creosote. This would give the most economical results in the long run. Electric railway ties were not subject to severe rail wear and so it was profitable to give them such treatment as would obtain the longest life of the wood. Mr. Winslow spoke of the results of treating steam railroad ties with zinc chloride and with zinc chloride and creosote. The creosote was added to bring the life of the tie up to its mechanical life as determined by rail wear. He said, however, that as zinc chloride was soluble in water it was not well adapted for localities which had heavy rainfalls and wet roadbeds.

He estimated that, with a treatment of ½ gal. of creosote per cubic foot, ties would be preserved beyond their mechanical life. This small amount of preservative would probably best be applied by the empty-cell treatment; that is, filling the cells and then applying the highest degree of exhaustion. The resultant life would be from ten to twelve years. A more generous treatment should afford a life of sixteen to twenty years, if a good penetration was obtained through the sap wood. The exact amount of preservative necessary, however, would depend largely on the nature of the wood.

R. M. Hemming, Columbus, asked how it was possible to know that ties had been treated properly, citing that the small roads could hardly afford to send an inspector to the plant. Mr. Winslow replied that the simplest way would be to saw up a tie and see if the sap wood had been penetrated. If the exact nature of the impregnating material was desired it would be necessary to grind up a portion of the treated wood and have the preservative contained therein analyzed. Mr. Winslow cautioned against the cutting of tie timber in the spring because of the danger of checking and early rot. When treating timber it was well to force in the preservative as far as possible, but full impregnation of the heart would be rather difficult. The speaker said that subjecting wood to vacuum did not affect its strength, but treatment should not subject the wood to over 220 deg. temperature or 20 lb. pressure.

C. L. Henry, Indianapolis & Cincinnati Traction Company, called attention to the good results obtained throughout the country by tie preservation and to the act that only one or two traction companies in the country were prepared to treat their own timber. He felt that the Central Electric Railway Association had the ability to point out a practical plan and lay down a proper schedule for the handling of timber by its members. Thus the practical results based on the experience of others would be obtainable for all. As the result of Mr. Henry's arguments the association voted to instruct the executive committee to appoint a committee to consider further the matter of timber preservation.

Mr. Henry also spoke of the desirability of planting trees. He said that one interurban road in Indiana was using 80,000 ties this year for renewal purposes and that it would be very desirable to have a supply of timber growing along the right-of-way.

Frank P. Smith, Indianapolis, Columbus & Southern, said that the timber preservation plant installed by his road had been profitable. The treatment given was greatly increasing the life of ties, poles, crossing planks and all other timbers. It was the policy to treat all timber except that which would be worn out mechanically before the preservative could have the opportunity of extending its life. The history of timber preservation on his road had been that some years ago considerable loss was experienced by installing in the track ties which had begun to rot. The next ties to be installed were treated by the open-tank method and these were put in the track alongside of other untreated ties for observation. Since then many of these untreated ties had been replaced, but the treated ties were still in good condition. Mr. Smith cited his experience in buying ties. He had seen a great many trees cut which would yield only one tie. As a result of observing this apparent waste of timber his company had bought about 500 acres of young timber and was prepared to hold them until the trees could profitably be cut for ties.

Mr. Winslow, replying to Mr. Hemming's inquiry, said that fence posts could profitably be treated by the open-tank method. He recommended treating the butts only and to a height of about 6 in. above ground. This could be done by setting them in an open tank in which the creosote was heated to about 200 deg. The treatment should last for two hours.

OVERHEAD CONSTRUCTION

A paper on overhead construction, by Edward Heyden, superintendent of overhead construction, Indianapolis Traction & Terminal Company, brought forth a spirited discussion on the relative merits of different materials. An abstract of this paper was printed in the Electric Railway Journal of June 24, page 1110. Mr. Heyden pointed out in the discussion that span wires should last much longer on interurban roads than on city roads because of the freedom in the country from smoke and sulphur. He hardly felt that the span wire now sold in the open market was up to the standard of that sold a few years ago. Also, the galvanizing was not so well done. Mr. Heyden spoke of experimenting with copper-clad steel trolley wire which had been installed on one of the most severe curves in Indianapolis. This was a No. 00 round wire put up in April, 1909. It had outworn two sets of ears and was still in good condition. The life of ordinary trolley wire had been exceeded considerably.

A representative of the Westinghouse Electric & Manufacturing Company spoke of a 2-mile catenary line built alongside of the Pennsylvania Railroad at the Westing-

house works east of Pittsburgh. This line was subjected to the smoke from more than 150 trains a day, as well as smoke from the Westinghouse plant. It had been in use for six years and included 7/16-in. double galvanized wire which was now in good condition, although some ½-in. malleable extension arms that had been japanned when new were now eaten away.

Considerable discussion developed on the proper length for trolley splicing ears, Mr. Heyden recommending a length of from 10 in. to 12 in. Regarding wood strain insulators, while Mr. Heyden had had no bad experiences with them from electrical breakdown, some had been broken by blows from the trolley wheels, and so now none were installed where they might be hit by the trolley poles.

Mr. Buckman spoke of the changes that had taken place in the design of trolley bases. In earlier years it was customary to use trolley bases in which the tension decreased as the pole was raised. When speeds became higher that principle brought about trouble. Now he favored the use of ball-bearing bases in which the tension was increased as the pole raised. When questioned Mr. Heyden said he did not think it would be economical to use all-steel trolley wire supplemented with copper feeders because of the heavy current drawn at 500 volts.

LOW-PRESSURE TURBINES

An illustrated talk on the application of low and mixed pressure turbines to existing electric power plants was made by H. C. Fairbanks, of the turbine department of the General Electric Company at Schenectady. Mr. Fairbanks' remarks were illustrated by a large number of lantern slides showing the development in the design of steam turbines and indicating that the days of experimental work had largely passed. He first called attention to the installation of low-pressure turbines made in 1905 in the plant of the Philadelphia Rapid Transit Company. These machines were still operating satisfactorily, as were the 7500-kw low-pressure turbines which had been installed in the Interborough plant in New York after a very exhaustive preliminary investigation. Mr. Fairbanks said that with average load conditions and low-pressure turbines an increase of 25 per cent in the load could be carried with the same amount of steam as required for Corliss engines.

At the conclusion of Mr. Fairbanks' interesting talk the customary votes of thanks were tendered those who had addressed the association, and also to the Edgewater Club, the citizens of St. Joseph and others who had been instrumental in entertaining the convention delegates.

NEXT MEETING

President Peck in adjourning the meeting stated that the next meeting of the association would be at Cedar Point, on Lake Erie, near Sandusky, Ohio, on Aug. 23 and 24. One day would be devoted to business and the other to pleasure.

The Rätische Bahn (Rhœtian Railway) in the Engadine, running between St. Moritz, Pontresina, Samaden Bevers and Schuls, in Switzerland, has been electrified, with 10,000-volt, 15-cycle operation. The line is 74 km (45.9 miles) long, and at St. Moritz connects with the Bernina Electric Railway. The electric installation as far as Zernez, a distance of about 47 km (29.1 miles), was carried out by the Elektrische Bahnen Zurich—the joint bureau of the Siemens-Schuckertwerke and the Oerlikon Maschinenfabrik, while between Zernez and Schuls—about 27 km (16.7 miles)—it was done by the Alioth Company, in conjunction with the Allgemeine Elektricitäts Gesellschaft. The overhead line has catenary suspension throughout. The trains are hauled by electric locomotives. Brown, Boveri & Company have furnished one of 600 hp and six of 300 hp each, the Elektrische-Bahnen one of 600 hp and one of 300 hp, and the Alioth-Allgemeine Elektricitäts Gesellschaft one of 600 hp and one of 300 hp.

REPORT OF STANDARDIZATION COMMITTEE OF THE CENTRAL ELECTRIC RAILWAY ASSOCIATION*

The standardization committee of the Central Electric Railway Association presented the following recommendations as its report:

REVISION OF STANDARD AIR BRAKE CYLINDERS, LEVERS AND BRAKE RIGGING

Recommended that the standard air brake practice should be as follows:

1. All braking power to be based on 50-lb. cylinder pressure. This in order to avoid confusion when stating percentages of braking power that may be figured on different brake cylinder pressures, e. g., 100 per cent braking power on 60-lb. cylinder pressure may be taken to mean greater than 100 per cent on 50 lb. cylinder pressure; and if this is always referred to on a common base confusion will be avoided.

2. All interurban cars to be braked at 100 per cent of light weight on motor axles and 90 per cent on non-motor and trailer axles.

3. All city cars to be braked at 85 per cent on motor axles and 75 per cent on non-motor and trailer axles. Seventy-five per cent with 50-lb. cylinder pressure is practically the same as 90 per cent with 60 lb.

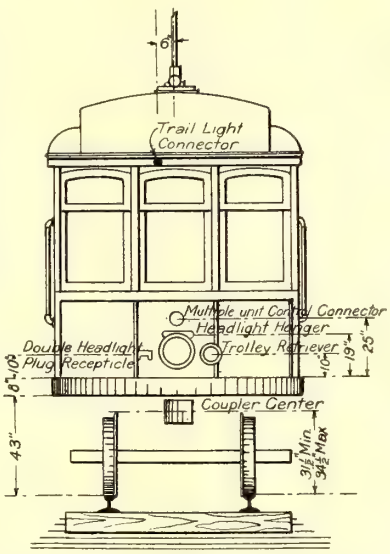


Fig. 1—Location of Connector Receptacles

4. Brake pipe pressure to be 70 lb. per square inch with automatic equipments.

5. Governor adjustment to be 85 lb. and 100 lb. for automatic equipment and 50 lb. and 65 lb. for straight-air equipment.

6. The standing piston travel adjustment to be 4 in.

7. Total truck leverage to be 6 to 1 for long wheel-base trucks with inside hung motors and 9 to 1 for short wheel-base trucks with outside hung motors.

8. A 12 to 1 maximum total leverage is permissible when brake shoes are hung not more than 2 in. below the center of the wheel. If brake shoes are hung lower than this it will be necessary to reduce the maximum total leverage accordingly, and if brake shoes are hung 5 in. or 6 in. below the center of the wheel a total leverage of 10 to 1 should be the limit.

9. The standard M. C. B. recommendations for maximum stress in levers, rods and pins to be adopted as follows:

(a) Maximum stress in levers—23,000 lb. per square inch.

(b) Maximum stress in rods, except jaws—15,000 lb. per square inch, no rod to be less than ⅞ in. in diameter.

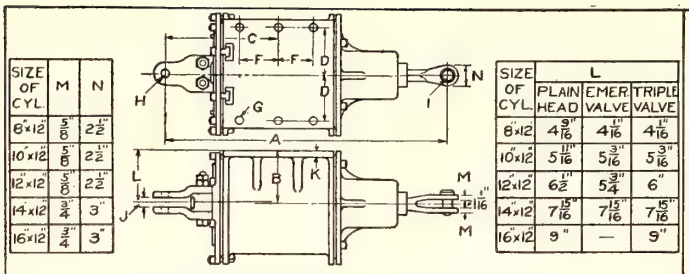
(c) Maximum stress in jaws to be 10,000 lb. per square inch.

(d) Maximum shear on pins—10,000 lb. per square inch single shear.

(e) Diameter of pins to provide a bearing value not to exceed 13,000 lb. per square inch of projected area.

10. Safety valve adjustment to be 10 lb. above maximum governor setting.

*Presented at the June meeting of the Central Electric Railway Association, St. Joseph, Mich., June 22, 1911.

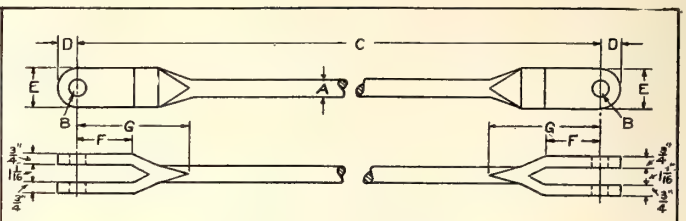


SIZE OF CYL.	M	N
8"×12"	5/8"	2 1/2"
10"×12"	5/8"	2 1/2"
12"×12"	5/8"	2 1/2"
14×12	3/4"	3"
16×12	3/4"	3"

SIZE OF CYL.	L		
	PLAIN HEAD	EMER. VALVE	TRIPLE VALVE
8"×12"	4 9/16"	4 1/16"	4 1/16"
10"×12"	5 11/16"	5 3/16"	5 3/16"
12"×12"	6 13/16"	5 3/4"	6"
14×12	7 15/16"	7 15/16"	7 15/16"
16×12	9"	—	9"

STANDARD DRILLING OF BRAKE CYLINDERS.

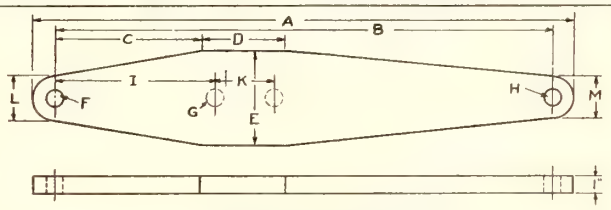
SIZE OF CYL.	A			B	C			D	E	F	G	H	I	J	K
	PLAIN HEAD	EMER. VALVE	TRIPLE VALVE		PLAIN HEAD	EMER. VALVE	TRIPLE VALVE								
8"×12"	3 4 1/2"	3 7 5/16"	3 7 11/16"	4 9/16"	14 1/8"	16 15/16"	17 5/16"	4 1/16"	4 1/2"	4 1/2"	11/16"	1 1/8"	1 1/8"	1 1/8"	11/16"
10"×12"	3 4 5/8"	3 7 7/16"	3 6 1/4"	5 11/16"	13 7/8"	16 11/16"	15 1/2"	4 11/16"	4 1/4"	4 1/4"	11/16"	1 1/8"	1 1/8"	1 1/8"	11/16"
12"×12"	3 5 1/8"	3 8 5/8"	3 8 1/8"	6 1/2"	14"	16 2"	17"	6 1/2"	4 3/8"	4 7/8"	15/16"	1 1/8"	1 1/8"	1 1/8"	13/16"
14×12	3 5 2"	—	3 8 1/2"	7 15/16"	14 1/4"	—	17 1/4"	6 5/8"	4 5/8"	4 5/8"	15/16"	1 1/4"	1 1/4"	1 1/4"	1"
16×12	3 5 5/8"	—	3 8 7/16"	9"	14 3/8"	—	17 3/16"	8 3/8"	4 5/8"	4 5/8"	1 1/16"	1 1/4"	1 1/4"	1 1/4"	7/8"



CYLINDER LEVER RODS.

SIZE OF CYL.	A	B	C			D	E	F	G
			PLAIN HEAD	EMER. VALVE	TRIPLE VALVE				
8" x 12"	7/8"	1 1/8"	40 1/2"	43 1/2"	43 1/2"	1 1/2"	2 1/2"	3 1/2"	7"
10" x 12"	1"	1 1/8"	40 5/8"	42 1/2"	42 1/2"	1 1/2"	2 1/2"	3 3/4"	7 1/4"
12" x 12"	1 1/8"	1 1/8"	41 1/8"	44 1/8"	44 1/8"	1 1/2"	2 1/2"	3 7/8"	7 3/8"
14" x 12"	1 3/8"	1 3/8"	41 1/2"	—	44 1/2"	1 3/4"	3 1/4"	5 1/4"	10 1/2"
16" x 12"	1 5/8"	1 3/8"	41 5/8"	—	44 7/16"	1 3/4"	3 1/4"	6 3/16"	11 5/16"

ALL PINS TO BE 1/32" LESS IN DIAMETER THAN DRILLED HOLES.



CYLINDER LEVERS

SIZE OF CYL.	A	B	C	D	E	F	G	H	I	K	L	M
8"×12"	29"	26"	6 1/4"	8 1/4"	3 1/2"	1 1/8"	1 1/8"	1 1/8"	7 3/4"	5 1/4"	3"	3"
10"×12"	31"	28"	7 1/4"	8 1/4"	4 1/2"	1 1/8"	1 1/8"	1 1/8"	8 3/4"	5 1/4"	3"	3"
12"×12"	34 1/2"	31 1/2"	8 9/16"	8 11/16"	6"	1 1/8"	1 1/8"	1 1/8"	10 11/16"	5 11/16"	3"	3"
14"×12"	39 5/16"	35"	9 1/2"	9 1/2"	7"	1 1/4"	1 3/8"	1 1/8"	11"	6 1/2"	3 5/8"	3"
16"×12"	39 5/16"	36"	10"	9 1/2"	8 1/2"	1 1/4"	1 3/8"	1 1/8"	11 1/2"	6 1/2"	3 5/8"	3"

ALL PINS TO BE 1/32" LESS IN DIAMETER THAN DRILLED HOLES.

STANDARD AIR BRAKE SCHEDULE.
MAXIMUM TOTAL LEVERAGE 12 TO 1.

SIZE OF CYL	LIGHT WEIGHT OF CARS. 50 LBS CYLINDER PRESSURE.			
	100 PER CENT B.P.	90 PER. CENT B.P.	85 PER. CENT B.P.	75 PER. CENT B.P.
8"×12"	UP TO 30,000	UP TO 33,000	UP TO 35,000	UP TO 40,000
10"×12"	30,000 TO 47,000	33,000 TO 52,000	35,000 TO 55,000	40,000 TO 62,000
12"×12"	47,000 TO 67,000	52,000 TO 74,000	55,000 TO 79,000	62,000 TO 89,000
14"×12"	67,000 TO 92,000	74,000 TO 102,000	79,000 TO 108,000	89,000 TO 123,000
16"×12"	92,000 TO 120,000	102,000 TO 133,000	108,000 TO 141,000	123,000 TO 160,000

Fig. 2—Central Electric Standards—Air Brake Details

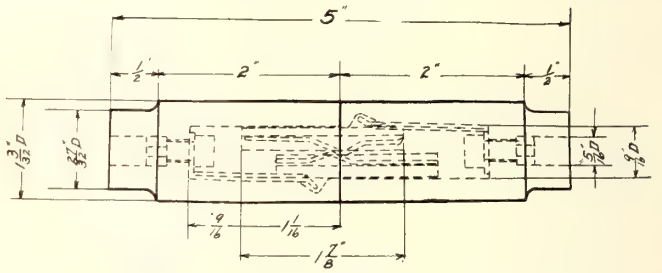


Fig. 3—Trailer Light Connector

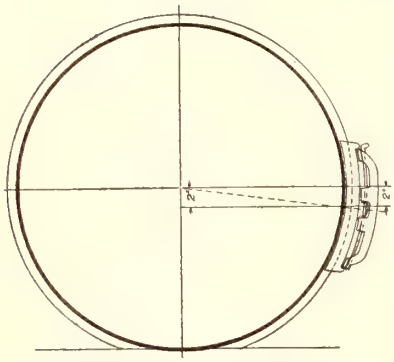


Fig 4—Location of Brake Shoes

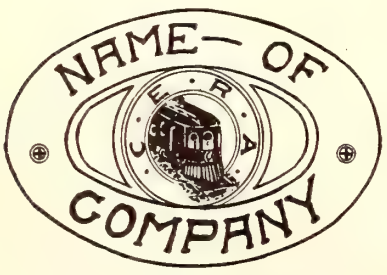


Fig. 5—Standard Insignia

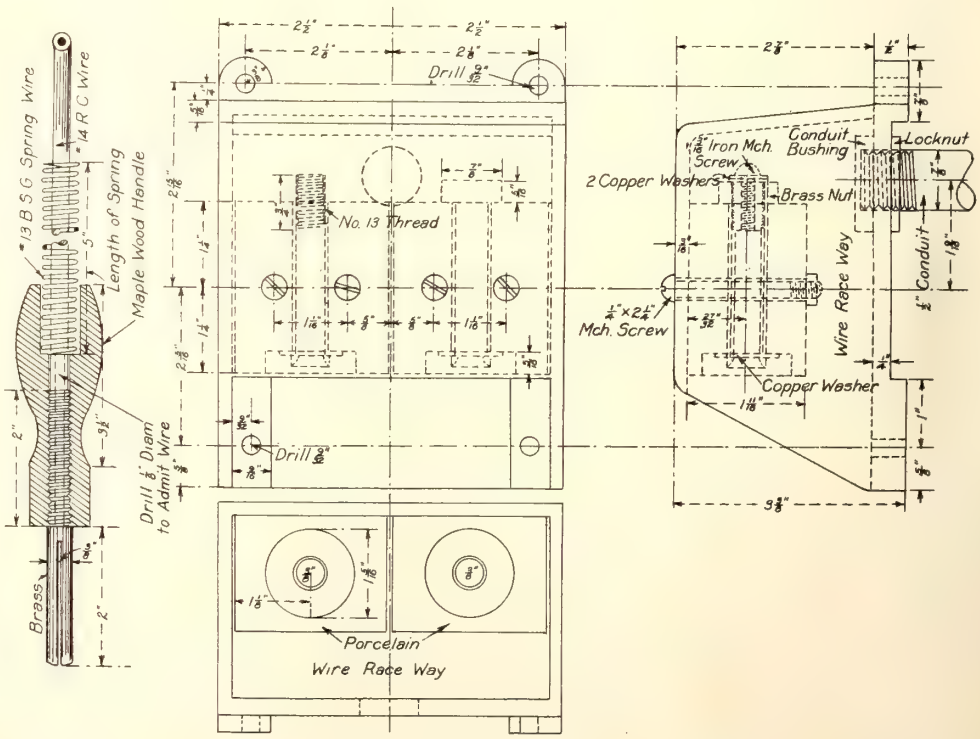


Fig. 6—Double Headlight Plug and Receptacle

CENTER OF BRAKE SHOE

Recommended that center of brake shoe be set 2 in. below center of wheel as shown in Fig. 4.

DESTINATION SIGNS

This subject was laid on the table on account of many other more important and pressing subjects.

TRAIN-LIGHTING CIRCUIT CONNECTOR

Recommended that trail car or train-lighting circuit connector, shown in Fig. 3, be placed 6 in. to the left of the center, as shown in Fig. 1, and concealed in the center of the platform hood apron.

HEADLIGHT PLUG RECEPTACLE

Recommended to use a double headlight connection, as shown in Fig. 6, and to be located as shown in Fig. 1.

STANDARD HEADLIGHT HOLDER

Recommended to use the standard headlight holder as adopted Sept. 22, 1910, and to be located as in Fig. 1.

NATIONAL INSIGNIA

Recommended that a national insignia, shown in Fig. 5, be adopted and that all material, as far as it is possible to mark, should be stamped with this insignia or this insignia should be cast in same with the name of the electric railway using the material also cast or stamped in the margin provided for that purpose.

TARIFFS*

BY ROBERT M. COLT, GENERAL PASSENGER AGENT FONDA, JOHNSTOWN & GLOVERSVILLE RAILROAD

I shall not attempt in this paper to outline fully the method of making tariffs, or the rules and regulations governing them, as this detail is well covered by the formal instructions issued by the Public Service and Interstate Commerce Commissions. In addition to this, the traffic committee will present to the association, for the use of its members, a complete set of "dummy" tariffs covering passenger traffic, showing the proper forms to be used for every tariff it is possible to issue under the rules and regulations of the two commissions, together with the recommendations of this committee as to the treatment of various conditions, with a view to greater uniformity.

What is a tariff? A tariff is a schedule or system of rates, charges, etc., which no man yet born has been able to compile perfectly. The science of tariff-making is one which requires a lifetime of study and experience. The tariff-maker must study his territory and be familiar with local conditions as they exist in different communities. He must bear in mind the kind and character of service rendered, the cost of providing such service, the possibilities for the future development of the business and whether or not the particular territory through which his line runs will prosper and grow under the schedule of rates contemplated, or whether the burden will be too heavy.

Where competition exists rates should be made low enough to get the business; where rates are made to a resort or park on the company's line, or where rates are made to a particular point temporarily for the purpose of inducing extra business on account of some special attraction, such rates should be as low as the property will stand, always, of course, with a fair margin of profit; and where rates are made locally—not in competition—to a resort or for the purpose of inducing special business the tariff-maker should bear in mind that his company must rely upon the net profit on local or regular business of this character to meet interest on its bonded indebtedness.

The question of the application of a rate made from a fare point located on a through or interurban line, as applying from a point on a purely local line, in connection with the through line, is one that is now and then agitated by persons residing on the purely local line, and is, I think, worthy of discussion.

The people residing on a purely local line, not understanding the proper application of the through rate, very often criticise a railroad company because they are obliged to pay a local fare to secure transportation to the through fare point from which the through fare is made. For example: A tariff is prepared for a railroad 100 miles in length, on the basis of 2 cents per mile. At a station half-way between the terminals of this line the fare is $1 in each direction from the through fare point, which in most instances, for the sake of convenience, is the ticket office or waiting room. Very often the cars operated on this through or interurban line, passing through this half-way point, take on passengers at certain regular stops within the city limits of the half-way point. These passengers, we hold, are entitled to the through rate of fare on the through line. We do not hold, however, that passengers who are transported on a purely local or city line car to the through fare point are entitled to the benefit of the through rate of fare. Thus it will occur that those persons who may reside on a purely local line, from which it is not possible to board a through or interurban car, will be obliged to pay the local fare to the through fare point before they are privileged to take advantage of the through fare. Should decisions be rendered to the contrary, the only remedy would be to base all through or interurban fares from the municipal limits of cities.

A great many companies, in order to take care of a certain condition which may exist in a particular locality, will extend the 5-cent fare zone beyond the line or fare limit prescribed by law. This is a bad precedent to establish, as any line or zone created or made by a railroad company outside of the municipal limits prescribed by the statutes governing fare limits in municipalities is an arbitrary line which will, as a rule, prove to be a bone of contention sooner or later. A precedent of this character once established is hard to combat, be the conditions what they may. We are all susceptible to example, and if one community is granted a special privilege other communities are bound, in time, to ask for the same privilege.

Conditions in certain localities are sometimes such that it may seem advisable and desirable for the railroad company to extend the 5-cent fare limit of a city, so as to give the residents of a small town or village just outside of the 5-cent fare limit the benefit of the 5-cent fare. In my opinion, this should never be done. A situation of this kind may be treated by a commutation ticket, with a liberal limit, at a rate per ride slightly in excess of the 5-cent fare, thus obviating the necessity of extending the 5-cent fare limit and at the same time providing an incentive for the development of the business by reason of the saving in fare for the regular or daily riders, the occasional riders paying the 10-cent fare. In this way no bad precedent is established by an exception to the prescribed 5-cent fare limit.

Just here I would like to quote the following saying: "Wise men are instructed by reason; men of less understanding by experience; the most ignorant by necessity." Do not, therefore, by the establishment of unwise precedents, place yourself in a position where it will be necessary to "instruct," because of a reason, an experience or through necessity.

Happily, the hostility toward railroads, which for some years made difficult the calm and wise discussion of rates and their application, is passing away. Nothing could be more conclusive on the point than the temper and tone of the hearings given before the Public Service and the Interstate Commerce Commissions.

In conclusion, I would say that the tariff-maker who can compile a tariff which meets with the universal approval of the public, the commissions and the railroad company itself is indeed worthy of distinction.

*Abstract of a paper read at the annual convention of the Street Railway Association of the State of New York, Cooperstown, N. Y., June 27-28, 1911.

REDUCTION OF CAR FAILURES*

BY J. P. BARNES, ELECTRICAL ENGINEER SYRACUSE RAPID TRANSIT RAILWAY

The reduction of car failures is, if not the sole end and aim of the mechanical department, at least one of its most important functions. Moreover, the data on car failures may be so compiled as to become a most excellent barometer of the general condition and efficiency of the mechanical department and to indicate clearly the directions in which the quality of work must be improved to better that general condition and efficiency. For the improvement of efficiency and reduction of the number of car failures in service we must have first, last and always good and sufficient inspection. The problem reduces itself to two main questions:

First: How shall we improve the quality of the individual inspector? and,

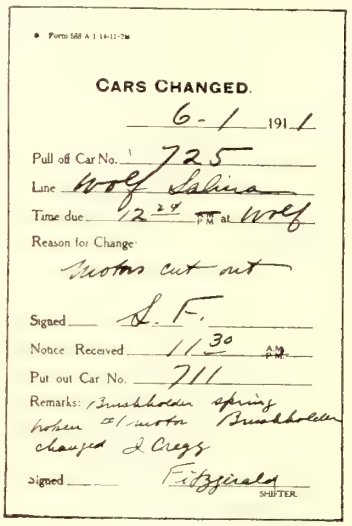
Second: How frequently shall we inspect the equipment?

The second question is the more easily answered, but, as it is largely affected by local conditions, must be answered differently for different systems. Clearly, for any mechanical or electrical device properly built, properly adjusted and properly inspected there is some minimum length of service either in terms of time or mileage below which we may expect assurance of satisfactory service. This minimum length of service will vary between different types of equipment, but may be determined with reasonable accuracy for any set of conditions. It is now fairly general practice to inspect all equipment on a mileage basis and we should invariably start with a mileage figure which we know to be well within the limits of safety. For example, at the outset we inspected and oiled motors on some types of double-truck cars of the Syracuse Rapid Transit Railway lines after 500 miles' service, but are now letting the same cars run 3000 miles between oilings with quite as good or even better results and with no additions or alterations of oil cups. To a very considerable extent the quality of inspection and the period of inspection are interdependent, as with better inspection the safe period between inspections may be increased and this increase will work toward better inspections, as fewer will need to be made during each working shift and, consequently, more time may be devoted to each one.

Having chosen a period of inspection, arbitrarily, if you will, but necessarily within the limits of safety and good operation, the record of the individual inspector and his operating efficiency must be first determined and then improved. For the proper and accurate determination of this efficiency it is essential to know, completely and correctly, the cause of each individual car failure. This known, the records and inspectors' reports must be in such form that the individual inspector who should have prevented the failure may be selected. With this information at hand the matter becomes simply one of following up the offenders and applying the proper discipline.

The form of report of the carhouse inspector must fulfil certain essential conditions. It must be simple and easily made out, it must show the condition in which the equipment was found and the condition in which it was left. If the inspector is to be held responsible for failures of equipment inspected by him, his report should be signed in his own handwriting and show that he considered the equipment O.K. when he left it. We use for this report a card about 7 in. x 10 in., which has printed on one side a list of car numbers, covering all cars on the system, with a blank square opposite each number. On this the inspector checks the numbers of all cars ordered inspected at the carhouse for his class of work. If he finds the equipment O. K. and makes no adjustments he marks the letter "O" in the square opposite the car number; if minor adjustments are made he marks the letter "A"; if replacements or renewals are made he marks the letter "X" and notes on the back of the card of what the replacements or renewals consisted. In case the car requires replacements or repair work beyond the carhouse facilities the inspector ties a tag on the car, noting on the card what trouble he has found and signing his initials. A car so tagged must be sent to the shop unless the carhouse foreman overrules the inspector's judgment, in which case the foreman is held responsible for possible failure of the car in service. Inspectors' reports are countersigned by the foremen and at the end of the shift are sent to the office of the mechanical department, where they are filed for reference.

The changing of cars which fail in service is handled by means of a car-change slip which serves four distinct purposes, and is the basis of fixing the responsibility for the failure. Any car failing in service is ordered changed by the dispatcher, who fills out the blanks on a printed car-change slip, giving the car number, time and place due, line, and reason for change. The slip is then handed to the carhouse foreman, who notes on it the time of its receipt by him and the number of the car to be put out, the slip being returned to him signed by the shifter after the change is made. He then turns the change slip over to an inspector, who notes on it the trouble found with the equipment. The car-change slips are sent daily to the office of the mechanical department, where two summaries are compiled from the information thus obtained.


CARS CHANGED.

6-1 1911

Pull off Car No. 725

Line Wolf Salina

Time due 12:24 P.M. at Wolf

Reason for Change

Motors cut out

Signed L. F.

Notice Received 11:30 A.M.

Put out Car No. 711

Remarks: Brushholder spring broken at motor Brushholder changed & Oiled

Signed Fitzgerald SHIFTER

Syracuse Record of Cars Changed

The first of these summaries shows the pull-ins classified according to causes. Individual car numbers are shown and cars running from different carhouses are shown in different colors. About the middle of the month the probable total failures for the month are forecast from the record of the first fifteen days. These figures are forecast for each carhouse and for the system as a whole. If the forecast indicates that the failures will exceed those of the previous month in number, the foremen concerned are called in for consultation as to means of reducing the number of failures. As long as the records indicate that the efficiency of carhouse inspection is on the increase the foremen are allowed to continue as they are doing. Each day the foremen are furnished with a list of the car failures of the day before, which are recorded against their inspectors. The list shows the car number, the cause of failure, the name of the inspector who last inspected the equipment and the date of the inspection. These lists are posted in the carhouses after the foremen have taken the action required by the individual cases. If a car has run its mileage and been ordered inspected and the inspection has been missed or neglected by the carhouse force, the failure of its equipment is recorded against the foreman individually.

From the data showing the inspector responsible for each failure another summary is made, showing the running record of each inspector. This summary shows, for each day, the number of failures recorded against the inspector and also the number of inspections made by him on that day. At the end of each month the figures are combined

*Abstract of a paper read at the annual meeting of the Street Railway Association of the State of New York, Cooperstown, N. Y., June 27-28, 1911.

to obtain an efficiency figure for the individual, which shows what per cent of the total inspections made by him were actually O. K. A list of names and efficiencies is posted monthly in the carhouses, the man having the highest efficiency appearing at the top of the list, and so on down.

A similar record of efficiency is kept for foremen, the figures in this case being total car failures and total cars inspected. A curve is plotted to show the efficiencies by weeks. It is interesting to note in connection with these figures the effect previously mentioned of interdependence of quality and frequency of inspection. In January 1096 cars were inspected with an efficiency of 59.5 per cent (that is, 652 of these cars ran without failure until full mileage was made and another inspection ordered). In May 983 cars were inspected (10.3 per cent less than in January) and the efficiency was 75.8 per cent, 745 cars making full mileage.

This increase in efficiency and reduction in number of inspections has been accompanied by a 10 per cent decrease in cost of inspection and a relative larger decrease in the number of inspectors.

Curves showing the car failures by months, the failures per 1000 car miles and car miles per failure are also kept up to date, but are not posted in the carhouses.

STEPS IN THE SOLUTION OF THE PROBLEM OF ADEQUATELY CONTROLLING ELECTRICALLY PROPELLED VEHICLES*

BY W. V. TURNER, CHIEF ENGINEER, WESTINGHOUSE AIR BRAKE COMPANY

Power brakes actuated by compressed air, as at present in general use throughout the country, may be broadly grouped as follows:

1. Straight-air brakes.
2. Straight-air brakes with automatic emergency features.
3. Automatic air brakes.
4. Electro-pneumatic brakes.

The relative merits of a straight-air type of brake as contrasted with the automatic principles of operation may be dismissed by the statement that outside of the item of expense any brake not embodying automatic principles is not worthy of serious consideration.

The reason for this is so plain that the only aspect of the proposition remaining for discussion is from the standpoint of the financial department. The simplest form of power brake for electric cars comprising an adequate automatic protection against a loss of the brake from causes unknown to the man running the car is the straight-air brake with automatic emergency features. This equipment was developed to meet the requirements of a strictly city or interurban service where the speeds are moderate and the stops frequent, and when the conditions require single car operation normally and trailer service or two-car trains intermittently. Conditions often arise in a single-car operation, especially where two or more cars occasionally are run together as a train, when it becomes necessary to provide some protection in the brake apparatus itself whereby it shall operate in case of a burst hose or ruptured pipe and apply the brakes and cause them to remain applied instead of permitting the entire loss of braking power on the vehicle. This protection is secured in the SME equipment without dispensing with any of the advantageous features of straight-air operation by the use of the emergency valve in connection with a brake pipe or emergency line in which pressure is normally maintained.

*Abstract of a paper read at the annual convention of the Street Railway Association of the State of New York, Cooperstown, N. Y., June 27-28, 1911.

AUTOMATIC AIR BRAKE

The limits of the straight-air method of applying and releasing the brakes are exceeded when more than two cars come to be hauled in the same train. This is on account of the inherent physical limitations which render it impossible to move a sufficient quantity of air through the conduit provided within a sufficiently short time to apply and more especially to release the brakes with a degree of uniformity, promptness and accuracy necessary for a proper control.

For trains of more than two cars prompt and uniform service application and release action can be secured only by the use of a triple valve—that is to say, by the use of the automatic principle in service as well as emergency operations. A representative automatic brake equipment for electric train service is the type AMM. This equipment is designed to meet the requirements of interurban service where trains of from one to five cars are operated at slow speeds and with frequent stops in towns, but are subject to high speeds and more or less long-distance runs outside these centers. These conditions require a triple valve on each car of the "plain" type; that is, one which will operate in response to variations in brake pipe pressure and shall have no quick-action feature. Provision is made for quick recharging of the auxiliary reservoirs when a release is made in order to insure prompt and certain response of the brakes to a reduction in brake pipe pressure whenever circumstances may require rapid successive brake applications; for quick action of the brakes from car to car in service, to produce rapid and definite application of all the brakes in the train; for a graduated release as well as graduated application of the brakes, in order that the motorman may control the train smoothly and accurately and in the most efficient way, and for a materially higher emergency brake than the maximum possible in a full service application, so that a powerful reserve braking power may be available when the shortest possible stop becomes imperative.

COMBINED AUTOMATIC AND STRAIGHT-AIR TRACTION BRAKE EQUIPMENT

The next development was an equipment which combined all the advantageous features of the automatic and of the straight-air types of brakes without their objectionable features.

The combined automatic and straight-air form of traction brake equipment has now been in service more than three years with increasingly satisfactory results. While primarily intended for service where cars are operated singly most of the time, with occasional two or three-car trains, this equipment is equally adaptable to train service where the number of cars does not exceed the limitations of a direct exhaust brake valve and plain triple valve—in other words, does not exceed five cars. It is especially adaptable to service such as is required of light electric locomotives or motor cars used for handling freight cars, switching, etc.

QUICK-ACTION AUTOMATIC AIR-BRAKE EQUIPMENT

The elevated and subway service of large cities introduces requirements of an entirely different and still more exacting character. These may be classified, according to their origin, as arising from a constantly increasing insistence upon (1) higher schedule speeds, (2) longer trains, (3) shorter and quicker stops, (4) smoother and more accurate stops, and (5) highest possible protection against delays to traffic.

To meet these requirements there must be added to the operative features of the equipments previously mentioned (1) the ability to transmit quick-action rapidly through the train in emergency applications, (2) the attainment of as high a brake cylinder pressure in emergency as the equipment can be designed to give, and (3) obtaining the quick-action application of the brakes with maximum cylinder

pressure at whatever time occasion for same may arise, without regard to previous manipulation and also when the brake-pipe pressure has been depleted for any reason beyond a predetermined danger point. The quick-action automatic brake equipment, type AML, embodies all these features, and, therefore, stands as the highest development to date of the purely pneumatic brake for electric traction service. It corresponds to the type AMM equipment already referred to in its general arrangement, but with the additional features required for longer trains and the more exacting service which it is designed especially to meet, as outlined above.

THE ELECTRO-PNEUMATIC BRAKE EQUIPMENT

With the possibilities of a purely pneumatic brake system developed to the greatest extent, there still arise demands for increased safety, greater reliability, reduction in time to make service stops and instantaneous response and uniformity of application of brakes whereby the human factor in manipulation can be reduced to a minimum. The electro-pneumatic brake possesses superior advantages which make it as nearly an ideal system as has yet been evolved. All the improvements have been accomplished by the addition of electric control to the service and emergency functions of the quick-action automatic brake.

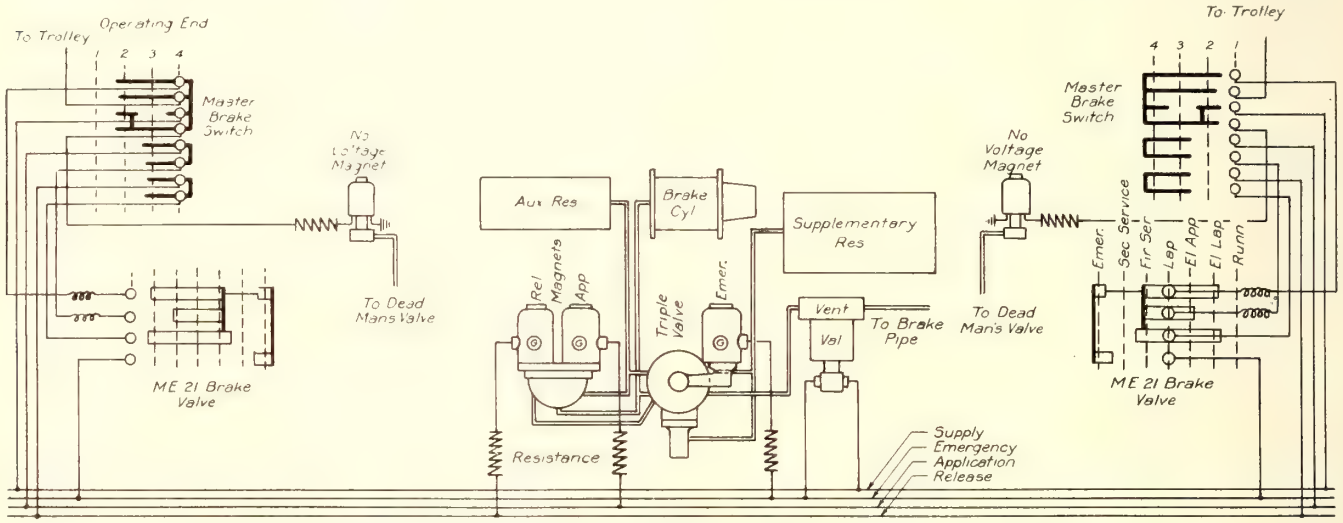


Diagram of Electro-Pneumatic Brake Equipment as Applied to New York Subway Cars

SERVICE STOPS

As illustrating the comparative power of the electro-pneumatic and the best automatic air brake it may be said that a ten-car train equipped with electro-pneumatic brakes can be brought to a full stop from an initial speed of 40 m.p.h. in the same time required to reduce the speed of an eight-car train equipped with the old-style quick-action brake to 25 m.p.h. This is 62½ per cent of its initial speed and about 39 per cent of the energy originally stored in the train at 40 m.p.h. still remains to be overcome before it can be brought to a standstill.

The electro-pneumatic brake has even greater advantages in completing the stop. With the electro-pneumatic brake a graduated release was made so as to prevent retardation becoming excessive toward the end of the stop. The same thing was tried on a train equipped with the high-speed brake, but could be only partially accomplished by making a release first and then a reapplication. The great difference in rate of obtaining braking power is important. With the ordinary manipulation characteristic of the two types of equipments there is a saving of twenty seconds' time in favor of the electro-pneumatic equipment. This shortening in time of stop means that power may be shut off sooner and the train allowed to drift for a considerably longer time before applying the brakes and making the stops at the same point.

For the same power consumption the electro-pneumatic brakes make it possible to maintain higher average speeds, shorter schedules and an increased traffic capacity with the same number of cars or the same traffic capacity with fewer cars, or it enables the same average speeds, schedules and capacity of road to be maintained as with a purely pneumatic brake, but at the expenditure of less power.

EMERGENCY STOPS

In an emergency a ten-car train with electro-pneumatic brakes can be stopped from a speed of 40 m.p.h. in 350 ft., or within two-thirds of its own length. A train with the old-style quick-action brake would pass this stopping point at a speed of 28.3 m.p.h. This is 71 per cent of its original speed and corresponds to 59 per cent of the energy originally stored up in the train which still remains to be overcome before the train can finally come to rest. It should be further noted that the train with the old-style quick-action electro-pneumatic brakes would reach the 350-ft. mark four seconds before the train with electro-pneumatic brakes comes to a standstill at this point. At the time that the train with electro-pneumatic equipment comes to a stop the train with old-style quick-action brakes would have run 140 ft. farther and would still be moving at a speed of 20.2 m.p.h., representing 25½ per cent of its original speed. The latter would not stop until it had run 650 ft., or 300 ft. farther than the train with electro-pneumatic brakes.

The electro-pneumatic brake system adds to the pneumatically operated brake of the highest type certain advantageous features otherwise impossible of attainment, namely: (1) Simultaneous and uniform response of all the brakes in the train. This practically eliminates the effect of the length of train and makes it as easy to handle the train, no matter how long, as it is to handle a single car. (2) Double protection against delays to traffic due to brake failure, since the pneumatic brake is always in reserve ready for use, if required. (3) Maximum efficiency and safety due to simultaneous operation of all the brakes in the train in both service and emergency applications and a perfect flexibility of manipulation. (4) Economy in air consumption, and (5) maintenance of brake cylinder pressure at will.

Briefly stated, this equipment consists of a quick-action, quick-recharge, quick-service, graduated release, automatic air brake with 20 per cent higher pressure in emergency application, combined with electrically controlled means of simultaneously admitting air directly to or releasing it directly from the brake cylinders without any movement of the triple valves. An absolutely simultaneous movement of the triple valves of the train to emergency position is obtained by the use of electricity.

Compressed air is supplied to the brake system through the brake valve at the operating end of the train from the main reservoir pipe, which extends throughout the length of the train. All of the reservoirs are directly connected to the main reservoir pipe.

PNEUMATIC CONTROL OF AUTOMATIC BRAKES

The motorman's brake valve, in so far as its pneumatic operations are concerned, is quite similar to the brake valve used at present with standard pneumatic equipments. The full release position is done away with and the motorman is thereby prevented from wilfully or carelessly overcharging the brake pipe in order to insure prompt and sensitive action on the part of the brake apparatus where brake applications are required in quick succession. The upper portion of the brake valve contains an electric switch portion controlling the operation of the electric portion of the brake system.

The feed valve attached to the base of the brake valve is adjusted to maintain the brake pipe pressure of 70 lb. per square inch while the brakes are not being operated. The quick-action portion of the triple valve is replaced by a somewhat similar combination of ports designed to vent air from the reserve supply carried for this purpose in the supplementary reservoir directly into the brake cylinder when the brake valve ports move to their emergency position. This produces a very quick rise in brake cylinder pressure to a maximum possible amount as determined by the pressure carried in the brake pipe. Provision is made for the quick recharge of both supplementary and auxiliary reservoirs to permit of quickly replacing any air used in pneumatic applications.

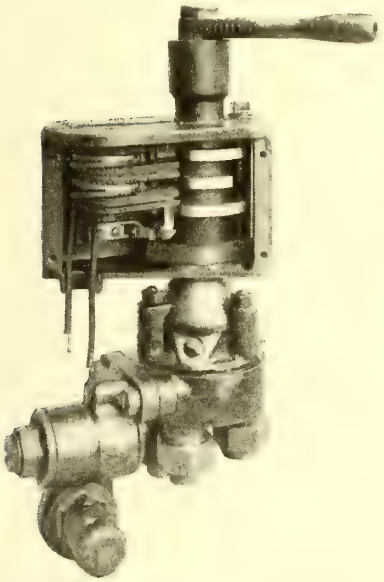
Since the quick-action feature of the brake is separated from the brake valve and since the supply of air for obtaining high emergency pressure is separate from that used during ordinary service manipulations of the brake it follows that both the propagation of quick-action through the train and high emergency pressure can be obtained without regard to what electric or pneumatic manipulation has previously been made.

The quick-action feature of this equipment is contained in a device separate from the triple valve and connected to the brake pipe. It consists essentially of a duplex piston with valve attached and a small reservoir and chamber suitably proportioned so that when the ports are in their normal positions, with reservoir and chamber charged, the pressure in the reservoir will fall with that of the brake pipe so long as the rate of fall of brake-pipe pressure does not exceed that required for the service application of the brakes. When the rate of brake pipe reduction exceeds that of the ordinary service application, the fall of brake pipe pressure and that in the upper chamber of the device is then more rapid than that at which the lower chamber can reduce.

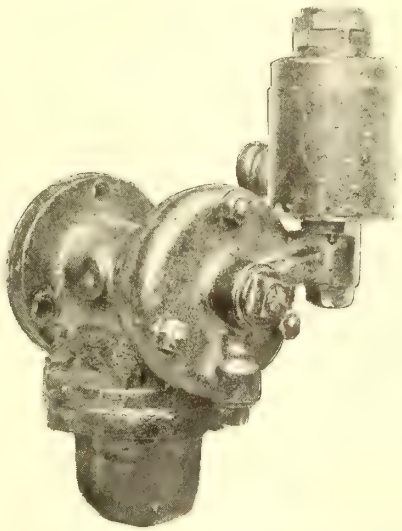
The difference of air pressure thus set up on the two sides of the duplex piston causes it to move over to a position which opens direct communication from the brake pipe to the atmosphere. This causes a local vent of air from the brake pipe, which propagates quick-action to the next car with great rapidity. Provision is made in the device to close the vent to the atmosphere after the quick-action has taken place, so as to permit the recharging of the brake pipe and release of the brakes following a quick-action application. The great advantage of this vent valve for propagating quick-action as compared with a similar action of the triple valve lies in the fact that the service and quick-action (emergency) operations of the brake system are entirely separate and independent. This practically eliminates the possibility of obtaining undesired quick-action, which it is difficult to prevent, with any degree of certainty, where the service and the quick-action operations of the apparatus are controlled from the same piston and slide valve.

In whatever way a rapid fall of brake pipe pressure is produced, be it by movement of the brake valve, the operation of trip cocks or the conductor's valve, the piston in the vent valve will instantly vent air from the brake pipe to the atmosphere through a very large opening, and this positively insures the propagation of quick-action throughout the train, however long it may be and regardless of the previous manipulation of the brakes.

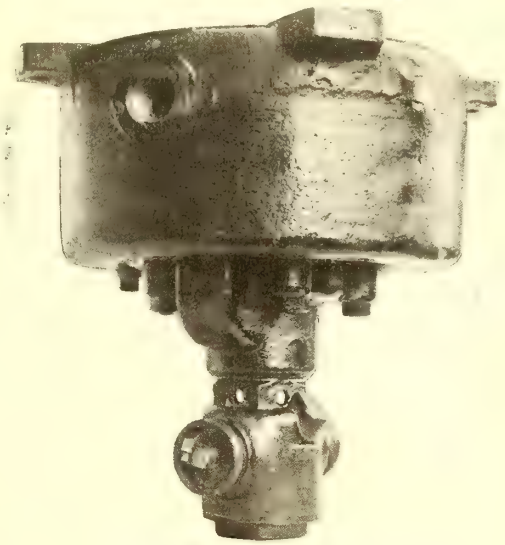
The only feature of the old brake equipment which has been sacrificed in this arrangement, which admits of propagating quick-action throughout the train irrespective of the pressure in the brake cylinder, is the venting of brake pipe pressure into the brake cylinder. With the large sizes of brake cylinders employed, i. e., 12 in. and 14 in., the gain in cylinder pressure over that of service application by venting the brake pipe into the cylinders is very small, but 2 lb. or 3 lb. at the most, and this is more than compensated for by venting the pressure of the supplementary reservoir into the brake cylinder in an emergency application whereby a brake cylinder pressure within 4 lb. or 5 lb. of the brake pipe pressure carried can be obtained in emergency applications.



Type ME-21 Electro-Pneumatic Brake Valve



Triple Valve with Emergency Magnet Valve

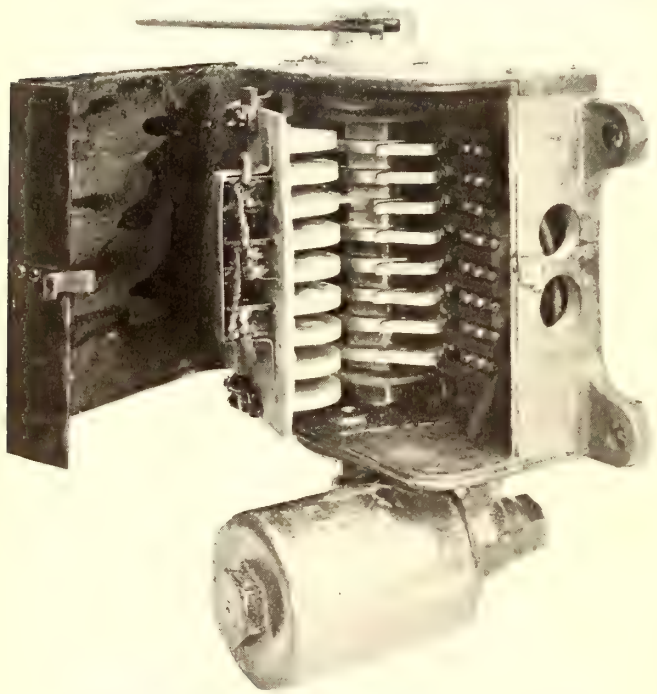


Brake Pipe Vent Valve for Propagating Quick-Action

ELECTRIC CONTROL OF BRAKES

For the operation of this portion of the electro-pneumatic brake system the source of current may be from the trolley or from a battery or other source of supply local to each car. The contacts in the electric operation of the brake, already referred to, are in reality nothing more than small controller points or switches, controlling the circuits to magnets governing the service application and release and emergency portion of the brakes. With the pneumatic portion of the brake in normal or running position the electric control of the brakes is accomplished by the aid of two magnets with poppet valves attached, governing the flow of air into and out of the brake cylinder direct or through the release port of the triple valve, according to the conditions of installation.

The release magnet is sometimes designed so that the release port is only open when the magnet is energized or vice versa—that is, requiring current in order to close the release magnet. Which method is to be preferred can only be determined by a study of the operating conditions which are to be met. In either case, while running over the road the exhaust magnet is holding the release valve open so that the brake cylinder is in direct communication with the



Master Brake Switch and No-Voltage Magnet

atmosphere. In making a service application of the brakes the exhaust valve is closed and the application magnet energized to open the application valve, thus closing the outlet from the brake cylinder to the atmosphere and opening the passage from the source of air supply to the brake cylinder. Various methods of accomplishing this feature have been used in different installations, but with the system in most general use the flow of air from the source of supply to the brake cylinder is controlled primarily by a relay valve of ample capacity, which is in turn caused to operate by the action of the application magnet valve. This does away with the necessity for the very powerful magnet which would be required to operate a valve of sufficient area to supply air to the large sizes of brake cylinders at a sufficiently rapid rate to give satisfactory service operation.

The relay valve referred to is acted upon by a spring so that when the brake cylinder pressure has been built up to within 20 lb. of that in the auxiliary reservoir the relay valve automatically closes. This valve, therefore, permits the additional functions of limiting the pressure obtainable in electric service application to approximately 20 lb. below the normal brake pipe pressure, thereby insuring the valuable feature of the increased braking power in emergency application over and above that obtainable in full service applications and this without the aid of any additional device, such as a safety valve.

The brake cylinder pressure can be raised to any amount up to the maximum contemplated in the design and held there as long as desired by moving the brake valve handle back to the electric lap position, which leaves the release magnet undisturbed, but de-energizes the application magnet, allowing it to close and prevent further flow of air into the brake cylinder. A further application of the brake or a release can then be made by moving the brake valve handle either to electric application or to release position, which either causes more air to flow to the brake cylinder, as described above, or operates the release magnet valve so as to permit the air in the brake cylinder to escape to the atmosphere. When making a release, if the brake valve handle is returned from release to electric lap position, the release magnet will again be actuated so as to close the brake cylinder exhaust. In this way the brake cylinder can be graduated off in any desired number of steps or graduations.

During the electric operation of the brake the release port of the brake valve is open and the communication between the feed valve and the brake valve is maintained. Consequently the air which is drawn from the auxiliary reservoir for use in the brake cylinders is continuously replaced from the brake pipe, which is in turn kept fully recharged through the feed valve. Should the motorman thoughtlessly continue the movement of the brake valve handle toward electric application position the brakes will continue to apply up to their predetermined maximum pressure. This will be the case until the handle is moved so far that a pneumatic application is begun. That is to say, the motorman cannot go beyond the point at which an electric application will cease to be made until after he has come into a position in which a pneumatic application is commenced. It will thus be seen that there is no possibility of a careless motorman failing to obtain an application of the brakes or losing an application already obtained electrically on account of moving the brake valve handle too far.

ELECTRIC EMERGENCY APPLICATION

Conditions on the New York Subway division of the Interborough Rapid Transit Company and on one or two other roads in the country have become so severe as to warrant extension of electric control to the quick-action and emergency operation of the brakes. In so doing an absolutely simultaneous and instantaneous application of the brakes is obtained throughout the train. This is accomplished by simply adding an emergency finger to the brake valve, an emergency wire running throughout the train and an emergency magnet with its valve controlling a port leading from the face of the triple-valve piston direct to the atmosphere. In order that an emergency application originating from a trip cock or conductor's valve, burst hose, etc., may be propagated electrically as well as when an emergency application is made by the motorman moving the brake valve handle, each brake pipe vent valve already referred to is provided with contacts whereby the operation of any vent valve in the train will energize the emergency magnets in the same manner as when the brake valve handle is moved to emergency position. The only advantage of the electrical transmission of quick-action lies in the saving of time as compared with the pneumatic propagation of quick-action throughout the length of the train, but where time is an important factor, as in subway or elevated service, this apparently slight saving of two seconds may have an immediate and important bearing on the economic operation of the road and its total carrying capacity.

There is little to be gained by coming to electric control

of the brakes for emergency applications until the best has been done that possibly can be accomplished by the pneumatic operation of the brakes. It is obvious that all that can possibly be gained by controlling the emergency application of the brakes electrically is in the time of transmission throughout the train. This does not hold, however, for the operation of brakes in service, since there is a marked gain in the ability to control trains, smoothly, safely and without shock, due to the simultaneous and uniform application of the brakes on each vehicle. Each vehicle thus does its proper share of the work of stopping the train, thereby reducing shocks and tendency to slide wheels and requiring much less skill in manipulation, while at the same time it affords the added safety of a double brake control system.

The characteristics of electric operation just mentioned make it possible to obtain initial brake cylinder pressure much more promptly and build this brake cylinder pressure up at a very much faster rate than can be permitted with a purely pneumatic control. This is because the application of the brakes pneumatically must necessarily be slow enough to avoid the shocks, uneven braking, sliding of wheels, etc., that are likely to follow where any considerable difference in rate of retardation can occur in different parts of the same train. When the brakes cannot be applied simultaneously and uniformly (as is inherently impossible with a purely pneumatic control) it is necessary to slow down the time and rate of brake application so as to avoid the troubles mentioned above. When the application of the brakes can be made both simultaneously in starting to apply and uniform in rate of building up brake cylinder pressure, a very much quicker rate of brake application can be utilized and still run no danger of troubles arising from non-uniformity of retardation on different vehicles. This explains why the electric service brake can be made so much more effective than a brake controlled only pneumatically and further explains why at this point it became imperative to add power to the emergency portion of the pneumatic brake. This follows logically from the fact that if the pneumatic emergency brake is less powerful than the maximum possible with the electro-pneumatic service brake the result would be a better service brake when operating the electric service control than could be obtained in pneumatic emergency, which must necessarily be the final resort in case of unforeseen failures or accidents.

The degree to which this increase in emergency braking power over service braking power can be carried is now limited only by main reservoir pressure. We are now able to obtain practically full main reservoir pressure in the brake cylinders when an emergency application is made, even though only 70-lb. brake pipe pressure is carried.

There is one other system which differs fundamentally from the one just described, and, therefore, warrants a brief reference. This fundamental difference lies rather in the means adopted for combining the electric control with the pneumatic portion of the brake system than in any difference in principle or manipulation. With the system above referred to the supply of air for operating the brakes electrically is drawn from the auxiliary reservoir, the triple-valve piston and ports remaining in their normal or release position. The brake pipe and therefore the auxiliary reservoirs are then being constantly recharged through the feed valve during electric service operation. In certain cases it has been found preferable to make the application magnet vent air from the brake pipe to the brake cylinder (the pneumatic portion of the brake valve then being in lap position), thus causing a brake pipe reduction and a movement of the triple valve piston and slide valve to their service positions, just as would be the case with any pneumatic service brake pipe reduction. In emergency applications the air is vented from the brake pipe to the atmosphere, thus causing all the triple valve pistons to move simultaneously and instantaneously to their emergency positions. The release magnet controls the release of air from the brake cylinder in the ordinary way, as already explained.

GOVERNOR SYNCHRONIZING SYSTEM

This system has been perfected during the last two years and is the most satisfactory and efficient apparatus for the purpose yet devised. Heretofore in the operation of electric trains consisting of two or more cars more or less difficulty has been experienced in securing an equitable division of the work of supplying the compressed air required for braking and other purposes among the different motor-driven air compresssors included in the train. The result has been that some compressors are overworked, while others are not working up to their full capacity. Such an inequality of compressor operation naturally results in increased wear and tear on the overworked compressors as well as an actual decrease in the available air supply under certain conditions, due to the attendant loss in efficiency of compressor operation.

Briefly stated, the characteristic features of the governor synchronizing system are as follows:

The current supply to the motor of each motor-driven air compressor in a train is controlled by a switch operated by air pressure substantially as in the ordinary form of electro-pneumatic governor previously used. The difference is that the cutting in and cutting out of this switch is controlled by the operation of a magnet valve instead of a pneumatic regulating portion connected to main reservoir pressure, as is the case with the ordinary compressor governor. In the governor synchronizing system this switch is called the compressor switch. In addition to the compressor switch a pneumatically controlled switch, called a master governor, is used on each motor car, similar in all respects to the previously used electro-pneumatic compressor governor, except that instead of controlling the current supplied to the motors of the motor-driven air compressors it acts simply as a pilot or master switch to control the magnets which operate the compressor switches. The magnets of the compressor switches are connected in parallel between the trolley (or positive battery terminal) and a wire, called the synchronizing wire, which runs the entire length of the train. The cutting in of any master governor connects the synchronizing wire to ground (or negative battery terminal) and thereby operates all the compressor switch magnets. All the main reservoirs in the train are connected by means of a main reservoir pipe line running the entire length of the train and connecting the pneumatic controlling portion of each master governor. With all the compressors cut out the pressure in this line becomes equalized. As soon as this pressure is decreased to the point at which any one of the master controlling mechanisms operates, the closing of this master governor switch supplies current to the magnets of each compressor switch in the train, causing them all to operate so as to cut in their switches and start all the compressors simultaneously. Whether one or more of the master governors cuts in at the same time is immaterial since the cutting in of a single master governor is sufficient to start all the compressors. They will then continue to operate and raise the pressure in the main reservoir on each vehicle and in the main reservoir line throughout the train, until such time as the controlling portion of the last master governor remaining cut in operates to open the circuit to the compressor switch magnets, which causes all the compressor switches to cut out and stop the operation of all the motor-driven compressors simultaneously. It will be seen that in this way all the compressors are forced to operate the same length of time, and since the main reservoir pressure is equalized on all vehicles, the stronger compressors help the weaker ones to the extent of insuring the necessary amount of compressed air being supplied at the expense of a minimum amount of energy, time, and wear and tear on the air-compressing apparatus.

THE VALUE OF BRAKES

Starting and stopping of trains are complementary factors in the problem of making time between stations; therefore it is evident that the best results can only be obtained where both factors are given due consideration. Generally, the starting factor is the only one fully considered, or, at least, the most adequately provided for. In a sense, however, the question of stopping is the most important, as the safety of the service and freedom from delays depend upon it to a great degree. The measure of the value of the brake is twofold: (1) the ability to stop in the shortest possible distance when necessary; and (2) to permit short, smooth and accurate stops being made in regular operation. Unfortunately, the brake is usually looked upon as a safety device only, and it is because of the prevalence of this idea that its installation and maintenance do not receive the consideration merited. Considering the investment, there is no part of the railway equipment that will give greater material returns than the brake when properly installed, operated and maintained. If the brake could to some extent be separated from the idea or impression that it is a safety device only and proof advanced to show that it makes possible hauling of heavier cars and faster and more frequent service, as much or more than do the motors, the block signals, and the good roadbed, its importance would be more fully appreciated. A safety device the brake is, par excellence; but it has other reasons for its existence.

PRESIDENT'S ADDRESS AT COOPERSTOWN*

By John H. Pardee

The Street Railway Association of the State of New York was organized in New York City on Dec. 20, 1883, by men representing street railways in New York, Brooklyn and Buffalo. Since that time regular conventions have been held each year, and to-day we are assembled in the twenty-ninth convention, and our member companies are operating railways in every city and large village in the State, with the exception of Greater New York.

At first, obviously all the railways were horse or cable street railways, but in 1890 the first general electrification and extensions began, and to-day, notwithstanding consolidations, we have in the association twenty companies, operating 580.89 miles of urban and 990.23 miles of suburban and interurban railways. This development beginning in the cities and extending into the country, and the connecting of the cities with the larger villages, continued rapidly and on an increasing scale until 1907, when two events of great importance took place: the financial panic and the passage of the Public Service Law.

The panic, caused by wild speculation and unscrupulous financing, has passed, but the Public Service Law is still with us with added drastic provisions, and in view of the fact that the building of railway lines has practically ceased since the passage of the law, it is quite pertinent to quote from the president's address in reference to it at your twenty-fifth convention in 1907:

"It was stated by several gentlemen who appeared in opposition to the bill at the public hearing that one effect would be to stop the building of interurban lines through sparsely settled territory. This statement was not controverted, and should it prove true, would cause a condition which could not be too quickly remedied, as even at present this State is far behind in the development of the rural communities by the interurban trolley systems."

There are three ways by which railways can be built: by the State with public funds, by private individuals for charitable purposes and by private individuals for profit. The first two of these methods are neither profitable nor practicable, and the third is not attractive under the provisions of the Public Service Law.

While this law has been most ably and justly interpreted and administered by the men chosen for that purpose, yet they are bound by its provisions and prevented from giving their sanction and approval to needed and legitimate enterprises.

The law, with its provisions permitting the reduction of rates, and the clamor of the people to place public utilities on approximately an investment basis, in effect say to men with the necessary funds who may wish to embark in a railway enterprises: "Gentlemen, the public will be delighted to have you build an electric railway through the country which may badly need transportation facilities. Put up your money; if your judgment is wrong and you fail, lose it and charge it up to profit and loss, but if perchance you should happen to win, we will permit you to obtain a return on your investment of 6 per cent or thereabouts." Theorists claim that this is right because we are operating public utilities. Why not apply the same reasoning to enterprises of bread-making and clothing? Surely these are public utilities.

The people of this State will in time see this matter in its true light and will so modify the statutes as to permit of a proper and adequate return to capital based on the risks incurred in investments in public utilities. However, the law in other respects in actual practice has proved of great benefit to both the public and the railways. It has protected both against unjust discrimination, and its administrators have demonstrated that it was passed for the benefit of the railways as well as the public.

Another most beneficial effect of the passage of the Public Service Law of this State and other States has been to bring forcibly to the minds of the railway men and also to the public that the profits of the railway enterprises have been much less than supposed, and that profits are dwindling on account of increased costs of material and labor and that remedies must be applied. One, which we are all trying to apply, is greater efficiency, and certainly this association has aided materially in that direction; another is an increase in rates, and surely those who deservedly need it should be permitted to apply it.

There is little doubt that the Public Service Law has come to stay, not only in this State, but in this country, and there is little doubt that we all believe that a proper law is beneficial to all—one that regulates not only public utilities but regulates the public in relation to such public utilities.

The pendulum of reform has been swung too far by the many specious arguments of bright and voluble, but too radical, reformers and by their mere imitators. However, the judgment of the people, after full information, is usually sound, and we already see the pendulum swinging backward, as evidenced by recent laws in other States, to its proper position.

For many years the electric railway associations in the various States in conventions and through committees have given much thought and attention to the formulation of a code of operating rules which might be made standard and put in force by all. This association has performed its share of the work, and during the past year a committee has spent much time and effort on a code which will be presented to this convention for adoption, and I trust that it will be carefully considered and put into effect by formal approval.

The character and thoroughness of the work done by this association through committees, at quarterly meetings and in conventions, have steadily improved from year to year, and this is evidenced by the quality of reports, papers and discussions. The education gained by individuals through the study and research necessary for the preparation of such committee reports and papers, and from discussions, has reflected itself in the more efficient operation of the

*Address presented at annual meeting of Street Railway Association of the State of New York, Cooperstown, June 27-28, 1911.

railways themselves, and has well repaid the individuals as well as the companies represented by them.

At a quarterly meeting held during the year the schedule of annual dues was revised downward, yet will provide sufficient funds to meet the running expenses of the association.

During the past year your executive committee has held numerous meetings and the usual quarterly meetings have been more largely attended than ever before. Your association is on a sound educational and financial basis and will take an increasingly important part in the future of the electric railway business of this State.

Since 1903 I have been honored by election to various offices in the association, and I take this oportunity to express my thanks and appreciation for the favors conferred, and especially to thank the various officers, members of the executive committee and individuals for their hearty cooperation and assistance.

GAS-ELECTRIC MOTOR CARS*

BY W. B. POTTER, CHIEF ENGINEER RAILWAY & TRACTION DEPARTMENT, GENERAL ELECTRIC COMPANY

The electric car meets certain transportation conditions where steam operation would be both unsatisfactory and uneconomical, and there are other conditions which, in the present state of the art, are undoubtedly better met by the steam locomotive. There are intermediate conditions where self-propelled cars are less expensive to operate than steam trains and where the investment for such cars would be considerably less than for complete electrification. In this latter class are many branch lines of steam roads and projected developments of new roads which might not at first justify electrical equipment. Recognizing this situation, efforts have been made to drive such a car with a self-contained boiler and engine, but without great success, as the performance is limited by restrictions imposed on the boiler capacity.

The development of the gasoline engine and its application to this class of work have resulted in marked success. The gasoline engine as a prime mover is essentially different from a steam engine in that it has no variable effective pressure in the cylinders such as may be secured by the variable cut-off of a steam engine. To secure the tractive force required for starting and to meet the changing requirements of speed and grade, it is necessary that some form of variable gear reduction be introduced between the engine and the driving wheels. To utilize the power of the gas engine to the best advantage it is essential to have a wide range of gearing. To a limited extent this can be secured by mechanical drives, with different sets of gears, as commonly used in automobiles. But the mechanical drive cannot, within practical limits, be provided with the desirable number of gear changes, and it also subjects the engines and driving mechanism to a severe strain by reason of the mechanical shock resulting from the use of a clutch.

The electric drive may seem a refinement, but its advantage will be appreciated when it is recognized that the engine may be driven at its most advantageous speed, independent of the speed of the car, and that the tractive force, without changing the speed of the engine, may be varied from what is required to accelerate the car to that required to drive it at 60 m.p.h. This change in tractive force and speed is accomplished smoothly, and without shock to the mechanism throughout the entire range. As an illustration, the electric drive makes it possible to develop a tractive force of 10,000 lb. at 1 m.p.h. and, without manipulating anything other than the electric controller, to propel the car at 60 m.p.h.

*Abstract of a paper read at the annual meeting of the Street Railway Association of the State of New York, Cooperstown, June 27-28, 1911.

The gas-electric equipment referred to consists of an eight-cylinder, 8-in. x 10-in. gasoline engine, driving an electric generator. The forward truck underneath the engine is equipped with two 600-volt standard railway motors. The weight on the driving wheels effective for traction is about two-thirds the total weight of the car. The movement of the car is controlled by varying the voltage of the generator, combined with series-parallel connection of the motors. The engine control is provided with a combination air valve and gas throttle by which the engine is started on compressed air, and as soon as it begins running on gasoline the air is shut off. With this arrangement, the engine need be run only when propelling the car. Three or four seconds only elapse between the time at which air for starting is admitted to the engine and the movement of the car, so no perceptible delay is occasioned by stopping the main engine at the station.

The car is lighted by a small two-cylinder gasoline engine which drives a lighting machine. This small engine is also fitted with an air compressor cylinder to charge the air tanks for starting the main engine on its first run. The latter is provided with an air compressor, which maintains a pressure when the car is once in operation.

A demonstration car of this type has been operating for the past two years, carrying passengers on railroads in different parts of the country, and at the present time there are seven cars in regular service. A grade of gasoline satisfactory for the operation of these cars can be purchased for from 6 cents to 7 cents per gallon. The gasoline tanks will hold 150 gal., sufficient for at least 200 miles on one filling. The gasoline consumption, per car mile, for cars weighing from 40 tons to 50 tons will vary from 0.5 gal. to 0.7 gal., according to the service conditions. On this basis for fuel, an estimated cost of operation per car mile, based on experience, is as follows:

Gasoline	$0.05
Supplies	.01
Maintenance (car body and trucks)	.01
Maintenance (engine and electrical equipment)	.03
Engineer, conductor and cleaning	.07*
	$0.17

*This item, in particular, will vary with the mileage and wages paid.

The car bodies are similar in respect to the engine compartment, the remainder of the interior and the entrances being modified to meet different requirements.

It is preferable that the cars be operated as independent units rather than to haul trailers, but as they are fitted with automatic air brakes, as well as straight-air, and with M. C. B. couplers, they can be used for trailer work, though at reduced speed.

The seats are nearly 4 ft. long, and, not having arms, it is possible for three people comfortably to occupy one seat. The aisle is narrower than in steam practice, though wider than in many trolley cars. The largest cars at present under construction are 70 ft. long and 10 ft. 5 in. wide over all.

The width, inside measurement, is 9 ft. 6 in. This car, with a 6-ft. baggage compartment and allowing three passengers per seat, will seat ninety-eight passengers, and it is practically a complete train within itself. Such a car would have a maximum speed of about 50 m.p.h. on level track, and a scheduled speed of 25 m.p.h. with stops 2½ miles apart.

There are undoubtedly many lines now operated by steam which under existing conditions are unprofitable, on account of both high operating expense and small receipts, but on which the traffic could be very much increased by a more frequent service and a pleasanter mode of travel.

The self-propelled gas-electric car seems to fulfill these requirements at less cost than by steam and so accomplishes the double purpose of a better and cheaper mode of transportation.

MAINTENANCE OF WAY MATTERS*

BY C. A. ALDERMAN, CHIEF ENGINEER BUFFALO & LAKE ERIE TRACTION COMPANY

The subject assigned me, "maintenance of way," is so broad that I am assuming it will be agreeable to the association to make statements regarding any branch of it. The road with which I am connected consists of approximately 200 miles of line, which is kept up by a roadmaster who has about twelve section crews on the electric and five on the steam divisions, while city section crews have about double the amount of track to look after that suburban ones have. Bridges are inspected by the roadmaster and the writer periodically. All matters pertaining to the overhead line—trolley feeder, transmission, etc.—are in charge of the electrical engineering department, which also has the work ordinarily falling upon a master mechanic or superintendent of motive power.

The amount of new construction performed by the Buffalo & Lake Erie Traction Company during the past five years has been so great that maintenance of way is handled jointly by the construction and operating departments. Many details of maintenance are attended to by division superintendents, who are under the general superintendent, and he in turn reports to the vice-president of the road.

The engineering department has charge of all new work, such as the location and construction of extensions and the revision and rebuilding of old or improving located tracks. Last year, for instance, about Aug. 1 we began to locate and stake out a 3½-mile cut-off line, shortening the distance 1¼ miles between Buffalo and Erie, and the line was opened for traffic the fifteenth of this month. The work involved 60,000 cu. yd. of earth excavation, one steel viaduct 900 ft. long and 90 ft. above the water, all of which is located on a private right-of-way, wide enough for a double track and two 60,000-volt transmission lines. The viaduct was erected with a derrick mounted on an ordinary flat car. The tracks were ballasted with granulated slag, which is used almost exclusively for our new work. Bonding was done with a bonding car using a brazed bond, practically welding it to the rail.

This piece of track was built on substantially level grades with no curve of over 4 deg., and only three in all, so that we believe its cost of maintenance will be reduced to the minimum.

In 1909 a double-track line consisting of 4½ miles of roadbed was built into Buffalo, extending from Lafayette Square to the Lackawanna steel plant. This line was so constructed that its maintenance is a very simple and inexpensive matter, as steel ties were used with 9-in. heavy girder rails with 10 in. of concrete under them and 6 in. under the ties. Seven-inch Medina block stone was used for practically all the paving. The year previous to this work 24 miles of new track was built between Buffalo and Dunkirk, laying 80-lb. A.S.C.E. rails with Continuous joints, nearly all of which was on private right-of-way. Catenary construction was adopted for the trolley line and separate poles for the transmission system which conveys Niagara power.

We have endeavored to build all lines, not only the new, but reconstruct the old, so that maintenance costs will be a minimum. I believe it is good policy to put enough money into the original line so that the grades and alignment will cause small power bills, few accidents and reduce the platform time. Level, straight lines not only do this but they save rolling stock and electrical equipment, requiring fewer section men and trouble patrolmen. Private right-of-way is another asset that is worth considering, as most accident claims originate on highways or in the city streets. With a private right-of-way higher speed can be made, thereby getting more car mileage for the same expenditure in power and labor. The character of construction is not subject to the approval of municipal authorities and the up-keep is easier to maintain.

Light grades and easy curves reduce the cost of operation and increase the gross receipts by causing more people to patronize the lines. The tractive effort on private right-of-way is less than in a public highway or city street where dirt accumulates on the rails.

CITY TRACK RECONSTRUCTION

During the past three years we have given the subject of track reconstruction in city streets our most serious consideration. We have built most of this track with a T-rail on a concrete base. About one-half of the Buffalo entrance was constructed with a low T-rail, open construction and stone ballast, and, while it is within the city limits, the city and the public are well pleased with it and the noiseless way in which the cars pass over this track, to say nothing of the fact that they can get into the city quicker and more comfortably during bad weather. In the latest type of street construction used by our company, a 100-lb. T-rail is laid with a 6-in. concrete base, the brick pavement going under the rail on the gage side of the track, thereby doing away with any special brick or troublesome groove. On the outside of the rail a brick with a slight offset is laid to insure the pavement remaining below the rail far enough so that the wheel tread will not injure it. While we have used a large number of steel ties in our construction we are not very strongly in favor of them excepting on new lines where no cars are operating. In rebuilding old track, the use of steel ties not only increases the cost of construction, but it is doubtful whether solid track is obtained, and we think it interferes with successful operation.

Maintenance of way is being constantly improved by the use of portable crossovers, hose bridges, track-grinding machines and a liberal supply of small tools for keeping cars in operation during repair and new work. I believe that a company can do all its track laying, ballasting and emergency work on roadbed cheaper, quicker and better than to let it by contract. Our train dispatchers give work trains all possible assistance, allowing them to work extra for several hours at a time, thus accomplishing much without interfering with the operating timetables. We endeavor to have as few switches as possible in streets, thereby using inexpensive switch and frog material and giving safer and faster track for cars to pass over; for example, where we have a double track through the streets we make all connection of the double track with single track on the private right-of-way located outside of the city or village.

DISTRIBUTION SYSTEM

Owing to the high pressure of our transmission system (60,000 volts) separate poles are set 160 ft. apart carrying three No. 2 copper wires on porcelain insulators, steel towers being used at all railroad crossings.

The trolley lines are of the catenary type of construction on about one-half of the system, in which poles are set 125 ft. apart, using three hangers between the trolley and messenger wire; the balance of the line is constructed of ordinary span construction in city streets and brackets on a single line of poles where the lines are on the sides of highways. Our electrical department is paying a great deal of attention to the subject of good bonding and proper ground return from the track to power houses and substations. Bonding is carried on pretty largely at night on operating lines so as to interfere as little as possible with the regular car operation.

In paved city streets two bonds at the joints on 100-lb. T-rail construction are used. Cross bonds are placed about 500 ft. apart.

*Abstract of a paper read at annual meeting of Street Railway Association of the State of New York, Cooperstown, June 27-28, 1911.

STEAM RAILROAD CROSSINGS

While it is very desirable to eliminate grade crossings of foreign roads, there are cases where this is not practicable, as in city streets or where the country is level and water lies close to the surface in large quantities. In localities of this kind I think it best to use solid manganese work, for although this type of crossing is much more expensive than the ordinary bolted one, it will last several times as long. We have constructed a large number of subways or under crossings of steam roads, all of concrete, of either the arch or box type. Where overways were required steel viaduct and trestle construction has been resorted to as being the best proposition from a maintenance of way as well as a construction standpoint. The grades of approaches were lightened.

DETAIL WORK NECESSARY TO ECONOMICAL AND EFFICIENT MAINTENANCE OF WAY

The traction line, urban or interurban, that gives careful and constant attention to the small matters such as compromise splice bars, renewing switch tongues when worn out or broken, is the one which is most likely to succeed.

Too much care and pains cannot be exercised in shimming loose joints in city and open track, thus keeping the surface of abutting rails level, also promptly renewing offset splice bars that join different sections of rail and special work. Neglect of these inexpensive joints may greatly damage costly special track work and rolling stock beyond repair in an incredibly short time.

RIGHT-OF-WAY RECORDS

Hopeless confusion of a company's real estate and franchise rights is only averted by giving its records careful attention. All right-of-way deeds should be filed in a cabinet in a vault or other safe place where they can be got at by the executive, legal, accounting or engineering departments at a moment's notice.

Each department should be furnished with a blue print index sheet giving the file number, name and station of each piece of property the deeds refer to. These index sheets should accompany right-of-way books (maps) drawn to a scale of about 100 ft. to the inch, which should also be a part of the records in the principal offices of the company.

SWING AND DRAWBRIDGES

The subject of protection of trains from going into the stream or becoming derailed at movable bridges is one that we have gone into at some length owing to the fact that in the city of Buffalo several bridges of this type are crossed.

Solid manganese terminals of rails widening out two or three times the width of the running rail, thereby allowing cars to pass smoothly from fixed to movable parts, are quite desirable both for safety of travel and saving of wear and tear on cars.

A derailing switch at approaches to drawbridges we believe to be productive of more harm than good in the majority of cases. We have a location where one was installed and taken out after remaining in the track a few months. The great trouble with these derailing devices is the same as at railroad crossings, viz., to operate them in winter weather and to be sure they are not gong to get out of order.

CONCLUSION

In conclusion let me say that maintenance of way is a very important part of successful traction management. It seems to me that too much attention cannot be given to the little and many details that will invariably come up day by day on the track and the line. If the roadbed is well maintained power bills are minimized, the life of rolling stock and equipment is prolonged and the public is kept in good humor, to say nothing of larger gross receipts and smaller operating expenses that will inevitably result from good track.

THE EDISON-BEACH STORAGE BATTERY CAR*

BY R. H. BEACH, FEDERAL STORAGE BATTERY COMPANY, NEW YORK

Probably it is not clear to many electric railway men how a storage battery can perform the very difficult task of supplying the large amount of electrical energy necessary to propel a heavy car, to accelerate it at frequent intervals and cause it to climb grades. Experience with batteries composed of lead compounds immersed in acid-electrolyte has been such as to lead many to think that all secondary batteries are delicate and have a short life, and therefore are to be avoided for use on vehicles. The Edison secondary battery, which is the source of energy in the Edison-Beach storage battery car, is neither delicate nor short-lived. The principle of the Edison storage battery is that metallic iron tends to combine with oxygen. When oxygen is combined with iron energy is developed either in the form of heat or electric energy. Conversely the oxygen may be removed from iron oxide, but to do this requires the expenditure of energy. The Edison battery consists essentially of plates of iron oxide and plates of nickel oxide immersed in water, to which potash is added. If an electric current is caused to pass through the electrolyte from the iron plate to the nickel plate the oxygen present in the iron oxide passes to and remains with the nickel oxide. When all of the oxygen has been removed from the iron oxide and is taken up by the nickel oxide then the battery is fully charged. In this condition the negative plate is composed of metallic iron, while the positive or nickel plate is composed of oxide of nickel and also a super-oxide of nickel. The finely divided metallic iron has an affinity for the oxygen in the positive plate and it will receive this oxygen if permitted to do so. It cannot receive the oxygen, however, without giving off energy in some form. If an electrical circuit be completed between the two plates an electro-chemical action takes place and the oxygen in the positive plate is transferred to the metallic iron in the negative plate. This process is accompanied by the generation of electricity.

MECHANICAL AND ELECTRICAL CHARACTERISTICS OF BATTERY

The Edison battery is analogous to but quite different from the older forms of lead batteries. Combinations of iron and nickel oxides and water are not self-destructive. Neither are they destroyed by the transfer of the oxygen back and forth. In a word, the distinctive feature of the Edison secondary battery is its stability. The battery is not liable to injury from use, and it suffers nothing from neglect. It may be charged at a rate as high as ten times the ordinary rate, or it may be discharged on short circuit. The electrolyte may be boiled or frozen without damage to the cell. With ordinary treatment the battery can be relied upon to do its work, providing it is kept reasonably clean. From experience extending over several years, it is known that the battery will not fall off in capacity during the first six years of its life. It is guaranteed for three years and it is believed that it will last for a much longer time, especially if distilled water is used.

With the older types of storage batteries it has been necessary to allow almost as long for charging the battery as for discharging it under service conditions. The older types of batteries require about eleven hours for a complete charge and in car operation this would mean that the car would be out of service at least half of the time. Because of the fact that the Edison battery is not injured by high rates of charging, a car equipped with this type of battery need be out of service practically none of the time. In Washington, D. C., a car is operated over a line 4 miles long. The running time is sixteen minutes and the layover time at the terminal is three minutes. The bat-

*Abstract of a paper read at the annual meeting of the Street Railway Association of the State of New York, Cooperstown, N. Y., June 27-28, 1911.

tery is charged at five times its normal rate during the three-minute layover and the car then runs to the other terminal, where the operation of charging is repeated. The battery is not charged at any other time and the car runs 204 miles each day. The three-minute layover at each terminal is required for changing the fender and giving the conductor an opportunity to reset the fare register. Advantage is merely taken of this time to charge the battery. Another car, operated in Concord, N. C., makes 99 miles a day and is charged twenty times for ten minutes at each terminal. The total charging time is three hours and twenty minutes during the day.

Mr. Edison has said of this battery that it is the most useful of all of the devices that he has invented. As the field of its application becomes better known it will be the means of supplementing and, to a large extent, supplanting many of the present means of electrical transmission. It makes not only possible but almost certain the removal from the streets of all overhead trolley wires, and makes unnecessary and uneconomical the third rail and the conduit.

WEIGHT PER SEAT

In designing the cars on which these batteries are used the writer has aimed to reduce the dead weight and to eliminate, as far as possible, friction losses. The average Pullman car weighs 3000 lb. per seated passenger. The ordinary wooden day coach used by steam railroads weighs about 1500 lb. per seated passenger. A steel suburban coach weighs 1100 lb. per seated passenger. An ordinary single-truck trolley car weighs about 800 lb. per seated passenger and an ordinary double-truck car about 1000 lb. per seated passenger. The average current consumption of a trolley car is approximately 125 watt-hours per ton mile. The Edison-Beach double-truck storage battery car weighs only 600 lb. per seated passenger, while the small single-truck car weighs 380 lb. per passenger. The latest type of long wheel-base, single-truck car weighs 360 lb. per seated passenger. The weight of the battery required on each of these cars is about 60 lb. per seat.

This reduction in weight has been accomplished by making a number of departures from the usual practice in body and truck construction. All of the joints in the truck frame are welded instead of being riveted or bolted. No difficulty has been experienced from broken welds. In longitudinal seat cars an electrically welded latticed steel girder forms a rest for the seat and extends the length of the car body. It is bolted to the side and cross sills and side posts. In an 18-ft. car these girders weigh about 300 lb. and they so stiffen the body that a reduction of nearly 3000 lb. can be made in the weight of the other parts. A very light roof is used because it is not necessary to support a trolley base. The body of an 18-ft. car with 5-ft. platforms and folding doors, but no bulkheads or interior doors, weighs about 3700 lb. A standard monitor-deck car body of the same length weighs about 6700 lb. and the light bodies with the steel girders are much stronger than the heavy bodies.

RECORDS OF PERFORMANCE

After extensive experiments had been made it was found that there was a considerable saving in friction losses if the wheels were permitted to rotate on the axles instead of having the axles fixed in the wheels and rotate in the journal bearings. Exactly how much saving in current consumption has been effected by this change is not known. A silent chain drive is used between the motors and the wheels. There is some gain in efficiency with this type of drive over the gear drive, but it is difficult to say exactly the amount. When new the gear drive is probably very nearly as efficient as the chain, but as it wears it loses its efficiency, whereas the chain does not. The chain drive possesses a great advantage over the gear drive while the car is coasting. On a test run between Athena and North Newark on the Erie Railroad, a distance of about 7 miles, a chain-driven car accelerated from 0 to 35 m.p.h. and maintained that speed on a practically constant grade of from ½ to 1 per cent without the use of any current. An ordinary journal-bearing car will scarcely move on this grade without the application of power. The average current consumption of the Edison-Beach storage battery car is very low, in no case exceeding 60 watt-hours per ton mile. In a test made at Atlantic City at the time of the American Electric Railway Association convention in October, 1910, one of these cars made thirty-six trips, aggregating 14.4 miles, with an average of six stops per mile and an average speed of 9 m.p.h. The average number of passengers carried was eighteen and the average consumption of current per ton mile was 54.2 watt-hours.

A double-truck car which was tested on the Greenwood Lake Division of the Erie Railroad between Forest Hill and Sterling Forest ran a total distance of 70.2 miles. The weight of the car, including passengers, was 16.53 tons and the maximum speed was 25 m.p.h., the schedule speed being 18 m.p.h. This line has a number of heavy grades, but the current consumption per ton mile averaged only 49.63 watt-hours. Another test made on the Erie Railroad between West Orange and Forest Hill at the same rate of speed showed a current consumption of 46.1 watt-hours per ton mile.

The Washington, Spa Springs & Gretta Railroad has had an Edison-Beach car in service for a number of months on a line which has grades as steep as 8 per cent. The battery car has averaged about 355 watt-hours per car mile and it has been found that one of these cars consumes only about one-fourth the current required for an ordinary trolley car.

It is of interest to note the long-distance runs which may be made by these cars on a single charge of the battery. The double-truck car previously mentioned has been run on a single charge from West Orange, N. J., via Jersey City to Middletown, N. Y., over the Erie Railroad as the second section of an express train. The same car was run on a single charge from Jersey City to Atlantic City, N. J., over the Central Railroad of New Jersey and the Reading Railroad, a total distance of 135 miles. Sufficient current was left in the battery upon arrival at Atlantic City to run about 40 miles more. This car can attain a speed of 25 m.p.h. on a level with full load and a speed of 16 m.p.h. on a 6 per cent grade. It is equipped with four motors rated at 15 amp and 200 volts and an Edison battery weighing 4800 lb. On the single-truck cars carrying twenty-six passengers two motors rated at 30 amp and 110 volts are used and the battery weighs 1800 lb. The lower voltage used on the single-truck cars lessens motor and controller troubles.

As showing what can be done with one of these cars on a small road, the results of operation on the Salisbury & Spencer Railway, Concord, N. C., are of interest. The total cost of this road, which is 1½ miles long, was $20,000 and the net earnings of a single car are at the rate of $7,670, which is equivalent to more than 33 per cent on the investment. The current for charging the battery of this car is purchased from the Southern Power Company at a price of 1¾ cents per kilowatt hour, measured on the alternating-current busbar. The car is operated by one man, passengers entering and departing by the front door. The following is a record of thirty days' operation:

Number cash fares	19,733
Number ticket fares	243
Total	19,976
Total car miles	2687.5
Total kw	5268
Kw. per mile	1.95
Total moneys received	$986.65
Operating expenses:	
Power at $1.75 per kw	92.19
Conductors and motormen	232.94
Miscellaneous	22.39
Total expenses	$347.52
Net profit	$639.13

Summing up, the advantages of the storage-battery car are: It eliminates the trolley wire and its supports; costs less for power; does away with electrolytic action of the return circuit; cars are silent running; there is no danger from lightning; the peak-load conditions on the power house are eliminated and each car is a separate, self-propelled unit which is less liable to delays than on a system where each car derives its current from a central station through an intricate distribution system. Storage battery cars also afford an excellent opportunity for existing trolley lines to be put on as trippers during the rush hours and late at night when it may be desirable to shut down the power house.

SINGLE-END VS. DOUBLE-END CAR OPERATION*

BY HERMAN E. HICKS, SUPERVISOR OF SCHEDULES NEW YORK STATE RAILWAYS

In the city of Rochester, from the time of the operation of the first electric car until April 1, 1910, there had never been operated any other than double-end cars. To facilitate this operation cross-overs were placed at each terminal and at various intermediate points, usually separated by about six minutes' running time, for the purpose of turning and spacing late cars.

On April 1, 1910, a new line was put into operation, formed by re-routing and combining two sections of an old line in such a manner as to obtain a line traversing the entire length of the main or principal business streets of the city. Upon portions of this line are operated ten other city lines, and in the center of the business section there is track common to seven other lines. The combined operation of these lines over this common track consists of 156 cars per hour in each direction during the peak load, or so-called rush hours. Two loops and two wyes were substituted for four cross-overs; two loops and one wye were placed at the terminals and one wye at the canal lift bridge; five intermediate cross-overs were left in for the use of cars operating on the other lines, but, of course, they could not be used by the single-end pay-as-you-enter cars placed upon this new line.

For the purpose of comparison I have taken a line of double-end cars whose operating conditions are very nearly identical with those of the new line. It is double-tracked from end to end, crosses the canal lift bridge and operates a considerable distance on the main street. In making these comparisons, which show the results of one year's operation, I will refer to the two lines as the "double-end" and "single-end" line.

The following table shows a comparison of operation for one year:

Items Compared.	Double-End Line.	Single-End Line.	Single-End Line. % Inc.	Single-End Line. % Dec.
1 No. of regular cars operated daily..	23	25	8.6%	
2 Av'ge No. p's'g'rs carried daily..	17,346	23,446	35.1%	
3 Av'ge No. p's'grs per car mile....	8.1	9.3	14.8%	
4 Average speed, miles per hour..	8.42	8.60	2.1%	
5 Total No. traffic interruptions....	149	144		3.4%
6 Total No. turn backs.....	493	186		62.2%
7 No. accidents per 10,000 miles operated	8.0	6.9		13.7%

The comparison of the first three items showing an increase in the number of cars operated and of passengers carried on the single-end line cannot be credited to the type of equipment used, but to the difference in density of population within the territory covered by each line.

ITEM NO. 4—AVERAGE SPEEDS

The 2.1 per cent increase in speed shown by the single-end line is due principally to the more expeditious method of turning cars at the terminals. Under ordinary conditions the actual time taken to turn (exclusive of the layover which the crew may take) is thirty seconds at the loop or wye and sixty seconds at the cross-over terminal, showing a saving of sixty seconds per trip. It is, however, at the heavy loading terminals, such as park resorts or factory districts, that the loop operation shows its greatest superiority, the cars there taking very little additional time to load, with no delay to the cars following. On the other hand, at the cross-section, with the necessary transfer of controller handle and switch iron, the turning of trolley and adjusting fenders and the crowding on of passengers, it is practically impossible to operate on a closer headway than two minutes unless two or more cars are turned at the same time. If this is done the cars have to be sent back in twos or threes and the schedule spacing is disarranged.

ITEM NO. 5—TRAFFIC INTERRUPTION AND TURNBACKS

While the traffic interruptions show a decrease of 3.4 per cent on the single-end line the turnbacks show a decrease of 62.2 per cent.

These turnbacks are caused by cars running late, due principally to traffic interruptions or abnormally heavy travel. The usual method of turning cars is as follows: When double-end cars are operating on a six-minute headway and a car becomes five minutes late or more the late car and its follower arrive at the cross-over at the same time, as the cross-over is located about four minutes' running time from the line terminal. The passengers are then transferred to the second car and the first car is turned and proceeds on its return trip.

This operation, however, is productive of two classes of complaints:

First: The transfer of passengers to the car following is always annoying to them and is particularly so in bad weather.

Second: Passengers between this cross-over and the end of the line see the first car turned back after they have waited for it twelve minutes instead of six, and have sometimes waited fourteen minutes on account of the time taken to transfer passengers and turn the first car.

This does not happen on the single-end cars, as their last turning places are located at much greater distances from terminals and are not used except in the case of extraordinary interruptions, such as fires, etc. This might lead one to think that the single-end line is not operated as closely to schedule as the double-end line, but the line is actually running closer to the schedule and giving a continuity of service not obtained on the other line. This shows that when there is no opportunity to turn back cars a greater effort is made to maintain the schedule.

ITEM NO. 7—ACCIDENTS

While many of the different classes of accidents, such as collisions with cars, vehicles, persons, etc., are common to both single-end and double-end equipment, and the decrease of 13.7 per cent in number of accidents per 10,000 miles operated is to a great extent due to the prepayment car, still there are accidents in the double-end car caused by passengers coming in contact with the controller, brake handle and other equipment located on the rear platform. The number of these classes of accident on the double-end line was twenty-nine, or 4.5 per cent of the total, and the aggregate sum for the whole system paid out in damages for these classes of accident was 3.3 per cent of the total amount paid. There are also the accidents caused by passengers riding on the left-hand rear step or fenders and falling in front of passing cars. A fatality of this kind recently happened in our city. These accidents do not occur in the single-end car.

ITEM NO. 8—EQUIPMENT

In the construction of single-end equipment there are many points which favor good operation. Two of the most important are as follows:

First: The removal of the heater from the interior of the car to the front platform, thereby eliminating the possi-

*Abstract of a paper read at the annual meeting of the Street Railway Association of the State of New York, Cooperstown, N. Y., June 27-28, 1911.

ble annoyance of coal gas and increasing the seating capacity of the car. This is very acceptable to the public, and from the company's standpoint is one of the few remaining opportunities of increasing the earning capacity per car.

Second: From a mechanical standpoint there is a reduction in weight of about 2200 lb. per car, thus effecting a saving in rolling stock investment and maintenance cost.

ITEM NO 9—TRACK AND ROADWAY

As previously stated, the construction of two loops and two wyes were found necessary for the single-end operation, intermediate wyes being formed by intersecting lines, while for the double-end operation there were nine cross-overs. The comparative cost of installation (exclusive of right-of-way cost) shows a reduction of 12.5 per cent in cost of special work. In addition, there is undoubtedly a considerable saving in maintenance cost from using the loop operation. We have also found that the single-end cars make less noise when traveling around their loop track than do the double-end cars in passing over the frogs and switches at terminal and intermediate cross-overs. Hence the number of complaints on this point is less.

REPORT OF COMMITTEE ON JOINT USE OF POLES*

The committee on the joint use of poles presents for consideration a proposed standard agreement, developed along the lines of the outline approved by the Street Railway Association of the State of New York at its last quarterly meeting. The committee has endeavored to make this agreement broad enough to warrant its adoption as a standard by this association.

In accordance with the instructions given the committee the matter was taken up with the Public Service Commission and also with the chairman of the overhead lines construction committee of the National Electric Light Association, as well as with the New York Telephone Company, which had previously asked for representation on this committee. The work to be taken up was outlined to these bodies and their representation was asked at the meetings, for the stated reason that it was desired to develop an agreement which would be broad enough to be universally applicable and suitable for use under the various conditions which exist in the different companies throughout this State.

Three meetings were held, at one or more of which there were present besides the committee experts from three departments of the Public Service Commission—the railway, the power and lighting, and the telephone and telegraph departments; two representatives from the New York Telephone Company and a representative from the overhead line construction committee of the National Electric Light Association.

The committee thus was well equipped in an advisory capacity and this was of very material service to the committee in preparing the agreement which is submitted.

It is not assumed by the committee that the agreement as submitted will be acceptable to all interests—in fact, the discussions at committee meetings developed a great diversity of opinion from the various representatives in regard to a number of points.

Attention is called to the following features of the agreement, which the committee believed should be borne in mind:

1. It should protect thoroughly the railway interests and at the same time not work any hardship on the other interests concerned. It must not permit hazardous or careless construction.

2. The agreement and specifications should be extremely simple and clear, unincumbered with unnecessary words.

3. It should be broad enough to admit of use by several companies jointly, under whatever conditions they operate.

4. It should cover any form of occupancy, whether by ownership or lease, whether covering one entire property or a single pole location.

With reference to the drawings referred to in Appendix "C" the committee has modified only those plates showing construction in which by virtue of joint occupancy electric railways would be interested, it being the opinion of the committee that in any matters involving only the telephone and electric light companies the use of the National Electric Light Association's standard specifications was permissible as representing the accepted engineering of these interests.

It was brought to the attention of the committee that the agreement submitted differs in many ways from work which has been done previously by the American Telephone & Telegraph Company and the National Electric Light Association and that in following this outline the tendency might be away from rather than toward a standard agreement which might be suitable for other interests. The committee, however, felt that it was not in error in its premises and that it should continue as nearly as possible along the lines which were approved at the last quarterly meeting.

If in the opinion of the association the proposed agreement is leading away from what might be termed "a universal standard," no time should be lost in instituting an investigation jointly with other companies and associations interested in producing a standard form of agreement and specification and developing an instrument which would be a composite of this one and others now in use. If, on the other hand, the committee has been proceeding in the right direction for the railway interests, it would recommend that the agreement as submitted be revised in such minor points as may be necessary and be presented to the Public Service Commission for its approval in order that it may be put into practical use at the earliest possible moment.

PROPOSED STANDARD AGREEMENT FOR THE JOINT USE OF POLES

This agreement, made and entered into this.....day of .....19...., by and between the..... Company, a corporation organized under and by virtue of the Laws of the State of.....; the..... Company, a corporation organized under and by virtue of the Laws of the State of.....; and the..... Company, a corporation organized under and by virtue of the Laws of the State of.....etc., etc., etc..... for and in consideration of one dollar by each to the other paid, receipt whereof is hereby acknowledged, and in further consideration of the covenants and agreements herein contained,

WITNESSETH THAT:

ARTICLE ONE

The term JOINT USE refers to the use of poles by two or more parties.

The term POLE refers to any form of abutment or support to which any attachments may be fixed.

The term ATTACHMENTS refers to all wires, cables, apparatus, fixtures or appurtenances which may be used by any party hereto in the conduct of its business.

(Give here, if desired, the reasons for entering into this agreement.)

(Describe here the territory covered by this agreement.)

ARTICLE TWO

Each party to this agreement must have such legal rights as will entitle it to enter into this agreement without prejudicing any of the other parties hereto, in their rights, in any way whatsoever.

It is understood that no legal or franchise rights of any of the parties to this agreement shall be invalidated by its execution.

ARTICLE THREE

Each of the parties hereto has the right to install and operate the attachments necessary to carry on its proper business.

ARTICLE FOUR

The right to the use of the poles covered by this agreement shall be according to the *Schedule of Poles Jointly Used*, in Appendix "B," which shall state, for each pole or group of poles, the proportion of ownership held by each party hereto.

This schedule may be amended from time to time by written fliers inserted in Appendix "B" and signed by designated officers of all parties hereto without invalidating this agreement.

The cost of a new joint pole for the mutual convenience of all the parties hereto shall be proportioned in accordance with the ownership designated in Appendix "B."

ARTICLE FIVE

Where rearrangement of attachments or replacement of poles is necessary for the sole convenience of one or more parties, that party or parties shall pay the entire expense of replacement or rearrangement.

Each party shall install its own attachments and bill the petitioning party or parties in accordance with Par. 1 of this article.

Space on poles shall be apportioned in accordance with the specifications and drawings in Appendix "C."

All work shall be performed in accordance with outline shown in specifications and drawings in Appendix "C."

*Abstract of report presented at the annual meeting of the Street Railway Association of the State of New York, Cooperstown, N. Y., June 27-28, 1911, by a committee consisting of W. J. Harvie, chairman; C. L. Cadle, W. B. Fenoyer, R. P. Leavitt and C. S. Stanton.

ARTICLE SIX

The systems of the parties hereto shall be operated in a proper and safe manner, and operating conditions shall not be materially changed without due notice to the other parties hereto.

Each party hereto shall keep its own attachments in safe condition, without disturbing the attachments of the other party or parties to this agreement.

The employees or agents of each party hereto shall have the right of access, in the performance of their duties, to any part of the poles, whether or not specifically set aside for the use of the other parties hereto.

Any party hereto placing any attachments on any joint pole shall, in every case, make provision to maintain proper alignment of the pole at its own expense.

Any change in pole location or attachments other than referred to in Article 5, Par. 1, shall be made by mutual agreement between the parties hereto, and such agreement must designate the party who shall do the work and the method of handling the cost.

The cost in cases covered by the above paragraph shall be apportioned in accordance with the ownership shown in Appendix "B," and each party shall handle its own attachments unless otherwise arranged when the mutual agreement referred to in this paragraph is entered into.

ARTICLE SEVEN

The maintenance and renewal of poles jointly owned and the methods to be followed shall be agreed upon by all parties hereto and outlined in Appendix "A." Neither party hereto shall at any time change the location of, or remove any pole jointly owned without the written consent of the other parties hereto.

Maintenance expense shall be apportioned in accordance with ownership shown in Appendix "B."

ARTICLE EIGHT

This agreement shall continue in force from date of its execution to January 1, 19...., unless terminated as provided in Par. 2 of this article, and may be renewed under the same conditions by mutual agreement of the parties hereto.

In case all parties to this agreement desire to abandon any joint pole all attachments of each of the parties hereto shall be removed by it and the joint pole shall be removed in such careful manner and within such time as the conditions may require. The party who shall do the work and the methods to be employed shall be as the parties hereto may mutually agree in writing. The cost of removal of joint pole shall be divided in accordance with the ownership as shown in Appendix "B," after any salvage value has been properly credited.

If any of the parties hereto shall at any time desire to abandon its proportion of ownership or to permanently discontinue the use of any of the said poles, it shall notify the other party or parties hereto in writing to that effect and shall remove its attachments therefrom within sixty (60) days. The party giving such notice shall, after removal of its attachments, and at the end of said sixty (60) days from the date of such notice, cease to be liable for any obligation or other charges incurred thereafter in connection with such pole or poles.

In case of abandonment by one or more of the parties hereto of the use of any pole, a flier, signifying such abandonment, properly executed by an official of the abandoning party, shall be made and posted under *Schedule of Poles Jointly Used* in Appendix "B." The interest of the abandoning party or parties shall be divided among the remaining party or parties to this agreement in proportion to their respective interests in the pole.

No party to this agreement shall sell, assign, lease or in any way dispose of any portion of any of the poles or attachments without the written consent of all parties to this agreement, but this shall not be construed to limit the right of any party to make a general lease or assignment of all of its rights, property and franchises, or to enter into any combination authorized by law; and in case of such lease, assignment or combination, the rights acquired hereunder shall pass to lessee, assignee or combination.

ARTICLE NINE.

Invoices shall be rendered monthly for work done on jointly used poles in such proportion as the parties hereto are interested, as shown in Appendix "B," amounts for which shall be paid within sixty (60) days after receiving invoice. Any party doing work under this agreement shall present, if desired, report showing detailed cost of work.

Invoices for attachments on a rental basis shall be rendered by the owner on or about the first of each year, payments for which are to be made by the tenant within sixty (60) days after receiving each invoice.

The count of attachments which are to be covered under the invoices shall be made once each year, during the month of July, and each company interested shall delegate a representative for such purpose. These representatives must agree with each other, and the count shown by them shall be final and binding on all parties hereto.

ARTICLE TEN

During construction, operation or maintenance each party to this agreement shall be responsible for the effect of its own attachments and the acts of its employees and agents.

ARTICLE ELEVEN

In case any of the parties to this agreement disagree as to any questions arising thereunder, such questions shall be settled by arbitration in the following manner: Upon the written request of any one of the parties failing to agree, each of the parties to the agreement shall, within ten (10) days, appoint one arbitrator. If this results in an odd number of arbitrators, the arbitrators thus appointed shall, within sixty (60) days from their appointment, decide the controversy and render a decision in writing thereon. If the original appointments result in an even number of arbitrators, these arbitrators shall, within ten (10) days, appoint an additional arbitrator and proceed with the questions in hand as above. Upon failure to agree upon the additional arbitrator within the specified time the parties to this agreement shall apply to the Public Service Commission for the appointment of an additional arbitrator, and the arbitrator appointed by the Public Service Commission shall serve as if elected by the arbitrators.

A majority report shall be final and binding upon all the parties represented, and the expense of such arbitration shall be borne equally by the parties represented by the arbitrators.

ARTICLE TWELVE

This agreement shall supersede any existing agreement between the parties hereto for the joint use of poles, in so far as the provisions of such existing agreement conflict with those of the agreement.

IN WITNESS WHEREOF each party has caused this agreement to be executed in its name and its corporate seal to be affixed thereto by its officer duly authorized thereunto, the day and year first above written.

(Seal) .....

By .....

(Seal) .....

By .....

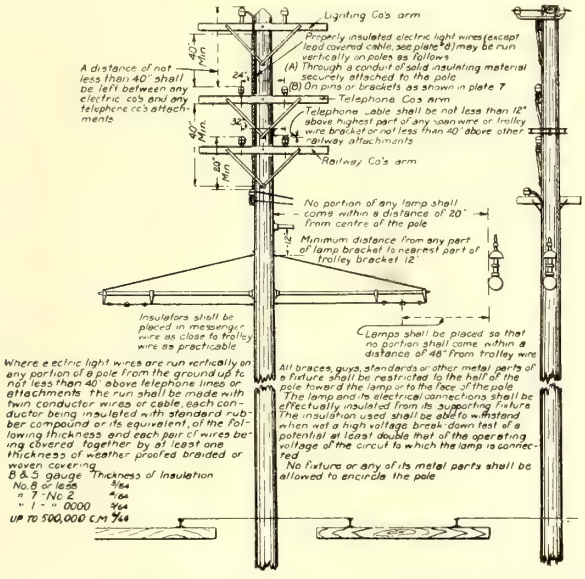


Plate 6—Electric Light Wires Run Vertically on Poles and Installation of Arc Lamps

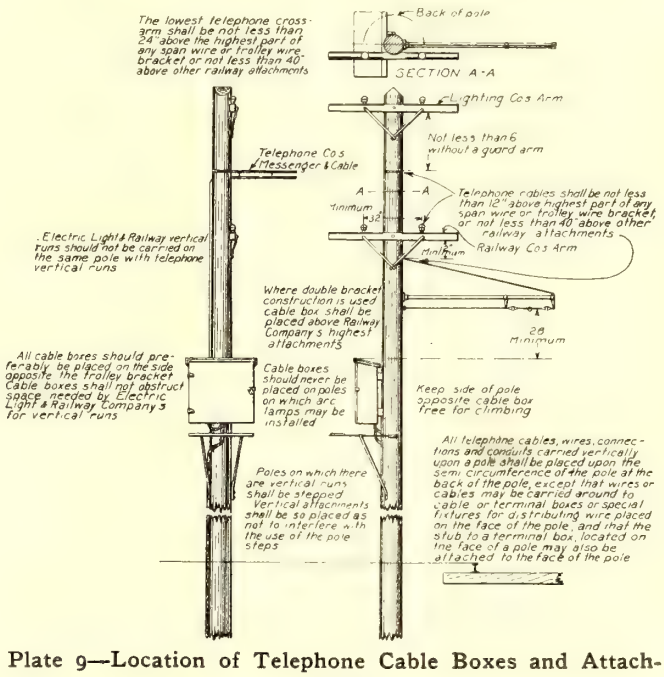


Plate 9—Location of Telephone Cable Boxes and Attachments

APPENDIX "A"

(Local conditions may be enumerated here. Please refer to article and paragraph to which each refers.)

APPENDIX "B"

(Show here the ownership of any or all poles or groups of poles which this agreement is intended to cover.—The rates agreed upon for rental privileges may be shown here.)

APPENDIX "C"

These specifications shall apply to poles jointly used by the parties to this agreement and are a part of the agreement.

For convenience the following definitions will be used:

The term *Class "A" Attachments*, where used in these specifications, shall include:

All attachments of a character or operating voltage other than those specified in classes "B," "C" and "D."

The term *Class "B" Attachments*, where used in these specifications, shall include all attachments of a character or operating voltage as follows:

Constant potential metallic circuits.....5000 volts or less
Alternating-current series, metallic circuits.....5000 volts or less
Direct-current series, metallic circuits.....7500 volts or less

The term *Class "C" Attachments*, where used in these specifications, shall include:

Telephone attachments.
Telegraph attachments.
District messenger service attachments.
Burglar, fire, police alarm and similar attachments.

The term *Class "D" Attachments*, where used in these specifications, shall include:

All railway attachments operating at 1500 volts or less.

Class "A" and Class "C" attachments shall not be placed upon the same pole.

The relative positions of the attachments of the parties hereto, on each pole, shall be as follows:

Class "A" Attachments shall occupy the top portion of the pole.

Class "B" Attachments shall occupy the next lower portion of the pole.

Class "C" Attachments shall occupy the next lower portion of the pole.

Class "D" Attachments shall occupy the lowest portion of the pole, except where different arrangements are agreed upon in writing by the parties hereto. In specific cases class "A" attachments may be placed below class "B" attachments, in which case special construction shall be agreed upon.

Where two parties operate class "A" attachments the class "A" attachments of each of the parties shall occupy the top portion of the pole, each one occupying opposite sides of the pole, with a climbing space of not less than sixty (60) inches between all attachments except those on the top cross-arm.

Not more than two class "A" circuits shall be allowed on any joint pole.

(Following is a descriptive list of the drawings which are a part of this appendix.)

Plate No. 1.—National Electric Light Association standard, showing relative position of class "B" and class "C" attachments, etc. (Not reproduced.)

Plate No. 2.—National Electric Light Association standard, showing climbing space. Class "C" attachments. (Not reproduced.)

Plate No. 3.—National Electric Light Association standard. Side view, showing location of class "B" and class "C" attachments. (Not reproduced.)

Plate No. 4.—National Electric Light Association standard, showing detail construction, class "B" and class "C" attachments. (Not reproduced.)

Plate No. 5.—National Electric Light Association standard, showing distribution methods and clearances, class "B" and class "C" attachments. (Not reproduced.)

Plate No. 6.—Modification of National Electric Light Association standard plate No. 6, showing class "B" and class "C" attachments, including arc lamp, with class "D" attachments added, giving clearances.

Plate No. 7.—National Electric Light Association, standard plate No. 7, showing class "B" and class "C" attachments, including incandescent lamp fixture, with following notations added showing railway clearance required:

Clearance from lamp to top of rail, not less than 14 ft.

Clearance from lamp to trolley wire, not less than 3 ft.

(Not reproduced.)

Plate No. 8.—National Electric Light Association standard, showing class "B" and class "C" attachments. Showing vertical runs, etc. (Not reproduced.)

Plate No. 9.—Modification of National Electric Light Association, standard plate No. 9, showing location of class "B" and class "C" attachments, including cable boxes and vertical runs, with railway attachments added.

Plate No. 10.—National Electric Light Association standard, showing methods of guying, with following note added covering minimum clearance of guy wire over trolley wire:

"Where guy wires cross trolley wires they shall have a clearance of not less than 5 ft. from the trolley wire."

(Not reproduced.)

Plate No. 11.—National Electric Light Association standard, showing method of guying. (Not reproduced.)

Plate No. 12.—National Electric Light Association standard, showing class "B," class "C" and class "D" attachments, with following alterations in notes to show railway requirements:

Para. No. 1, which reads "All line wires shall be carried on pins on wooden cross-arms, etc.," to read as follows:

"All line wires shall be carried on pins on cross-arms, etc."

Para. No. 1, in upper right-hand corner, the latter part of which reads, "* * * unless approved by the chief engineer," changed to read as follows:

"* * * unless approved by all parties to this agreement."

Para. No. 2 from top of plate on right-hand side of plate, which reads, "The lowest telephone cross-arm shall not be less than 24 in. above the highest part, etc.," changed to read as follows:

"The lowest telephone cross-arm shall not be less than 36 in. above the highest part, etc."

Para. No. 4 from top of plate, on right-hand side of plate, which reads, "Trolley wires shall be effectually insulated from span, etc.," that portion in regard to brackets changed to read as follows:

"Where brackets are used the trolley shall be double insulated and the insulators shall be placed as close as practicable to the trolley wire."

Para. No. 10 from ton of plate, on right-hand side of plate, which reads, "Negative feeder connections from a point, etc.," to be omitted.

The last two paragraphs on the right-hand side of plate to be omitted.

Change spacing of railway pole pins from 24 in. to 32 in.

ENTERTAINMENTS AT COOPERSTOWN

Many of the delegates to the Cooperstown convention reached Cooperstown early Monday morning in order to enjoy the entertainments which had been arranged by the committee and play golf at the links of the Country Club. In the evening there was a trip by boat on Otesaga Lake.

During the session on Tuesday morning the ladies had a clock golf tournament on putting greens on the hotel lawn and in the afternoon they played bridge whist. About 4:30 the annual ball game took place between the railway men and the supply men. The teams lined up as follows: Railway Men—Callaghan, Barnes, Cherry, Duffy, J. C. Collins, Hamilton, Badger, Moore and Holmes. Supply Men—Ransom, Slimp, Berry, Chapin, Whipple. Smith, Hegeman, Garland and Miller.

The Supply Men soon showed their superiority at the game and would undoubtedly have won, despite the umpire, if a disappointed and chagrined supporter of the Railway Men's nine had not seized the bat and ball, during an intermission, and thrown them into the lake. This ended the contest.

On Tuesday evening the banquet was held and was followed by dancing in the ballroom. On Wednesday morning the ladies enjoyed an automobile ride and afterward partook of lunch at the Golf Club.

THE BANQUET

The annual banquet was held on Tuesday night, June 27, and was a most enjoyable affair in accordance with the best traditions of the association. A novel feature was the presentation of verses and large cartoons of prominent members. Those who were honored in this way were Past-presidents J. N. Shannahan, Edgar S. Fassett and R. E. Danforth, President J. H. Pardee, Treasurer H. M. Beardsley, of Elmira; E. J. Cook, of Rochester, and J. H. Stedman, the well-known transfer ticket inventor and raconteur. Topical verses were also sung in honor of two of the speakers, the Rev. Ralph Birdsall and Oscar T. Crosby.

After reading congratulatory messages on the work of the association from Arthur W. Brady, president American Electric Railway Association, and F. W. Stevens, chairman Public Service Commission, Second District, President Pardee introduced Rev. Ralph Birdsall as the first speaker.

Dr. Birdsall, who had addressed the association at the Cooperstown meeting in 1910, expressed his pleasure at having been adopted into the electric railway family. In a happily worded address he asked his hearers to remember that they owed something more to the world than the faithful discharge of their routine, professional duties. It was not the burden but rather the opportunity of every man to take an active part in uplifting his fellow-men. The responsibility for such great public matters as sanitation, civic beauty and morality must not rest entirely on the physician, architect and clergyman respectively, but must be shared by all men who wanted to be good citizens.

Randall J. LeBoeuf, counsel Albany & Southern Railroad, the second speaker, first discussed the humorous side of electric railway accident litigation, such as contributory negligence and preponderance of evidence. Following this, he referred to the work of public utilities commissions which he said had placed the public utilities corporation in a better position than ever before. The public utilities corporation now had the great advantage that a public service commission would not permit competition if the corporation was giving satisfactory service to the communities which it served. Never before were the securities of public service corporations on a firmer basis. Every new security issued in New York State since the public utilities law went into effect on July 1, 1907, had behind it practically the guarantee of the people of the State that there had been an honest investigation to ascertain whether the issues were warranted and whether the corporation would be able to pay the fixed charges.

The third speaker was Oscar T. Crosby, president Wilmington & Philadelphia Traction Company and one of the pioneers in electric railway construction and operation. He said the great problems before electric railways now were far different from those which confronted them in the past. Then it was a question of meshing gears, keeping the trolley wheel on the wire, or preventing commutators from burning up, now it was the question of what constituted a reasonable return on the investment. Modern conditions made it imperative to recognize that there was a partnership between the public utilities corporation and the public itself. The problem was how to adjust this partnership relation wisely. At present there was still much confustion in the public's mind on this subject, because the people could not discriminate between a new enterprise whose financial standing was still in peril and an old, established enterprise. He thoroughly believed that the right of repudiating past agreements was one which no government could afford to

lay aside. Every reform in government had been a repudiation of ancient privileges. However, the public must exercise this right with the greatest patience, otherwise we would be thrust from the Scylla of Bourbonism to the Charybdis of anarchy. The partnership between the public and the corporation should be expressed by some understanding as to what reasonable limitation of dividends should be allowed. This limitation should not be such as to hinder the projects of progressive, ambitious men who were willing to risk their all in opening up territory of doubtful profit. Such men were entitled to a special reward in case of success.

He wanted to say a word about watered stock, which seemed to him an excellent invention. Many people were completely confused by the practice of capitalizing earning capacity. Now if a promoter went to a bond buyer with bonds limited to 6 per cent, he could not sell them without offering some stock as a bonus while keeping the rest of the stock for himself. This arrangement expressed the relative seniority of the claims to the profits—first, capital, and second, brains. Thus the stock represented the possibility of getting a higher dividend than the interest charges, which in themselves would not attract a man who was asked to invest in a new undertaking of doubtful profit. Yet to-day the government asked, What investment do the stock issues represent? A narrow limitation of earnings would make it possible only for strong established companies to do new work, and thus the doors of opportunity would be closed to ambitious men of limited means. The misunderstanding about the propriety of watered stock might disappear if all stock in an enterprise should be issued in the form of profit-sharing certificates instead of having a nominal par value. Thus in an undertaking requiring a cash investment of $1,000,000, against which in the past $1,000,000 in 6 per cent bonds and $1,000,000 in stock might have been issued, Mr. Crosby said that the bonds might be issued for the cash required and that each stock certificate would represent simply the right to participate in the profits after the interest was paid on the bonds. If the State should decide that these profits should be limited this could be done in any way which might seem desirable after the stock had received a return equal, say, to that paid on the bonds. Unless all new enterprises are to be abandoned some arrangement should be made for the reward of that much blackguarded individual the promoter, who assumes so many financial perils in launching his undertaking. Mr. Crosby defined an old enterprise as one which could raise money at, say, 5 per cent for any extension desired. With such companies also some arrangement should be made to permit them a minimum dividend plus a share of any net earnings which exceeded the figure so fixed.

In returning to the subject of watered stock, Mr. Crosby said that there should be no concealment as to its functions. It should be issued under a kind of pure food act which would attest the make-up and purpose of the article offered for sale. In conclusion, the speaker said that the railways should never enter into any arrangement which would not allow them to pay the good wages essential to hire and keep good men for their service.

The banquet was concluded with a witty speech by Walter B. Reed, secretary Schenectady Chamber of Commerce.

In connection with the building of a new central railway station at Copenhagen, Denmark, a line is to be constructed to connect it with the old Oesterbro station. It is proposed that this shall be operated electrically and a commission has been appointed to study the project. It is proposed to include other suburban lines in the scheme, and the single-phase system is advocated. In the provinces also electrification is under consideration, and steps in this direction are being taken. Thus in Jutland the new line from Aarhuus to Randers is to be electrically operated.

ANNUAL MEETING OF THE AMERICAN INSTITUTE OF ELECTRICIAL ENGINEERS.

The twenty-eighth annual convention of the American Institute of Electrical Engineers was held in Chicago, Ill., June 26-30. The headquarters were at the Hotel Sherman and all of the meetings were held there. On Tuesday evening papers were read by Henry Floy on "Depreciation as Related to Electrical Properties" and by H. M. Byllesby on "The Responsibilities of Electrical Engineers in Making Appraisals." Abstracts of these two papers are printed elsewhere in this issue.

DISCUSSIONS OF PAPERS OF MESSRS. FLOY AND BYLLESBY

Bion J. Arnold agreed with the authors that engineers could perform no higher service than to assist in making clear in the minds of the public just what were fair, equitable decisions in controversies between public service corporations and the public. The strained relations of the past had been due to oversight of the duties of corporations with respect to the public, which had brought about a general feeling of distrust. When the public, through city councils and National and State legislatures, found itself in a position to exact unjust demands, it in turn overstepped the bounds. The public was now treating the corporations more fairly because the American people fundamentally are inclined toward right and justice and because good work had been done by engineers in showing the true value of public utility properties and the true cost of rendering the service.

Referring to franchise values Mr. Arnold said that in the early days some companies held franchises that were very valuable, and they asked the public to pay rates that would produce earnings on these franchises which had been capitalized as well as on capital representing obsolete plant and equipment which had been replaced. He felt that public service corporations were justly entitled to more than a limited return on capital honestly invested in the early hazardous times. The fundamental principle of rate regulation was that the public should pay rates such as would pay for the service given plus the interest on the capital necessary to carry on the operations of the companies. If the early losses had been great the company should be allowed to recoup the actual money put into the property in the beginning and the cost of obsolete plant since replaced. This assumed that the company from now on was to have rate regulation. Conversely those properties which made large earnings in the early days were not entitled to retain in their capitalization the value of such losses as might have been sustained in the beginning but which should have been made up out of earnings when the increase in earnings justified such action. One Chicago property had paid dividends of 30 per cent at one time, so that now it suffered no hardship in having to accept rates which allowed a fair return on the present value only. The pioneer days had gone by and investment values were now fairly stable, so that those who had made large profits in the past should now be satisfied with an ordinary rate of return on their investment.

In the matter of valuations Mr. Arnold thought the proper method was first to determine the cost of reproduction new and then make additional allowances for development expenses, which might be from 20 to 25 per cent.

HEAVY ELECTRIC TRACTION

At the railway session on Wednesday morning three papers were presented in abstract. These were: "Analysis of Electrification," by W. S. Murray, New York, New Haven & Hartford Railroad; "Electrical Operation of the West Jersey & Seashore Railroad," by B. F. Wood, and "Induction Machines for Heavy Single-Phase Motors," by E. F. W. Alexanderson. Mr. Murray's paper was the same as he presented at the Toronto meeting of the Institute in April, 1911, and was abstracted in the ELECTRIC RAILWAY

Journal of April 15, page 667. Mr. Wood's paper is printed in abstract on another page in this issue.

Mr. Murray said that the object of his paper was to represent fairly the present status of the single-phase system of trunk-line operation after an experience of five years. He was convinced that the single-phase system was the best to use for heavy electric traction. Engineers should begin to get together on questions of standardization of principles for trunk-line installations. No road was a true trunk line unless it had important terminals, from which it followed that it should give suburban passenger service in and out of those terminals. Handling freight was a most important consideration. The railroads on the Atlantic Coast had a ratio of yard track mileage to main track mileage of nearly 50 per cent, hence it was necessary to consider yard electrification as well as main-line operation. The Harlem River yards of the New York, New Haven & Hartford Railroad, with 100 miles of track and in some places fifty-three tracks wide, were being equipped for operation with the single-phase system at a cost of one-third that of any other system. The cost and weight of single-phase locomotives and multiple-unit motor cars were being reduced steadily. The latest single-phase locomotives weighed only 116 tons and were doing the same work as was performed by earlier locomotives weighing 150 tons. The designers had made the weight more nearly in correct proportion to the power and a reduction in cost per horsepower necessarily followed.

Frank Sprague quoted from his presidential address to the Institute in 1892, in which he forecast electric operation of railroads. He now understood that improved designs of split-phase transformers were making possible the use of polyphase induction motors on single-phase roads. He regretted that the railroads feared to give out the actual results of electric operation and complimented Mr. Woods on the data relating to the West Jersey & Seashore Railroad which he had made public. The time had not yet come, in his opinion, when engineers could agree that any one system of electric traction was the best for all roads and all conditions. Mr. Sprague next referred to the load factor of power stations for railway work and said that the time would come when very large central stations at favorable locations would supply power not only for railways but for lighting and commercial purposes throughout wide areas. Such stations could furnish power cheaply on account of the diversified load which they would carry. Finally he gave as his opinion that the battle should be between the steam and electrical engineers as to whether electrification was advisable rather than between electrical engineers as to what system should be used.

E. B. Katte, chief engineer of electric traction, New York Central & Hudson River Railroad, said that he regretted that Mr. Wood had omitted all comparisons of steam and electric operation. The New York Central figures were not now available because steam and electric operations were still mixed. He did not think that any one system of electric traction had yet been developed which would meet all conditions in a satisfactory manner. The speaker then presented comparative figures of current consumption in watt-hours per ton mile for typical runs of New York Central direct-current trains and New Haven alternating-current trains, which in all cases, he said, showed less energy required for the direct-current system. The New York Central recently operated 212,000 train miles in two months without a single detention due to failure of any part of the electric equipment. The cost of electric locomotive inspection and maintenance during the past three years had been about 3¼ cents per locomotive mile.

L. C. Fritch, chief engineer Chicago Great Western Railway, spoke from the standpoint of the steam railroad engineer. Steam locomotives had their limitations, but electric locomotives could perform any and all services more efficiently. He thought the railroads were making a mistake in delaying electrification. The Mallet compound steam locomotive was the dying gasp in the effort to retain steam power. In his opinion, the steam railroads had spent millions of dollars in terminal and grade improvements that would have brought better results if the money had been spent for electrification. A number of the roads entering Chicago could electrify certain parts of their lines profitably, but before electrification was begun the general scheme of the Chicago terminals should be entirely changed. He thought Mr. Murray's investigation of the cost of switching service was of great value and he believed that yard tracks could be equipped with overhead wires at a cost of less than $2,000 per mile.

N. W. Storer, Westinghouse Electric & Manufacturing Company, called attention to the advantage of increasing the coasting of electric trains and thus reducing the speed before applying the brakes so as to reduce the power demand. He referred to the apparently high cost of trolley wire maintenance on the West Jersey & Seashore as compared with third-rail maintenance. The trolley wire maintenance was high because of the use of small trolley wheels on heavy trains. It could be reduced by using the roller type trolley such as is used on the Southern Pacific and Key Route cars. Mr. Storer advocated a standard system of electrification. If a third-rail system was used on cross-country roads a high voltage would be needed and the hazard would be increased. He then described the latest type of New Haven locomotive weighing 116 tons complete with heating boiler and direct-current control apparatus. The tractive effort was nearly 40,000 lb. and the guaranteed speed was 50 m.p.h. It had four pairs of driving wheels, each driving axle being geared to two motors. Paradoxical as it might seen, it had been found that the locomotive could be made lighter by driving each axle with two small motors instead of one large one. The pairs of motors were permanently connected in series, thus giving the advantage of high voltage. The two motors were connected to a single gear on the axle while a large motor required two gears on each axle. The number of moving parts, such as commutator segments, brushes, etc., was practically the same and the small motors with their control apparatus were much easier to handle and maintain.

J. W. Lieb, New York Edison Company, urged standardization on one kind of transmission current interchangeable with that of the lighting and power companies because of the great economy of a diversified load. He said that storage batteries were indispensable for continuity of the Edison service, but the method of using them recently had been changed. Instead of discharging them every week, it was now found satisfactory to utilize them only as a reserve. He praised the Commonwealth Edison Company for taking the lead and showing that central stations could profitably assume railway loads.

Charles F. Scott, Westinghouse Electric & Manufacturing Company, pointed out that manufacturers had spent vast sums to demonstrate that both alternating-current and direct-current systems would fulfil railroad requirements. Now the final decision rested with the operating officials of the steam roads. He made a plea for standardization along lines that would permit future developments, such as the possible use of mercury arc rectifiers and induction motors on single-phase locomotives.

B. F. Wood said that undoubtedly the West Jersey & Seashore Railroad would have purchased its power if it could have obtained the low rates given in Chicago. The power plant, which cost $750,000, had a load factor of only 16 per cent, while the Commonwealth Edison Company had a factor of 45 per cent.

Mr. Murray, in closing, said that the experience of the New Haven road showed that the economy of electric operation would cover the interest on the investment in electrical equipment.

Annual Meeting of New York State Association

A Report of the Discussions on the Committee Reports and Papers Which Were Presented and Are Printed in Abstract Elsewhere in This Issue.

With a well-diversified program of papers on important business subjects, a successful banquet and other entertainments the members of the Street Railway Association of the State of New York held their twenty-ninth annual convention at the Hotel O-te-sa-ga, Cooperstown, N. Y., on June 27 and 28.

FIRST BUSINESS SESSION

President John H. Pardee called the first business session to order at 10:30 a. m. on Tuesday, June 27. The opening session was attended by about eighty members.

The association was welcomed to Cooperstown by Judge Nathaniel P. Willis.

Mr. Pardee then spoke of the recent death of Capt. J. W. Hinkley and said that he had appointed a committee to take appropriate action. The committee was composed of J. K. Choate, Otsego & Herkimer Railroad; E. S. Fassett, United Traction Company of Albany, and W. H. Collins, Fonda, Johnstown & Gloversville Railroad. Its report, presented by Mr. Choate, and unanimously adopted, recommended that the following tribute be placed upon the minutes:

"The members of the Street Railway Association of the State of New York desire to place on record some expression of their sense of loss in the recent death of Capt. James W. Hinkley, second vice-president of the association and president of the Poughkeepsie City & Wappinger's Falls Electric Railway. Although preceded by a long illness, the death of such a man as Captain Hinkley, in the prime of life, with the promise of many years of usefulness, finds his friends quite unprepared to realize that his earthly career is ended. A valuable factor in the life of his own community, he was also highly esteemed throughout the State by members of this association. His judgment was of so sound a quality that whatever he had to say always commanded interest and attention. While his service to this association was of a most effective character, it is nevertheless chiefly in a personal sense that his death is felt by its members. He possessed in a rare degree the gift of friendship. He enjoyed among us a popularity which belonged not merely to personal charm, but to personal integrity and sterling worth. The association extends its condolences to Captain Hinkley's bereaved family with the assurance that the memory of one who set so high a standard in its membership will ever be held in deep regard."

Secretary C. Gordon Reel then read letters of regret from invited guests who were unable to attend the convention.

President Pardee read the annual address of the president, which is published elsewhere in this issue.

H. M. Beardsley, the treasurer, was detained in Elmira and in his absence his annual report was read by Secretary Reel.

The report of Secretary Reel showed an increase of members over the preceding year.

President Pardee called attention to the fact that the association was fortunate in having present railway officials of other states, as well as representatives of the Public Service Commission and others interested in railway affairs. He extended a very cordial invitation to all to participate in the discussion on the important subjects before the association.

REPORT OF COMMITTEE ON INTERURBAN RULES

Mr. Choate then presented the report of the committee on interurban rules, which consisted of resolutions based upon the report which the committee on interurban rules of the American Electric Railway Transportation & Traffic Association has prepared for submission at the convention to be held in Atlantic City in October. The report of this committee was distributed in pamphlet form to the members present. The resolutions offered by Mr. Choate provided for the approval and adoption by the association of the code recommended by the American Association committee.

In asking the adoption of the resolutions Mr. Choate said that the committee considered that the report represented the combined best ideas of the operating officials of high-speed interurban lines in all sections of the country. The committee believed that the revised American code constituted the best report that it could make. All the credit for the rules was due to the committee of the American Association, headed by J. W. Brown, Public Service Railway of Newark. The committee felt that its real success would lie in the adoption by the association of a code that had the general approval of experienced operating officials. It was not the purpose of the committee to prevent discussion on the rules, which were prepared in the most thorough manner, but it believed that the code should be adopted without delay, with the proviso, of course, that amendments might be made from time to time.

Mr. Choate suggested that Mr. Brown, chairman of the American Association committee, be asked to comment on the code.

Mr. Brown stated that any action taken by the New York Association would be either a very great help or a very great drawback to the American Association committee in its plan to secure the adoption of the code by the national association in October. The committee represented widely separated sections of the country, and after the completion of its work had the satisfaction of knowing that some of those who did not favor the code adopted at Denver in 1909 had already expressed approval of the present revision. If the New York Association would place itself on record as approving the revised code it would do a great deal toward the accomplishment of a national success. The approval of the New York committee was greatly appreciated by the American Association committee.

J. N. Shannahan, Washington, Baltimore & Annapolis Electric Railroad, said he thought he had never seen a committee report as full and as nearly perfect as that of the American committee. The form of compilation of the report made it very easy to analyze and discuss the points of change. He believed in the elimination of all rules that it was possible to do without and of all unnecessary signals, but thought that it was unadvisable to eliminate Section k of Rule 99 in the old code, which read as follows: "Answer to signal of train displaying signals for a following section." The committee in its revision eliminated this section as superfluous. This signal appeared to be a very simple safeguard, and it should not be neglected. Mr. Shannahan was prepared to adopt the code, but would continue the use of this signal.

Reference was then made by Mr. Shannahan to the last paragraph of old Rule 203 and to old Rule 203a, which were eliminated by the committee as opposed to good practice. These related to the operation of trains protected by flag. They were adopted because of a partial tie-up of one system as the result of damage to telephone wires by a sleet storm. If the same conditions should develop again the complete abandonment of service could not be enforced if the tracks were safe for operation. Mr. Shannahan had grave doubts as to the inclusion of this rule at the time of adoption of the Denver code, and still had grave doubts regarding it,

but some rule should be outlined as a guidance to trainmen under such circumstances. He was prepared to vote for the change, but thought that some instructions should be placed on record to show the men the course which they should follow.

In regard to old Rule 211, which was revised, and 212, which was eliminated, Mr. Shannahan said that probably they should be withdrawn, but it was necessary to make some provision so that the line car could pass over the road when telephone wires were out of service for any cause.

Mr. Choate, in referring to a conference which the committee had with F. W. Stevens, chairman of the New York Public Service Commission, Second District, said that Mr. Stevens had asked for copies of the code in order that it might be inspected by representatives of the commission who are familiar with train operation.

Mr. Brown, in speaking of the suggestions of Mr. Shannahan, said that Section k of old Rule 99 was eliminated because it was thought that it caused a complexity of signals. In old Rule 203 and 203a the committee thought that the fundamental principle involved was that of safety and that any rule which allowed a train to proceed protected by flag should not be retained. Old Rule 212 provided that all extra trains lost their rights when the telephone became defective. It was not thought wise to allow this rule to remain because trainmen on extra trains would not always know when the telephone became defective.

Mr. Shannahan said that the code provided for two whistles as the answer to the signal of a train displaying signals for a following section and this might be confused with the answer to the bell-cord signal. If this created a dangerous condition it should be eliminated. He recognized the risk of having trains proceed protected by flag, but said that some way must be provided for getting trains over the road.

Mr. Pardee asked W. H. Collins to take the chair. Mr. Pardee then stated that it appeared to him that the code was more satisfactory than any that had been adopted heretofore. It was shorter and some rules that were undoubtedly essential and were always adapted to varying conditions on the roads had been eliminated. It would be a mistake to try to obtain in one code a preventive for every condition or possible happening on all roads. Many of these matters could be adjusted by the individual roads.

J. P. Maloney, superintendent Albany & Southern Railroad, believed that under Rule 231, as it now reads, the road might be tied up.

On motion of E. S. Fassett the vote on Mr. Choate's resolution approving the rules was postponed until the afternoon to allow the members more time to consider the subject.

Report of Committee on Amendment of Section 192 of the Railroad Law

W. H. Collins, general manager Fonda, Johnstown & Gloversville Railroad, presented the report of this committee, as follows:

"Your committee appointed at the annual meeting of the association held at Cooperstown on June 27 and 28, 1910, for the purpose of conferring with the Public Service Commission as to the proper interpretation of Section 192, formerly Section 109, of the Railroad Law of this State, relating to the use of center-bearing rails, submitted a report at the quarterly meeting held in Syracuse on Dec. 6, 1910.

"The report was accepted and the committee continued with instructions to confer further with the Public Service Commission and draft a bill to be presented to the Legislature. A bill was drafted and submitted to the members of the Public Service Commission, but they declined to approve it, Chairman Stevens stating that he did not think it would be wise for the commission either to approve or to disapprove same at that time. He said, however, that, if the bill should be introduced into the Legislature and the committee having the bill in charge should ask the opinion of the commission regarding its merits, of course such opinion would be freely given. He further stated that if the commission had any objection to the bill it would state it to the committee at that time.

"The position taken by the commission in this matter we understood to amount practically to an approval of the bill as drafted, and it was, therefore, presented to the Legislature, being introduced into the Assembly by Mr. Myers as Assembly Bill No. 1770, and into the Senate by Senator White as Senate Bill No. 1083. Neither of these bills has thus far been reported by the committees, and they have, therefore, received no progress this year."

Upon motion the report was accepted and the committee was continued.

Report of Committee on Joint Use of Poles

W. J, Harvie, chief engineer Utica & Mohawk Valley Railroad, read the report of the committee. It is published elsewhere in this issue. Commenting on the report, Mr. Harvie said that it was made up of two parts. The first part contained the standard agreement, which was of interest to all companies. A blank Appendix "A" was added in which local conditions might be enumerated. A blank Appendix "B" was left to give a schedule of the ownership of the poles and of the rentals. Appendix "C" was the specifications. In Appendix "C" there were references to twelve plates. Of these ten corresponded with the standard of the National Electric Light Association, but the committee recommended changes in two plates, namely, plates 6 and 9.

The secretary then read a communication from R. M. Ferris, chief engineer New York Telephone Company, commenting on the report. Mr. Ferris stated that he realized that the committee had done a great deal of work on the report, but that it really represented the position of only one party among those interested. He believed, however, that there would be comparatively little difficulty in harmonizing the recommendations in this code, and in that of the National Electric Light Association, and in that desired by the writer's company, and in conclusion he suggested further conferences between representatives of the three interests concerned.

Charles R. Barnes, electric railroad inspector, Public Service Commission, upon being called upon, said that he had been present at two meetings of the committee and, as he realized the amount of work that had been done on the report, hesitated about making any suggestions, but mentioned a few slight changes that he thought might be incorporated. In Art. 3, Par. 1, he thought a reference might be made to the classes of attachments mentioned in Appendix "C," part 2. Art. 6, Par. 3, could be expanded by the addition of the words "all legally authorized persons." Again, as the joint occupancy of poles was of interest to the Public Service Commission, it would be advisable to provide under Art. 8, Par. 5, that the commission be notified of any changes made under that paragraph. He also suggested the addition of the word "solely" after the words "shall be" and before the word "responsible" in Art. 10, Par. 1.

E. F. Peck, general manager Schenectady Railway, referred to the importance of the subject treated by the committee and the desirability of a joint use of poles by the several corporations interested, and said that he believed it was very necessary for the interests to get together on this subject.

C. Loomis Allen, general manager Syracuse Rapid Transit Railway, asked if the committee had any recommendations to make as to the disposition of its report. As Mr. Harvie said that he would like some action on it, Mr. Allen moved that the agreement be adopted as the standard of the association and be referred back to the committee for such further amendments as it might wish to make, and that the committee should make another report at the next quarterly meeting.

REPORT ON FRANCHISES

C. Loomis Allen, of Syracuse, stated on behalf of the commitee on standard franchises that the committee had taken up the subject with Commissioner Carlisle, who subsequently had retired from the Public Service Commission. He asked that the committee on this subject be continued. This was done.

STORAGE BATTERY CARS

The next order of business was the presentation of a paper entitled "The Edison-Beach Storage Battery Car," by Ralph H. Beach, president Federal Storage Battery Car Company, New York. An abstract of Mr. Beach's paper will be found elsewhere in this issue.

R. A. Dyer, Jr., assistant general manager Auburn & Syracuse Electric Railroad, asked what the efficiency of the battery was. Mr. Beach replied that the efficiency varied greatly according to conditions. At the normal rates of charging and discharging it was 61.2 per cent. In practical daily operation, however, 85 per cent efficiency in watt-hour output can be secured when the battery is discharged to only three-fifths of its total capacity. The battery is much more efficient in the earlier part of its discharge than in the latter part. Three-fifths of the discharging capacity should not be exceeded when the highest efficiency is desired. Continuing, in reply to James P. Barnes, electrical engineer Syracuse Rapid Transit Railway, Mr. Beach said that the initial difference of potential was 1.5 volts per cell. This would soon drop to 1.2 volts, but it would fall only very slowly thereafter until the battery was discharged to about 0.8 of its rated capacity. In conclusion, Mr. Beach said that numerous experiments in the Edison laboratory appeared to show that no further chemical improvement was possible in the battery, such as the oxidation feature. Nevertheless, an important electrical improvement had been effected by reducing from ¼ in. to ⅛ in. the diameter of the tubes of the positive plate. This change has greatly reduced the internal resistance of the battery so that the voltage drop on grades is much lower.

After a vote of thanks had been tendered Mr. Beach for his paper the meeting adjourned for luncheon.

TUESDAY AFTERNOON SESSION

The first order of business was the continuation of the discussion on interurban rules. C. Loomis Allen, vice-president and general manager Utica & Mohawk Valley Railway, submitted the following resolution:

"WHEREAS, This association did, at the 1910 meeting at Cooperstown, adopt a standard code of rules for interurban operation; and,

"WHEREAS, The association through the standing committee of rules has reported certain amendments and changes at this meeting, which by proper resolution have been approved by this association, now, therefore, be it

"Resolved, That these rules as amended be adopted and ratified by this association and that the committee be continued, to report at the next meeting of the association such proposed changes or amendments as may be wise or necessary."

Mr. Choate then withdrew his resolution and seconded that of Mr. Allen, which was unanimously adopted.

W. B. Potter, chief engineer railway and traction department General Electric Company, then presented a paper entitled "The Gas-Electric Car." An abstract of this paper is published elsewhere in this issue.

Mr. Allen asked Mr. Potter about maintenance costs. The latter replied that in one series of tests a car had run 35,000 miles for an apparatus maintenance cost of 2 cents per car mile. This charge covered the same items which in his paper were estimated at 3 cents per car mile.

Robert M. Colt, general passenger agent Fonda, Johnstown & Gloversville Railroad, then read his paper on "Tariffs," which is abstracted elsewhere in this issue.

W. V. Turner, chief engineer Westinghouse Air Brake Company, then presented a paper entitled "Steps in the Solution of the Problem of Adequately Controlling Electricaly Propelled Vehicles." An abstract of Mr. Turner's paper, on which there was no discussion, appears elsewhere in this issue.

The meeting was then adjourned after the appointment of a nominating committee consisting of Past-presidents Peck, Shannahan, Fassett and Allen.

WEDNESDAY MORNING SESSION

In opening the Wednesday morning session President Pardee announced that, owing to a delay in printing, the report of the committee on tariffs would have to be mailed to the members after the meeting.

The first paper of the session was "Reduction of Car Failures," by J. P. Barnes, electrical engineer Syracuse Rapid Transit Company. An abstract of Mr. Barnes' paper is presented elsewhere in this issue. In concluding his paper, Mr. Barnes added that his car-failure forecast for June showed an improvement of 12 per cent over May.

W. H. Collins, general manager Fonda, Johnstown & Gloversville Railroad, asked whether the 3000-mile lubrication standard applied to all cars. Mr. Barnes replied that it applied only to the Westinghouse No. 101 and the General Electric No. 216 equipments, which have oil wells and waste feed. A 300-mile lubrication period was used for the other equipments, which employed grease originally, but which were now oiled by means of felt and waste. In reply to a question by E. F. Peck, general manager Schenectady Railway, Mr. Barnes said he could not give the exact number of pull-ins, but he thought that the daily average of failures was about 8 per cent.

The next paper was on "Single-End versus Double-End Cars," by Herman Hicks, supervisor of schedules New York State Railways. An abstract of Mr. Hicks' paper appears elsewhere in this issue.

R. A. Dyer, Jr., assistant general manager Auburn & Syracuse Electric Railroad, asked for the difference in the maintenance cost of single-end and double-end cars. Mr. Hicks said that the difference was $79.70 per car in favor of the single-end car.

Mr. Peck asked if the cost of loops and special work was not a deterrent to changing over from single-end to double-end cars, especially in view of later extensions. Mr. Hicks admitted that there were heavy change-over costs, but he believed that they were justified because of the economies of single-end operation.

In support of Mr. Hicks, E. J. Cook, general manager New York State Railways, said that the single-end line had proved so successful after one year's service that another line would be equipped with single-end cars on July 1. It will be operated with fifteen entirely new cars and twelve converted cars, making a total installation of fifty-two single-end cars in Rochester. He expected that the company would continue this course. Referring to Mr. Peck's inquiry, he said that he had had considerable trouble sometimes in getting the necessary terminals for loops. Under certain conditions it might not be possible to get proper accommodations. However, he did not figure the purchase of real estate as a charge against the change because the land could be sold at a profit whenever the extension of the line required the abandonment of the loop.

In reply to Mr. Barnes, Mr. Hicks admitted that the difference in favor of single-end car maintenance costs might be due in part to the newness of the single-end equipments.

The last paper was "Maintenance of Way Matters," by C. A. Alderman, chief engineer Buffalo & Lake Erie Traction Company. An abstract of this paper appears elsewhere in this issue.

In reply to Mr. Barnes, Mr. Alderman said that owing to difficulties in high-speed operation on their three-point catenary suspension line, where 150-ft. spans are used, all future work would be of standard span or bracket construction.

Mr. Dyer expressed his astonishment at this change and said that the 300-ft. spans with five points of suspension were giving excellent service on the Syracuse, Lake Shore & Northern and the Rochester, Syracuse & Eastern Railways, where cars were operated up to 60 m.p.h. He had gradually lengthened his suspension points to 60 ft. Lesser distances than that had proved troublesome. Mr. Peck also expressed satisfaction with the behavior of catenary construction on the Ballston Spa high-speed line of his company.

M. J. French, engineer maintenance of way Utica & Mohawk Valley Railway, said he was glad to see that 100-lb. T-rail was giving such good service in paved streets, thus justifying the assertions of the association in favor of the T-rail.

In reply to a query by Mr. French, Mr. Alderman said that wooden ties had been used in preference to steel ties because the conditions of frequent car service favored that construction which would cause the least delay to car operation.

Mr. French asked if anyone had experienced trouble with slag ballast. Some kinds of slag generated a weak sulphuric acid which was injurious to the ties. He had had trouble of this kind on a small section of slag-ballasted track in Utica. Mr. Alderman said he had used a finely granulated slag ballast in open track for the past three years without injurious results.

Upon motion of W. H. Collins, a resolution of thanks was tendered to the entertainment committee, to Mr. Choate and to the management of the O-te-sa-ga Hotel.

The final business was the election of officers, which resulted as follows: President, Joseph K. Choate, Cooperstown; first vice-president, W. H. Collins, Gloversville; second vice-president, E. J. Cook, Rochester; secretary, J. C. Collins, Rochester; treasurer, H. M. Beardsley, Elmira; executive committee, J. C. Calisch, John E. Duffy, J. Stanley Moore and Charles H. Smith. After President-elect Choate had expressed his thanks for the honor of election, the convention was adjourned.

PROMOTING COMMUTATION TRAFFIC ON THE ALBANY SOUTHERN RAILROAD

The traffic department of the Albany Southern Railroad during the past two years has paid special attention to the development of commutation traffic. It has solicited information regarding property for sale or rent, summer hotels, camps and boarding houses along its line, and has



Portable Houses at Kinderhook Lake

furnished this information to anyone interested in country life. A list of the most desirable of these places has been published in the summer timetable pamphlet to attract, if possible, some of the many visitors to Electric Park, which is 18 miles south of Albany, N. Y., and is owned and operated by the railroad company. This year the railroad has purchased and erected at Electric Park, on the shore of Kinderhook Lake, a number of portable houses of different sizes which it has rented for the summer or sold with a ground lease. One of the accompanying illustrations shows a row of three of these houses of large and small size.

Another method of attracting residents to the towns reached by the Albany Southern has been tried this year for the first time. Large signboards have been erected



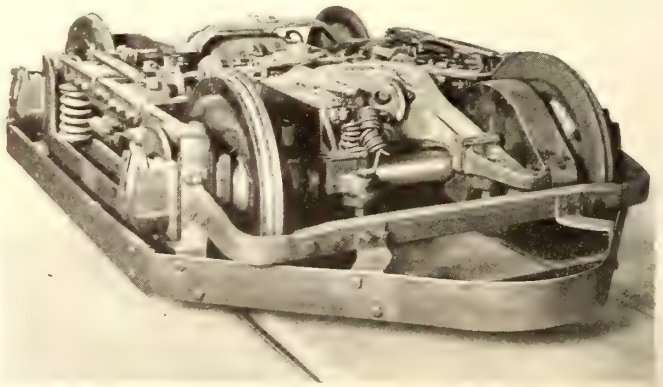
Sign at Station Stop

near the stations in each town, where they can be read by passengers sitting in the cars stopped at the stations. These signs give the name of the town, the running time and the round-trip commutation fare to Albany. One of the signs at Nassau is reproduced.

ELECTRICAL EQUIPMENT OF BOSTON PAY-WITHIN CARS

The Boston Elevated Railway is just putting into service fifty semi-convertible pay-within cars for surface operation. The new cars were made by the Laconia Car Company and embody several notable improvements, including an all-steel underframe, steel bulkheads, steel roof trusses and manually operated folding steps and doors, as described in the Electric Railway Journal for April 1, 1911.

The motor and control equipments were supplied by the Westinghouse Electric & Manufacturing Company.

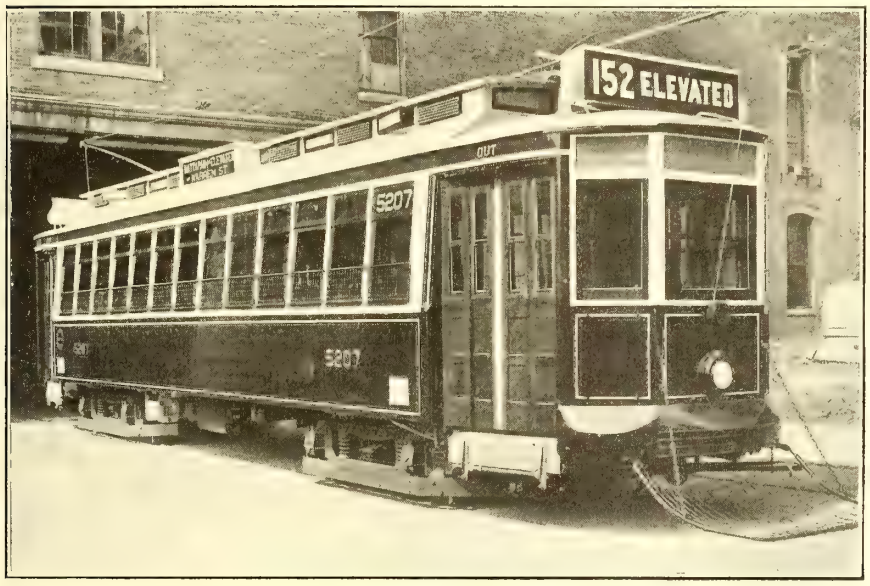


Equipped Motor Truck for Boston Pay-Within Car

Each car will have a quadruple equipment of No. 306 motors, particularly adapted for high-speed schedules. The No. 306 motor has a nominal one-hour rating of 50-hp at 500 volts and 60-hp at 600 volts. Lugs are provided on the corners of the upper half of the cast-steel motor frame for bolting the motor to the suspension crossbar. The axle caps are bolted to brackets extending from this upper frame. The suspension is designed so that, with the motor

in place, removal of the retaining bolts allows the lower half-frame to swing downward. The bearing housings are so fitted that the lower half of the frame may be dropped free of the armature and bearings, or the armature and bearings dropped with the lower frame for inspection of the upper field.

The main poles are four in number, and are centered



Boston Pay-Within Car

at 45 degrees from the horizontal plane through the axis of the motor. The main pole pieces are built up of soft steel punchings. The interpole coils are wound with copper strap and insulated, constructed and finished in substantially the same manner as the field coils. Each is supported and protected against injury by a bronze casting pressed into a groove around the tip of the interpole, and the coils are held firmly in position to prevent vibration.

The accompanying illustration, made from a photograph taken in the railway company's shop, Boston, shows one of the trucks equipped with the No. 306 motors. The trucks for the new cars were supplied half by the Standard Motor Truck Company and half by The J. G. Brill Company.

The motors are to be controlled by the Westinghouse unit switch control system, type HL, with no jumper provision for train operation. In type HL control the various main circuit connections between trolley, starting resistors and motors are made by pneumatically operated switches assembled in a common frame or switch group underneath the car. The reversing connections ordinarily made by the reverse drum of the plaform controller are made by a reverse drum similar to that of the controller, but of more substantial construction, pneumatically operated and mounted in a separate case underneath the car. The admission or release of compressed air to the pistons for operation of the switches and reverser is regulated by means of electrically operated magnet valves, one of which is attached to each piston cylinder. The switch group and reversers are hung from 2½-in. x 2½-in. angle irons by means of insulated bolts. The control resistors and fuse box are hung by means of wooden hangers, and the junction box by means of sharp iron hangers.

The circuits from the various magnet valves are controlled by a master controller on either car platform through a control train line which extends the entire length of the car and terminates at each end in a twelve-conductor train line receptacle. When the motorman's platform is in use as a rear end the doors are folded against the dash, thus making available the entire platform for loading or discharging passengers.

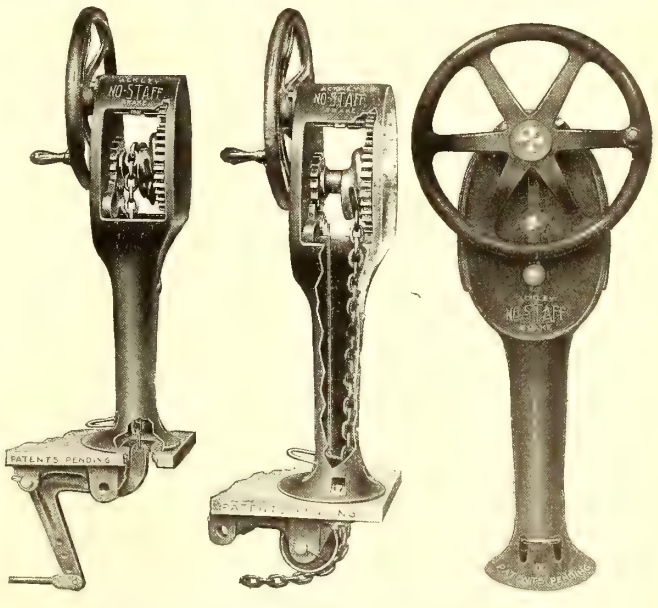
A STAFFLESS HAND BRAKE

To reduce the space occupied on the platform by the controlling devices a new hand brake has been designed by G. S. Ackley, the inventor of the Ackley adjustable brake. This brake combines the space-saving features of the vertical wheel with the advantages of the spur-geared eccentric winding drum. It has been named the Ackley No-Staff Brake because the customary brake staff is omitted.

The first engraving shows a full front view of the new brake. The pedestal and gear housing is a one-piece casting with doors on both sides for assembly and inspection purposes. In the second view these doors are shown removed and the pedestal broken open, disclosing the interior mechanism.

As will be seen, the brake chain is attached to the eccentric or cam of the drum, and by means of a spur gear cast to this drum and the pinion actuated by the hand wheel, is wound along the smooth spiral course to the drum's smallest diameter. This drum revolves on a roller bearing, and with its axis in a horizontal position there is no difficulty in the release, as the tension and weight of the unwound portion of the chain serve toward this purpose. In the center illustration the chain is shown as fully unwound.

A new arrangement is used in holding the brakes when applied. A pawl ratchet is mounted on the end of the drum and a pawl or dog mounted on the housing by a stud bolt directly under. The pawl is weighted on the spur end so that it is kept normally free of the ratchet. A vertical rod connects the pawl with the foot lever, the exposed part of which is normally raised. When the brakes are set and the motorman desires to hold the car he locks the



Side and Front Views of Staffless Brake

gears by pressing upon the foot lever, which throws the pawl into engagement with the ratchet. A slight turn of the hand wheel in the winding direction allows the weighted spur end of the pawl to drop free of the ratchet, permitting the brake to release but only when the motorman is prepared for it and has hold of the hand wheel. This feature eliminates the dangers of the old staff floor ratchet pawl and, with which, if the pawl was inadvertently kicked loose, the brake handle would revolve with great rapidity.

The third cut shows the chain wound in, the ratchet pawl which holds the brake from releasing and the goose-neck lever connection between the brake chain and the brake levers. This goose-neck connection provides for variable leverages by a series of holes so that the draw rod may be attached at different distances from the fulcrum. Different combinations of gear ratios are provided for, but those of 14:34 and 12:36 (the gears are four pitch) have been found to give the most satisfactory results; these combinations are interchangeable in the same housing. The Ackley no-staff brake will be handled for export by the Ackley Brake Company, New York City, and its many agents abroad.

COMBINATION BAGGAGE AND REFRIGERATOR CAR

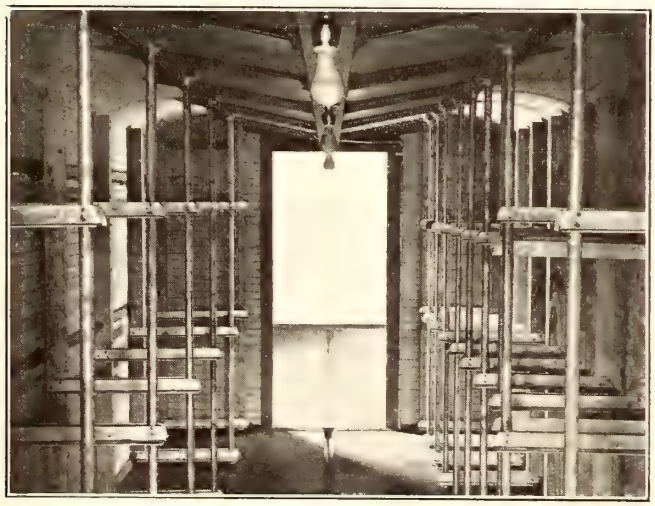
J. B. Haggin, one of the wealthy owners of farms in the Bluegrass section of Kentucky, has very largely given up the breeding of thoroughbred race horses since the decadence of racing. At Elmendorf, his beautiful property near Lexington, dairy cattle have succeeded the horse as



Baggage and Refrigerator Car Used on the Lexington & Interurban Railway

the chief interest of the owner, and he has become so interested in the possibilities of dairy products that he has purchased a combination baggage and refrigerator car in which to handle the products of his farm over the Lexington & Interurban Railway.

The car was built by the American Car Company, St. Louis, Mo. The body is made up principally of wood and the underframe of semi-steel construction. The trucks are Brill No. 27 M.C.B.-2. The principal dimensions are as follows: Length of the body, 50 ft.; length over the vesti-

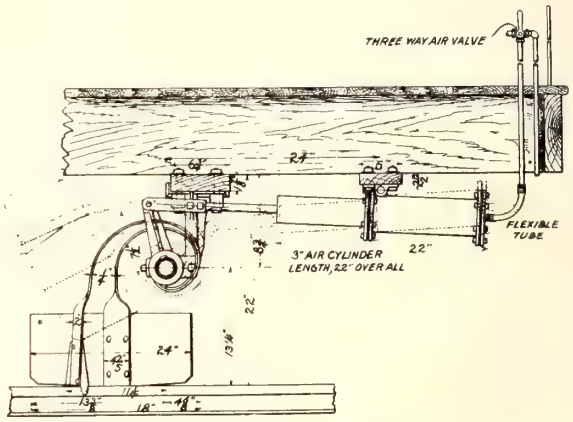


Interior of Refrigerator Car Used on the Lexington & Interurban Railway

bules, 48 ft.; width over the sills and over the posts at the belt, 8 ft. 6 in.; height from the sill to the trolley base, 9 ft. 6 11/16 in.; height from the top of the rail to the sills, 42½ in.; length of bolster centers, 32 ft. 6 in. The two trucks carry four Westinghouse No. 112 motors. Among the specialties on this car are the following: Ohio Brass couplers and sanders, National Brake Company's hand brakes, General Electric Company's headlights and Electric Service Supplies Company's gongs. The wheels, axles, bolsters, brake shoes and journal boxes were furnished by the J. G. Brill Company, and the body bolsters, bumpers and ventilators by the American Car Company.

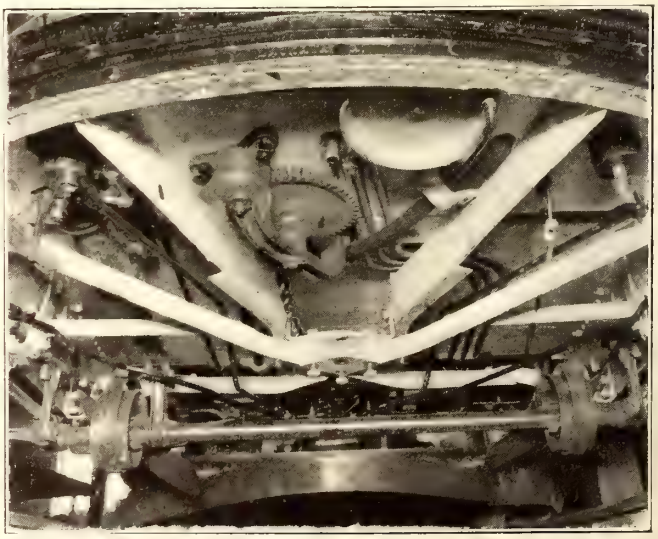
PNEUMATIC TRACK SCRAPERS IN BOSTON

The Boston Elevated Railway has recently applied to 100 cars the Root pneumatic track scraper shown in the accompanying halftone and drawing. The two most important features of this air-operated scraper are that it eliminates an extra wheel and staff from the platform and that it cannot fall at either end of the car when it is



Side Elevation of Pneumatic Track Scraper for Boston Pay-Within Cars

not in service. The scraper can be adjusted for any desirable pressure. It operates instantly when the motorman turns on the three-way air valve which is located on the platform. When the air is released, the spring inside the air cylinder pulls the scraper out of the way. This type of scraper was especially designed for the new Boston cars in order to avoid the use of windlass rods. With the exception of the pipe from the air cylinder to the three-



Pneumatic Scraper Applied to the Pay-Within Cars of the Boston Elevated Railway

way valve, the complete scraper equipment was furnished by the Root Spring Scraper Company, Kalamazoo, Mich. These pneumatic scrapers are furnished in several styles for application to either the car body or the truck, as conditions require.

LONDON LETTER

(*From Our Regular Correspondent.*)

As a result of the decision of the Prussian State Railways to electrify at least two of their lines as an experiment, questions on the electrification of railways in Great Britain have been asked the president of the Board of Trade recently in the House of Commons. The German Minister for Railways declared recently that electrification was an experiment at present on account of the military problems involved, which dominate all other matters in Germany. On this account, the substitution of electricity for steam as motive power must necessarily proceed slowly in Germany as the military authorities have to settle the question of danger to the whole railway system of the country in time of war. Mr. Buxton, the president of the Board of Trade, replied to the question in the House of Commons by saying that he was aware of the experiment being made by the Prussian State Railways, but that he did not think there was any reason to be disappointed with the progress of electric traction in England. The Railways Act of 1903 provided ample facilities for the introduction of electricity on railways when desired. Mr. Buxton also stated that he would apply for a copy of the report on the electrification of railways made to the Prussian Diet by the State Railway Administration.

In 1910 the British Electric Traction Company carried 324,750,000 passengers against 302,750,000 in 1909. The receipts were £1,690,327 in 1910 against £1,561,657 in 1909. The net profit for 1910 was £139,512 as compared with £130,564 in 1909. This, however, is not sufficient to pay dividends on all the various classes of stock. The dividend on the preferred shares has been paid to September, 1908, but no dividend has been paid on the ordinary shares since 1906. The report states that the board is evolving a plan to readjust the capital. The dividends which have accumulated on the preferred shares amount to £242,000.

The report of the Glasgow Corporation tramways for the year ended May 31, 1911, and the official list of statistics show traffic receipts, £946,021, an increase of £52,430 over last year's returns. There was an increase of 15,236,736 in the number of passengers carried, the total being 237,967,307, against 222,730,571. There was a decrease of 2,409,941 in the total of penny fares, but this is attributed to a large extent to the fact that for the four months ended May 31 two-stage fares were in operation in Glasgow. Since the beginning of the year on June 1, 1910, 6 route miles of extensions were opened for traffic. The average single-track mileage open during the year was 194¼ miles; the car mileage was 21,704,237 miles, an increase of 730,237 miles; the traffic receipts per car mile, 10.416d., an increase of 0.236d.; the traffic receipts per passenger, 0.954d., a decrease of 0.009d.

Sheriff Gardner Millar has delivered judgment in an appeal brought at the instance of the Glasgow Corporation Tramways committee against the city assessors to secure a reduction of assessments which are payable by the tramways. His Lordship has decided that the tramways committee is not entitled to have the undertaking assessed as a railway and has dismissed the appeal. His Lordship stated that there was no doubt that the appellants' undertaking, so far as it consisted of the lines upon the street, fell under the description of "lands or heritages," but the question was whether it was a railway within the meaning of the statute, so that its yearly rent or value should be deemed to be one-fourth of the amount entered upon the valuation roll of the city. So far as the physical appearance was concerned, the appellants' counsel maintained that the essential features of the two systems were identical. Like a railway the tramway ran upon a rail fixed to ties in the ground. Counsel for the respondents admitted there was no feature in the one system which would differentiate it from the other, but the tranmways were constructed and managed under different statutes from those which apply to a railway. A tramway as a rule consisted of lines in the public streets, whereas a railway was usually constructed on land acquired by its promoters. A railroad was not intended to be traversed by ordinary traffic.

The third reading of the bill to empower the City of London to build a new bridge across the Thames near St. Paul's Churchyard resulted in a vigorous debate in the House of Commons, and the bill has been referred back to the committee. No one doubts that a new bridge is necessary, but there is difference of opinion as to how the bridge should be constructed. As it was intended that the bridge should carry tramways it was expected that a scheme would be evolved by which the tramways would be brought across the river and continue in a subway underneath Cheapside, joining the northern system in Aldersgate. After the City of London had consented to the construction of the bridge an effort was made to change the site of the structure so as to open up a vista of St. Paul's Cathedral. The original idea was to bring the approach of the bridge to the end of the Cathedral, which would have carried traffic in a straight line from the bridge past the east end of St. Paul's to Aldersgate. Many influential people and architects, however, thought that it would be inadvisable to spend such a large sum of money on a bridge in the vicinity of St. Paul's without endeavoring to open up a vista of the Cathedral from the bridge approaches and they therefore desired to direct the bridge toward the center of the Cathedral. The police claim that the proposed change would quadruple the difficulty of handling the traffic at that point.

The tramway estimates of the London County Council for the current financial year show that the total expenditure on capital account up to March 31, 1911, amounted to £11,060,000, and that a further sum of £2,400,000 would be required to complete the work of electrification and the construction of authorized lines. This total of £14,000,000, however, does not include the cost of tramways for which powers are now being sought in Parliament. Reporting on the estimates, both the finance committee and the highway committee draw attention to the motor omnibus companies, which it is claimed occupy an exceptionally favorable position owing to the fact that they are liable, as is the Council, for rates for occupying the roads over which its omnibuses run. In addition, these companies are not required to contribute to the upkeep of the roads. The electric railways are placed at a great disadvantage by having to contribute towards the upkeep of the road. It is estimated that this relief for the local authorities amounts to £118,000 a year, exclusive of the cost of street cleaning. This amount is likely to increase in the future. The operation of all-night and workmen's cars were also criticised as they involve a loss to the Council estimated at £70,000 a year. The omnibus companies, on the contrary, do not give special workmen's fares, nor do they run their vehicles all night. The estimated surplus for the coming year is more than £900,000, but after the charges have been deducted the net surplus will be about £187,844, of which it is proposed to apply £138,270 to renewals fund, worked out on the agreed basis of ¾d. per car mile, and £49,574 to the general reserve fund. In 1905 the number of persons killed per 1000 licensed vehicles was 12 by motor 'buses and 12 by municipal tramcars; in 1906 it was 32 by motor 'buses and 9 by tramcars; in 1907, 29 by motor 'buses and 12 by tramcars; in 1908, 55 by motor 'buses and 13 by tramcars, and in 1909, 44 by motor 'buses and 12 by tramcars. The highways committee reports that the scheme for a tramway from Marble Arch to Cricklewood was withdrawn in committee, and that there is no doubt as to the value this line would be to the public. It has therefore decided to submit at an early date a recommendation to the Council with a view to the reintroduction into Parliament in the session of 1912 of a scheme for constructing tramways along this route.

The tramways committee of the Birmingham City Council has obtained permission to borrow £99,806 for rolling stock and to reconstruct the tramways. Sixty new cars are to be purchased, and top covers are to be added to 130 others which are at present uncovered. The cost of the new cars and covers will be £61,379. About £31,928 will be spent on the reconstruction of the track between Colmore Row and Hockley Brook, £2,714 is required for the overhead equipment of the tramways in place of the present cable system, £2,585 for cables and switch pillars for the Hockley route, and £1,200 for additional machinery and plant. During the year just ended more car miles were run than in the previous year. The equipment of the cars with meters has enabled the company to reduce the consumption of current.

A. C. S.

News of Electric Railways

Right to Compel Electrification at Chicago

In response to the request of the local transportation committee of the Common Council of Chicago, Corporation Counsel Sexton, of Chicago, on June 19, 1911, rendered an opinion to the effect that the city of Chicago through its police power is vested with authority to compel the electrification of the steam railroads which operate into the city. An opinion in regard to this matter was sought on account of the ordinance presented to the Council by Alderman Britten, which, if passed, would compel the railroads which operate into the city to adopt some power other than steam and to install the new power so as not to emit smoke. In his opinion Mr. Sexton said:

"Any ordinance should, of course, provide that the time within which the railroads should comply with the duties imposed upon them should be commensurate with the magnitude of the task which the ordinance requires them to perform. The contention will no doubt be made that the railroads have certain rights under their respective charters, whether special or granted under the general law providing for the incorporation of railroads, which are protected by the constitution.

"This argument will probably be advanced upon the theory that the railroads have built their lines over certain rights of way before certain numerous streets were opened up across such rights of way, and upon the further theory that at the time most of their charters were granted steam was the only adequate motive power then adaptable, and that on account of the imperfect development of smoke consumers in locomotives at that time the Legislature contemplated that it was necessary in the operation of locomotives to emit dense clouds of smoke and other noxious gases, and that their right so to operate locomotives is, therefore, protected by their charters.

"This position is not tenable. All corporations must accept their charters subject to the police powers of the State. Any ordinance passed should direct what should be done or omitted and should leave the railroads free to adopt their own methods to accomplish the desired result."

Replies of Companies Filed in New York Rapid Transit Negotiations

On June 27, 1911, the Interborough Rapid Transit Company rejected the terms fixed by the Board of Estimate of New York for the construction, equipment and operation of rapid transit lines in New York in accordance with the recommendations of the special committee of the Board of Estimate and the Public Service Commission which proposed a division of territory between the Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company. The Brooklyn Rapid Transit Company, however, on the same day expressed a desire to accept the terms of the city, but in its reply cited certain modifications which it declared were conditions precedent to its acceptance. In its letter the Interborough Rapid Transit Company said substantially:

"We regret for the reasons set forth in the accompanying memorandum that we are unable to accept the terms proposed, or, under the new conditions that have arisen, to continue in force our subway offer of Dec. 5, 1910, and May 9, 1911.

"We regret that we are forced to take a position which, together with the declared policy of the city authorities, necessarily leaves the city divided into two rapid transit districts, requiring a double fare to travel from one to the other; renders impossible of fulfilment the wise policy of the old Rapid Transit Commission, repeatedly declared, of developing the present subway lines so as to afford at the least possible cost through trunk lines upon the east and west sides of Manhattan, with normal feeders to the outlying boroughs; deprives the greater city as a whole of the benefit of a unified rapid transit system with a single 5-cent fare; substitutes for a 5-cent access to Coney Island from all parts of the city a plan under which the greater portion of the citizens can reach the seaside only upon the payment of a double fare, and in many cases a triple fare; cuts out the heart of the business center of Manhattan, separates it from its own residential districts, attaches it as a terminal to the Brooklyn system alone, and necessarily unsettles and perhaps revolutionizes real estate values throughout the boroughs of Manhattan and the Bronx; applies the credit released through the successful operation of the present subway system on the island of Manhattan and a great portion of the additional credit hereafter available to the development of the rapid transit system of one borough; entails upon the city, under the guarantee provision to the Brooklyn Rapid Transit Company above referred to, a large continuing deficit, of which Manhattan and the Bronx will bear the larger proportion; gives absolutely no rapid transit relief to the great residential district of the upper west side of New York; furnishes no transit facilities to the public using the new Pennsylvania station or to the lower west side; leaves congestion upon the east side for many years substantially where it stands to-day; only in the distant future, if the triborough route should be built, promises to extend a limited service to the Bronx, and postpones such relief as it does propose to confer upon a limited section of New York through a period of many years.

"In justice, however, to the holders of our stock and of our bonds, no other course is open to the company than to decline. If the city desires the co-operation of the Interborough Company, and through it the co-operation of private capital, in the execution of its general rapid transit plans, it will be necessary for the city to propose terms which will justify this company, with respect to both its old and new investment, in embarking in the project.

"We are likewise compelled to decline the terms tendered for third-tracking the elevated lines. We nevertheless stand prepared, within the reasonable limits of our resources, to relieve at an early date the unfortunate condition of travel congestion in this city. Our offer of June 10, 1910, with respect to elevated improvements and the operation of the Belmont tunnel, connecting Queens with Manhattan, upon which an agreement had been almost reached with the Public Service Commission, we still leave open for your further consideration."

The memorandum which accompanied the letter begins with a review of the subway negotiations and then discusses the company's fears concerning the losses likely to be experienced in the first five years of operating the extended system, assuming the terms as set forth in its offer amended down to May 9, and the traffic growth as estimated in the report of the special committee of the Board of Estimate and the Public Service Commission. The memorandum then remarks that if the actual rate of travel increase on the elevated and subway lines in the past year were used as determining the growth of the first ten years of operation the net result might be disastrous. In the memorandum the company declares:

"The margin of safety in our offer of May 9 was so narrow that the introduction of the Broadway competitive route reducing our estimated revenues by not less than $5,000,000 a year would have made it impossible for us to carry the offer into effect. If, therefore, our own offer went to the limits of conservatism it must be manifest how utterly impossible it is for us to accept the city's present offer, which makes certain a severe competition and imposes many additional hardships on the company."

The reply of the Brooklyn Rapid Transit Company points out in detail the modification of the terms which the company desires. That part of the reply, however, in which the company signifies its general willingness to accept follows:

"We beg to say that generally we are prepared to accept the recommendations of said report as applicable to the proposals made by this company and, upon the terms therein laid down, to pledge the entering into contracts for the carrying out of such recommendations, through the

instrumentality of a new company to be organized for that purpose and of the existing railroad companies the operation of whose lines is to be merged with that of new rapid transit lines.

"In making this response, however, we ask, as a condition of our acceptance, that certain matters not explicitly or fully covered in the report be made clear according to our understanding of the intentions of the conferees, and that certain modifications of the proposed operating terms be made in the light of a better appreciation of their effect or a fuller understanding of the facts upon which they were based. While there are several features of the report as applicable to us which we regard as unnecessarily severe and one in particular which we believe to be unwise from the point of view of the city, nevertheless our disposition has been from the beginning, and is now, to co-operate with the city to the extent of our ability for the solution of the transit problem. So much does our plan offer in the way of transit relief and for the best development of New York that it would, in our judgment, be a public calamity if by insistence upon terms which are unreasonable either as against the city or as against the company, the negotiations which have progressed during three months should now fail of accomplishment.

"The modifications which we have requested merely offer some protection against possible loss and assist in our financing of this great project. We do not ask that the city, because adopting the absolutely uneconomic proposition of a 5-cent fare to Coney Island, should bear the burden of such a policy. We do not even ask that this unreasonable condition should be eliminated from the proposed terms, but we do suggest that the city, even more than the company, has a vital interest in this matter and that before enforcing such a rate of fare for purely pleasure traffic it should await for a reasonable period the result of operation under the present rate of fare."

Initiative Measures in Portland, Ore.

At the recent election in Portland, Ore., several initiative measures were voted upon which affect the Portland Railway, Light & Power Company. The three measures of greatest moment to the company were the bill to create a local public service commission, a no-seat-no-ride ordinance and a proposal to place a license tax of 3 per cent on the gross earnings of the electric companies in Portland. The measure to create a public service commission and the no-seat-no-ride ordinance were defeated, but the tax measure was passed.

The Portland Railway, Light & Power Company conducted a campaign of publicity which lasted two weeks to meet the issues which were raised by the proposed measures. During the first week the campaign was entirely educational, being designed to bring the public to realize the immense amount of work done by the company in Portland and the significance of this work in respect to the prosperity of the city and the comfort of its inhabitants. Practically every organization in the city condemned the no-seat-no-ride ordinance, many of them condemned the tax measure, and the principal newspapers and a large number of prominent individuals condemned all three. The first week of the campaign of the company paved the way for arguments and the second week of the campaign, which was the week preceding the election, was given over to discussions of the questions and principles involved in the measures which were to come before the voters.

The Portland Ad Club was one of the prominent organizations of the city which opposed the no-seat-no-ride ordinance and the tax measure. F. W. Hild, general manager of the Portland Railway, Light & Power Company, addressed this club. He said that the company paid out last year in various forms of taxation about $658,000, or approximately 12¼ per cent of its gross earnings. This was made up as follows: $318,000 in direct taxes, $30,000 in bridge rentals and $300,000 in paving assessments, which are a survival from the horse-car days. In the five years which end this year, Mr. Hild said, the gross earnings of the company will approximate $24,900,000, while during the same period expenditures for all purposes will amount to about $44,000,000, the difference representing the amount expended for extensions and general improvements.

Arbitrator Selected in Toledo

The City Council of Toledo, Ohio, and Mayor Whitlock have decided to accept the proposal of the Toledo Railways & Light Company to select an arbitrator to decide differences between the two expert appraisers of the property. Mayor Whitlock has asked the company to name its appraiser so that the work may proceed.

In a letter to Mayor Whitlock, Albion E. Lang, president of the Toledo Railways & Light Company, stated that the question of an arbitrator to settle the differences between the experts chosen to fix a valuation on the railway property for franchise purposes would be decided at the regular meeting of the board of directors on June 29, 1911. The letter was written by Mr. Lang while he was in New York consulting with the bondholders of the company.

Attorney W. W. Miller, of Hornblower, Miller & Potter, is quoted as follows in regard to the affairs of the company:

"The committee representing the bondh lders is satisfied with the negotiations now being carried on for an adjustment of the franchise question with the city of Toledo, and confidently expects that the matter will be adjusted within a comparatively short time. An attempt to throw the company into the hands of a receiver at this time would be unwise.

"A meeting of the bondholders and creditors was held in Toledo recently to arrange to pay off the semi-annual interest on the company's bonds due July 1, 1911, and discuss the question of improvements to the property for the coming six months.

"Since the creditors and bondholders' protective committee was organized more than two years ago it has expended more than $1,000,000 for improvements and has arranged to expend still further sums in raising the standard of efficiency of the property to meet the requirements of the traveling public.

"No steps will be taken toward reorganizing the property until the franchise question has been settled. As soon as that matter is out of the way a plan will be presented, and it is expected that little trouble will be experienced in putting it through to the satisfaction of all parties concerned without throwing the company into the hands of a receiver, which would be expensive."

A petition signed by 200 members of the Toilers' League was presented to the City Council recently asking that the company be required to operate at a rate of eight tickets for 25 cents and that a charge of $500 a day be made for the use of streets upon which the franchises are said to have expired.

New Haven Protests Against Compulsory Electrification at Boston

The New York, New Haven & Hartford Railroad has sent to every member of the Legislature of Massachusetts a circular protesting against compulsory electrification of its lines out of Boston, in which it says in part:

"Except where use of tunnels is rendered less dangerous by use of electricity there has been no compulsory electrification of railroads. All the New York, New Haven & Hartford Railroad's electrification has been without compulsory legislation. The company has repeatedly stated its desire and willingness to electrify. This year it proposes to electrify from Readville, on the Boston & Providence Railroad, to Beverly, on the Boston & Maine Railroad.

"Electrification of short distances, say 10 miles, has never been found at all economical, and compulsory electrification within a 10-mile limit will be unusually uneconomical. Money required for electrification must be raised by the issue of new securities, and, unless the money for electrification is wisely and economically expended, there will be placed upon railroad transportation a very serious charge which can only be met by increased passenger and freight rates. The best business interests of New England require these rates to be kept as low as possible consistent with safety.

"It is proposed to discriminate against every other city and town in Massachusetts in favor of the district within 10 miles of Boston. Estimated cost of electrification of this district will amount to approximately $40,000,000. If the railroads are called upon to make this expenditure in the

city of Boston and vicinity, if the proceeds of the securities which the railroad corporations can find the public willing to purchase must be expended in this electrification, then other railroad improvements must necessarily wait. Electrification in other parts of Massachusetts must wait because there is a limit to the amount of money which the public will invest in railroad securities."

New Detroit Municipal Ownership Amendment

Corporation Counsel Hally, of Detroit, Mich., has prepared a new draft of a municipal ownership charter amendment which he believes corrects the legal defects of the former amendment. Mr. Hally said that Council cannot take action on the amendment until Aug. 1, 1911, as the law under which it is drawn does not take effect until that time. Two elections will then be required, one to ascertain whether the people favor municipal ownership and the other to authorize bonds to purchase the street railway property.

Alderman Thomas Glinnan, of Detroit, Mich., has introduced in the Council of Detroit a resolution to submit the question of the city taking over the Detroit United Railway to the voters of Detroit at an election to be held some time after Aug. 1, 1911. The resolution directs the committee of the Council on charter and city legislation and Corporation Counsel Hally to prepare the bill for submission to the voters, and requests the committee on charter and city legislation to select a day for a special election to be held as soon as possible after Aug. 1, 1911, to determine the question. Mr. Glinnan's bill, which provides for an amendment to the charter so as to permit the city to own and operate the street railway system, was referred to the committee on charter and city legislation.

Amendments to Cleveland Grant

At a meeting of the committee of the whole of the City Council of Cleveland on June 20, 1911, the Kramer amendments to the Tayler franchise were approved and they will come before Council at the next regular meeting. On June 19 and 20 G. M. Dahl, street railway commissioner, and Mr. Baker, the city solicitor, expressed their views openly, and Mr. Baker finally refused to vote upon the amendments. At the previous meetings Mr. Baker supported the amendment to require the property to be maintained at 100 per cent of its renewal value, but at the meeting on June 20 he said that he thought this was impractical. Mr. Dahl also objected to the amendment. He contended that under it the people would be taxed unnecessarily to protect capital.

On the question of extending the low fare to the suburbs as they are annexed Mr. Baker argued that each car rider should pay approximately what it cost to carry him. Mr. Dahl said that each rider should pay a flat fare and Mr. Baker finally agreed that this was the correct system. The Hanratty amendment to provide for the extension of low fare to all annexed territory after Dec. 18, 1909, failed, but the Kramer amendment, which gives Council the right to extend the fare to any suburb, was adopted.

Mr. Baker asked whether the company would have the right to raise the fare to the suburbs during the last fifteen years of the life of the ordinance. Councilman Morgan and others pointed out that ordinances extending the fare would be subject to a referendum vote. Mr. Baker opposed the amendment to give the city power to dictate extensions and betterments up to the last five years of the life of the franchise, subject to arbitration on the propriety of making such betterments and the company's ability to finance them. He asserted that the acts of Council should not be subject to arbitration as to their propriety, but should be absolute. Mr. Dahl stated that it might not be possible for the company to comply with arbitrary demands of the Council and thought that some means should be provided to meet such a crisis. The amendment was approved in its original form. The Burke amendment to permit conductors and motormen to ride free when not in uniform by exhibiting their badges was approved.

The City Council did not act upon the proposed amendments to the Tayler franchise at its regular meeting on the evening of June 26, 1911.

National Civic Federation Conference on Uniform Public Utility Legislation

The national committee on the regulation of railroads and public utilities, which was appointed some time ago by President Seth Low of the National Civic Federation, New York, held its first meeting in New York on June 23, 1911, to consider the question of drafting a bill for a model law for the regulation of railroads and other public utilities. Mr. Low, who presided, was authorized by the committee to appoint a sub-committee of seven to make an investigation and report on a plan for the proposed bill, and he named the following sub-committee before the meeting adjourned: Emerson McMillin, American Light & Traction Company, chairman; Franklin K. Lane of the Interstate Commerce Commission, Martin S. Decker of the Public Service Commission of the Second District of New York, Milo R. Maltbie of the Public Service Commission of the First District of New York, Prof. John H. Gray of the University of Minnesota, P. H. Morrissey, former grand chief of the Brotherhood of Railroad Trainmen, and Franklin Q. Brown.

During the meeting President Low called attention to the fact that the Civic Federation a few years ago sent a commission abroad to investigate the status of public and private ownership and operation of public utilities in England as compared with similar enterprises in the United States. He said that the report of that committee was probably the best compendium of facts on the subject yet produced. Lack of uniformity in State legislation on the subject was liable to injure railroads and other corporations. The sub-committee expects to meet soon.

Among the speakers at the meeting on June 23, 1910, were: Prof. John H. Gray of the University of Minnesota, who was a member of the federation commission which went abroad to study government and private operation of public utilities; Blewitt Lee, general solicitor of the Illinois Central Railroad; P. H. Morrissey, former grand chief of the Brotherhood of Railroad Trainmen, and Emerson McMillin, president of the American Light & Traction Company. Some others in attendance, or invited to be present at the meeting, were: Arthur W. Brady, president American Electric Railway Association; James Campbell, president North American Company; Theodore N. Vail, president American Telephone & Telegraph Company; George W. Perkins, railway director and banker; Samuel Insull, president Commonwealth Electric Company; Robert Winsor, banker and director in public utilities companies; August Belmont, chairman board of directors Interborough Railroad Company; Timothy S. Williams, president Brooklyn Rapid Transit Company; Robert Mather, president Westinghouse Electric & Manufacturing Company; W. W. Freeman, president National Electric Light Association; Charles L. Edgar, chairman committee on public policy National Electric Light Association; George F. Swain, professor political economy Harvard University; W. J. Clark, General Electric Company, and James H. McGraw, president McGraw Publishing Company.

Extension of Time for Terminal Improvement in New York.—The New York Central & Hudson River Railroad has been granted an extension of time until Dec. 31, 1912, by the city authorities of New York in which to complete the improvements to the Grand Central station.

Mono-Rail Line Ordered to Be Removed.—The Board of Estimate of New York has decided that the Pelham Park & City Island Railroad, New York, N. Y., must remove its mono-rail line from Pelham Bay Park and has refused to grant the company an extension of time in which to build the line through City Island.

Suit Proposed to Compel Returns in Regard to Bond Sales.—The Public Service Commission of the Second District of New York has issued an order to require the Rockland Railroad to show cause before it on July 10, 1911, at Albany, why an action should not be commenced to recover penalties for the failure of the company to file reports covering the issuance of bonds previously authorized by the commission. On Jan. 26, 1910, the commission authorized the company to execute a mortgage for $3,000,000 and issue thereunder a

like amount of fifty-year gold bonds. The company, which proposes to build an electric railway in Rockland County, has failed to file reports covering the sale of these bonds in the form required by the commission.

Suburban Municipal Line at Toronto Desires Entrance Over City Lines.—Corporation Counsel Drayton, of Toronto, Ont., has asked the Ontario Railway & Municipal Board for an order to require the Toronto Railway to approve of the city's plans for the proposed municipal street car lines in the remote sections of the city. H. S. Osler objected that the application for running rights over the company's lines was premature because the city had not built any lines. Mr. Drayton replied that without an understanding beforehand the city might be put to unnecessary expense for carhouses, etc., if the Toronto Railway should object to the equipment as unsuitable after the city had built the proposed lines. The board reserved judgment.

Physical Value of Seattle, Renton & Southern Railway Fixed.—R. H. Thompson, city engineer of Seattle, Wash., has completed the work of valuing the physical property of the Seattle, Renton & Southern Railway. The appraisal was made in accordance with a resolution to authorize the city to issue $800,000 of bonds to take over the property, the purchase of which was approved by the voters of Seattle some time ago. Mr. Thompson has fixed the value of the property at upward of $500,000, and his report to the Board of Public Works has been referred to a committee composed of Mr. Thompson, A. L. Valentine, superintendent of public utilities, and J. D. Ross, superintendent of lights.

Arguments Concluded in Milwaukee Fare Case.—The arguments before the Railroad Commission of Wisconsin in connection with the petition of the city of Milwaukee for a 3-cent fare on the lines of the Milwaukee Electric Railway & Light Company were concluded at Milwaukee on June 16, 1911. At the concluding hearings Lester C. Manson, former assistant city attorney, appeared for the city and E. S. Mack, George P. Miller and W. J. Curtis appeared for the company. A summary of the contentions in the brief of the company, which bears the names of Miller, Mack & Fairchild, attorneys, and Sullivan & Cromwell, counsel for the company, was published in the ELECTRIC RAILWAY JOURNAL of June 10, 1911, page 1025.

Columbus Dynamiting Cases.—The indictment against David A. Davis on the charge of aiding and abetting in the dynamiting of cars during the strike of the employees of the Columbus Railway & Light Company, Columbus, Ohio, a year ago, has been nolled, as sufficient evidence for conviction could not be secured by the prosecuting attorney. Davis claimed that union street car men gave him money to be handed to Alfred N. Strader, now serving a fifteen-year term in the penitentiary on the charge of dynamiting cars. He asserted that he did not know that Strader was charged with dynamiting cars when he gave him the money and helped him to escape. Morris V. Cranmer, financial secretary of the local organization of street railway men at Columbus, is yet to be tried on the charge of aiding and abetting in the dynamiting.

Boston & Eastern Railroad Granted Certificate of Necessity.—Governor Foss of Massachusetts has signed the bill granting to the Boston & Eastern Railroad a certificate of exigency for the right to build a high-speed interurban electric railway over a private right-of-way from Boston to Danvers and certain intermediate points. The original application for a certificate of necessity was made on Aug. 23, 1906. On Sept. 18, 1907, the Railroad Commission declared the route faulty and suggested an independent entrance to Boston. On Nov. 17, 1908, the commission witheld the certificate of necessity for lack of authority to build the tunnel. An April 6, 1909, the Legislature instructed the railroad and transit commissioners to report jointly on the desirability of the tunnel. On June 15, 1910, the Governor signed the tunnel bill. Hearings were then ordered on question of exigency, and on Aug. 22, 1910, the commission deferred issuing a certificate until the Legislature had acted on other reports relating to metropolitan affairs at Boston. On Aug. 23, 1911, the company applied for a rehearing with the result that it has now obtained the necessary certificate.

Financial and Corporate

New York Stock and Money Markets

June 27, 1911.

Aside from activity on Saturday and Monday following the decision of the government case against the Harriman lines in favor of the railroads, business on the New York Stock Exchange has been quiet throughout the week and trading has been light with few price changes. Brooklyn Rapid Transit advanced 1⅛ points, the rise being attributed to developments in the subway question. Interest in the money market is increasing owing to financing of the Panama Canal bonds and the volume of July disbursements. Quotations to-day were: Call, 2¼@2½ per cent; ninety days, 2¾@3 per cent.

Other Markets

The Philadelphia market, while active, has not been greatly concerned with traction interests.

Elevated railway issues have been leaders in the Chicago market for the week, prices advancing on Saturday last, followed by slight declines in Monday's market.

Narrow trading and minor price changes form the record of the Boston Exchange, with American Telephone and the coppers constituting the only shares of interest in to-day's market.

United Railways issues were strong and active in Baltimore early last week and Augusta & Aiken Electric & Railway preferred gained a point last Monday.

Quotations of traction and manufacturing securities as compared with last week follow:

	June 20.	June 27.
American Light & Traction Company (common)	a295	a295
American Light & Traction Company (preferred)	a108	a108
American Railways Company	a44	a44
Aurora, Elgin & Chicago Railroad (common)	a43	40¾
Aurora, Elgin & Chicago Railroad (preferred)	a88	a85¾
Boston Elevated Railway	129½	a128½
Boston Suburban Electric Companies (common)	a16	a14½
Boston Suburban Electric Companies (preferred)	75	a75
Boston & Worcester Electric Companies (common)	10	a12
Boston & Worcester Electric Companies (preferred)	a51	a57
Brooklyn Rapid Transit Company	80¼	81⅝
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	85	86
Capital Traction Company, Washington	127¼	127⅜
Chicago City Railway	a195	a195
Chicago & Oak Park Elevated Railroad (common)	2	2
Chicago & Oak Park Elevated Railroad (preferred)	6	6
Chicago Railways, ptcptg., ctf. 1	a84	a85
Chicago Railways, ptcptg., ctf. 2	a22	a24
Chicago Railways, ptcptg., ctf. 3	a9½	a9½
Chicago Railways, ptcptg.	a5½	a5½
Cincinnati Street Railway	*133	130½
Cleveland Railway	a96	a96
Columbus Railway (common)	96	*96
Columbus Railway (preferred)	101	*101
Consolidated Traction of New Jersey	a76	a76
Consolidated Traction of N. J., 5 per cent bonds	a105½	a105½
Dayton Street Railway (common)	a30	a30
Dayton Street Railway (preferred)	a100	a100
Detroit United Railway	a74	a74
General Electric Company	163¼	162¼
Georgia Railway & Electric Company (common)	151	a155
Georgia Railway & Electric Company (preferred)	93	a93
Interborough Metropolitan Company (common)	18⅛	18
Interborough Metropolitan Company (preferred)	51⅜	50
Interborough Metropolitan Company (4½s)	77⅜	78½
Kansas City Railway & Light Company (common)	a19	a19
Kansas City Railway & Light Company (preferred)	a44	a44
Manhattan Railway	137⅛	a137½
Massachusetts Electric Companies (common)	a23	a22¾
Massachusetts Electric Companies (preferred)	a92¾	a91½
Metropolitan West Side, Chicago (common)	a26¼	a26
Metropolitan West Side, Chicago (preferred)	a72	a74¼
Metropolitan Street Railway, New York	15	15
Milwaukee Electric Railway & Light (preferred)	*110	110
North American Company	74½	74⅜
Northern Ohio Light & Traction Company	*48	48
Northwestern Elevated Railroad (common)	a27¾	a28½
Northwestern Elevated Railroad (preferred)	a67	a69
Philadelphia Company, Pittsburgh (common)	a56½	a56
Philadelphia Company, Pittsburgh (preferred)	a44½	a43⅞
Philadelphia Rapid Transit Company	19½	a19⅛
Philadelphia Traction Company	a87¼	a86½
Public Service Corporation, 5% col. notes (1913)	101	101
Public Service Corporation, ctfs.	a107	a107½
Seattle Electric Company (common)	a111	a112
Seattle Electric Company (preferred)	a103	a102½
South Side Elevated Railroad (Chicago)	77	a80
Third Avenue Railroad, New York	11	10½
Toledo Railways & Light Company	8	8
Twin City Rapid Transit, Minneapolis (common)	a108¼	a108½
Union Traction Company, Philadelphia	a49½	a49¼
United Rys. & Electric Company, Baltimore	18¾	a19½
United Rys. Inv. Co. (common)	37⅜	a39
United Rys. Inv. Co. (preferred)	68½	69⅞
Washington Ry. & Electric Company (common)	35⅛	a35⅜
Washington Ry. & Electric Company (preferred)	89¼	a90
West End Street Railway, Boston (common)	a90½	a90
West End Street Railway, Boston (preferred)	104	a103¼
Westinghouse Elec. & Mfg. Co.	76	75¾
Westinghouse Elec. & Mfg. Co. (1st pref.)	a118¼	a120

a Asked. *Last sale.

ANNUAL REPORT

London (Ont.) Street Railway

A comparative statement of operations for the last two years follows:

Year ended Dec. 31.	1909.	1910.
Earnings:		
Passengers	$238,267	$250,897
Miscellaneous	5,092	5,381
Gross earnings	$243,359	$256,278
Expenses:		
Maintenance—		
Way and structures	$21,736	$21,737
Equipment	24,743	25,102
Transportation:		
Power plant	27,796	31,610
Car service	67,866	73,851
General	27,689	29,891
Total operating expense	$169,830	$182,191
Net earnings	73,529	74,087
Deductions:		
Interest on bonds	$28,346	$28,750
Interest on overdraft	542	
Total deductions	$28,888	$28,750
Net income	$44,641	$45,337

Henry A. Everett, the president, says in part:

"The expenditure for track purposes continues to increase, owing to the general reconstruction necessary throughout the system.

"The rolling stock has been well maintained and is being constantly overhauled and repainted in order to keep it in first-class condition.

"We have considered several propositions submitted by the Hydro-Electric Commission, relative to Niagara power, which we find are not attractive in comparison with modern steam generation. However, there is still a possibility that some arrangement can yet be made to our mutual satisfaction.

"The wages of motormen and conductors were voluntarily increased on April 1, the new scale for regular men being 18 cents per hour for the first and second years, 19 cents per hour for the third year, and 20 cents per hour for the fourth year. Other wages have also been increased as conditions required.

"As we have had sufficient money for our requirements, your directors have not yet considered it necessary to dispose of the $25,000 bonds recently authorized.

"The gross earnings and surplus for the past year have shown a substantial increase, and we believe the coming year will be quite as satisfactory.

"Your directors are pleased to state that our relation with the public is very gratifying, and that no litigation of any kind appears against the company."

A statistical statement given in the report shows the following:

Year ended Dec. 31.	1909.	1910.
Expenses, per cent of earnings	69.8	71.0
Net income, per cent of capital	8.08	8.21
Passengers carried	6,673,709	6,930,602
Car earnings per revenue pass—cents	3.62	3.67
Transfers	1,015,164	1,063,531
Total passengers	7,688,873	7,994,133
Car earnings per passenger—cents	3.09	3.13
Car mileage	1,422,223	1,418,030
Gross earnings per car mile—cents	17.11	18.07
Operating expenses per car mile—cents	11.94	12.84
Net earnings per car mile—cents	5.17	5.23
Number of miles of track	33.25	33.25
Gross earnings per mile of track	$7,319	$7,707

Republic Railway & Light Company

A new corporation, which will probably be known as the Republic Railway & Light Company, is being formed with an authorized capital stock of $17,500,000, to take over the controlling interest in a number of companies operating electric light, power, gas, street railway and other public utilities. Among the companies on whose stock it is reported that options are being obtained are Mahoning & Shenango Railway & Light Company, Youngstown-Sharon Railway & Light Company, the Sharon & New Castle Railways Company, Pennsylvania & Mahoning Valley Railway Company, New Castle Traction Company, the New Castle Electric Company, the Lawrence Gas Company, the Mahoning Valley Railway, the Mahoning Valley South Eastern Railway Company, the New Castle & Lowell Railway, New Castle & Lowell Realty Company, Wheatland Street Railway, the Youngstown Park & Falls Street Railway, New Castle Electric Street Railway, the Trumbull Electric Railroad, the Mineral Ridge & Niles Traction Company, the Youngstown Consolidated Gas & Electric Company, the Merchants Light, Heat & Power Company, the Youngstown & Sharon Street Railway, the Shenango Valley Electric Light Company, Sharpsville Electric Light Company, Sharon Gas & Water Company, the Sharon & Wheatland Street Railway, the Shenango Valley Street Railway, the Valley Street Railway, Sharon & New Castle Street Railway, the Sharon & New Castle Railway.

It is stated that the directorate will include: Samuel McRoberts, vice-president National City Bank, New York; Myron T. Herrick, president Society for Savings, Cleveland; Anson W. Burchard, assistant to president General Electric Company; R. E. Reed, president American Gas & Electric Company; Henry H. Wehrhane, Hallgarten & Company, bankers, and executive committee American Gas & Electric Company; James Parmlee, president Cleveland Electric Illuminating Company; Ray Morris, White, Weld & Company, bankers; Harrison Williams, president Springfield Railway & Light Company; Thomas A. Reynolds, National City Bank; J. J. Bodell, of Bodell & Company, bankers, and director American Textile Company, and P. W. Herrick, a director of the Cleveland Electric Illuminating Company.

Of the total capital stock $10,000,000 will be 6 per cent cumulative preferred stock and $7,500,000 common stock. It is planned to issue $5,200,000 and $6,360,000 respectively.

Progress of New Orleans Railway & Light and American Cities Railway & Light Company Merger

A special meeting of the stockholders of the American Cities Railway & Light Company was called for June 28, 1911, at Jersey City, to act on the proposal of the directors to sell to the American Cities Company, recently incorporated in New Jersey, all the property and assets of the American Cities Railway & Light Company, together with approximately $1,500,000 cash, and to accept in payment therefor $10,000,000 face value of eight-year collateral trust bonds, $9,976,750 face value of the common stock and $6,476,750 of the preferred stock of the American Cities Company, which will have acquired more than 90 per cent of the capital stock of the New Orleans Railway & Light Company. The meeting was also to authorize the sale of all the American Cities Company stock for such sums as shall be sufficient to provide $1,500,000, to discharge all debts, to pay off the preferred stock at par and accrued dividend and to pay off the common stock at 75 and accrued dividend; and to consent to the firm of Isidore Newman & Son being interested in the purchase of any part of said stock and bonds.

J. K. Newman, president of the American Cities Railway & Light Company, issued a statement in which he said:

"The new holding company which is being organized to purchase the assets of the American Cities Railway & Light Company and the stocks of the New Orleans Railway & Light Company will be called the American Cities Company. The similarity of the name between this company and the American Cities Railway & Light Company does not mean there is any connection between the two companies, and they are separate and distinct.

"The notice for a special meeting of the stockholders of the American Cities Railway & Light Company refers to the payment for the assets of the American Cities Railway & Light Company in securities, but an immediate sale will be made of these securities, so that the stockholders of the American Cities Railway & Light Company will receive par and accrued dividend in cash for the preferred stock and 75 and accrued dividend at the rate of 5 per cent in cash for the common stock, and no proposition will be accepted by the American Cities Railway & Light Company which does not provide for such cash payment. In other words, payment is made in securities for a legal expediency and the securities are immediately sold for cash, thus providing cash for the stockholders of the American Cities Railway & Light Company.

"The meeting of the American Cities Railway & Light Company will be held on June 28, and if favorable action is then taken to sell its assets the payment in cash therefor will follow as soon as the necessary details for the transfer can be completed. This cash payment will probably be made about July 15."

Principal Stockholders of New Haven Railroad

The *Boston News Bureau* published recently a list of owners of 1000 shares or more of the New York, New Haven & Hartford Railroad, with the number of shares standing in their names as of April 1, 1911, and 1910. The list contained about 120 names, among which appeared the following holders:

April 1.	1911.	1910.
New England Navigation Company	156,303	172,946
Pennsylvania Railroad	37,400	34,900
Mutual Life Insurance Company	35,640	35,640
Adams Express Company	34,730	34,730
American Express Company	23,493	23,493
L. C. Ledyard, New York	20,542	20,542
New York Central Railroad	11,248	11,248
Charles Pratt & Co., New York	10,563	10,563
C. M. Pratt, New York	6,690	6,690
W. W. Astor, New York	5,051	5,051
J. J. Astor, New York	4,766	4,112
M. F. Plant, New York	4,208	4,000
Cheney Bros., South Manchester, Conn	3,191	2,091
C. S. Mellen	3,580	3,580
N. Thayer, trustee	3,135	2,496
Lee, Higginson & Company	2,706	2,931
Rhode Island Company	1,479	1,600

The statement says that as the New England Navigation Company is a subsidiary corporation, the amount of stock standing in its name is practically the same as if that amount of stock was in the treasury of the New York, New Haven & Hartford Railroad.

American Cities Railway & Light Company, New York, N. Y.—A semi-annual dividend of 2½ per cent has been declared on the $10,761,165 of common stock of the American Cities Railway & Light Company payable on July 1, 1911, to holders of record on June 17, 1911. This dividend compares with 2 per cent and ¼ of 1 per cent extra in January, 1911, 1¾ per cent in July and 1½ per cent in January, 1910, and 1 per cent in July, 1909. The regular quarterly dividend of 1½ per cent on the preferred stock was also declared, payable at the same time. The stockholders of the company have been notified of the proposed purchase by Bertron, Griscom & Jenks, New York, N. Y., of $10,000,000 of bonds of the new holding company, and the intention to make an advance offering of these bonds to the stockholders at 95 and accrued dividend, payment to be made at the office of Isidore Newman & Company after July 1, 1911.

Boone (Ia.) Electric Company.—John Reynolds, president of the Boone Electric Company, as trustee of the property of the company, is said to have arranged to transfer the property to Dows, Read & Smith, Cedar Rapids, Ia. An agreement entered into by Mr. Reynolds with Andrew Stevenson, J. H. McBride and others, in July, 1909, for the transfer of the property to them, was subsequently canceled.

Boston (Mass.) Elevated Railway.—In compliance with order of the House dated June 19, 1911, the Boston Elevated Railway has transmitted through the tax commissioner a list of stockholders who own or control more than 100 shares of the stock of the company. Included in this list are the following names: F. H. Prince & Company, 6,934; Hayden, Stone & Company, 4,807; Kidder, Peabody & Company, 4,090; J. J. Bright, Cambridge, 3,600; A. Ames, 960; W. E. Rice, 900; D. P. Kimball, trustee, 500; M. S. Ames, 500; J. S. Ames, 500; J. P. Morgan, 350; A. Thayer, trustee, 337; J. M. Prendergast, 300; W. A. Bancroft, 300.

Chicago (Ill.) City Railway.—The Chicago City Railway has announced that an agreement has been reached by which it will take over the property of the Chicago & Southern Traction Company in Chicago at a valuation to be fixed by Bion J. Arnold and George Weston, who on June 21, 1911, were appointed a valuation committee to evaluate that part of the Chicago & Southern Traction Company's property which lies within the city limits of Chicago.

Citizens' Railway Company, Waco, Tex.—H. S. Shear, Waco, who has exercised an option on the property of the Citizens' Railway Company, as noted in the ELECTRIC RAILWAY JOURNAL of June 17, 1911, page 1085, is connected with the Southern Traction Company, organized to build an electric railway between Dallas and Waco, through Waxahachie and Hillsboro, with a branch line to Corsicana. The option was secured by J. F. Strickland and associates; and on June 1, 1911, the Waco Gas Company, comprising the gas and electric light companies at Waco, and the Citizens' Railway Company passed under the management of the J. F. Strickland Company, which manages and operates the Texas Traction Company, Bonham Electric & Gas Company, Cleburne Electric & Gas Company, Dublin Electric & Gas Company, Hillsboro Electric & Gas Company, Sherman Electric & Gas Company and Waxahachie Electric & Gas Company. The interurban cars will operate over the Citizens' Railway into Waco terminals, but new tracks will be laid under the franchise of the Citizens' Railway into the heart of the city. The Waco Street Railway has been incorporated with a capital stock of $1,000,000 to succeed the Citizens' Railway Company.

Electric Properties Company, New York, N. Y.—The annual report of the Electric Properties Company for the year ended April 30, 1911, shows income through interest and dividends on securities owned, and interest on notes and accounts receivable, of $251,840. Expenses, including salaries, legal expenses, taxes, etc., amounted to $62,100, leaving a balance of $189,739, compared with $184,991 in the previous year. The profit and loss surplus for the year was $138,636. No dividends were paid.

Indianapolis & Louisville Traction Company, Louisville, Ky.—John E. Greely, Jeffersonville, Ind., has been appointed receiver of the Indianapolis & Louisville Traction Company by Federal Judge Anderson, at Indianapolis, on the application of the Colonial Trust Company, Philadelphia, Pa., which is said to represent holders of $750,000 of the first mortgage bonds of the company and $300,000 of the second mortgage bonds.

Interborough-Metropolitan Company, New York, N. Y.—August Belmont, Edward J. Berwind, Andrew Freedman, Theodore P. Shonts and Cornelius Vanderbilt, voting trustees of the Interborough-Metropolitan Company, have requested the holders of the preferred stock of the Interborough-Metropolitan Company to send in their stock to August Belmont & Company, New York, N. Y., for exchange into the new voting trust certificates. A majority has already been exchanged. The old voting trust certificates for the common stock have been stricken from the list of the Stock Exchange and the new common voting trust certificates are now the only delivery. As soon as a sufficient amount of the preferred stock has been exchanged it is expected that the Stock Exchange authorities will take the same course with respect to the preferred stock.

Metropolitan Street Railway, Kansas City, Mo.—The receivers of the Metropolitan Street Railway have arranged with the holders of $300,000 of bonds of underlying companies which become due on July 1, 1911, for an extension of the time of payment.

Northwestern Elevated Railroad, Chicago, Ill.—The special meeting of the stockholders of the Northwestern Elevated Railroad to pass upon the plan to issue a mortgage covering the property to secure an issue of $25,000,000 of bonds has been called for Aug. 21, 1911. At the close of business on June 24, 1911, deposits of stock of the elevated railways which it is planned to merge totaled 71 per cent of all the outstanding stock of the companies.

Norwich & Westerly Railway, Norwich, Conn.—The property of the Norwich & Westerly Railway was sold under foreclosure at Norwich on June 23, 1911, for $940,000 to A. E. Locke, Boston, Mass., and H. M. Merrill, Portland, Me., who are said to represent the bondholders.

Pueblo & Suburban Traction & Lighting Company, Pueblo, Col.—H. M. Byllesby & Company, Chicago, Ill., confirm the report of the purchase by them of the property of the Pueblo & Suburban Traction & Lighting Company and allied interests in Colorado, referred to in the ELECTRIC RAILWAY JOURNAL of June 24, 1911, page 1128. The property was taken over on June 14. The Pueblo & Suburban Traction & Lighting Company operates the street railway system of

Pueblo and supplies electricity to Pueblo and the Cripple Creek Gold Mining district, including Cripple Creek, Victor and Goldfield. The towns of La Junta and Rockyford are served with electricity by subsidiary corporations. W. F. Raber, general manager of the Ottumwa Railway & Light Company, Ottumwa, Ia., has been placed in charge at Pueblo temporarily by Byllesby & Company.

Springfield (Ill.) Consolidated Railway.—The Illinois Traction System has submitted to the Springfield Consolidated Railway terms upon which it will lease to that company the unoccupied right of way which runs to the zinc plant, the Devereaux mine, the state biological laboratory, etc., and also to lease to the company the line between Sangamon Avenue, Springfield, and Ridgely Junction.

Twin City Traction Company, Dennison, Ohio.—The Twin City Traction Company has been incorporated to succeed the United Electric Company, which operates between Dennison and Uhrichsville.

United Railways & Electric Company, Baltimore, Md.—The United Railways & Electric Company has applied to the Maryland Public Service Commission for permission to issue $3,125,000 of three-year 5 per cent secured convertible coupon notes to provide funds to pay $2,000,000 of Baltimore City Passenger Railway first-mortgage 5 per cent bonds, which mature on Nov. 2, 1911, and $500,000 of the 4½ per cent certificates of indebtedness of the same company, which mature on the same day, and to redeem $535,000 series "B" and "C" car trust certificates outstanding after Oct. 1, 1911. The notes will be convertible into United Railways & Electric Company stock at $25 a share at any time before maturity, provided the notes shall not have been redeemed. The notes will be secured by deposit as collateral of $2,500,000 United Railways & Electric Company first-mortgage 4 per cent bonds and by an amount of the company's stock sufficient to meet the conversion rights. The notes will be redeemable by the company at par upon sixty days' notice.

Virginia Railway & Power Company, Richmond, Va.—The stockholders of the Virginia Railway & Power Company and the Norfolk & Portsmouth Traction Company have approved the merger of these companies as the Virginia Railway & Power Company, effective July 1, 1910, in accordance with the terms which were given in the Electric Railway Journal of May 27, 1911, page 930.

Waukegan, Rockport & Elgin Traction Company, Waukegan, Ill.—It is reported that the Chicago & Northwestern Railroad is negotiating for the purchase of the property of the Waukegan, Rockford & Elgin Traction Company.

West Jersey & Seashore Railroad, Camden, N. J.—The State Board of Public Utility Commissioners of New Jersey has approved an issue of bonds to the amount of $1,089,000 by the West Jersey & Seashore Railroad to retire underlying issues which mature on July 1, 1911.

Dividends Declared

Auburn & Syracuse Electric Railroad, Syracuse, N. Y., quarterly, 1½ per cent, preferred.

Aurora, Elgin & Chicago Railroad, Chicago, Ill., quarterly, 1½ per cent, preferred; quarterly, ¾ per cent common.

Carolina Power & Light Company, Raleigh, N. C., quarterly, 1¾ per cent, preferred.

Chicago City & Connecting Railways, Chicago, Ill., $2.25 on preferred participation certificates; $1.00 on common participation certificates.

Cincinnati, Dayton & Toledo Traction Company, Hamilton, Ohio, 2½ per cent, preferred; ⅝ per cent, common.

Cincinnati, Newport & Covington Light & Traction Company, Covington, Ky., quarterly, 1⅛ per cent, preferred; quarterly, 1¼ per cent, common.

Citizens' Electric Street Railway, Newburyport, Mass., 2½ per cent.

Columbus, Newark & Zanesville Electric Railway, quarterly, 1½ per cent, preferred.

Consolidated Traction Company, Newark, N. J., 2 per cent.

Denver & Northwestern Railway, Denver, Colo., quarterly, 2 per cent.

El Paso (Tex.) Electric Company, 3 per cent, preferred.

Little Rock Railway & Electric Company, Little Rock, Ark., 3 per cent, preferred; 4 per cent, common; 1 per cent, common (extra).

London (Ont.) Street Railway, 3 per cent.

Louisville & Northern Railway & Lighting Company, New Albany, Ind., quarterly, ⅝ per cent, preferred.

Nashville Railway & Light Company, Nashville, Tenn., quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

New England Investment & Security Company, Springfield, Mass., 2 per cent, preferred.

New Orleans Railway & Light Company, New Orleans, La., quarterly, 1¼ per cent, preferred.

Ohio Traction Company, Cincinnati, Ohio, 1 per cent, common.

Omaha & Council Bluffs Street Railway, Omaha, Neb., quarterly, 1¼ per cent, preferred; quarterly, 1 per cent common.

Ottawa (Ont.) Electric Railway, quarterly, 2½ per cent.

Pacific Coast Power Company, 3 per cent, preferred; 2½ per cent, common; 5 cents, common (extra).

Philadelphia Company, Pittsburgh, Pa., quarterly, 1½ per cent, common; ½ per cent, common (extra).

Porto Rico Railways, Ltd., San Juan, P. R., quarterly, 1¾ per cent, preferred.

Public Service Corporation of New Jersey, Newark, N. J., quarterly, 1½ per cent.

Puget Sound Electric Railway, 3 per cent, preferred.

Ridge Avenue Passenger Railway, Philadelphia, Pa., quarterly, $3.

Scioto Valley Traction Company, Columbus, Ohio, quarterly, 1½ per cent, first preferred and preferred.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., 1¼ per cent, preferred.

Utica & Mohawk Valley Railway, Utica, N. Y., quarterly, 1¼ per cent, preferred; quarterly, ½ per cent, common.

Washington Water Power Company, Spokane, Wash., quarterly, 2 per cent.

Western Ohio Railway, Lima, Ohio, quarterly, 1½ per cent, second preferred.

MONTHLY ELECTRIC RAILWAY EARNINGS

ATLANTIC SHORE RAILWAY.

Period.			Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income
1m.,	May,	'11	$26,660	$20,487	$6,173	$8,339	+$2,166
1 "	"	'10	25,357	17,543	7,815	12,549	+4,734
5 "	"	'11	103,366	91,937	11,428	40,495	+29,066
5 "	"	'10	111,339	84,726	26,614	62,701	+36,087

BANGOR RAILWAY & ELECTRIC COMPANY.

1m.,	May,	'11	$41,750	*$20,882	$20,868	$12,483	$8,385
1 "	"	'10	42,875	*22,524	20,351	11,712	8,639
11 "	"	'11	525,400	*244,963	280,437	134,046	146,391
11 "	"	'10	510,230	*237,145	273,085	129,041	144,044

EL PASO ELECTRIC COMPANY.

1m.,	April,	'11	$53,695	$30,797	$22,898	$8,221	$14,677
1 "	"	'10	49,490	28,874	20,616	8,306	12,310
12 "	"	'11	655,195	381,905	273,290	98,067	175,223
12 "	"	'10	624,844	359,328	265,516	100,599	164,917

GALVESTON-HOUSTON ELECTRIC COMPANY.

1m.,	April,	'11	$121,147	$69,393	$51,753	$24,856	$26,897
1 "	"	'10	104,550	66,059	38,491	23,540	14,951
12 "	"	'11	1,365,290	807,876	557,414	296,136	261,278
12 "	"	'10	1,239,449	745,649	493,800	270,407	223,393

JACKSONVILLE TRACTION COMPANY.

1m.,	April,	'11	$46,165	$26,826	$19,339	$10,161	$9,178
1 "	"	'10	47,213	24,443	22,770	9,290	13,480
12 "	"	'11	583,544	321,877	261,667	116,910	144,757
12 "	"	'10	521,035	275,572	245,463	112,295	133,168

MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY.

1m.,	May,	'11	$412,771	$223,308	$189,463	$125,217	$64,246
1 "	"	'10	384,866	214,358	170,508	113,219	57,289
2 "	"	'11	2,010,663	1,075,937	934,725	599,994	334,731
2 "	"	'10	1,879,343	1,030,679	848,664	554,411	294,254

NORFOLK & PORTSMOUTH TRACTION COMPANY.

11m.,	May,	'11	$1,906,275	$1,090,922	$815,353	$685,972	$129,381
11 "	"	'10	1,754,018	1,001,546	752,472	709,503	42,969

PENSACOLA ELECTRIC COMPANY.

1m.,	April,	'11	$22,734	$13,238	$9,496	$5,850	$3,646
1 "	"	'10	22,263	12,754	9,508	4,937	4,571
12 "	"	'11	279,149	164,169	114,980	64,987	49,993
12 "	"	'10	254,445	145,892	108,553	54,657	53,896

PUGET SOUND ELECTRIC RAILWAY.

1m.,	April,	'11	$145,604	$104,440	$41,163	$48,227	$7,064
1 "	"	'10	158,919	105,573	53,346	50,547	2,800
12 "	"	'11	1,885,663	1,250,515	635,148	608,292	26,856
12 "	"	'10	1,927,477	1,291,724	635,753	591,378	44,375

WHATCOM COUNTY RAILWAY & LIGHT COMPANY.

1m.,	April,	'11	$32,093	$17,669	$11,625	$10,920	$706
1 "	"	'10	32,662	19,091	13,571	8,370	5,201
12 "	"	'11	433,339	221,745	180,282	117,494	62,788
12 "	"	'10	413,567	236,546	177,021	76,139	76,139

Traffic and Transportation

Accidents in New York City in April

The Public Service Commission of the First District of New York has issued the following comparative summary of accidents during April, 1909, 1910 and 1911, on the street railways which come within its jurisdiction:

April.	1909.	1910.	1911.
Car collisions	84	92	102
Persons and vehicles struck by cars	986	954	1,320
Boarding	552	685	658
Alighting	547	614	592
Contact electricity	18	21	20
Other accidents	1,767	1,699	1,925
Totals	3,954	4,065	4,554
INJURIES:			
Passengers	1,577	1,794	1,742
Not passengers	475	458	505
Employees	275	329	369
Totals	2,327	2,581	2,616
SERIOUS (Included in above):			
Killed	18	25	14
Fractured skulls	7	8	10
Amputated limbs	2	4	4
Broken limbs	15	36	27
Other serious	99	113	109
Totals	141	186	164

To Call Street Names in Des Moines.—Conductors of the Des Moines (Ia.) City Railway have been instructed to announce the names of streets as the cars approach street corners.

New Round-Trip Chartered Car Rates.—On July 21, 1911, the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., will put into effect new round-trip chartered car rates between various local stations in New York State.

Electric Sign Railway Advertising in San Francisco.—The San Francisco, Vallejo & Napa Valley Electric Railway, Vallejo, Cal., is spending $5000 for advertising its Napa Valley route by means of electric signs placed at intervals along Market Street in San Francisco.

Service in Atlanta.—P. S. Arkwright, president of the Georgia Railway & Electric Company, Atlanta, Ga., has addressed a long letter to Campbell Wallace, secretary of the Railroad Commisison of Georgia, Atlanta, Ga., in which he shows what the company has done to comply with the recent orders of the commission in regard to service in Atlanta.

Chair Cars Between Indianapolis and Louisville.—The Indianapolis, Columbus & Southern Traction Company, Columbus, Ind., which operates between Indianapolis and Seymour, Ind., and over whose line cars are run between Indianapolis and Louisville, has announced that it will establish a chair-car service, the chair cars to be attached to the limited cars between Indianapolis and Louisville.

Increase in Wages in Pottsville.—The employees of the Eastern Pennsylvania Railway, Pottsville, Pa., have entered into a two years' agreement with the company by which they receive an increase of 3 cents an hour in wages. The first-year men will receive 22 cents an hour and the employees who have served the company more than a year will receive 25 cents an hour. The new agreement becomes effective on July 1, 1911.

San Francisco's No-Seat-No-Fare Ordinance.—The public utilities committee of the Board of Supervisors of San Francisco, Cal., met on June 15, 1911, to consider the no-seat-no-fare ordinance introduced by Supervisor Walsh. The committee adjourned until June 29, 1911, at which time the ordinance will be considered again. The committee announced that in the meantime it hoped to be able to induce B. J. Arnold, Chicago, Ill., to stop in San Francisco on his way to Los Angeles, and confer with the members of the committee in regard to the proposed investigation.

Key Route Trolley Trips.—Wm. R. Alberger, traffic manager of the San Francisco, Oakland & San José Consolidated Railway, San Francisco, Cal., the Key Route, has announced that on July 15, 1911, the company will establish regular trolley trips. Mr. Alberger is reported to have said: "On July 15, 1911, the company will start 'Key Route trolley trips.' These will be sightseeing trips, the first ever had on the Oakland side of the bay. We will advertise these trips throughout the East. Facilities at the Key Route pier are to be increased. Additions to the pier facilities will cost in the neighborhood of $500,000. The work will begin at the time the filling in of the pier is begun.

Subway Accident Record in New York.—In a speech which James L. Quackenbush, counsel of the Interborough Rapid Transit Company, New York, made before the Brooklyn League on June 15, 1911, he said in referring to the operating record of the company on its subway division: "We have never killed a passenger on the Interborough. Yet we have carried on our cars more people than the entire population of the earth. There is an element of luck in it you will say, but it can't all of it be luck when we run ten-car trains so close together that one is going out of a station as the other is coming in. That can't be all luck. There must be some good management in it. A train every minute and forty-eight seconds; that is our schedule, and we have never killed a passenger."

Through Limited Service Between Cleveland and Detroit.—Through limited passenger service was established between Cleveland and Detroit on June 21, 1911. Six trains are operated each way. A train leaves each terminal at 7:30 in the morning and every two hours thereafter until 5:30 in the evening. The running time is six hours and twenty minutes. Train crews are changed at Toledo. The service is being conducted by the Detroit United Railway and the Lake Shore Electric Railway. Cars run on the schedule of the Lake Shore Electric Railway and the Detroit, Monroe & Toledo Short Line is used between Detroit and Toledo. Three of the cars each way run by way of Sandusky and the other three by way of Norwalk. It is said that a package and express business will be established within a short time with cars operating on limited time.

Suppressing Tipplers in Illinois.—All of the railroads which operate in Illinois are preparing placards promulgating the law just passed by the Illinois Legislature making it unlawful to drink intoxicating liquors or to be intoxicated in or upon railroad passenger cars in use for transportation of passengers or in or about any railroad station or platform. According to the final section of the law the railroads failing to put printed copies of the law in all of their stations are liable to a forfeiture of $50 for each omission. The law says that there shall be no drinking in smoking cars, parlor cars, day coaches, interurban cars and cabooses used for the transportation of passengers. It does not mention buffet cars. Railroad conductors are called upon to arrest all violators of the law. Furthermore, they will become liable to a fine of not less than $10 nor more than $25 if they fail to arrest violators. By the provisions of the law every conductor who is on duty is authorized and empowered to exercise the powers of a sheriff in any county of the State.

Indiana Railroad Commission News.—The Indiana Railroad Commission has heard the evidence in the case of the Kokomo, Marion & Western Traction Company against the Pennsylvania Railroad and other steam railroads to compel them to deliver coal to the electric railway at the same rate as is charged Kokomo manufacturers. The petitioners are now paying 10 cents more on the ton than is paid by the manufacturers. The Kokomo, Marion & Western Traction Company contended that with the domestic rate it could compete with the manufacturers in supplying motive power. The company's petition was opposed on the ground that it is not a bona fide manufacturer, and that the power furnished manufacturing concerns is surplus power. The commission has taken the matter under advisement. The commission has granted the special committee which is investigating block signal systems a further extension of time for presenting its report. The report was due on June 23, 1911, but Chairman Wood of the commission said the matter was of great importance and that the committee should have every opportunity to present a complete report. The commission has addressed to all the steam and electric railways in Indiana Circular No. 76, concerning reports of accidents. This superseded Circulars Nos. 8, 9 and 41. It has also addressed to the electric railways Circular No. 77 in regard to highway crossing signs. This circular supersedes Circulars Nos. 21 and 60.

Personal Mention

Mr. John E. Benton, a lawyer of Keene, N. H., has been appointed a member of the Public Service Commission of New Hampshire by Governor Robert P. Bass.

Mr. James R. Empey has resigned as general foreman of shops and carhouses of the Lehigh Valley Transit Company, Allentown, Pa., effective on July 1, 1911.

Mr. Edward C. Niles, a lawyer of Concord, N. H., has been appointed a member of the Public Service Commission of New Hampshire by Governor Robert P. Bass.

Prof. Thomas W. Worthen, head of the department of mathematics at Dartmouth College, Hanover, N. H., has been appointed a member of the Public Service Commission of New Hampshire by Governor Robert P. Bass.

Mr. Samuel J. Herrell, formerly assistant superintendent of transportation of the Knoxville Railway & Light Company, Knoxville, Tenn., has been appointed claim agent of the company to succeed the late Eugene R. Roberts.

Mr. A. D. Kimmett, assistant master mechanic of the Lackawanna & Wyoming Valley Railroad, Scranton, Pa., has been appointed master mechanic of the company, to succeed Mr. F. J. Stevens, whose appointment to the Ft. Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind., is noted below.

Mr. F. von Schilling, auditor of the Newport News & Old Point Railway & Electric Company, Newport News, Va., has been given the title of acting general manager of the company and has succeeded to the duties performed previously by Mr. W. W. S. Butler, who resigned from the company some time ago.

Mr. Jacob W. Gerke has resigned as master mechanic of the Tri-City Railway & Light Company, Davenport, Ia., to become master mechanic of the Wilmington & Philadelphia Traction Company and Southern Pennsylvania Traction Company, with headquarters at Wilmington, Del. He will assume his new duties on Aug. 1, 1911.

Mr. F. J. Stevens, master mechanic of the Lackawanna & Wyoming Railroad, Scranton, Pa., has resigned, effective July 1, 1911, to accept a like position with the Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind. Mr. Stevens entered the service of the Lackawanna & Wyoming Valley Railroad during the construction period nine years ago.

Mr. E. M. Wharff has resigned from the Beebe System, Syracuse, N. Y., to become connected with the operating engineering department of the Illinois Traction System, Peoria, Ill. Mr. Wharff was graduated from Syracuse University as a member of the class of 1903 of the College of Liberal Arts. Subsequently he was graduated from the I. C. Smith College of Applied Science. For the last five years he has been connected with the so-called Beebe System of electric railways in Central New York as apprentice, electrical engineer of the Syracuse, Lake Shore & Northern Railroad and the Syracuse & South Bay Electric Railroad, in charge of power houses, substations, carhouses and overhead line and as superintendent of track work and overhead construction, including the catenary line.

Mr. John Blair McAfee, who retired on July 1 as president of the Norfolk & Portsmouth Traction Company, Norfolk, Va., the property of which has been merged with the Virginia Railway & Power Company, was tendered a farewell banquet by the business men of Norfolk on June 17, 1911, by whom he was presented with a silver punch bowl. In acknowledging this token of esteem Mr. McAfee paid the following tribute to his associates in the company: "I am glad that I am afforded an opportunity to say a few words thus publicly of those with whom I have so closely associated in the work of the company for the last three and a half years. I mean by those with whom I have been associated the local directors, the officers and the employees of every class. In more than a quarter of a century of experience in corporate work I have never met a company, its officers and employees, in which there was less personal strife. This unison of effort, this co-working sympathy, has done as much as any other one thing to make the company a successful operating and growing concern. I want now to extend to those whom I have mentioned, as a class, my sincere thanks and fullest appreciation of their ability, their efforts and their kindliness toward me."

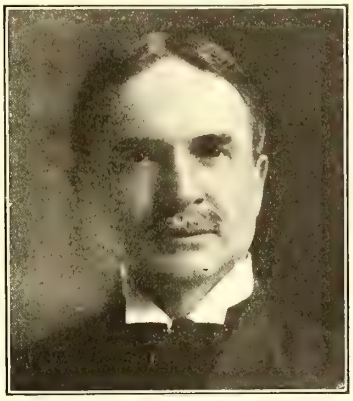
Mr. John A. Cleveland, who has been general manager of the electric railway, electric light and gas properties of the Commonwealth Power Railway & Light Company in Bay City, Mich., has been appointed general manager of the Saginaw-Bay City Railway, Saginaw Power Company, Saginaw City Gas Company, Bay City Power Company, Bay City Gas Company, Saginaw and Bay City, Mich., all of which are controlled by the Commonwealth Power, Rail way & Light Company, to succeed Mr. F. T. Hepburn, whose resignation was noted in the Electric Railway Journal of June 3, 1911. Mr. Cleveland has been manager of the properties at Bay City for the last two years. He was graduated from Cornell University and entered business with the Rochester Railway & Light Company, Rochester, N. Y., as a member of that company's electric sales department. He was subsequently made one of the superintendents of the Rochester Railway & Light Company. His connection with the properties in Saginaw and Bay City dates from 1906, when he was appointed superintendent of new business of the electric companies in both Saginaw and Bay City.

Mr. George H. Whitfield has retired as general superintendent of the light and power department of the Virginia Railway & Power Company, Richmond, Va., to devote himself more particularly to consulting engineering work, in which capacity he will be retained for all the Gould properties in Virginia, which include the Virginia Railway & Power Company and the Norfolk & Portsmouth Traction Company, with plants at Richmond, Petersburg, Norfolk and Fredericksburg. Mr. Whitfield was graduated from Richmond College with the degree of A.B. in 1892 and from Cornell University with the degree of M.E. 1896. He first entered the street railway manufacturing field, but in 1899 became superintendent of shops of the United Railways & Electric Company, Baltimore, Md., where he remained until 1901. He was also general superintendent of the San Francisco & San Mateo Electric Railway for a year. Mr. Whitfield became connected with the Virginia Railway & Power Company in 1902. In addition to his work with that company Mr. Whitfield designed the electrical features of several plants, including that of the Emporia Hydro-Electric Company and the Richmond & Chesapeake Bay Railway. Mr. Whitfield is a member of the American Institute of Electrical Engineers and has represented the Virginia Railway & Power Company actively in the National Electric Light Association for some time.

Mr. Lucius S. Storrs, president of the New England Investment & Security Company, has been appointed vice-president of the Connecticut Company and Berkshire Street Railway Company, with headquarters at New Haven, Conn. Mr. Storrs is widely known in electric transportation circles as the executive head of the street railway systems serving central Massachusetts under an operating organization, including the Worcester and Springfield urban and interurban networks, and extending from the Connecticut Valley to Rhode Island via the Blackstone Valley. He was born in Buffalo, N. Y., in 1869, and was graduated with the degree of A. B. from the University of Nebraska in 1890, taking the scientific course. Later the degree of A. M. was given to Mr. Storrs by his alma mater. For about seven years after graduation he was on the staff of the Colorado Fuel & Iron Company with the title of geologist, joining the organization of the Northern Pacific Railroad in 1897 and working along similar lines under Presidents Mellen and Hill. In 1906 Mr. Storrs entered the organization of the New York, New Haven & Hartford Railroad at New Haven, Conn., going to Boston in 1907 as vice-president of the New England Investment & Security Company. He soon became president of the organization and since 1908 has maintained headquarters in Springfield, Mass., having charge of the administration of the electric railway properties above indicated, with particular interest in the development of the central Massachusetts territory of both passenger and express service and the co-ordination of the several systems into an organization of improved earning power and efficiency. Mr. Storrs is a member of numerous scientific and

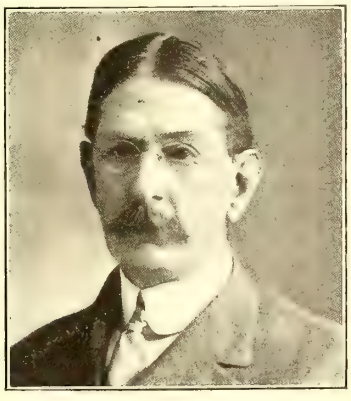
professional organizations, including the Sigma Xi Society and the American Institute of Mining Engineers.

Mr. Calvert Townley has resigned as vice-president of the Connecticut Company, New Haven, Conn., and has re-entered the service of the Westinghouse Electric & Manufacturing Company, with which he had long been connected prior to his going with the New York, New Haven & Hartford Railroad. His headquarters will be at the New York office of the Westinghouse Electric & Manufacturing Company, and his duties for the present will be to cover certain special fields of work under the direction of the chairman and the president of the company. His position will be a confidential one of importance, but nothing more in detail concerning his duties can be made public at the present time. He will enter upon his new work July 1. Mr. Townley has had an extended experience as an electric railway engineer and manager. He was graduated from Sheffield Scientific School, Yale University, in 1886, and later received the degree of M. E. from that university. Immediately after graduation he became associated with the Westinghouse Electric & Manufacturing Company, and was located first at Pittsburgh. In 1895 he went to the company's Boston office, where he remained until 1901, when he moved to New York. While with the Westinghouse Company he made a specialty of electric railway problems. In the fall of 1904 he was invited by the New York, New Haven & Hartford Railroad to take charge of and consolidate the various electric railways which it had recently purchased in Connecticut. He undertook this work and accomplished it with signal success, and after the formation of the consolidated company was elected its vice-president. As such he has had general charge of the management of these properties. Mr. Townley has always taken an active interest in association matters, and has been a member of important committees of the American Institute of Electrical Engineers and of the American Electric Railway Association.



Calvert Townley

Mr. Joseph K. Choate, general manager of the Otsego & Herkimer Railroad, who was elected president of the Street Railway Association of the State of New York at the annual meeting on June 28, was born on Aug. 22, 1854, in Salem, Mass. He attended school at Taunton, Mass., and prepared for college, but did not enter college until later in life, when he took a degree in the University of Colorado. Mr. Choate started his business career as a civil engineer, serving as an axeman in Central Park, New York, in 1875. He was made chief engineer of the bureau of streets and avenues of New York City in 1880, and after one year resigned and went with the Pennsylvania Railroad as supervisor of track on the New York division. In the same year he left that company and went with the Erie Railroad as principal engineer of construction on the New York, Lake Erie & Western Coal & Railroad Company. In 1882 Mr. Choate was made principal engineer of construction on the Erie & Wyoming Valley Railroad. In 1884 he went to the Union Pacific Railroad as assistant to the general manager. He then served as general manager of the Nevada Central road and afterward as superintendent of the Park division of the Union Pacific road and general superintendent of all Colorado lines. While in Colorado in this position Mr. Choate had charge of all operation and also jurisdiction over all traffic matters. He resigned from this company in 1900 and after spending several years in New York City as consulting engineer and acting in an advisory capacity on matters of railway operation he went to the Otsego & Herkimer road, first in the capacity of consulting engineer, and four years ago was made general manager. Mr. Choate has been an active worker in the New York association, serving on a number of committees, including the executive committee. He has also been an active member of the American Electric Railway Association and is a member of the committee on compensation for carrying United States mail. Mr. Choate is a member of the American Society of Civil Engineers.



J. K. Choate

OBITUARY

George K. Trask, railroad editor of the Indianapolis *Star,* and the originator of the railroad news column in the American press, died at his home in Indianapolis on June 26, 1911. Mr. Trask was seventy-nine years old. He had been engaged in newspaper work continuously since 1871, first as railroad editor of the Indianapolis *Journal,* and after the purchase of that paper by the Star Publishing Company, as railroad editor of the Indianapolis *Star.*

William Richard Brixey, whose death on June 9, 1911, at Seymour, Conn., was noted briefly in the ELECTRIC RAILWAY JOURNAL of June 24, 1911, was born at Southampton, England, on May 11, 1851. He was educated there and then entered the British Mercantile Marine service, commanding his own ship and visiting all the leading ports of the world. He came to this country in 1878, became at once an American citizen and went into business with his brother-in-law, Mr. A. G. Day, a pioneer in the American rubber industry and the inventor of "Kerite." He became general manager of the Kerite Company on the death of Mr. Day, and sole proprietor upon the death of his sister, Mrs. Day. Noteworthy among the large contracts undertaken by him were the supplying and laying of the Alaskan cable, the furnishing of the Panama Zone cable and furnishing the wires and cables for the Pennsylvania tunnel and terminal connecting the two shores of the Hudson and East Rivers. In 1908 Mr. Brixey incorporated the business as a company and soon after retired, leaving it to the management of his eldest son, Mr. Richard D. Brixey, president of the Kerite Insulated Wire & Cable Company. Mr. Brixey left two other sons, Mr. Reginald W. Brixey, vice-president, and Mr. Austin D. Brixey, secretary of the company.

D. L. Huntington, president and general manager of the Washington Water Power Company, Spokane, Wash., has outlined more in detail the important work which the company has in hand to which reference was made in the ELECTRIC RAILWAY JOURNAL of June 3, 1911, page 989. According to Mr. Huntington the principal project which the company has under way at present is the construction of a hydraulic power station on the Spokane River about 25 miles west of Spokane, to contain ultimately four 12,500-kw units. The first two units have been ordered for delivery early next year. The present stage of the work is that of rock excavation and unwatering the river for the construction of a dam 170 ft. above the present water level, creating a lake about 23 miles in length with an average width of about three-eighths of a mile. The land and water rights for this development have all been acquired, and there are now about 400 men engaged on the construction work.

The company is also constructing a railroad about 21 miles in length to connect this power plant, for construction purposes, with the Great Northern Railway at Springdale, Wash. It expects to complete the railroad by Aug. 1, 1911. The work of installing the last of the four 5000-kw generators at Little Falls power station is under way, and that new station, which has been in operation less than a year, will be entirely completed by midsummer. The company has put twenty-five new pay-as-you-enter cars in service. The first section of the new carhouse, with a capacity of twenty-five cars, has been put in operation. The other expenditures of the company cover a multitude of items, the most important expenditure, perhaps, being for the extension of the underground duct and conduit system.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Elberton & Eastern Railway, Augusta, Ga.—Chartered in Georgia to build a 50-mile electric railway between Elberton, Tignall, Washington and Lincolnton. Capital stock, $500,000. Incorporators: W. O. Jones, W. F. Anderson, J. H. Blackwell, J. M. Heard, R. L. Cauthen and J. Z. Rogers. [E. R. J., June 3, '11.]

***Kokomo, Frankfort & Western Railway, Kokomo, Ind.**—Application for a charter has been made in Indiana by this company to build a 25-mile electric railway in Indiana. Capital stock, $750,000. Incorporators: George J. Marott, John H. Holliday, Indianapolis; T. C. Reynolds and J. B. Carter, Kokomo.

***Twin City Traction Company, Dennison, Ohio.**—Incorporated in Ohio to succeed the United Electric Company, which operates between Dennison and Uhrichsville. Headquarters, Dennison. Capital stock, $100,000. Incorporators: Ralph E. Westfall, Smith N. G. Bennett, M. R. Thornton, H. Miller and W. M. Huffman.

***Waco (Tex.) Street Railway.**—Incorporated in Texas to succeed the Citizens' Railway Company, which was taken over under an option secured by J. F. Strickland and his associates, as noted in the Electric Railway Journal for June 17, 1911. Captial stock, $1,000,000. Incorporators: J. F. Strickland, Osce Goodwin and M. B. Templeton, all of Dallas.

***Ridgeley & Miller Avenue Railway, Ridgeley, W. Va.**—Application for a charter has been made in West Virginia by this company to build an electric railway from the Blue Bridge over the Potomac River, about 2 miles, to Miller's farm. It is expected to connect with the Cumberland Electric Railway at the bridge. Incorporators: John L. Miller, Alfred Ridgeley, J. T. Vandergrift and R. A. Radcliffe, all of Ridgeley, W. Va., and Conrad Miller, Cumberland, Md.

***Twin Mountain & Potomac Railway, Twin Mountain, W. Va.**—Chartered in West Virginia to build a 22-mile railway from McNeil to Twin Mountain. Capital stock, $100,000. Incorporators: R. T. Cunningham, H. R. Hinzelman, J. M. Brownfield, Kemble White and E. A. Russell, all of Fairmont.

FRANCHISES

Little Rock, Ark.—The Little Rock Railway & Electric Company has asked the City Council for a franchise to extend its Main Street line into the southern part of Little Rock.

Lodi, Cal.—The Central California Traction Company, San Francisco, has received a franchise from the Board of Trustees to extend its tracks north on Sacramento Street in Lodi.

San Diego, Cal.—The San Diego & El Cajon Valley Interurban Railway has received an extension of its franchise from the Common Council permitting it to build its tracks over certain streets in San Diego.

Hartford, Conn.—The Connecticut Company has received permission from the Council to double-track, extend and rebuild some of its lines in Hartford.

Elgin, Ill.—The Elgin & Belvidere Electric Company, Chicago, will ask the Commissioners for a franchise to extend its line in Elgin from Wing Park to North State Street.

Gary, Ind.—C. H. Geist, Philadelphia, Pa., and associates have received a franchise from the City Council in Gary. This is part of a plan to build an electric railway to connect Gary, Chesterton and Whiting. [E. R. J., Dec. 10, '10.]

Washington, Ind.—The Vincennes, Washington & Eastern Traction Company has received a fifty-year franchise from the City Council in Washington. The road will connect Vincennes, Washington and Loogootee. [E. R. J., April 15, '11.]

Burlington, Ia.—The People's Gas & Electric Company has asked the City Council for a franchise to double-track its North Hill line from Fourth Street to Sunnyside.

Boston, Mass.—Governor Foss has signed the bill granting the Boston & Eastern Railroad a certificate of exigency for the right to build a high-speed interurban railway over a private right-of-way from Boston to Danvers and intermediate points.

Montague, Mass.—The Miller's River Street Railway, Orange, has asked the Council for a franchise in Montague. This 14-mile railway will connect Miller's Falls, Montague, Irving, Wendall and Orange. D. P. Abercrombie is interested. [E. R. J., May 13, '11.]

New Bedford, Mass.—The Union Street Railway has received permission from the Commissioners to extend its tracks in New Bedford.

Springfield, Mass.—The Springfield Street Railway has received an extension of one year of its franchise from the Aldermen in which to extend its St. James Avenue line.

Worcester, Mass.—The Worcester Consolidated Street Railway has asked the Board of Aldermen for franchises to double-track and extend several of its lines in Worcester.

Durham, N. C.—The Durham Traction Company has asked the County Commissioners for a franchise to extend its tracks from the city limits to the West End Land Company's property.

Statesville, N. C.—T. H. Vanderford and W. F. Snider, of the Salisbury & Spencer Electric Railway, Salisbury, have asked the Board of Aldermen for a franchise in Statesville.

Summit, N. J.—The Morris County Traction Company, Morristown, has asked the Common Council for a thirty-year franchise to build a double track line from Maple Street, Summit, to the dividing line between Summit and Chatham.

North Tonawanda, N. Y.—The Frontier Electric Railway has again asked the Common Council for a franchise in North Tonawanda. This line will extend from Buffalo to Niagara Falls. T. S. Ramsdell, president. [E. R. J., June 17, '11.]

Portland, Ore.—The Portland Railway, Light & Power Company has asked the Council for a franchise on Belmont Street and Nebraska Street, in Portland.

Middletown, Pa.—F. H. Alleman, representing the Middletown & Elizabethtown Street Railway, has asked the Council for a franchise in Middletown. [E. R. J., June 3, '11.]

***Philadelphia, Pa.**—Edward N. Patton has introduced in the Councils of Philadelphia an ordinance authorizing the laying of tracks with the necessary equipment for the operation of cars upon several hundred miles of thoroughfares in the northern, northeastern and northwestern sections of the city. Mr. Patton stated that he does not feel at liberty at present to divulge the names of the persons at whose instance the ordinance was presented to the Council.

Scranton, Pa.—The Scranton & Lake Ariel Railway has asked the City Council for a franchise in Scranton. This line will connect Lake Ariel and Scranton. J. J. Brown, president. [E. R. J., Oct. 1, '10.]

Providence, R. I.—The Rhode Island Company has received a franchise from the City Council to double-track Eddy Street, in Providence.

Columbia, S. C.—The Columbia Electric Street Railway, Light & Power Company has received franchises from the City Council to double-track and extend a number of its lines in Columbia.

Glendale, W. Va.—The Wheeling Traction Company has asked the County Court for a franchise to double-track its line through Glendale.

La Crosse, Wis.—The La Crosse City Railway has asked the Council for a franchise for an extension in La Crosse.

TRACK AND ROADWAY

Owens River Valley Electric Railway, Bishop, Cal.—Grading has been begun by this company on its 4½-mile electric railway between Bishop and Laws. Henry Shaw, president. [E. R. J., April 15, '11.]

Pacific Electric Railway, Los Angeles, Cal.—Charles W. Cearbaley, Wilcox Building, Los Angeles, has been awarded the contract by this company to build a single-track pile trestle bridge 320 ft. long across the Verdugo Wash on the Glendale-Burbank extension.

Oakland (Cal.) Traction Company.—Plans are being made by this company to begin work on the many improvements to its lines in Richmond, Alameda, San Leandro and Oakland. The San Pablo Avenue line is to be double-tracked to the county line. The proposition of double-tracking the lines of the East Shore & Suburban Railway, Richmond, is now being considered. In North Berkeley the Grove Street line will be double-tracked from University Avenue to the Circle. The Claremont Avenue line of the Key Route will be double-tracked from Telegraph Avenue to the end of the line. Work will be begun at once.

Geary Street, Park & Ocean Railway, San Francisco, Cal.—Work has been begun by the city on the reconstruction of this line as a municipal undertaking.

Bridgeport & Danbury Electric Railway, Bridgeport, Conn.—Work has been begun by the Sperry Engineering Company at the Trumbull line for this company. It will connect Bridgeport, Trumbull, Monroe, Newton, Bethel, Stepney and Danbury. [E. R. J., April 8, '11.]

Shore Line Electric Railway, New Haven, Conn.—Work has been begun by this company laying its tracks on Middletown Avenue in New Haven. It is expected to have the line from New Haven to Guilford in operation within the next two months.

Groton & Stonington Street Railroad, New London, Conn.—Work has been begun by this company on its extension from Mystic station to Old Mystic.

St. Simons Railway, St. Simons, Ga.—This company has decided to extend its line on St. Simons Island. [E. R. J., March 20, '11.]

Chicago, Ottawa & Peoria Railway, La Salle, Ill.—Grading for the extension to Joliet has been completed by this company and ties and 90-lb. rails are being laid.

Rock Island Southern Railroad, Monmouth, Ill.—The Myers Construction Company, St. Louis, has been awarded the contract by this company to build a bridge on its extension to Alexis. Grading has been completed and construction will be begun at once.

Springfield & Central Illinois Traction Company, Springfield, Ill.—This company is considering plans to build a line from Edwardsville to Greenville, to connect with the main line. It will connect Pawnee, Morrisonville, Hillsboro, Greenville, Carlyle, Hoffman and Centralia. Isaac Smith, St. Louis, president. [E. R. J., Jan. 4, '11.]

***Martinsville, Ind.**—J. S. Bradley and M. S. Howel, Martinsville, plan to build an electric railway between Martinsville, Morovia, Hall and Eminence. It is said that it is proposed to have the line connect with the Terre Haute, Indianapolis & Eastern Railway at Mooresville and operate over that line into Indianapolis.

Indianapolis, New Castle & Toledo Railway, New Castle, Ind.—Arrangements are being made by this company to finance the extension of its line from New Castle to Muncie. Work is expected to be begun in the fall.

Vincennes, Washington & Eastern Traction Company, Vincennes, Ind.—The Canadian Construction Company has been awarded the contract by this company to build its electric railway between Vincennes, Washington and Loogootee. Work has been begun. J. L. Ebner, Vincennes, is interested. [E. R. J., April 15, '11.]

Davenport-Muscatine Railway, Davenport, Ia.—This company has increased its capital stock from $100,000 to $1,000,000 to insure the construction of this line between Davenport and Muscatine. J. F. Porter, Davenport, president. [E. R. J., June 24, '11.]

Southwestern Interurban Railway, Arkansas City, Kan.—Material has been ordered and construction will soon be begun by this company on a 3-mile extension in Winfield.

Manhattan City & Interurban Railway, Manhattan, Kan.—The Public Utilities Commission has authorized this company to issue $200,000 in bonds to build an extension from Manhattan to Ft. Riley.

***Kenner, La.**—Plans are being made to begin the construction in the near future of an electric railway between Kenner and Metairie Ridge.

Boston & Northern Street Railway, Boston, Mass.—This company will double-track its line from Malden to Revere Beach in the near future.

Benton Harbor, St. Joe Railway & Light Company, Benton Harbor, Mich.—Grading and preliminary work is being rushed by this company on its line from Benton Harbor to Dowagiac. The company expects to build two concrete bridges across the Dowagiac Creek.

Minneapolis Northern Suburban Railway, Minneapolis, Minn.—The Atlas Engineering & Construction Company has been awarded the contract by this company to build its railway between Minneapolis and Little Falls. Work has been begun. [E. R. J., June 17, '11.]

Vicksburg (Miss.) Traction Company.—All material is at hand and construction has been begun by this company on its 2-mile extension between Vicksburg and Walters.

Kansas City & Southeastern Traction Company, Kansas City, Mo.—This company advises that it will begin construction in the fall on its 126-mile line between Leeds, Raytown, Little Blue, Lee's Summit, Warrensburg, Sedalia and Jefferson City. The company will furnish power for lighting purposes. Its repair shops will be located at Little Blue Station. Capital stock, authorized, $5,000,000. Capital stock, issued, $180,000. Bonds, authorized, $5,000,000. Officers: Charles A. Sims, 3724 East Twenty-seventh Street, Kansas City, president; Howard W. Gibson, vice-president; C. Guy Minturn, 2714 Mersington Street, secretary; Benjamin F. Shouse, treasurer, and Jerome C. Herring, Twenty-second and Jackson Streets, chief engineer. [E. R. J., March 6, '09.]

St. Louis, St. Charles & Northern Traction Company, Middletown, Mo.—This company advises that it has not yet awarded any contracts for the construction of its line. Work will begin within the next eight months. It will connect St. Louis, St. Charles, Old Monroe, Middletown, Laddonia and Mexico. The motive power will be electricity or gasoline. Capital stock authorized, $3,000,000. Officers: C. B. Duncan, Corso, president; R. E. Race, Mexico, vice-president and general manager; C. Pearson, Middletown, secretary, and R. M. Hendershott, Middletown, treasurer. [E. R. J., Nov. 19, '10.]

Public Service Railway, Newark, N. J.—This company has decided to build a viaduct over the West Shore and the Susquehanna Railroads tracks at Little Ferry to avoid crossing these roads at grade.

Binghamton (N. Y.) Railway.—Plans are being made by this company to extend its tracks in Binghamton.

Buffalo & Williamsville Electric Railway, Buffalo, N. Y.—This company is building 1½ miles of track with 85-lb. T-rails and brick pavement in Williamsville.

Catskill (N. Y.) Traction Company.—The Public Service Commission of the Second District has received an application from this company for permission to extend its railroad from Leeds to Cairo, 6.7 miles.

Suffern (N. Y.) Railway.—The Public Service Commission of the Second District has authorized the Suffern Railroad to construct a single-track electric railroad from Orange Avenue to Lafayette Avenue in Suffern, Rockland County. The company is also authorized to issue $24,000 of its common-capital stock at par for cash to pay the cost of constructing such track. The Suffern Railway will connect with the North Jersey Rapid Transit Railway at State Line and complete an interurban road from Paterson, N. J., to Suffern. [E. R. J., May 13, '11.]

Syracuse, Watertown & St. Lawrence Railroad, Syracuse, N. Y.—The Public Service Commission, Second District, has authorized this company to construct a 6-mile electric railroad from a point near Stop 9 on the Syracuse & South Bay Electric Railroad in Cicero to and into Brewerton. [E. R. J., June 3, '11.]

Carolina Light & Power Company, Raleigh, N. C.—This company will soon award contracts to build its 3-mile extension from the city limits to the Raleigh Country Club.

***Cleveland, Ohio.**—O. P. Van Sweringen, M. J. Van Sweringen and associates plan to build an electric railway in the southeastern part of Cleveland.

Fostoria & Fremont Railway, Lima, Ohio.—This company placed in operation on June 15 its 20-mile railway between Fostoria and Fremont.

Lane County Asset Company, Eugene, Ore.—This company has begun work on its 12-mile electric railway to connect Eugene and Elmira. It will ultimately be extended to Coos Bay. [E. R. J., June 17, '11.]

Portland, Eugene & Eastern Railway, Eugene, Ore.—A permanent survey is being made and most of the right-of-way has been secured by this company for its line between Eugene and Corvallis.

Lancaster & York Furnace Street Railway, Lancaster, Pa.—This company is building a 3-mile extension connecting with the Lancaster & Southern Street Railway at Mount Nebo.

Philadelphia Railways, Philadelphia, Pa.—This company recently chartered to take over the Southwestern Street Railway has planned extensive improvements to its lines. Among these are the establishment of a through service to Prospect Park and Media and the double-tracking of the line westward from the Schuylkill River. Isaac H. Silverman, 605 Land Title Building, Philadelphia, president. [E. R. J., May 27, '11.]

Aberdeen (S. D.) Street Railway.—Work has been begun by this company on an extension in Aberdeen to Wylie Park.

Bristol (Tenn.) Traction Company.—This company has placed in operation its extension in Bristol to Virginia Park.

Tennessee Traction Company, Memphis, Tenn.—This company plans to reorganize and increase its capital stock. W. K. Burton, president. [E. R. J., June 17, '11.]

***McKinney, Tex.**—The Commercial Club, McKinney, is endeavoring to interest capital in the construction of a 36-mile electric railway between McKinney and Bonham.

Richmond & Henrico Railway, Richmond, Va.—This company is considering plans to build several extensions to its line.

Seattle, Wash.—A. O. Powell, Rufus R. Wilson, C. J. Farmer, T. T. Aldwell and associates have completed the organization for the financing and construction of a 51-mile electric railway between Port Angeles and Port Ludlow. Work will be begun at once. [E. R. J., June 10, 1911.]

Seattle, Wash.—W. H. Coughlin, 302 American Bank Building, Seattle, advises that franchises, right-of-way and $90,000 in subsidy bonds have been obtained to build a 7½-mile electric railway between Seattle, Highland Park and Lake Burien. This will be turned over to anyone who will agree to build and operate the line. [E. R. J., May 20, '11.]

Grafton (W. Va.) Traction Company.—This company is building a 3-mile extension in West Grafton and has begun work on its proposed extension on Walnut Street to the Beaumont addition.

Parkersburg & Ohio Valley Electric Railway, Parkersburg, W. Va.—John Shrader has been awarded the contract by this company to complete the 5 miles of track between Friendly and Sistersville.

***Eau Claire, Wis.**—Harry Norris, Hudson, Wis., and Fred Carr, Minneapolis, Minn., propose to build an electric railway between Eau Claire, Wis., and St. Paul and Minneapolis.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—An extension from Racine to Eagle Lake is being considered by this company.

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—It is reported that this company has selected a site for its proposed carhouse on Homeward Avenue, in Los Angeles, on the Moneta Avenue branch of the Redondo Beach line.

Central California Traction Company, San Francisco, Cal.—This company's freight depot at Tenth Street and X Street, in Sacramento, was destroyed by fire on June 13. The loss is estimated to be about $3,000.

Tidewater Power Company, Wilmington, N. C.—This company has let a contract for the erection of several concrete combination stations and waiting rooms. These will be located at Greenville, Sheel Road Crossing, Winter Park Gardens, and other points on the line between Wilmington and the terminus, Lumina, at the beach.

Southern Pennsylvania Traction Company, Chester, Pa.—Plans have been drawn for an annex to the present carhouse of this company in Chester. It will be enlarged at an early date.

Galveston-Houston Electric Railway, Houston, Tex.—Construction has been begun by this company on its new terminal station in Houston. The structure will be 160 ft. x 100 ft., and of brick construction.

Longview & Junction Street Railway, Longview, Tex.—During the next three months this company will award contracts to build a new carhouse in Longview.

Seattle-Everett Traction Company, Seattle, Wash.—The contract has been awarded by this company for the construction of a terminal station for its own use and the Everett Railway, Light & Water Company and the Puget Sound International Railway & Power Company, in Seattle. This building will house the general offices, and the yard will be used by the Snohomish & Seattle Interurban Railway Company.

POWER HOUSES AND SUBSTATIONS

Pueblo & Suburban Traction & Lighting Company, Pueblo, Col.—H. M. Byllesby & Company, Chicago, Ill., who have purchased the property of the Pueblo & Suburban Traction & Lighting Company, are arranging to increase the capacity of the steam station at Pueblo, build additional transmission lines and enlarge its hydro-electric development. At present the company has a steam electric power station of 4135-kw at Pueblo and a hydro-electric plant of 1600-kw at Skaguay.

Athens (Ga.) Electric Railway.—This company is enlarging its Mitchell's Bridge power plant, which has a capacity of 1000 hp. It will be increased by 200 hp. The company also plans to increase the capacity of its Tallahassee Shoals plant.

Chicago, Ottawa & Peoria Railway, Ottawa, Ill.—This 90-mile division of the McKinley system in northern Illinois, which is completing a 22-mile extension from Morris to Joliet, has purchased from the Westinghouse Electric & Manufacturing Company three substation equipments of 300 kw each.

Illinois Traction System, Peoria, Ill.—The St. Louis, Springfield & Peoria Railway, a subsidiary of the Illinois Traction System, has purchased from the Westinghouse Electric & Manufacturing Company two rotary-converter substation equipments, one of 300-kw and the other of 500-kw capacity. These are made necessary by the increase of traffic occasioned by the entrance of the road into St. Louis.

Arkansas Valley Interurban Railway, Wichita, Kan.—Construction has been begun by this company on a new brick power house at the junction of the Newton and Halstead lines, in Halstead.

Kansas Ctiy Railway & Light Company, Kansas City, Mo.—A substation is being built at Fortieth Street and State Line for the use of this company and the Metropolitan Street Railway. The structure will be one-story, 40 ft. x 132 ft., and of reinforced concrete construction. The cost is estimated to be about $17,000.

Syracuse (N. Y.) Rapid Transit Railway.—This company has ordered three 1000-kva transformers, one 1000-kw rotary converter, three 350-kva transformers and a switchboard from the General Electric Company.

Lancaster & York Furnace Street Railway, Lancaster, Pa.—This company is installing two 300-kw rotary converters at its power house.

Susquehanna Traction Company, Lock Haven, Pa.—Extensive improvements are in progress at the power house of this company in Lock Haven. The company is installing a new 300-kw generator.

Washington-Oregon Corporation, Vancouver, Wash.—Preliminary arrangements are being made by this company to build a new power plant on the Kalamon River. The cost will be about $750,000. A. Welch, 502 Fenton Building, Portland, Ore., general manager.

Manufactures & Supplies

ROLLING STOCK

Boston (Elevated) Railway has issued specifications for fifty surface cars.

Montreal (Que.) Street Railway has issued specifications for twenty-five cars.

Wausau (Wis.) Street Railway is in the market for five single-truck pay-within cars.

Connecticut Company, New Haven, Conn., has ordered one snow plow from the Wason Manufacturing Company.

Rhode Island Company, Providence, R. I., has ordered ten closed cars from the Osgood-Bradley Car Company.

Texas Traction Company, Dallas, Tex., has ordered six Brill 27-MCB-3 trucks from the American Car Company.

Greenville, Spartanburg & Anderson Railway, Greenville, S. C., has ordered five express cars from the Southern Car Company.

Denton (Tex.) Traction Company has ordered two 18-ft. closed cars mounted on Brill 21-E trucks from the Danville Car Company.

Northern Ohio Traction & Light Company, Akron, Ohio, has ordered one switching locomotive from the G. C. Kuhlman Car Company.

Springfield (Mo.) Traction Company has ordered six 21-ft. closed motor car bodies mounted on Brill 21-E trucks from the Danville Car Company.

Denver & Inter-Mountain Railway, Denver, Col., has ordered four No. 306-B railway motors from the Westinghouse Electric & Manufacturing Company.

Portland, Gray & Lewiston Railroad, Portland, Me., has ordered five 30-ft. flat cars mounted on Brill 57-F trucks from the Wason Manufacturing Company.

Charleston (W. Va.) Interurban Railroad is in the market for a number of wheel guards. The company is overhauling its cars and rebuilding some of the bodies.

Philadelphia (Pa.) Rapid Transit Company, it is reported, will order thirty cars for elevated-subway service in addition to the 200 cars to be ordered for the surface lines.

Fort Scott Gas & Electric Company, Fort Scott, Kan., has ordered one 25-ft. 4-in. closed motor car mounted on Brill 22-E trucks from the Danville Car Company.

Yonkers (N. Y.) Railroad has ordered one 34-ft. 4-in. flat motor car body mounted on Brill 27-G-2 trucks, and two Brill 27-G-2 trucks without car wheels from The J. G. Brill Company.

Emporia (Kan.) Street Railway has ordered five 21-ft. closed cars mounted on Brill 21-E trucks and four 20-ft. open cars mounted on Brill running gears from the Danville Car Company.

Muskegon Traction & Lighting Company, Muskegon, Mich., has ordered one 33-ft. 4-in. semi-convertible vestibule motor car body mounted on Brill 27-G-1 trucks from The J. G. Brill Company.

Oklahoma City (Okla.) Traction Company has ordered one quadruple equipment of No. 92-A railway motors and type K-10-A control from the Westinghouse Electric & Manufacturing Company.

Louisville (Ky.) Railway has ordered thirty partial car equipments of four motors and K-35 controllers from the General Electric Company for use on the cars being built by the Cincinnati Car Company.

Piedmont Traction Company, Charlotte, N. C., has ordered three express cars from the Southern Car Company. The company has also ordered six Brill 27-MCB special trucks from The J. G. Brill Company.

Woodlawn & Southern Street Railway Company, Woodlawn, Pa., has ordered four Brill 57-F trail trucks, four Brill 27-E-1 trucks with rolled-steel wheels and two Brill 21-E trucks with rolled-steel wheels from the G. C. Kuhlman Car Company.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y., has specified that the four vestibuled closed motor cars ordered from the G. C. Kuhlman Car Company shall be 56 ft. 5⅝ in. long over all, 8 ft. 4 in. wide over all and equipped with Westinghouse air brakes. McConway & Torley couplers, Keller curtain fixtures, Brill journal boxes, four GE-205 motors and Brill-27 MCB-3 trucks.

Boston (Mass.) Elevated Railway, noted in the ELECTRIC RAILWAY JOURNAL of May 6, 1911, as having ordered forty all-steel closed subway cars from the Standard Steel Car Company, has specified the following details for this equipment:

Seating capacity 72	Control .....West.
Weight (car body).38,000 lb.	Couplers .....Tom.
Bolster centers, length..51 ft.	Curtain fixtures..Cur. S. Co.
Length over all...69 ft. 2½ in.	Headlights .....Neal
Width over sills...9 ft. 2¼ in.	Journal boxes .....Sym.
Over all .....9 ft. 6 in.	Motors .....2 West. 300
Height, rail to sills...22¾ in.	Motors .....inside hung
Body .....metal	Sash fixtures.....Edwards
Interior trim.....bronze	Seats .....long
Headlining .....steel	Trucks .....Brill
Roof .....semi-monitor	Ventilators. .....Perry
Underframe. .....metal	Wheels.....solid forged steel
Air brakes .....West.	Special device,
Bumpers.Hedley anti-climber	Consol. door mech.

Morris County Traction Company, Morristown, N. J., has included the following in its specifications for the ten semi-convertible cars which are being built by The J. G. Brill Company:

Seating capacity 44	Curtain material...pantasote
Weight (car body)..18,500 lb.	Gears and pinions.....solid
Length of body....30 ft. 8 in.	Gongs .....Dedenda
Over vestibule.....40 ft. 8 in.	Hand brakes,
Width over sills..8 ft. 2½ in.	12-in. Brill ratchet
Over all .....8 ft. 7 in.	Headlights ....Crouse-Hinds
Body .....wood	Motors .....4 West. 101-B
Interior trim.....white ash	Motors .....outside hung
Headlining .....birch veneer	Sanders .....Dumpit
Roof.....Brill plain arch	Sash fixtures .....Edwards
Underframe .....wood	Seats .....Winner
Air brakes .....West.	Seating material .....rattan
Axles .....4¼-in. Std.	Step treads .....oak
Bumpers ....Brill angle iron	Trolley base .....Union
Car trimmings.....bronze	Trucks.....Brill 27-G1
Couplers .....Hovey	Ventilators ..Brill mushroom
Curtain fixtures....N. L. W.	Wheels .....33-in. cast iron

TRADE NOTES

Indiana Tie Company, Evansville, Ind., has increased its capital stock from $113,000 to $225,000.

D. C. & Wm. Jackson, Boston, Mass., have moved their Chicago office from the Commercial National Bank Building to the new Harris Trust Building, 111 West Monroe Street.

The J. G. Brill Company, Philadelphia, Pa., has elected Edward P. Rawle a member of the board of directors to fill the vacancy caused by the death of his brother, Francis W. Rawle.

Perry Ventilator Corporation, New Bedford, Mass., has received orders for ventilators for the twenty new cars now being built at the works of the Pressed Steel Car Company for the Boston (Mass.) Elevated Railway.

Berg Storage Battery Car Company, New York, N. Y., has been granted a charter with a capital stock of $110,000 to manufacture freight and passenger cars. The incorporators are: C. H. Lee, T. Sturgis, New York, N. Y., and R. G. Dale, Plainfield, N. J.

Asbestos Protected Metal Company, Beaver Falls, Pa., has opened a new plant for manufacturing asbesto protected metal and weather-proof-non-rusting skylights at Beaver Falls. The executive offices of the company have also been removed to Beaver Falls.

Manganese Steel Rail Company, New York, N. Y., has been incorporated in Delaware with an authorized capital stock of $6,000,000 to manufacture and deal in ingots of iron and steel and manganese. The incorporators are Charles S. Fallows and George M. Judd, New York, N. Y., and Harry W. Davis, Wilmington, Del.

McKeen Motor Car Company, Omaha, Neb., has shipped a 70-ft. gasoline motor car to the Oregon Short Line, Ogden, Utah. This is the first of four cars ordered by this railroad, and will be operated for local passenger service between

Ogden and Salt Lake City. The company has also shipped the fourth motor car to the Ann Arbor Railroad.

Railway Roller Bearing Company, Syracuse, N. Y., has received an order from the Baldwin Locomotive Works for rolling journal boxes for an electric locomotive for the Portland, Gray & Lewiston Railroad, Lewiston, Me. These are said to be the largest roller bearing journal boxes installed up to this time. The axle journals are 5 in. x 9 in. and the rollers are 2¼ in. diameter.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has received orders for power equipment from the following companies: Seattle-Tacoma Power Company, Seattle, Wash., three 1000 kva, 50,000-volt oil insulated, water-cooled transformers; Empire District Electric Company, three substation equipments, consisting of nine 250 kva, 33,000-volt transformers, three switchboards and three sets of lightning protective apparatus; People's Power Company, Willows, Cal., six 100 kva, 55,000-volt oil insulated, self-cooling transformers; Sacramento Power Company, San Francisco, Cal., six 100 kva, 55,000-volt oil insulated, self-cooling transformers.

Transportation Utilities Company, New York, N. Y., has removed to its New York office at 30 Church Street the exhibit which was shown at the recent Master Mechanics' and Master Car Builders' conventions at Atlantic City. The exhibit will be a permanent one and includes the products of the Acme Supply Company and the General Railway Supply Company, which the Transportation Utilities Company represents directly. Among the exhibits are working models of four different styles of trap doors for elevated and grade level platforms, operating models of sash balances, vestibule and car window curtains, including the Tuco rack curtain fixture, which was exhibited for the first time at Atlantic City.

Ohio Brass Company, Mansfield, Ohio, has received an order from the Piedmont Traction Company and the Greenville, Spartanburg & Anderson Railway for Tomlinson radial M. C. B. couplers and sander equipments for 31 new interurban cars. The company will also furnish the entire overhead material for 150 miles of track. Single catenary construction supported by brackets will be used. The poles will be spaced 150 ft. apart on tangents and 1 and 2 deg. on curves, and the trolley wire hangers will be spaced 30 ft. apart. The pole brackets will be 10 ft. long, and the trolley will be No. 0000 grooved copper. The contract also includes all porcelain insulators for 33,000-volt transmission line, telephone, signal and feeder wires.

Walter L. Conwell, whose election as president and treasurer of the Transportation Utilities Company, New York, N. Y., was announced in the Electric Railway Journal of April 15, 1911, resigned on July 1, 1911, from the Westinghouse Electric & Manufacturing Company in order to devote his entire time to the affairs of the Transportation Utilities Company. Mr. Conwell was graduated from the University of Pennsylvania in 1898 in the course of electrical engineering. He then engaged in electric railway construction and engineering work for three years. In the fall of 1901 he became connected with the sales department of the Westinghouse Electric & Manufacturing Company, and for the past five years has had entire charge of railway work for that company in its New York territory.

Sherwin-Williams Company, Ltd., Montreal, Que., has been formed by Walter H. Cottingham, Cleveland, Ohio, and C. C. Ballantyne, Montreal, Que., to take over the Canadian business of the Sherwin-Williams Company of America, the Canada Paint Company, Ltd., and Lewis Berger & Sons, Ltd., of London, Eng. The new company will have a capital of $8,000,000, half preferred and half common. Of the $4,000,000 of cumulative preferred stock $3,000,000 is now being issued. The entire amount of common stock is being issued. The present management will be continued, and the Canadian company, under an agreement with the American company, will have the benefit of the large research and development work constantly being done by the latter. Walter H. Cottingham, founder of the Canadian business of the Sherwin-Williams Company, chairman of Lewis Berger & Sons, Ltd., and president of the Sherwin-Williams Company of America, will be president of the new company. The present management of the Canada Paint Company and Lewis Berger & Sons, Ltd., will be continued.

The Baldwin Locomotive Works, Philadelphia, Pa., which was incorporated in June, 1911, has acquired all of the capital stock of "Baldwin Locomotive Works" and intends to acquire the ownership of the plant and property of the Standard Steel Works Company. The new company has authorized $20,000,000 of 7 per cent cumulative preferred stock and $20,000,000 common stock. The holders of the $20,000,000 stock of Baldwin Locomotive Works receive $14,100,000 cash, $5,900,000 of the preferred stock and $11,970,000 of the common stock of the new company. Drexel & Company, Philadelphia, and White, Weld & Company, New York, N. Y., are offering the unsold balance of the $20,000,000 7 per cent preferred stock. As now constituted, the board consists of twelve men, among whom are four heretofore identified with the concern. They are William L. Austin, chairman of the board; Alba B. Johnson, president; Samuel M. Vauclain, vice-president, and William Burnham, president of the subsidiary Standard Steel Works. The new interests are represented by Edward T. Stotesbury, Roland Z. Taylor and Thomas De Witt Cuyler of Philadelphia; E. C. Converse, president of the Bankers' Trust Company, New York; Samuel M. Roberts, vice-president of the National City Bank, New York; Charles D. Norton, vice-president of the First National Bank, New York; Francis M. Weld, White, Weld & Company, New York, and Otis H. Cutler, president of the American Brake Shoe & Foundry Company.

ADVERTISING LITERATURE

Ohio Brass Company, Mansfield, Ohio, has issued Catalog K, listing and describing Ohio valves and steam specialties. Attention is called particularly to the Ohio gage cock, water gage and pressure regulating valve.

Goulds Manufacturing Company, Seneca Falls, N. Y., is mailing a circular covering its new line of single stage centrifugal pumps. They are made in both the single and double-suction type, either of which is designed so that it may be readily adapted to any form of drive.

Allis-Chalmers Company, Milwaukee, Wis., has issued Bulletin No. 1076, covering its line of power transformers. The bulletin describes the theory underlying the construction of power transformers and illustrates the various details of manufacture. Tables of efficiency and heating are also included.

Gold Car Heating & Lighting Company, New York, N. Y., has issued a 166-page catalog which lists and illustrates the various devices, fittings and special fixtures used in connection with the Gold systems of steam-vapor, hot-water and electric train heating. Attention is also called to the improved Gold system of acetylene car lighting.

The J. G. Brill Company, Philadelphia, in the *Brill Magazine* for June, 1911, prints a biographical sketch of A. L. C. Fell, chief officer of the London County Council Tramway system. The sketch is accompanied with an excellent portrait of Mr. Fell as a supplement. This issue of the magazine also contains a reprint of a pamphlet issued by the International Railway, Buffalo, N. Y., describing the first "near-side" type of car. Among other articles are the following: "Centrifugal Sprinkling Car for Davenport, Ia.," "Thirty More P. A. Y. E. Cars for Vancouver, B. C.," and "Pay-Within Cars for Central Pennsylvania Traction Company, Harrisburg, Pa."

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 4834, which comprises an article on the electrical equipment of the Detroit River tunnel, reprinted from the Electric Railway Journal of Jan. 14 and Jan. 21, 1911. Bulletin No. 4855 illustrates and describes various types of motor-driven pumps designed for different purposes. Bulletin No. 4836 issued by the company describes and illustrates the G. E. steam flow meter, and Bulletin 4847 describes its form B belt-driven alternators. They are built in capacities ranging from 50 to 200-kw and are adapted for three-phase or two-phase winding without change except the armature and terminal blocks, the exciters and all accessories being the same for both. Designs have been made for 240, 480, 600, 1150 and 2300 volts.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVIII NEW YORK, SATURDAY, JULY 8, 1911 No. 2

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.
HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.
CURTIS E. WHITTLESEY, Secretary and Treasurer.
TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

HENRY W. BLAKE, Editor.
L. E. GOULD, Western Editor.
Associate Editors:
RODNEY HITT, FREDERIC NICHOLAS, WALTER JACKSON.
News Editors:
G. J. MACMURRAY, FRANK J. ARMEIT.

CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1021 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Tuesday noon of the week of issue.

Copyright, 1911, by MCGRAW PUBLISHING COMPANY.

Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL 8500 *copies are printed.*

NEW YORK, SATURDAY, JULY 8, 1911

CONTENTS.

Materials and Schedules... 73
The Reorganization of Railways... 73
Questions of Capitalization... 74
Equipment Trusts... 74
The New York Situation... 75
Latest Type of Interurban Passenger Car for McKinley System... 76
Dispatcher's Control of Line Circuit Breakers... 81
Equipment Trusts... 82
Change of Mailing Date... 84
Meeting of American Society for Testing Materials... 84
Plan of Membership in N. E. L. A... 85
Selectively Operated Semaphore and Telephone Equipment for Electric Railways... 85
A 35-Ton Electric Locomotive... 86
Electric Railway Legal Decisions... 88
News of Electric Railways... 90
Financial and Corporate... 93
Traffic and Transportation... 95
Personal Mention... 97
Construction News... 98
Manufactures and Supplies...101

Materials and Schedules

The popularity of the subject of efficiency has had a tonic effect which will do some good if it is not overdone. A wholesome result of the agitation has been a widespread interest in the methods of the efficiency engineers. Although the genesis of these methods was in shop work and in motion study in connection with manufacturing processes, there is no question that the publicity which has been given to them has provoked a similar consideration of topics of more direct bearing on railways. Of such topics two that may be mentioned are greater economy in the use of materials and closer analysis of schedules so as to eliminate as much unprofitable car mileage as possible. An appeal to employees is an effective way of re-awakening their interest in the economical use of supplies and securing their co-operation, which is essential in any successful plan of improvement. In the revision of schedules it is always a serious problem to know how far to go. There is no permanent advantage in the reduction of car mileage to a point that discourages the traffic. In city operation frequent, rapid service is desirable and headways cannot safely be lengthened beyond certain intervals in order that full loads may be secured. Economy could be enforced to the sure discomfort and inconvenience of the traveling public, and, therefore, to the eventual disadvantage of the company, but the achievement of economy at this price would not be wise railway efficiency. The best operation, however, requires continual investigation of the traffic and schedules and readjustment from time to time to meet the changes that develop. In the practice of some companies it has been found that a material of lower cost can be substituted at times for one of higher cost without any detriment, or a smaller car substituted for a large one and the traffic accommodated satisfactorily; and these small things help to make an aggregate that, whether large or small, is gain and not loss.

The Reorganization of Railways

Through the appeal to the Court of Appeals from the decision of the Appellate Division of the State Supreme Court the order of the Public Service Commission in the Third Avenue Railroad reorganization case will be adjudicated finally in the court of last resort. In the consideration of this case by the Appellate Court the controlling importance was placed upon the single question of the authority of the commission in a reorganization proceeding. We stated on Oct. 1, 1910, in a review of the decisions of the commission, that the question was whether the applicant was to be regarded as seeking a new capitalization for a new property or whether the old property was to be considered as the real applicant. In the latter event it was assumed that the reasonable costs of conversion from one

form of motive power to another would be retained in the capitalization. The court, however, has gone much further than this and has swept aside all questions of the value of the property. It concludes that the authority of the commission is confined in fact to a review of the acts of the corporation under a statute which, it holds, applies to reorganization cases and has not been repealed by implication by the public service commissions law. It is the conclusion of the court, further, that the new corporation is "based upon the former corporation, depending for its existence upon the provisions of the reorganization statute and embodying in itself as the very reason for its being the reorganization agreement of the affairs of its immediate predecessor." This would give the security holders of companies that undergo receivership full control of plans for reorganization in New York State. The effect of a final determination that such is the law would be interesting. A State policy of this nature would, it appears, tend to restrict the commissions to jurisdiction over present and future rather than over past acts.

Questions of Capitalization

At the banquet of the Street Railway Association of the State of New York on June 27 Oscar T. Crosby presented a strong defense of that often maligned individual, the promoter. No one will deny that in the transportation industry, as well as in other lines of business, little progress will be made if capital should be invested only in enterprises of established security, and this will be the case if the opportunities for making a "promoter's profit" should be greatly reduced. We agree with Mr. Crosby that the rate of return to which the investor in any line of business is entitled, should the enterprise prove successful, ought to be commensurate with the risks which are assumed. For instance, a return of 25 per cent per annum upon the money, upon the value of the time invested by the promoter and upon the cost of the other factors necessary in the development of certain classes of electric railway undertakings is not too high. On the other hand, 6 per cent might be large for an underlying security in a well-established public service corporation. And disasters have followed attempts to secure 25 per cent on the latter class of securities just as they will follow attempts on the part of the State to confine the profit on hazardous enterprises to the legal rate of interest. If we admit that those who promote the latter class of enterprise are entitled, in case of its success, to compensation for their risk, this return may be paid to them in the form of high dividends upon a low capitalization or in the form of moderate dividends upon a capitalization in excess of the cash value of the elements which were required to organize and establish the business. From one point of view the way in which the annual profits of a public utility company are distributed is a matter of no concern to the public. Its chief interest lies in the fact of whether the people are paying an undue profit for the service rendered. Whether this profit is paid as a dividend upon one capitalization or at the rate of half of that dividend upon twice that capitalization is a matter of little moment. According to Mr. Crosby, much of the popular misunderstanding in regard to capitalization would disappear if the "par value" of the capital stock of a company should be forgotten, or if the stock should be issued without any specified par value. Each share would then represent the right of its proportionate participation in the profits of the company, and while there would be rigorous supervision over the issue of such shares they would not necessarily indicate that any particular amount of money had been paid in by the original holder.

EQUIPMENT TRUST NOTES

The favorable experience of steam railways with equipment trust notes, to which Mr. Brockway calls attention in his suggestive article in this issue, has already encouraged some participation by electric railways in this form of security. An inspection of the last edition of American Street Railway Investments shows that the following companies had equipment trust securities outstanding: Ft. Wayne & Wabash Valley Traction Company, Indianapolis Traction & Terminal Company, Northwestern Elevated Railroad of Chicago, Chicago & Oak Park Elevated Railroad, United Railways & Electric Company of Baltimore, Public Service Railway of Newark, N. J.; Coney Island & Brooklyn Railroad, Pittsburgh Railways, Norfolk & Portsmouth Traction Company, Hudson & Manhattan Railroad, Buffalo, Lockport & Rochester Railway, International Traction Company of Buffalo, and Virginia Railway & Power Company.

Necessarily there are fundamental differences between the conditions of issue of these certificates by the large steam railroad and by the more generally local electric railway. But so far as these differences affect marketability they lie in the total amount of the issue and not in the quality of the security, and hence they are not disparaging to the electric railway. A steam railroad with extensive mileage would issue a larger volume of securities than a local electric railway system, because its needs and revenues are greater. Therefore, it would be better able to interest large banking houses or syndicates of bankers having representation in a number of important cities. This would facilitate the rapid distribution of the securities, which is the essential feature to the underwriting banker. However, if an issue of equipment trust notes made by an electric railway is small in amount or the other securities of the company are not well known outside of the community in which it operates, the local bankers should be induced to furnish the market. Indeed, it is our understanding that some of the notes of this character which have been issued by electric railways have been taken at once by savings banks and trust companies in the community and held for permanent investment instead of being offered for re-sale to the general public. Another method of marketing the securities which has been followed releases the railway company from all negotiations except those conducted directly with the equipment manufacturing company, which receives payment in notes for the equipment furnished. The manufacturing company then makes either a direct sale to bankers or a commission arrangement under which the notes are sold for its account.

It is the "ultimate consumer," the investor, who determines in the end the market position of the various classes of securities, but his judgment as to the interest his capital should yield on long-time investments is affected by the

money rates prevailing in financial centers. As a general rule, the equipment trust securities outstanding bear 4½ per cent to 5 per cent interest and were sold to the public to yield a little over or under 5 per cent. With the interest return at this satisfactory rate, the principal other question that concerns the investor is the factor of safety. In an equipment trust note he has an interest in a mortgage on specific property which is readily distinguishable. That is an advantage which is not possessed by many underlying mortgages on properties which, after merger, are lost to identity. One other feature, that of convertibility into money, is important to the investor. Ease in convertibility could be assured under ordinary circumstances if the notes were sold to banks in the community.

COST OF ELECTRIC OPERATION OF RAILROADS

The engineering aspects of the problem of electric operation of steam railroads are no longer in doubt. Both the single-phase alternating-current system with overhead trolley and the direct-current third-rail system have been installed and successfully operated for a sufficient period of time to demonstrate their superiority over steam locomotive operation in high-speed passenger service, suburban service, yard switching and hauling long, heavy freight trains in tunnels and up steep grades. Electricity will do all and more than steam as a motive power with equal reliability. This much has been proved. The relative cost of electric and steam operation is the crux of the situation with respect to electrification projects of the future.

Electrical engineers can estimate the cost of installation and roughly the cost of operation, but their figures admittedly are estimates. They do not know what it costs to operate electrified steam roads and the officials of such roads, if they know themselves, have not been willing to tell. Why this apparent desire for secrecy? It is safe to say that no steam railroad official would willingly abandon electric operation where it has once been begun. If it is not directly profitable it certainly is not unprofitable when the comfort of passengers, the higher speeds of trains and the simplified terminal operations are taken into account. Nothing is to be gained by concealing the true cost, even though it is apparently resulting in a deficit. The figures relating to the West Jersey & Seashore Railroad which were given by B. F. Wood in his paper read last week at the annual convention of the American Institute of Electrical Engineers are among the first to be made public, and they constitute a substantial addition to the general fund of rather widely scattered data. Unfortunately they tell less than half the story, for the West Jersey & Seashore is still operating freight trains with steam locomotives and no figures of steam passenger operation prior to electrification are given from which comparisons with electric passenger train operation can be made. What is wanted now is a complete statement of operating results from all of the electrified steam railroads. The public, which is demanding electrification of terminals in large cities, has a right to know what results may be expected if the demands are complied with. The engineering fraternity has a right to know, so that costly mistakes may be avoided in planning other electrification projects of the future.

THE NEW YORK SUBWAY SITUATION

The New York subway situation is developing rapidly every day. After lying dormant for nearly seven years, or since the present subway was put in operation, each day now sees some change in its condition. The city and the railway companies interested in the proposed franchises have issued ultimatums which have been followed later by ultimatissimums. Each railway has advanced important reasons why it should receive different terms or more favorable conditions than the other. Finally, estimates by the city of large profits from certain routes, when placed under the microscopes of the corporations for careful examination, have been returned with the statement that they were really deficits in disguise. It is undoubtedly true that never before have transportation experts been required to calculate the future profits upon urban railway enterprises of such magnitude as those represented by the franchises offered in the McAneny proposal to the Interborough and Brooklyn Rapid Transit Companies. Not only have the companies been obliged to predict the future traffic and profits from the new lines, but they have had to determine the effect of each new system on the other and upon each company's existing system. A miscalculation of 1 per cent in the growth of future business, or an erroneous allowance of the same amount in regard to the operating ratio, would amount to millions of dollars during the period of the franchise. It would be a serious misfortune to the city of New York if after all these negotiations and efforts it shall not succeed in securing the best possible extension to its rapid transit facilities. At the same time no one can blame the companies for being unwilling to assume the financial burden of conducting an unprofitable service.

We have great sympathy with the position of ex-Mayor Low, who stated that any transportation scheme other than one which would include both existing system, as in the proposal originally submitted to the companies, would be a makeshift. The purpose toward which efforts should be directed is that of providing rapid transit between each of the outlying boroughs and the lower half of Manhattan Island, with such extension of these routes only as will provide train loads in both directions. A through service from the northern confines of the Bronx to the southerly end of Brooklyn is not only unnecessary but uncalled for.

The modified acceptance of the proposals of the city by the Brooklyn Rapid Transit Company and the apparent willingness of the authorities of the city to adjust the points of difference between them and this company assure, we hope, that at least a considerable part of the general plan will be carried out. The final answer of the Interborough Rapid Transit Company was not expected until July 5, or after this paper went to press. The company has taken a number of exceptions to the city's original offer and has advanced many good reasons why some change should be made in them. We sincerely trust, for the sake of a well-rounded-out system, that the concessions which it will ask in its proposal this week will be such that they will be granted. If not, we feel that the Brooklyn Rapid Transit Company is amply able to build along the routes which will be open to it a rapid transit system which will be of great benefit to the city.

Latest Type of Interurban Passenger Car for McKinley System

These Cars Are of the Combination Passenger and Baggage Type and Are Designed for Train Operation. They Have Arch Roofs and the Framing Is Strongly Reinforced with Steel.

Ten large interurban cars designed by J. M. Bosenbury, superintendent of motive power and equipment of the Illinois Traction System, have just been built by the Danville Car Company. Six of these cars have been put into service on the Chicago, Ottawa & Peoria Railway and four on the Illinois Traction System. Numerous improvements in design which have been found desirable as the result of experience with older types of cars on the McKinley traction system have been incorporated in these new cars, which are intended for high-speed multiple-unit service. Each car has a motorman's cab at the left-hand corner and is subdivided into a combination baggage and smoking compartment, a main compartment, a toilet room and a heater closet. The cars are arranged for single-end operation and the seats are placed so that passengers in the forward compartment have a clear view ahead. The rear platform is inclosed. The accompanying engravings show the principal features of design and the general appearance of these new cars, which have turtle-back roofs and are heavily reinforced with steel in the framing.



Illinois Traction Car—Exterior View

The cars weigh 93,000 lb. completely equipped and have seats for fifty-six passengers.

GENERAL DIMENSIONS

The principal dimensions are as follows:

Length over buffer plates	55 ft. 6 in.
Width over outside sheathing	9 ft. 6 in.
Width inside between wainscoting	8 ft. 8 1/16 in.
Height from bottom of sill to top of roof	9 ft. 4 13/16 in.
Height from top of rails to bottom of sill	3 ft. 5 in.
Height from top of rails to center of draw-bar	2 ft. 10½ in.
Length of posts between sill and plate	6 ft. 8 in.
Truck-center distance	32 ft. 3 in.

BOTTOM FRAMING

The ten cars were designed to be substantial, easy riding, and to have great strength to resist damage in butting collisions. The principal members of the underframe are four 6-in. 12¾-lb. I-beams extending from buffer to buffer and two steel plate side sills ¼ in. thick by 18 in. deep. The center and intermediate sills are filled out with yellow pine timbers and the deep plate side sills are reinforced at the top and bottom by 3-in. x 3-in. x ⅜-in. angle irons. The compound side sill is bolted to the inside of the posts of the side framing. The center and intermediate sills over the bolsters are reinforced with 4-in. x 4-in. x ½-in. angle irons 8 ft. long. The longitudinal sills are held together by ¾-in. tie rods terminating between the center sills at hollow rectangular malleable-iron spacing blocks. These blocks are made hollow to provide a continuous space between the center sills for installing the cables and air pipes.

At the front end of the car the sills terminate in a combination crown-block, buffer beam and end sill, which is made of straight-grained white oak 2¾ in. thick. The outer member of this buffer beam is made of 8-in. x 10-in. white oak. The buffer beam and crown block are slip-tongue and grooved together and held in position by U-shaped pocket irons to which the sill webs are bolted. The outer side of the buffer beam is faced with a continuous iron plate ½ in. x 8 in., which is returned along the side sills. On the outside of this facing Hedley anti-climber sections 2 in. x 5½ in. x 7 ft. 4 in. have been applied. The rear buffer beam of the car is similar to the front buffer beam, except that the face plate is returned around and into the step openings. Both buffer beams are supported on the bottom flanges of the center sills, the web and top flange having been cut away.

The bolsters are made up of steel plates. The tension or upper member is a 1-in. x 12-in. plate with the ends upset to 2⅛ in. x 12 in. The lower member is a 1⅛-in. x 12-in. plate, the ends of which rest against the inside portion of the upset ends of the top member. The lines of contact between the top and bottom members were accurately machined. The top and bottom members are held apart by iron spools and wing castings. The bolster plates support machine-finished castings which are fitted on the lower side with 1-in. x 4-in. wearing plates to serve as side bearings. The center plates are held in place by four 1⅛-in. bolts extending through the bolster and above the tops of the center sills. The lower nuts on these bolts are fitted with National lock washers and underneath one nut on each center plate is a copper terminal to receive the ground wire. The center pins are 2 in. in diameter; they have forged upset heads and extend below the truck bolsters a sufficient distance to be fitted with ½-in. cotter pins.

The needlebeams consist of 5-in. 14¾-lb. I-beams trussed

with two ⅞-in. rods. The main longitudinal truss rods are double-refined iron 1½ in. in diameter and they are anchored to the side sills with forged truss-rod hinges made of ¾-in. x 4-in. iron bolted to the side sills.

BODY FRAMING

The bodies of these cars, as shown in the accompanying half-tone engravings, have arched roofs and are sheathed with steel. On the left-hand side of the body are eight double Pullman type windows, in addition to the rear passenger entrance door and the motorman's cab door. On the other side of the car are seven double windows, a baggage door and a single window. The front end has three windows with double sash and the rear vestibule has two windows with single sash and an end door in the center with drop sash for passing through to a trailer car when used for train operation.

The outside of the car bodies up to the letter board is covered with No. 14 sheet steel. This protective covering is brought around the corner posts and around both ends of the car. The vertical members of the side framing consist of ash posts 2¼ in. x 4¾ in. in section. Each post is mortised into the side sill at the bottom and the side plate at the top and the double pier posts are gained inside for filler blocks. The side plate is a continuous piece of long-leaf yellow pine. Between each adjacent pair of window posts is a yellow pine brace 1½ in. x 4¾ in. in section, held at the upper end against a ½-in. hook rod terminating under the side sill. The side and vestibule framing structures are tied together by a ¼-in. steel plate. The tie rods in the side frame are ½ in. in diameter and are incased in grooves cut in the single posts and in the blocking between the double posts and they are wedged to prevent vibration. The side framing of each side of the car is strengthened by an overhang truss rod resting on deep cast-iron struts over each bolster and terminating in metal anchor blocks underneath the corner posts of the body. These truss rods are ⅜ in. x 1½ in. in section where they pass through the side framing and 1⅛ in. round where they pass down through the side sills. All the side framing of these cars was strengthened by three-cornered glue blocks at the junctions of the letter boards and posts and by blocking between the double pier posts.

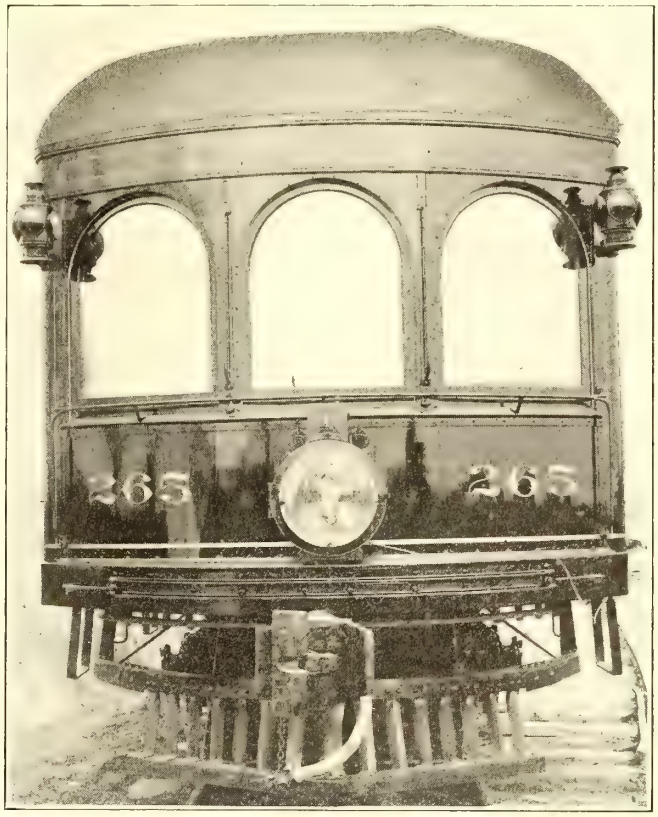
The truss plank which forms part of the underframing consists of a steel plate ¼ in. thick by 18 in. deep, to which the side posts are bolted. This truss plank is reinforced at the top and bottom with heavy angles. A wood capping which forms a continuous foot rest from end to end of the car is securely bolted to the upper angle. The truss plank is fitted with malleable-iron clips to hold the hot-water heater pipes. Underneath the angle iron and near the top of the truss plank is a ¾-in. loricated conduit having a bell-mouth opening at each seat for the electric heater wires. This conduit is supported on wrought-iron clips fastened to the angle irons which stiffen the truss plank.

FLOOR

The floor consists of long-leaf yellow pine 13/16 in. thick and 3¼ in. wide. The lower layer of the floor is placed crosswise and the upper layer lengthwise of the car. Between these two layers are two thicknesses of "red rope" building paper.

STEPS

These cars are designed for single-end operation and have the standard step arrangement of other cars of the Illinois Traction System, which includes brass-bound sheet-steel hangers, covered with Empire safety treads and O. M. Edwards type-F trap-door fixtures.

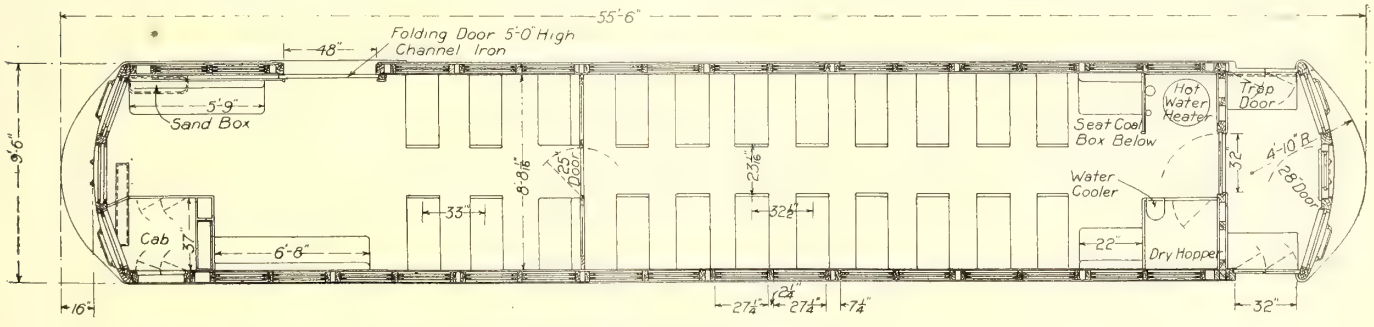


Illinois Traction Car—End View

ROOF

The roof of these new cars is designed along lines similar to the roof of the sleeping cars of this company. Its shape conforms to two segments of circles joined by a flat curve. The arch roof is supported by compound carlines consisting of white ash pieces 1¾ in. thick faced on the outside with two pieces of steel ½ in. x 1¾ in. These carlines have feet bent at an angle at each end to rest on the side plate, and they are fastened to the plate with ½-in. bolts and also by tie rods. Wood rafters 1⅜ in. thick are placed between adjacent carlines. The purlins are built up of ½-in. x 1¾-in. iron and ash filler blocks. The iron members of the composite purlins are bent at an angle at each end and bolted to the main carlines of the roof.

Particular care was taken in designing the hood framing to make it substantial so that it will withstand extraordinary



Illinois Traction Car—Floor Plan

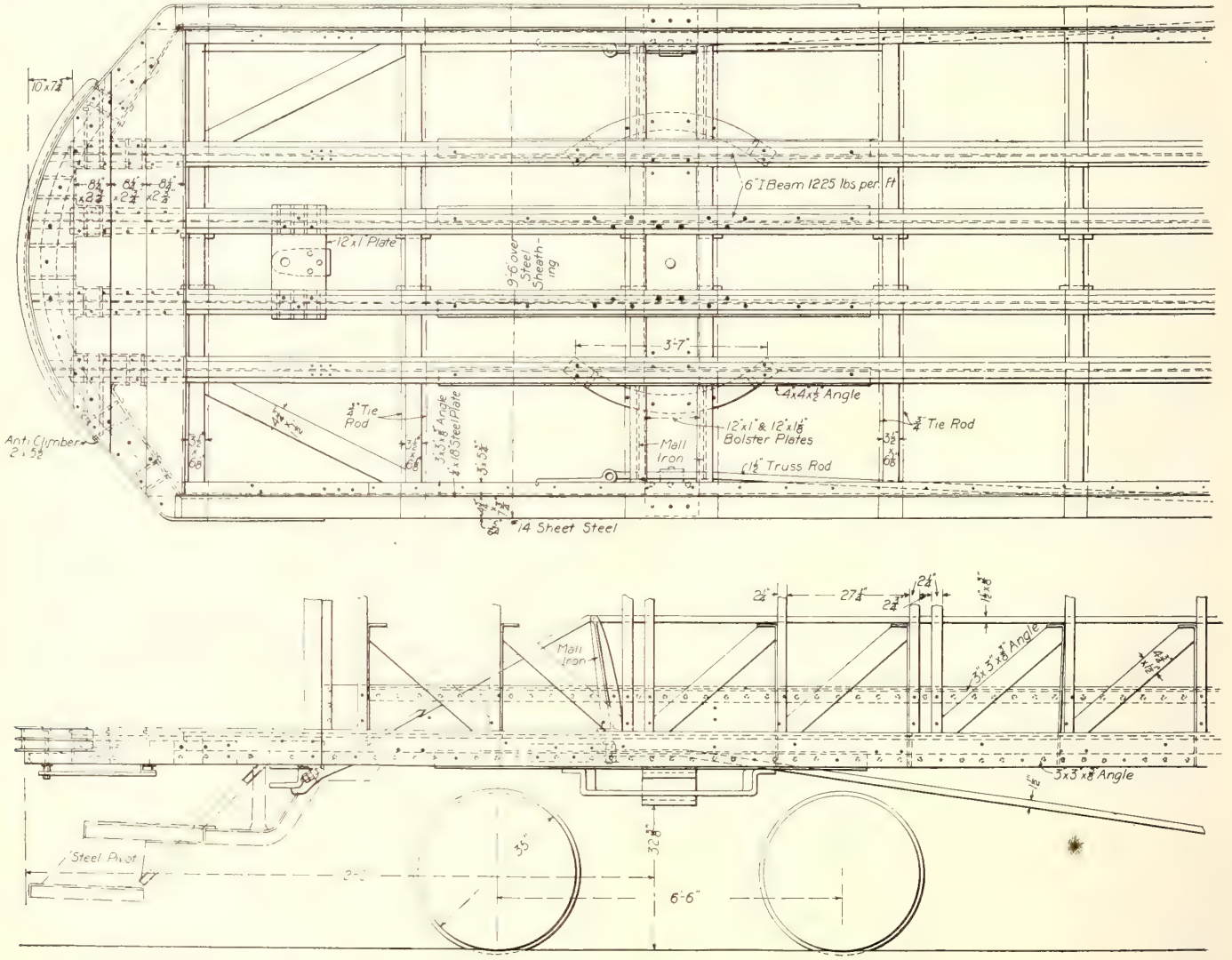
shocks. The hood covering is an extension of the main roof without any offset. Its supports are framed of 1⅜-in. rafters connecting with a 2-in. yellow pine bulkhead and secured by ½-in. strap bolts. The wood rafters are faced on each side with iron carlines and thus the roof of the hood is a stiff structure rigidly tied to the side framing through the bulkhead.

The roof of the cars consists of 9/16-in. matched yellow poplar boards laid with the tongues pointing toward the center of the roof. Over the hoods were laid two thicknesses of 9/32-in. boards steam-bent to form the contour. The entire roof of the cars is painted with two coats of white lead and boiled linseed oil, and then covered with one piece of No. 6 cotton duck applied with No. 10 copper tacks. Drip moldings were made of 13/16-in. yellow poplar and

The roofs of the cars are fitted wtih automatic ventilators for the main ventilation and one ventilator each for the motorman's cab and toilet room, and an air insulated smoke jack for the hot-water heaters. At the points where these ventilators pass through the roof blocking has been inserted to strengthen the roof and ceiling structures. The ceiling openings for the ventilators are fitted with polished bronze shutters which can be operated by the conductor from the aisle. The ventilators in the motorman's cab, toilet room and the smoke-jack top on the heater pipe are 5-in. Globe ventilators.

SHEETING

The outside of the cars below the window sills is sheeted with yellow pine boards 13/16 in. thick gained over the posts and glued and screwed thereto. The upper sheeting



Illinois Traction Car—Half Plan and Side Elevation of Framing

the roofing canvas was fastened to these. After the canvas covering was placed it was treated and painted according to Illinois Traction System standard painting specifications. Small copper eaves troughs were placed over each door opening. These troughs are attached by nails to furring blocks placed on the underside of the roof. A running board continuous for the full length of the car and made of 1½-in. x 6-in. yellow pine rests on ash cleats fitted to the contour of the arched roofs. At a point 11 ft. 4 in. from the rear end of the car blocking was attached for mounting a No. 13 United States trolley base. The rear hood of each car is covered with an ash slat rack to protect the roofs from the trolley wheel. This rack rests on four hickory ribs bent to the contour of the hood and securely bolted to the roof.

is of yellow poplar. Over the sheeting has been placed No. 14 sheet steel, double-rolled and straightened. The joints of the steel plates are covered with battens of 1⅛-in. wagon box iron slightly concave on the inside to retain a strip of lead putty.

The steel sheeting was applied with round-headed steel screws dipped in red lead. The battens are held by oval-headed screws. All the holes in the steel sheeting were drilled and special care was taken to prevent denting the steel. After the sheeting had been applied it was sand-blasted to remove the roll scale and rust before paint was applied. The inside of all the sheet-steel work was painted a coat of red lead and linseed oil before application. An iron batten ¼ in. x 1¾ in. in section extends the full length of the car under the edges of the arm rails.

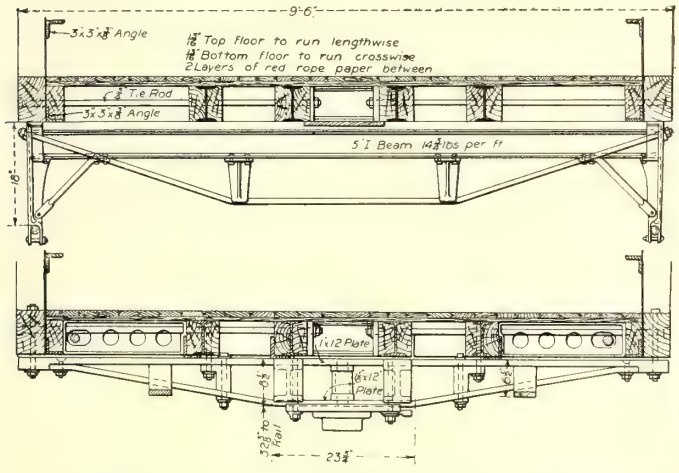
WINDOWS

The windows, of which there are eight on one side and seven on the other, are of the double Pullman type, and are provided with two complete sets of lower and Gothic sashes in each opening. The upper outside Gothic sashes are screwed to the window heads and the letter board from the inside and the construction is such that the sashes can be removed from the outside by removing the retaining battens which are held in position with brass screws. The inner Gothic sashes are so arranged that they may be moved up to permit cleaning the inside of the windows. Both the lower window sashes can be raised 24 in. above the arm rail. The inside sashes have the glass beads removable from the inside and the outside sashes have the beads removable from the outside. All window sashes are fitted with O. M. Edwards anti-rattling devices and window catches.

The front windows of the cars have two complete sashes at each opening. The outside front sashes are stationary and the inside sashes are hung on three brass hinges and have two catches. The windows on the rear platforms have single stationary sash with the exception of the opening in the door, which has a drop sash. All the sashes in the cars are made of 13/16-in. solid mahogany. The glass is 3/16-in. polished American plate and all outside windows and doors are fitted with Bosley's metallic weather strips fastened with 3/8-in. brass escutcheon pins.

COUPLERS

Each car is equipped with two Illinois Traction System standard couplers of the Bosenbury type with spring draft



Illinois Traction Car—Sections of Underframing

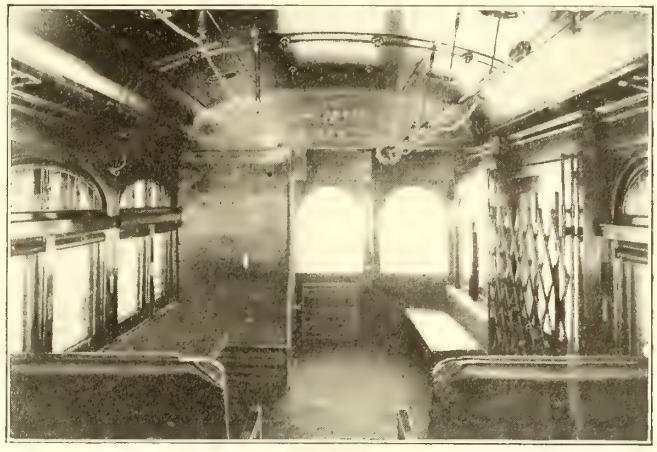
gear made by the National Malleable Castings Company. The draft pockets are made of cast steel and the radial carrying irons are made of 7/8-in. x 3½-in. iron secured to the buffer beam by 3/4-in. square-head bolts, passing through thirteen cast-iron spacing spools and two malleable-iron end stops. The drawbar and spring pocket are made of cast steel. The tail pin of the coupler is at the center of the circle described by the face plate of the buffer beam, which has a radius of 4 ft. 10 in. Each car has one Illinois Traction System standard steel angle pilot held by angles and hydraulic tubing at an elevation of 10 in. above the rails.

INTERIOR ARRANGEMENT

One of the engravings shows the floor plan of these cars. This plan, with slight modifications, conforms to the standard interior arrangement of the Illinois Traction System's passenger equipments. At the forward end is a combination smoking and baggage compartment from which the motorman's cab has been set off. The smoking compartment has two folding longitudinal seats and six cross seats. The baggage door is on the right-hand side of the car and is 48 in. wide. The double-arched interior window covering the baggage-door recess is a single section, hinged at the corner post and having an extra heavy stile and three spring hinges, so that it may be swung into the car to permit cleaning the windows or repairing the baggage-door runway. The main compartment of the car has sixteen cross seats and two small box seats. All the seats are Hale & Kilburn 199-EE reversible with double head rolls, brass corner grab handles and automatic foot rests. The hot-water heating equipment is located in a closet at the right hand of the rear door and the toilet room at the left hand.

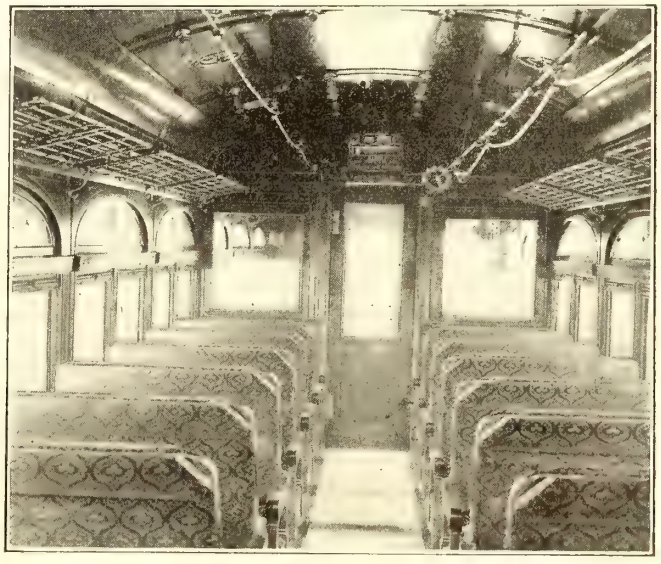
INSIDE FINISH

The inside finish of the car is of Honduras mahogany



Illinois Traction Car—Smoking and Baggage Compartment

above the arm rail and below the crown molding, with the exception of the ceiling bands. The finish below the arm rail is No. 14 sheet steel applied over girths made of long-leaf yellow pine and glued and screwed into position. The steel inside of the car is treated in the same manner as described for the outside sheeting and after application was painted and grained mahogany to match the interior. The ceiling and head lining are formed of three-ply poplar veneer 1/4 in. thick. Between the ceiling and its supports pieces of cloth have been placed at points of contact to prevent squeaking.



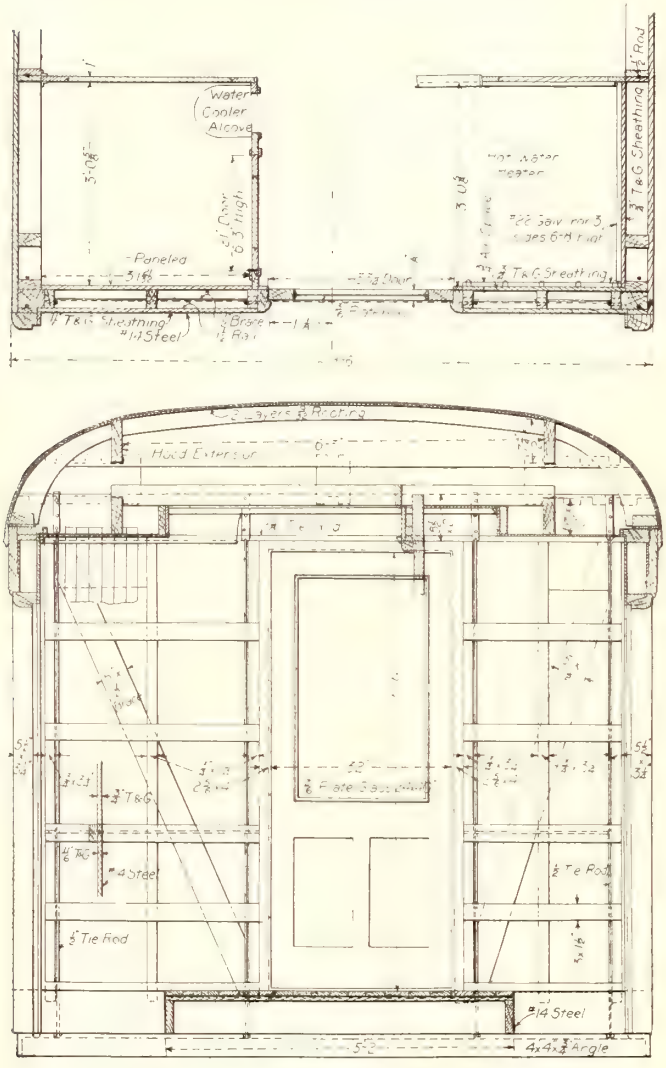
Illinois Traction Car—Passenger Compartment

The motorman's cab at the forward left-hand corner of the car is covered on the smoking compartment side with sheet steel protected at the corners by angle iron. This cab contains a switch cabinet lined with 3/8-in. transite board. The cabinet has no cover, but is protected by three 1/2-in. round iron guards. Under the switch cabinet is a smaller receptacle for the air governor, feed and governor valves. To the left of the switch cabinet is a recess of similar depth provided with coat hooks. The motorman's cab has a double

folding door in the side of the car and a double folding creep door leading into the smoking compartment. Above the latter door is a window. The cab is ventilated by a 5-in. Globe ventilator fitted with a bronze shutter which can be operated from the inside. The crown block from the motorman's cab to the center of the car between the sills was routed out to receive cables and pipes leading from the space between the two center sills.

INTERIOR FIXTURES

All the side windows in the car as well as the window above the creep door to the motorman's cab have Pantasote curtains equipped with O. M. Edwards spring rollers and



Illinois Traction Car—Plan and Elevation of Rear End Framing

Forsyth fixtures with ring tips. The curtain rollers for the side windows are inclosed in mahogany curtain boxes held in place by bronze screws.

As earlier stated, the car contains twenty reversible seats and six stationary seats. All of the stationary seats have cushions similar to those of the reversible seats and have their backs set at the same angle. The two long seats in the smoking room are made with spring bottoms and the edges of the cushions are covered with No. 14 sheet steel with rounded corners. All the seats in the smoking compartment are upholstered in dark green split horsehide and the rest of the seats in the main passenger compartment are upholstered in green frieze plush.

An emergency tool box located over the window in the motorman's cab contains one axe, one 8-lb. steel sledge, one Diston steel-blade hand saw and one small pinch bar. The tool box is lined with plush and all the tools are painted red and lettered "I. T. S."

The car is equipped with one Illinois Traction System sheet-steel sand box and an air sander-trap with Ohio Brass Company's sander valve. The sand pipes and hose carry the sand in front of the wheels of the forward truck.

The center aisle of the car in the main compartment is covered with a strip of plain brown linoleum 24 in. wide and 3/16 in. thick, at each edge of which is a beveled strip of hard maple. The car is lighted by forty incandescent lamps arranged in rows of four lamps across the ceiling at the double window posts. A shift light is provided for illuminating the motorman's cab.

CAR HEATING

Each car is equipped with a No. 1-C Peter Smith hot-water heater connected to three rows of 1½-in. pipe on each side of the car under the continuous foot rest. These pipes extend from the heater compartment at the rear of the car as far forward as the baggage door on the right-hand side, and then under the floor and up into the motorman's cab and return to the rear on the left-hand side of the car. In addition to the hot-water heating equipment each car has twenty-seven Consolidated Car Heating Company's electric heaters distributed as follows: Sixteen under the reversible seats in the main compartment and four under the reversible seats in the smoking compartment; two under one of the longitudinal seats and one under the other longitudinal seat in the smoking room; three heaters mounted against the front lining of the front vestibule. A cab type heater independent of the others is located in the motorman's compartment. The electric heaters are arranged for three degrees of heat and those in the main compartment are controlled independently of those in the smoking compartment.

GRAB HANDLES AND SILL STEPS

Grab handles and steps have been installed to conform to the requirements of the safety appliance law. Two wrought-iron handles have been placed on the front window posts of the cars and a continuous handle extends from the bumper beam up to the front vestibule window sill and across the front and down to the other end of the buffer beam. Wooden grab handles are placed outside of the motorman's cab door; wrought-iron grab handles are placed at each side of the baggage door; one wood grab handle has been placed over each inside rear vestibule door, and one on the outside of each of these doors; two wrought-iron grab handles have been placed on the rear center door posts, two on the rear dash and one at each diagonal corner of the car for mounting to the roof. Wrought-iron sill steps have been placed at the motorman's cab door and the baggage door, and wrought-iron ladders at diagonal corners on the outside of the car.

MISCELLANEOUS FITTINGS

All the trimmings in the car are made of polished bronze. These include match scratchers in the smoking room, door locks, catches and hinges, window catches and hinges, parcel racks, bell and register cord hangers, sign holders, grab-handle sockets and a corner grab handle in the toilet room. The car is equipped with four combination marker and classification lamps of Adams & Westlake manufacture and with four combination flag and marker brackets.

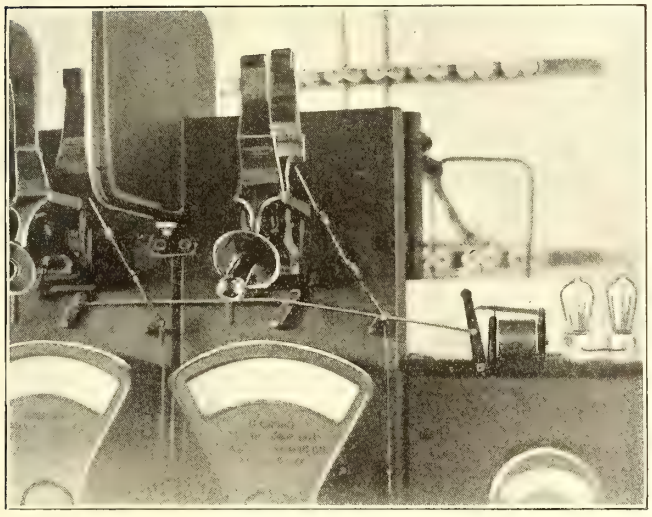
One of the short seats in the main passenger compartment has a well beneath it lined with zinc designed for storage of the marker lamps so as to prevent their damaging clothing. Each car is equipped with one 6-amp automatic Wagenhals arc headlight and supporting brackets on the front dash of the car and on the rear train door. Some of the other miscellaneous equipment includes 3-gal. Alert chemical fire extinguisher, twelve destination signs supported in a wood-lined galvanized iron box, six camp stools with mahogany frames and tops covered with Wilton carpet supported by cotton duck; malleable-iron threshold plates, Illinois Traction System standard window guards, Consolidated Car Heating Company's tow car coupler, Knutson No. 5 trolley retriever. Ohmer interurban type

register, Dayton standard dry closet screen pocket in toilet room, bronze parcel racks built by the Rostrand Manufacturing Company, Milford, Conn.; lazy-tong channel-iron gates for baggage-door opening, oil report-card box, equipment report-card box, train mail box and clip for holding train orders.

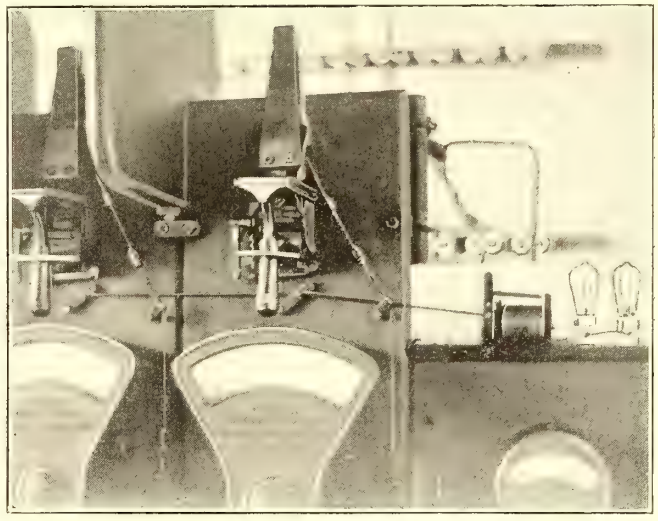
The cars are equipped with hand brakes operated by a vertical acting ratchet lever brake handle installed in one corner of the motorman's cab. This hand-brake equipment supplements the Westinghouse schedule AMS combination straight and automatic air-brake equipment, which has M-22 brake valves and D-2-E-G compressors. Conductor's emergency air valves are provided.

ELECTRICAL EQUIPMENT

The cars are mounted on Baldwin M.C.B. type trucks of 30,000-lb. center-pin capacity. Each truck carries two 303-A, 100-hp Westinghouse interpole motors. The control is Westinghouse unit-switch, type H-L, with combination mechanically and pneumatically operated reversers. The air pipes for the control are painted yellow and those for the brake system are painted black. The electric-light wiring is inclosed in conduit, but the cables are run in three-ply, 1-in. water hose. The main car cables are run in cotton hose and all of the main electrical wiring is protected from chafing and runs through the hollow malleable-iron sill spacers between the center sills. This runway between the center sills is inclosed from below to protect the cables against wheel wash.



Line Circuit Breakers Open



Line Circuit Breakers Closed

The cars are fitted with Westinghouse Air Brake Company's electro-pneumatic signal valves and cords designed for facilitating train operation. The signal apparatus is inoperative unless there is sufficient air on the car to apply the brakes and thus a safety feature is introduced. Cords and valves are so arranged that pulling the cord in any car will blow a signal on both platforms of each car except the motor car, on which the signal is only given at the rear of the car, thus making it possible to hold the conductor of the forward car responsible for the safe starting of the train. The same cord which operates the motorman's signal can be used by him for signaling the conductor of the head car.

During the month of May, 1911, the Employees' Relief Funds of the Pennsylvania Railroad and affiliated lines distributed $186,886.96 in benefits to members. This was an average of $6,028.21 a day. The families of members who died received $58,220.18 and members who were incapacitated for work received $128,666.78. Since the organization of the fund in 1889 a total of $30,820,807.60 has been paid in death and disability benefits.

DISPATCHER'S CONTROL OF LINE CIRCUIT BREAKERS

The Indianapolis & Louisville Traction Company has recently installed in its power station at Scottsburg, Ind., a simple device by means of which the train dispatcher can open the circuit breaker instantly and throw all current off the line. The accompanying illustrations show the method of applying the device on the switchboard in the power house. The small electromagnet, shown at the right is connected to the trolley in series with two banks of incandescent lamps, one of which is mounted on the switchboard and the other in the dispatcher's office. A double-throw switch is inserted in the circuit in the dispatcher's office. With the switch in normal position the current passes from the trolley wire through both banks of incandescent lamps and the electromagnet coil. The resistance of both banks of lamps in series is so high that the current flowing through the magnet coil is very weak and the armature will not attract the tripping latch.

To shut off the current from the line and stop the cars in an emergency the switch in the dispatcher's office is thrown to the second position. This cuts out one bank of incandescent lamps from the circuit and lowers the resistance correspondingly. Sufficient current then flows through the magnet coil to attract a small horizontal tripping lever shown above the coil. This lever acts as a detent for the vertically pivoted lever which is connected to a rod extending across the front of the switchboard. This rod is connected to small bell cranks under each circuit breaker. The shafts of these bell cranks pass through the switchboard and counterweights are attached on the back side. When the electromagnet is energized sufficiently to attract the latch lever the vertical lever is released and the counterweights on the back of the switchboard cause the bell crank arms to move to the left. The bell crank arms strike the latches of the circuit breakers and open them instantly.

As long as the dispacher's switch remains in the second position it is impossible to restore the circuit breakers because the instant the circuit breakers are closed the electromagnet is energized and the detent latch is again attracted. When the dispatcher throws his switch to the second position the bank of incandescent lamps which remain in the circuit burn brightly for an instant and then go out. The dispatcher thus has a positive indication that the tripping device has operated and that the current is off the line.

The details of the device were worked out by H. D. Murdock, superintendent of the Indianapolis & Louisville Traction Company.

Equipment Trust Securities

By W. B. BROCKWAY

This Article Describes the Methods of Issuing Equipment Trusts and Discusses the Character of the Security Covered by Them.

A study of equipment trust securities, as applied to electric railways, brings out little that does not apply also to the same class of securities put forth by steam railroads. Indeed, it is, comparatively, only recently that electric railways have taken advantage of this most excellent form of borrowing for the purpose of providing equipment.

Therefore for the history of the equipment trust plan we must turn to the steam railroads, where it is found that equipment trust securities were first issued in the early seventies. A careful investigation seems to show the surprising fact that there has never been a permanent default in principal and but few instances of delay in the payment of interest upon the securities of this nature. I believe this is a record not equaled by any other form of corporation security either here or abroad.

During the three years of panic and receiverships, 1893-1896, a time when railroads as a class were in a worse condition than they have been since, equipment securities made a most remarkable record. Over 100,000 miles of steam railroad were placed in charge of receivers. The companies which failed had outstanding many millions of dollars of equipment securities of various forms, and in every instance the holders of these securities received payment in full for principal and interest. In many cases the first mortgage bonds were in default and, in the process of reorganization, were scaled down or changed for a junior lien, yet the equipment securities, with few exceptions, suffered no delay in the receipt of interest and in the end obtained par value for both principal and interest.

It is particularly interesting to note, in corroboration of the above, the names of railroads reorganized without loss to the holders of equipment securities. The list is a long one, but only the best known are selected as examples, as follows:

Atchison, Topeka & Santa Fé Railroad.
Baltimore & Ohio Railroad.
Chesapeake & Ohio Railroad.
Northern Pacific Railroad.
Philadelphia & Reading Railroad.
Union Pacific Railway.

In the reorganization of these properties practically all other securities issued by them were scaled either in amount or rate.

The principal reason for this remarkable record is that a railroad cannot operate without equipment. That is axiomatic; therefore it or the court in charge during the receivership cannot afford to permit anything to happen which will deprive it of what may be called, for lack of a better word, its tools. In fact, that particular word has been used in court to explain the importance of recognizing equipment obligations.

The courts have recognized the truth of this and have often permitted receivers to issue their certificates to provide for the payment of interest and instalments of principal.

Thus equipment securities have not only the first lien upon a most necessary part of a railroad property, but their obligations receive a prompt recognition from the courts. Due to the ample and growing margin of value over the debt outstanding, they are always in a very important and satisfactory position from the standpoint of the investor and they bring satisfactory returns to the company.

That buying equipment by the equipment trust method has grown in popularity is expressively shown by the table prepared from the reports of the Interstate Commerce Commission. The ratio of equipment obligations to the total of capital stock, bonds and other interest-bearing debt (excluding ordinary bills or notes payable) has nearly trebled since 1888, but the enormous increase of actual debt outstanding of this nature, the amount outstanding in 1908 being seven times the amount outstanding in 1888, is the best evidence of how this class of security has pleased the investing public and assisted the railroads.

Table I.—Amount of Equipment Obligations Outstanding. From Annual Reports of Interstate Commerce Commission, 1888-1909.

1888	$49,294,329	1899	$42,058,348
1889	Not available	1900	60,308,320
1890	49,478,215	1901	68,116,723
1891	54,755,157	1902	89,208,425
1892	55,153,595	1903	142,980,116
1893	62,699,282	1904	173,334,694
1894	63,970,204	1905	186,302,906
1895	55,915,327	1906	224,719,099
1896	50,304,931	1907	329,773,289
1897	39,888,767	1908	344,592,782
1898	40,351,111	1909	307,869,061

Equipment trusts equaled 0.637 per cent of total stock and funded debt of the railroads in 1888 and they have nearly trebled, increasing to 1.760 per cent, in 1909.

It is interesting to note the effect business depressions have had upon these securities. Table I shows that at every pause in business more equipment trusts are issued than at just before that period; also that the tendency is to reduce the amount outstanding after the depression has passed, or, in other words, to issue the trusts in smaller amounts while the maturities serve to reduce the total outstanding.

This does not by any means argue that equipment trusts are panic makeshifts, but rather that the plan is recognized as the surest one that will permit the company to continue to purchase its equipment without material sacrifice of proceeds of obligations issued. In fact, there are times when they are almost the only obligations which can be issued economically.

The investor finds these securities to be conservative and exceptionally safe. His only regret is the chance of early maturity of his holdings, but as there are always investors in the market who wish short term investments, that objection is easily met. In this connection there are two plans by which the instalments are called. The usual method is to fix the maturity of bonds by number in the agreement; the other plan is to call by lot in the customary manner. In either case the market value is usually close to par.

When issuing an equipment trust the usual plan is for the company to pay 10 per cent of the cost of the equipment in cash. The remaining 90 per cent fixes the amount of the bonds issued. The term of payment is spread over ten years in equal annual or semi-annual instalments. At the termination of the full period, that is to say, at the payment of the last instalment, the title to the whole equipment is turned over to the company in fee and ordinarily falls under the operation of the "after acquired property" clause of a regular mortgage.

An electric-car trust covers not only the car body and trucks but also the electric equipment and air-brake equipment of the car; that is to say, the whole car equipment is treated and covered as a unit. With reference to the financial plan upon which equipment securities are issued and assuming, for example, the average life of equipment at twenty years and subject to a flat depreciation of 5 per cent a year, also that the instalments are payable semi-annually, the plan works out about as follows:

Cost of equipment	$1,000,000
Paid in cash	100,000
Represented by equipment bonds	900,000
Semi-annual installment	45,000
Annual depreciation	50,000

TABLE II.—SHOWING COURSE OF EQUIPMENT SECURITIES.

	Value of Equipment.	Bonds Outstanding.	Security Times Bonds Outstanding.	Company's Equity Per Cent.
When issued	$1,000,000	$900,000	1.11	10.00
After 1st half year	975,000	855,000	1.14	12.25
" 2d " "	950,000	810,000	1.17	14.75
" 3rd " "	925,000	765,000	1.21	17.25
" 4th " "	900,000	720,000	1.25	20.00
" 5th " "	875,000	675,000	1.30	22.90
" 6th " "	850,000	630,000	1.35	25.85
" 7th " "	825,000	585,000	1.41	29.10
" 8th " "	800,000	540,000	1.48	32.50
" 9th " "	775,000	495,000	1.57	36.20
" 10th " "	750,000	450,000	1.67	40.00
" 11th " "	725,000	405,000	1.79	44.20
" 12th " "	700,000	360,000	1.94	48.55
" 13th " "	675,000	315,000	2.14	53.25
" 14th " "	650,000	270,000	2.41	58.50
" 15th " "	625,000	225,000	2.78	64.00
" 16th " "	600,000	180,000	3.33	70.00
" 17th " "	575,000	135,000	4.26	76.50
" 18th " "	550,000	90,000	6.11	83.60
" 19th " "	525,000	45,000	11.70	91.42
" 20th " "	500,000	.....	....	.....

A short consideration of the accompanying diagram shows the course of the debt clearly. The diagram is based on semi-annual payments and shows diagrammatically the facts given in Table II. The line marked "security times debt outstanding" is the one which most clearly gives the value of this plan of borrowing in the eyes of the lender. Because of the steadily reducing amount of debt outstanding and also because of the condition in the deed of trust that the title of the whole equipment stays with the trustee until the last instalment is paid, the margin of safety to the lender has, at the sixth year, climbed to twice the amount of outstanding debt. From the sixth year the rise is rapid until at the ninth year the security is just over six times the debt.

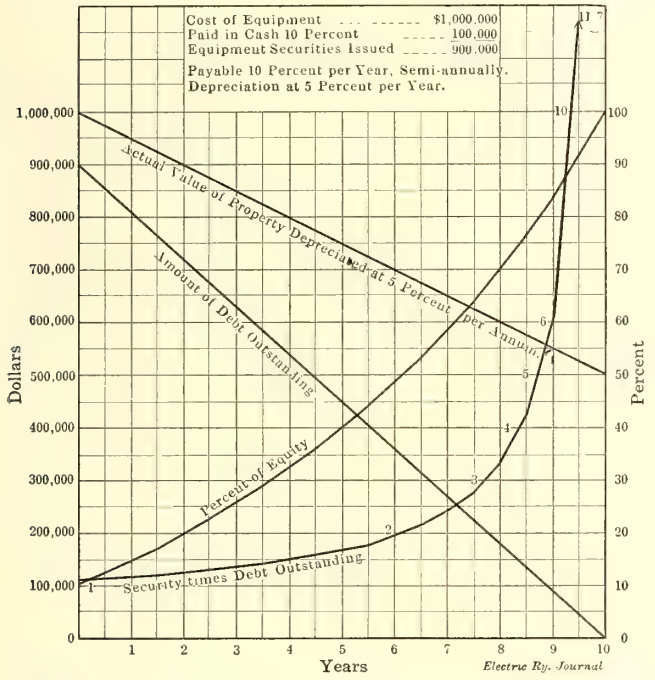


Diagram Showing Relation Between Security and Debt Outstanding

From the point of view of the railroad the curve giving the per cent of equity is of much interest. In six years the margin is 50 per cent and it increases rapidly thereafter.

In electric as well as in steam railroad practice there are in general use three methods by which equipment securities are issued. In each of the three the railroad is obligated for any loss which may arise.

The first method is to purchase the equipment through an association which leases the equipment to the railroad. The lease is deposited with a trustee which issues its car-trust certificates against the lease.

Another form follows the first, except that the association sells its own stock instead of using the trustee's certificate. The certificates of stock in this instance are ordinarily guaranteed by the railroad.

These two methods are known as the "Philadelphia plan." The third method, now most used, is a direct first-mortgage equipment bond issued by the railroad itself. The trustee in this case holds the title under lease or else sells it conditionally to the railroad.

The result of each of these plans is the same, viz.: Not until the last security is taken up is the equipment deeded by the trustee or the association to the railroad.

Under certain of the above conditions the interest upon the notes is called a rental but under other plans it is called interest.

Speaking broadly, the form of agreement between the railroad and the trustee follows closely the form of an ordinary mortgage, although the length of the agreement or the trust deed, as the case may be, is very much shorter, due to the less complicated nature of the property mortgage. Of course, the conditions provided in the agreements vary, probably no two agreements being exactly alike, but, in general, provision is made somewhat like the following, which is taken from a car trust agreement issued by an electric railway company:

The company acknowledges receipt of the equipment, which is described by number and class.

Title is to remain with trustee until last bond is paid.

Bonds are to be retired in either semi-annual or annual instalments in accordance with the plan agreed upon.

The wording of the bond is given in full.

Bonds must be certified or countersigned by the trustee.

Bonds may be registered as to principal.

Temporary bonds may be issued.

Maturing coupons are to be paid in gold in the usual manner.

Gold coin with which to retire maturing bonds, or the entire issue if called, is to be deposited by the company with the trustee.

Company is to pay all taxes.

Equipment is to be kept in full repair and cars destroyed are to be replaced with others "of like character and equal value."

Cars are to be plainly marked showing the trustee to be the owner and lessor.

Equipment is to be insured at the expense of the company and loss, if any, is to be paid to trustee.

Mortgage is to be recorded.

Company is to make periodical reports of condition of equipment, and trustee is to have the right of inspection and the further right to require repairs which it may consider necessary after inspection.

The usual terms relating to default and seizure and sale of equipment and disposition of proceeds are provided. The company agrees to be liable for any deficiency as a result of such sale.

The trustee may be removed, or resign, and its place be filled in the ordinary manner, and it is not to be held personally responsible for acts performed in good faith.

Trustee agrees to convey title to the company upon payment of the last obligation and expenses of the trust.

The resemblance of an equipment trust deed to the ordinary mortgage of a railroad is thus seen to be quite marked.

The courts are now rather generally permitting executors to invest trust bonds in equipment securities, especially when another bond of the same company is acceptable for such investment. Hence, equipment obligations, when issued by a railway, must not be taken as an indication of financial weakness, but as showing that the company is taking ad-

vantage of a modern partial payment method to replace equipment out of earnings. It is thus a form of depreciation.

The securities are not listed upon stock exchanges, but on account of their equity and the importance placed upon them by the courts they are always in demand and are liquid investments to a marked degree.

Only during the last few years has the plan been adopted by the electric railways. The census of 1907 made no separate tabulation of car trusts, and as that is the only source of complete information available for electric railway statistics, no figures can be obtained. The plan is being taken up more widely and successfully from year to year and there seems no good reason why the equipment trust should not be as satisfactory to the electric roads as it has been to the steam railroads.

CHANGE OF MAILING DATE

Beginning with the issue of July 15 the Electric Railway Journal will be issued and put in the mails on Saturday morning of each week instead of on Thursday afternoon. This will allow the publishers to keep the news and editorial columns open thirty-six hours later than formerly and to include in the issue of the current week news of conventions and other events occurring as late in the week as Thursday. It is hoped that this change, with the increase in size of type introduced with the issue of July 1, will be appreciated by the readers of this paper.

MEETING OF AMERICAN SOCIETY FOR TESTING MATERIALS

The American Society for Testing Materials held its fourteenth annual convention in Atlantic City June 27 to July 1, inclusive. Among other subjects considered were specifications for hard-drawn copper wire and specifications for rolled-steel wheels and heat-treated axles.

The specifications for hard-drawn copper wire submitted this year were amended so as to provide a more practicable test for small sizes of wire. The requirements for all sizes are the same as those submitted last year except that the percentage of elongation is increased for the smaller sizes.

The specifications for rolled-steel wheels which were submitted by committee A-1 on standard specifications for steel were referred back to the committee for further consideration. The specifications for heat-treated axles, however, were approved and will be submitted to letter ballot for adoption. As they differ in several important respects from the specifications submitted by the committee on heavy electric traction of the American Electric Railway Engineering Association they are reprinted below.

PROPOSED STANDARD SPECIFICATIONS FOR HEAT-TREATED CARBON STEEL AXLES, SHAFTS AND SIMILAR PARTS

1. Steel under this specification shall be made by the open-hearth or other approved process.

2. A sufficient amount of discard must be made from each ingot to insure freedom from piping and undue segregation.

3. The steel shall conform to the following limits in chemical composition:

Carbon	Not over 0.60	per cent
Manganese	0.40 to 0.80	" "
Phosphorus	Not over 0.05	" "
Sulphur	" " 0.05	" "

4. Drillings shall be taken from the crop end of one axle, shaft, or similar part from each melt represented, parallel to the axis on any radius one-half the distance from the center to circumference, to determine whether the chemical composition of the heat is within the limits of Par. 3.

In addition to the complete analysis, the purchaser has a right to call for a phosphorus determination, to be made from turnings from each tensile test specimen, and the phosphorus must show within the limits of Par. 3.

5. The steel shall conform to the following minimum physical properties:

Ultimate strength, lb. per sq. in.	85,000
Elastic limit	50,000
Elongation in 2 in., per cent.	22
Reduction of area	45

The elastic limit shall be determined by extensometer. Above 40,000 lb. per square inch each increment of load shall be not more than 1000 lb. per square inch.

6. The test specimen, 0.5-in. diameter and 2-in. gage length, shall be used to determine the physical properties as specified in Par. 5. Test specimens shall be taken from the crop end of one axle, shaft, or similar part, from each treating-plant heat; if more than one open-hearth heat is represented in a treating-plant heat, a test shall be taken from each open-hearth heat represented. A full-size prolongation shall be left on each axle, shaft or similar part.

7. A cold bend test shall be made from the crop end of one axle, shaft, or similar part, from each treating-plant heat; if more than one open-hearth heat is represented in a treating-plant heat, a test shall be taken from each open-hearth heat represented. The test shall be made with a ½-in. square specimen, 6 in. in length, around a flat mandrel with edges of ½-in. radius, and the specimen shall bend, without fracture, 180 deg. around the said mandrel.

8. Specimens for tensile test and cold bend test shall be taken parallel to the axis of the axle or shaft and on any radius half way from the center to the circumference.

9. In case the physical results obtained from any lot of axles, shafts, or similar parts, do not conform to those called for by Par. 5 and 7, the manufacturer shall have the privilege of re-treating such parts, from which new tests shall be taken by the purchaser, and these shall govern the acceptance or rejection of the lot.

10. Each axle, shaft or similar part shall be allowed to cool after forging, shall then be reheated to the proper temperature, quenched in some medium, allowed to cool, and then reheated to the proper temperature for annealing.

11. Warped axles or shafts or similar parts must be straightened hot—that is, at a temperature above 900 deg. Fahr., and before offering the parts for test.

12. All axles, shafts and similar parts shall be free from cracks, flaws, seams or other injurious imperfections when finished. Those which show such defects while being finished by the purchaser will be rejected and returned to the manufacturer, who must pay return freight.

13. All axles, shafts and similar parts must be rough-turned with an allowance of ⅛ in. on surface for finishing, except on collar, which is to be left rough forged. Turning must be done on 60-deg. centers with clearance at point.

14. The heat number shall be stamped on the rough forged collar. After rough turning the manufacturer's name, heat number, individual axle or shaft number and inspector's mark shall be stamped at place indicated by the purchaser, except at any point between the rough collars.

15. The inspector representing the purchaser shall have free entry, at all times while his contract is being executed, to all portions of the manufacturer's shop which concerns the manufacture of material ordered. All reasonable facilities shall be afforded to the inspector by the manufacturer to satisfy him that the axles, shafts and similar parts are being furnished in accordance with the specifications. All tests and inspection shall be made at the place of manufacture prior to shipment and free of cost to the purchaser. The purchaser shall have the right to make tests to govern the acceptance or rejection in his own testroom, or elsewhere, as may be decided by the purchaser, such test, however, to be made at the expense of the purchaser and to be made prior to the shipment of the material. Unless otherwise arranged, any protest based on such tests must be made within six days to be valid. Tests and inspection shall be so conducted as not to interfere unnecessarily with the operation of the mill.

COMMUNICATION

PLAN OF MEMBERSHIP IN N. E. L. A.

MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY

Milwaukee, Wis., June 26, 1911.

To the Editors:

Referring to the recent convention of the National Electric Light Association in New York, May 29 to June 2, and to the marvelous growth in the membership of that association, particularly in Class A company members and Class B associate members, composed of officers and employees of company members, unquestionably the most potent factor in increasing the membership has been the formation of "company sections."

This company has recently formed a "company section" of the National Electric Light Association with a membership of 101, 94 of whom became Class B members of the National Electric Light Association in order to be eligible for membership in the "company section." This means that there were added to the Class B membership roll 94 members, who, presumably, would not have otherwise become Class B members of the National Electric Light Association, and would not be eligible for nor be able to participate in the advantages of membership in the "company section."

The advantages of "company sections" to the companies, their employees and the National Electric Light Association are so well understood as to need no specific mention here. These advantages are mutually beneficial and of far-reaching importance.

This company, being a member of the American Electric Railway Association as well as of the National Electric Light Association, feels that the formation of "company sections" in the American Electric Railway Association, along the lines laid down and followed by the National Electric Light Association, would accomplish the same relative and comparative good results for the American Electric Railway Association and for the interests which it represents as have been accomplished by the National Electric Light Association and for the interests which it represents.

As the recognized and authoritative organ of the electric railway business, if this suggestion appeals favorably to you, or if you consider the matter of sufficient importance to bring it to the attention of your readers, you are at liberty to publish this letter, if you so desire.

C. N. DUFFY, Comptroller.

Mr. Duffy's letter suggests that an outline of the present organization and different classes of members of the National Electric Light Association may be of interest to those who are not acquainted with the plan of organization of the National Electric Light Association. There are five different classes of members as follows:

Class A members are company members, and are the only ones who vote. The privilege of holding office is confined to representatives of member companies. The dues of member companies depend upon the population of the city in which the lighting company is located and vary from $10 a year to $1,250 a year.

Class B members are officers or employees of member companies and are elected and continued from year to year as members only with the consent of the member company with which they are connected. They have the privilege of attending the open meetings of the association. They may also attend the executive sessions if they have the consent of the member company with which they are connected. The "company sections" mentioned by Mr. Duffy are made up of Class B members by the organization into local sections of the employees of individual member companies. These company sections hold frequent sessions at which technical subjects are discussed. The advantages of a section of this kind over an ordinary electrical club within the ranks of the company are that each member receives all of the publications of the association and so is kept in touch with the technical progress of the industry. These reports and the Monthly Bulletin and Question Box form the basis in many instances of the discussions at the meetings of these company sections. The dues of Class B members are $5 a year for any section other than a company section and $2.50 additional for membership in each additional section.

Class C members are instructors, teachers and practitioners of engineering and related sciences, who are interested in the objects of the association. They may become members only upon the annual invitation of the executive committee, and they may attend the open meetings of the association. The dues are $5 per year.

Class D members are the manufacturing companies, which in the American Electric Railway organization are members of the Manufacturers' Association. Publishers and firms of consulting engineers also come in this class. They have the same privileges as Class C members. The dues are $20 a year, plus $5 for each representative or guest enrolled under the company's name at the annual convention.

Class E members are individuals connected with the corporations which are Class D members. They are elected and continued from year to year only with written consent of the company with which they are connected. The annual dues for Class E members are the same as for Class B members.

NUMBER OF MEMBERS NATIONAL ELECTRIC LIGHT ASSOCIATION AS OF JUNE 24.

	1909.	1910.	1911.
Class A	731	850	962
Class B	2,079	3,757	6,942
Class C	0	0	19
Class D	194	219	231
Class E	133	688	837
Total	3,137	5,514	8,991

Some figures on the growth of the different classes of members of the Electric Light Association during the last two years may also be of interest in this connection. They are given in the accompanying table.—EDS.

SELECTIVELY OPERATED SEMAPHORE AND TELEPHONE EQUIPMENT FOR ELECTRIC RAILWAYS

The Western Electric Company, in conjunction with the Union Switch & Signal Company, has been working on a combination telephone and semaphore system which would provide a selectively operated semaphore signal for use in connection with the telephone train wire—that is, instead of having a selector on the telephone circuit ring a bell at a way station, the semaphore at this point will be thrown. This gives the dispatcher a chance to get into communication with any train crew. The economy of time and the increased safety of operation resulting from a combined semaphore, selector and telephone equipment are important advantages of this system.

The semaphore selector and telephone equipment are mounted on the same iron post in a weatherproof box, making the apparatus self-contained. The box is locked so that access to it is obtainable only by means of keys which would be furnished to the proper parties. The semaphore signal is of standard make and can be furnished in either the upper or lower quadrant types, as desired. A three-spectacle casting is provided. The semaphore blade itself can be furnished of any type or shape desired.

Everything is arranged for facilitating maintenance work. Terminals of ample size are used throughout in the apparatus, and practically all maintenance connections inside the casting are made with terminal screws or hexagonal lock-nuts. The wiring throughout is of insulated weatherproof braided wire, conforming with good signal practice.

All of the wood which is used in the interior of the set is oil-treated. The telephone and selector are inclosed in an inner compartment. All openings are arranged so that water cannot enter the set. In addition, the outer door of the set has a weatherproof gasket, rendering it practically impervious to moisture.

The signal mechanism is of the electrically operated type, but is manually restored. The operating relay is normally de-energized, and ten dry cells are required for its operation. As this relay will operate on four cells, an ample margin of battery is allowed. The signal mechanism proper is contained in the compartment at the top of the casting. The only part of this which appears on the surface of the inside door is the handle of the restoring lever. The selector and terminals are readily accessible for maintenance purposes.

One important feature of the selectively operated semaphore is the fact that it gives to the dispatcher an answer back which cannot be mistaken, telling him that one particular semaphore has completed its movement and is at the "stop" position at the time the answer-back signal is received.

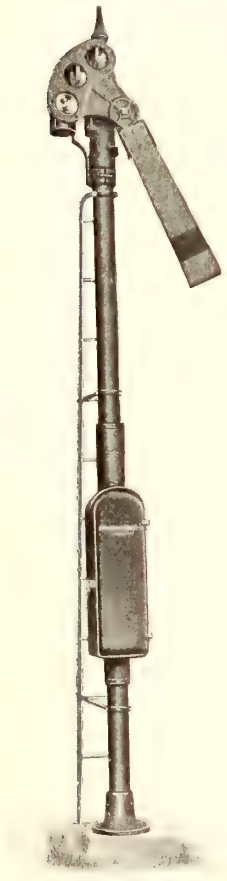
The telephone set is especially designed for railway work and is of high efficiency. The transmitter and receiver are mounted on the outside of the inner door on the lower part of the apparatus casting. The transmitter mouthpiece is of metal and so fastened in the set that it cannot be removed without opening the inner door. All parts are arranged so that they can be easily inspected and maintained. All metal is given a black finish, which eliminates any chance of rusting.

The signal mechanism is operated by the Western Electric's latest type of railway selectors. This selector is practically independent of weather conditions and is asserted to be absolutely reliable. It is in operation at the present time on eighteen of the largest railroad systems in this country, where it is giving universal satisfaction.

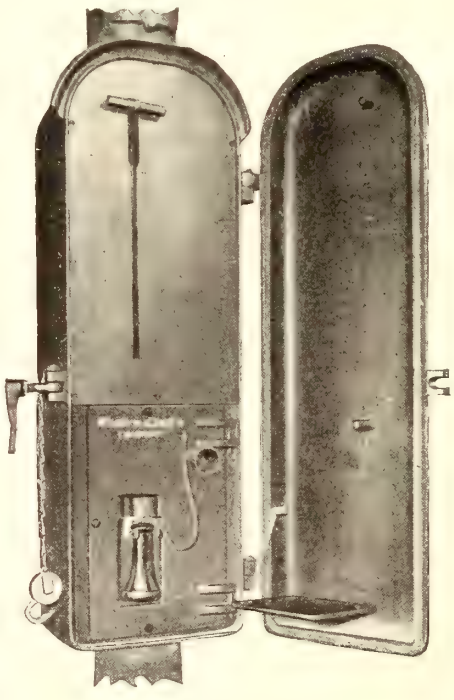
The circuit arrangements of the signaling equipment above described are very similar to the standard Western Electric train dispatching circuit. The dispatcher operates selector keys in the same manner; instead, however, of a bell ringing at the point called, a semaphore blade moves to "stop." The answer-back signal returns to the dispatcher clearly and distinctly and then he waits for the crew of the train so signaled to call in. Should he be disconnected from the circuit for any reason the crew can easily call him, but ordinarily operating practice does not require this. Only one pair of wires is needed to extend along the line. As many sets as may be desired can be connected to this circuit, and it is used both for talking and signaling. All equipment is bridged directly across the circuit and any piece of apparatus can be taken off the line without affecting the rest of the equipment.

The use of these instruments affords an exceedingly flexible system, for as many semaphores can be located upon one telephone circuit as necessary, in addition to the telephone apparatus.

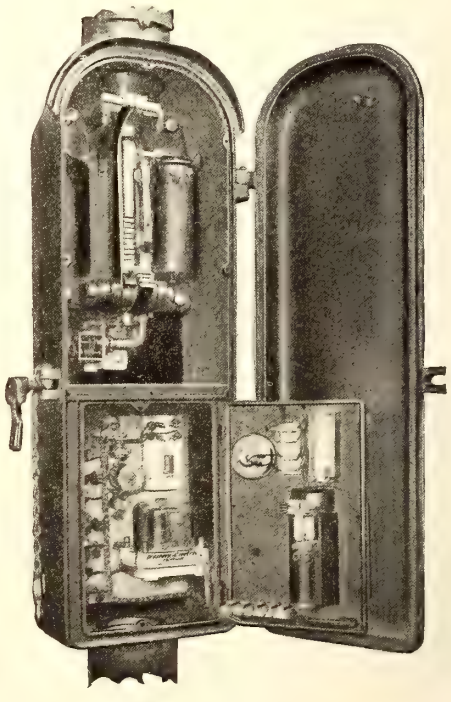
If desired, standard telephone apparatus can also be used at other points along this circuit where semaphores are not located. This semaphore equipment can also be placed upon existing train wires which are being operated by means of the telephone. In addition to being exceedingly flexible, the use of these semaphores insures an accurate, speedy, convenient and economical method of handling train movements.



Signal Post



Outer Door Open



Inner Door Open

A 35-TON ELECTRIC LOCOMOTIVE

The Woodward (Ala.) Iron Works have ordered a 35-ton slow-speed locomotive from the General Electric Company. It will be used for hauling coke. The locomotive makes about fifty round trips a day, the approximate length of each trip being 2000 ft., and it handles about 20 tons of coke per trip. There is a 3 per cent grade about 300 ft. long. The locomotive has all-steel framing and cab and arch bar truck. It is equipped with type M single unit control.

The platform framing consists of six pieces of channel and two large plates, all riveted. Of these two 8-in. side channels 18¾ lb. per foot and two 7-in. center channels 17¾ lb. per foot run the whole length of the platform. A box casting forming the drawhead is riveted between the center channels and to an 8-in. cross channel that forms the end framing. The outer longitudinal channels are also riveted to the same cross channel through forged knees.

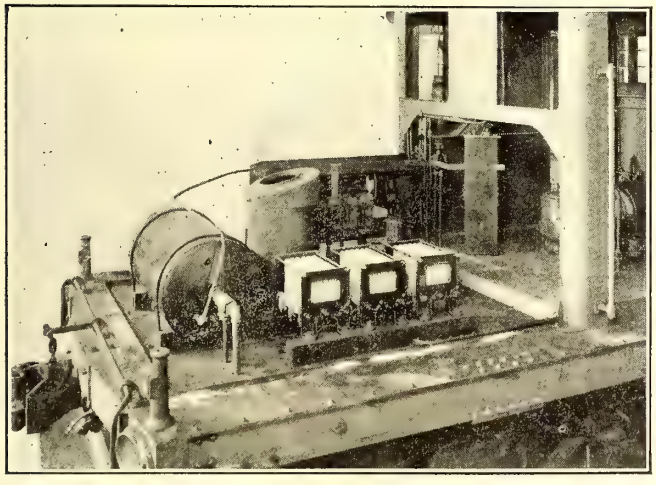
All this channel framework is connected and squared by two heavy plates, each of which covers half the length of the platform and runs the entire width, forming the floor of the locomotive. The whole forms a simple and substantial design.

The draft gear is a Climax No. 3 M.C.B. freight coupler with 5-in. x 5-in. shank fitted with yoke springs and follower plates. It is carried in an extension of the drawhead casting, which is riveted to the center sills and end frame, so that hauling and buffing stresses are transmitted directly to the principal members of the locomotive frame. An oak buffer beam cushions buffing shocks.

The center pin is a steel casting riveted to a bolster formed of upper and lower plates, each ¾ in. x 17¾ in. Of these the lower plate passes under all three sills and is riveted to them, while the upper plate passes under the center sills, and turning sharply upward butts against the outer sill near the floor plate. Thus there is formed a truss of great vertical rigidity which assists in transmitting the weight of the platform to the center pin.

The ballast consists of 2-in. rolled bars lying between the sills and running the whole length of the platform. They are notched over the bolster plates and bolted to the sills, thus strengthening the platform framing instead of serving merely as dead weight.

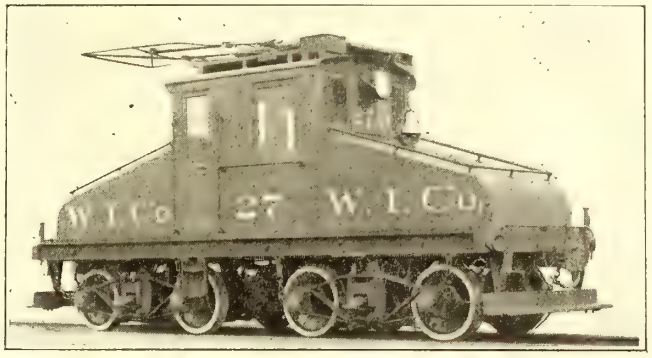
The members of the truck side frame are forged bars 4 in. wide. The journal boxes are steel castings carried between the top bar and tie bar by pedestal bolts and fitted with bronze bearings and wedges. Malleable-iron bolster guides are bolted in between top bar and arch bar with 1½-in. bolts and a spring plank consisting of a 12-in. steel channel is riveted to these bolster guides. The bolster itself is a steel casting of a box girder design approximately 8 in. x 10 in. deep, with the lower center pin formed in the upper surface of the casting. Cast-iron side bearings are bolted to the outer ends of the bolster. The weight of the bolster and center pin load is carried on full elliptic springs built up of ⅜-in. plates 6 in. wide and designed for a normal load of 12,365 lb. each. The brake rigging is inside hung. A 12-in. x 12-in. brake cylinder is located midway between the trucks and attached to the center platform sills. The brake piston is attached to the truck levers through a system of



Apparatus of Woodward Locomotive in Place with Cab End Removed

floating levers arranged symmetrically on the two sides of the locomotive.

The central cab contains the apparatus directly manipulated in the control of the locomotive, while the auxiliary end cabs contain the auxiliary apparatus. The width of all the cabs is slightly less than the platform width, leaving a running board about 10 in. wide. The cabs themselves are built of soft sheet steel plates. Doors and windows are framed in small angles and channels riveted to the inside of the cab sheet and serving the double purpose of framing the doors and windows and of stiffening the cab sheets. The view of an end cab removed shows the arrangement of the auxiliary apparatus. At the outer end of the platform are located the air reservoirs and sand boxes. Next to them the rheostats are located on one side and a bank of contactors upon the opposite side, the latter supported on a channel iron framework built up from the floor of the locomotive. All wiring in the locomotive is drawn through conduits which were built into the locomotive during construc-



Slow-Speed Locomotive for the Woodward Iron Works

tion. The conduits and piping in the main cab are bracketed against the walls. A false flooring of wood in the main cab covers all the conduits and pipes which are cleated to the iron floor beneath. In the center of the main cab there is a CP-28 air compressor.

The locomotive operates at 220 volts. The motor equipment consists of four GE-57-H motors furnished with gearing giving a ratio of 4.25 to 1. The motors can develop a tractive effort of 10,000 lb. at the rated one-hour load with a speed of 6 m.p.h.

A US-106 bow trolley on the cab roof will make contact with a trolley wire having a variation in height from 15 ft. to 22 ft. above the rail heads. The fuse box and lightning arrester are also mounted on the cab roof.

The engineer's operating seats are placed at diagonally opposite corners of the main cab. A C-74-A controller is located near the engineer's left hand. Directly in front of the engineer are located the handles for sander and brake valves. One brake valve operates the automatic air system for braking the train, the other the straight air system applied to the locomotive alone. The air compressor furnishes air also for dumping the cars and for closing the doors of the coke ovens. An illuminated duplex air gage is placed at the right-hand side of the engineer's window. The headlights are of the G.E. luminous arc type. A switchboard in the interior of the main cab contains the switches for the auxiliary circuits, including one main auxiliary switch, two switches for headlights, one for cab lights, one for compressor and two switches for control circuits. All these auxiliary switches are of the MS-46 type.

A 50-lb. bell is mounted on one end and an air-operated whistle on the other. These are operated through bell and whistle ropes leading to the engineer's positions. The locomotive is fitted with a tool box and other miscellaneous equipment, such as flags, screw jacks, oil cans, etc. The general dimensions and main specifications of this locomotive follow:

Length inside of knuckles	26 ft. 0 in.
Length over cab	22 ft. 6 in.
Height over cab	10 ft. 9 in.
Height with trolley down	12 ft. 0 in.
Width over all	8 ft. 6 in.
Total wheel base	18 ft. 0 in.
Rigid wheel base	6 ft. 0 in.
Track gage	4 ft. 8½ in.
Weight electrical equipment	17,400 lb.
Weight mechanical equipment	52,600 lb.
Weight, total	70,000 lb.
Air compressors	General Electric CP-28
Compressor capacity	25 cu. ft. per minute
Control	Type "M" single unit
No. steps series parallel	6
No. steps parallel	4

ELECTRIC RAILWAY LEGAL DECISIONS

LIABILITY FOR NEGLIGENCE

Georgia.—Landings for Passengers.

Generally the duty which the law imposes upon an ordinary railroad company to provide and maintain a safe place for landing its passengers is not applicable to a street car company operating its line along a public street of a city and not stopping at regular places selected by it, or providing places for passengers to get on and off its cars, but stopping such cars at street crossings or various intermediate places upon signal from a passenger.

Under such circumstances it is the duty of the company and its agents or employees representing it to use due diligence to select a reasonably safe place for landing its passengers, and to make such selection with reference to getting off the car while it is at rest. (Turner v. City Electric Ry. Co., 68 S. E. Rep., 735.)

Massachusetts.—Controller Explosion—Res Ipsa Loquitur.

That an explosion occurs in the controller box of a street car which up to the time of the explosion was running smoothly is not, under the doctrine of res ipsa loquitur, a showing of gross negligence on the part of the operatives of the car. (Martin v. Boston & N. St. R. Co., 91 N. E. Rep., 159.)

Massachusetts.—Rights of Travelers on Street—Collision.

That a passenger of an elevated railroad was injured by falling over parcels negligently left in the doorway of the car by another passenger does not render the carrier liable for the injury, in the absence of a showing that defendant had notice of the obstruction, or that it had existed for such a length of time that defendant should have known thereof. (Lyons v. Boston Elevated Ry. Co., 90 N. E. Rep., 419.)

Massachusetts.—Injuries to Person on Track—Excessive Speed.

A street railroad is liable for injuries resulting from a collision with a motorcycle at a crossing of a city street, where the car approached at the rate of 40 mlies an hour and, if it had approached at a reasonable speed, plaintiff could have seen it in time to have crossed in safety. (Robbins v. Dartmouth & W. St. Ry. Co., 89 N. E. Rep., 1039.)

Massachusetts.—Injuries to Passengers—Contributory Negligence.

Where a passenger while boarding a street car was injured by placing his hand on the door as it was opening, the fact that in feeling for the handle plaintiff may have accidentally put his hand on the door before it was entirely open would not constitute contributory negligence if he was in the exercise of due care and the injury which he received was due either to the negligent manner in which the door was operated or to a defect in the construction of the car. (Carter v. Boston & N. St. Ry. Co., 91 N. E. Rep., 143.)

Massachusetts.—Injuries to Passengers—Negligence.

In an action for injuries to a passenger falling into the space between the car and the platform while attempting to board a car at a subway station, it appeared that the clearance of 3 in. between the cars and the platform was the minimum clearance necessary. The distance between the center of the end door of the second car and a five-car train was normally 8 in. and might vary 2 in. more or less, owing to the swing of the car. The passenger attempted to board the second car through the end door, and fell into the space between the car and the platform, estimated at 9½ in. Held as a matter of law not to show the carrier's negligence in failing to use a movable platform or other appliance, so as to lessen the space between the platform and the car.

That an elevated railway took steps to prevent a repetition of an accident occasioned by a passenger falling into the space between the car and the platform while attempting to board the car was not evidence of prior negligence. (Anshen v. Boston Elevated Ry. Co., 91 N. E. Rep., 157.)

Michigan.—Master and Servant (Sec. 185*)—Negligence of Fellow Servants.

Plaintiff, a street car conductor, was injured while on the running board by his foot coming in contact with a loaded wheelbarrow negligently left too near the track by one of the company's sectionmen for such a short time that it did not have actual or constructive notice of the obstruction. Held, that a master is not liable for injuries caused by a transitory act of a co-servant in using a safe appliance negligently, so that the company was not liable for plaintiff's injuries, the car and roadbed being a safe place of work in absence of the servant's negligence. (Wickham v. Detroit United Ry., 125 N. W. Rep., 22.)

Michigan.—Personal Injuries—Excessive Damages.

A female passenger on a street car was injured in a collision. She testified that she was struck on her forehead and become unconscious, and that she was injured on her nose, arm, chest, mouth and ankle, and that since the accident she had always been sick and dizzy, while before the accident she had been in perfect health, doing her own work and earning wages besides. A physician who had treated her up to thirty days of the trial, occurring about twenty months after the accident, testified that she had recovered as far as could be seen. Held, that a verdict for $2,000 was not excessive. (Plozke v. Detroit United Ry., 127 N. W. Rep., 700.)

Missouri.—Injuries—Negligence—Failure to Stop Car.

That a four-year-old child after leaving the curb merely hesitated for a brief time in the street from childish indecision before advancing on to the track did not give the motorman the right to proceed under the idea that the child did not intend to go on to the track. (Simon et al. v. Metropolitan St. Ry. Co., 132 S. W. Rep., 250.)

Missouri.—Damages.

Plaintiff, who was injured by being thrown from defendant's street car, was forty-four years old, in good health, and earned $35 to $40 a month for eight months in the year as a school teacher. Her injuries were permanent, and it was probable that she would never be able to earn anything in the future, and she had suffered great pain from her injuries. Held, that a verdict for $5,000 was not excessive. (Torreyson v. United Rys. Co. of St. Louis, 129 S. W. Rep., 409.)

Missouri.—Injuries to Travelers—Negligence—Contributory Negligence—Prima Facie Case.

Where plaintiff before driving on a street car track at night looked to see whether there was a car coming, and his companion thereafter kept a constant lookout for cars while plaintiff was driving on the track, where he was struck and injured by a car approaching without a headlight, in violation of an ordinance, such facts established a prima facie case of defendant's negligence and plaintiff's freedom from contributory negligence. (Maness v. Jopin & P. Ry. Co., 130 S. W. Rep., 87.)

Missouri.—Injuries to Passengers—Care as to Enfeebled Person.

Where an old lady in an enfeebled condition boarded a street car, the conductor who had watched her was negligent in giving a signal to start the car before she had had a reasonable time in which to take a seat, rendering the railroad liable for injuries sustained to her by being thrown against the side of a seat by the starting of the car. (Brady v. Springfield Traction Co., 124 S. W. Rep., 1071.)

Missouri.—Carriage of Passengers—Street Railways—Care Required—Contributory Negligence.

It is the duty of a street railway company to exercise that high degree of care for the safety of passengers that a very careful person would use under like circumstances.

In an action for injuries to a street car passenger struck by a cross-beam near the track on a curve, evidence that one track at that place was higher than the other, causing a car passing the beam, in rapid motion, to lurch, throwing the car near to the beam, was admissible on the question of the company's negligence.

In an action by a street car passenger for injuries from being struck by a beam near a track, evidence tending to show that he was riding with a portion of his arm protruding through the car window is sufficient to take the case to the jury on the question of contributory negligence.

Such an act of the passenger would not be negligence per se, preventing a recovery. (Gardner v. Metropolitan St. Ry. Co., 122 S. W. Rep., 1068-9.)

Nebraska.—Care Required at Street Intersection.

The employees in charge of the operation of a street car are held to great caution when crossing a street intersection at a point where a car upon the opposite track is, or has

been very recently, discharging passengers. The motorman should keep a sharp lookout, give ample and timely warning of the approach of the car, and have it under such control that it can be readily stopped if necessary. (Stewart v. Omaha & C. B. St. Ry. Co., 129 N. W. Rep., 440.)

New Jersey.—Injury to Pedestrian—Contributory Negligence.

Plaintiff left the sidewalk to cross a public street. When between the sidewalk and a street car track he looked and saw a car about 50 ft. away, approaching rapidly the point at which he intended to cross the tracks. Without paying any further attention to the car he walked in front of it and was struck by it. Held, that he was guilty of contributory negligence. (Kraut v. Public Service Ry. Co., 75 At. Rep., 165.)

New York.—Injuries to Passengers—Contributory Negligence.

Where the speed of a street car, running at 10 or 12 m.p.h. as it struck a curve in the track, did not endanger the safety of passengers remaining in the seats provided for them, the act of a passenger in getting on the running board, when the car maintained that speed before and as it struck the curve, the existence of which he knew, was negligence as a matter of law, precluding a recovery for his injuries by being thrown from the car. (Maercker v. Brooklyn Heights R. Co., 122 N. Y. Sup., 87.)

New York.—Injuries—Contributory Negligence—Failure to Stop and Look.

Where a pedestrian's vision of street cars is obscured by darkness, obstructions, etc., he, as well as the motorman, must exercise increased vigilance in looking out for a street car in crossing the track and may even be required to make repeated efforts to determine whether a car is near before crossing the track.

Plaintiff, in attempting to cross the double tracks of a street railway where they ran under the pillars of an elevated railway and while 20 ft. from the point at which he was struck, saw a car approaching some 125 ft. away, but did not try to determine its probable speed or again look at it, relying upon it giving him time to cross safely. Held, that plaintiff was negligent in crossing without attempting to obtain further information upon which to base his judgment that he could cross safely. (Wecker v. Brooklyn, Q. C. & S. R. Co., 120 N. Y. Sup., 1020.)

New York.—Operation of Cars—Right-of-Way—Collisions—Negligence—Proximate Cause.

The right of a street car, while operated in a block and not at street intersections, is paramount, and the motorman may expect that a driver on the street in the block will not drive in front of an approaching car though he is headed in that direction, and the mere fact that his team is so headed does not call for the sounding of gongs and the giving of warnings until it is apparent that the driver is intent on going on the track or that he is obstructing the paramount rights of a car, since the motorman need only exercise reasonable care.

A wagon of plaintiff was drawn up near the curb. The wagon of a third person was similarly drawn up and the driver thereof drove on the street car track in front of an approaching car and was struck by it so that his wagon was forced against the wagon of plaintiff, damaging it. There was nothing to apprise the motorman of any danger until the car was within 15 ft. of the point of collision and the car was not operated at a reckless speed. There was no evidence that the car could have stopped in time to have avoided the accident, though the danger of collision was apparent when the car was 50 ft. away. No gong was sounded. Held, that the proximate cause of the accident was the act of the third person, making him alone liable for the damages sustained by plaintiff. (Stern v. Brooklyn Heights R. Co. et al., 124 N. Y. Sup., 1043.)

Pennsylvania.—Injury to Pedestrian—Automobiles.

A passenger alighting from a street car is not free from contributory negligence where, without looking, he steps from the car and then, suddenly seeing an automobile approaching, stops and is struck by it. (Kauffman v. Nelson, 73 At. Rep., 1105.)

Washington.—Injuries to Pedestrians—Contributory Negligence.

Plaintiff, a Scandinavian of a low degree of intelligence, attempted to cross a street in the middle of a block and, after waiting for a car to pass her, stepped in front of a car moving on the further track in the opposite direction and was struck and injured. She had lived in the vicinity of the accident for several months and was familiar with the tracks and the running of cars thereon. She had also seen the car by which she was injured approaching and had noticed that it was moving rapidly. Held that if plaintiff was a person of ordinary understanding and intelligence she would have been guilty of contributory negligence as a matter of law precluding her recovery. (Hovden v. Seattle Electric Co., 180 Fed. Rep., 487.)

Wisconsin.—Construction of Cars—Plans—Statutes—Master and Servant—Competency—Negligence—Damages.

The passage of Laws 1907, Ch. 390, providing for the use of fenders on street cars to go into effect at a future date makes manifest at once the legislative intent of the necessity for such a safety device.

Where, in an action against a street railway company for the death of a person struck by a car, the competency of the motorman was in issue, evidence of his competency when he first began work was admissible as bearing on his competency at the time of the accident, in view of his limited experience before that time.

Under St. 1898, Sec. 1862, providing that street railways must be constructed on the most approved plan, and under the franchise of a street railway company requiring it to use all reasonable care to prevent injury to persons and property, the testimony of an expert as to the proper equipment of street cars and that the most approved plan of construction requires a fender to pick up objects in front of the car, is competent as against the company. (Fisher v. Waupaca Electric Light & Ry. Co., 124 N. W. Rep., 1005-6.)

MISCELLANEOUS

Montana.—Master's Liability for Acts of Servant.

Where an employee is made a special officer, the employer is liable for his acts during the course of his duty, even though they are done in excess of his authority. (Rand v. Butte Electric Ry. Co. et al., 107 Pac. Rep., 87.)

New York.—Costs—Assault on Passenger.

Where plaintiff obtains a verdict of $25, and enters judgment thereon, for an assault in ejecting him from defendant's street car, costs held properly taxed by the clerk at $25, under Code Civ. Proc., Sec. 3228, Subd. 3. (Lynch v. Syracuse Rapid Transit Ry. Co., 124 N. Y. Sup., 169.)

New York.—Master and Servant—Injuries—Contributory Negligence.

In an action by a motorman for personal injuries in a collision, plaintiff held guilty of contributory negligence for not fixing a curtain on the door so as to exclude the light from the vestibule, or for not opening the vestibule window to enable him to see ahead better, or for not running the car slowly enough to enable him to avoid collision. (Forton v. Crosstown St. Ry. Co. of Buffalo, 121 N. Y. Sup., 749.)

Washington.—Master's Liability for Injuries to Servant—Assumption of Risk.

A party working on a tower erected on a flat car in putting up trolley wire, who was familiar with the work and knew all the dangers incident thereto, that the trolley wire often slipped and was liable to do so any time, and that he would be injured by grasping a live wire, cannot recover for injury due to the trolley wire slipping and causing him to lose his balance so that he involuntarily grasped a live wire, since he assumed the risk of such injury. (Shore v. Spokane & I. E. R. Co., 106 Pac. Rep., 753.)

Washington.—Master and Servant—Injury to Servant—Safe Place to Work—Delegation of Duty.

Where the foreman of a crew of linemen when he saw the approach of a work train ordered his men to push a tower car across a bridge, it was his duty to protect them and not to permit them to go any further than they could with safety from the approaching train, and his negligence in not performing such duty was the negligence of the company. (Hillis et al. v. Spokane & I. E. R. Co., 110 Pac. Rep. 625.)

News of Electric Railways

Changes in the Personnel of the Spokane & Inland Empire Railway

Carl Raymond Gray has been elected president of the Spokane & Inland Empire Railway, Spokane, Wash., to succeed Jay P. Graves, and C. A. Coolidge has been elected first vice-president and general manager of the company to succeed A. L. White and C. M. Graves, respectively. Waldo G. Paine, who has been second vice-president and traffic manager of the company, continues in those capacities. F. V. Brown, counsel for the Great Northern Railroad, and George T. Reid, counsel for the Northern Pacific Railroad, Carl Raymond Gray and C. A. Coolidge have been elected directors of the company to succeed Jay P. Graves, A. L. White, W. G. Paine and Clyde M. Graves. W. G. Graves, Fred B. Grinnell and Aaron Kuhn remain as directors of the Spokane & Inland Empire Railroad. Mr. Gray, the new president, issued the following statement on June 24, 1911, in regard to the changes in the personnel of the company:

"Jay P. Graves, since disposing of a controlling interest about eighteen months ago, has, by request, retained direction of the company's affairs, with the understanding that at some future date he would be relieved of the responsibility. His action in this respect has been greatly appreciated by the owners, and they are glad indeed to know that they will have his friendship and support.

"These changes in management do not mean, and should not be construed to mean, any material change in the policies of the Spokane & Inland Empire System, and this is true with particular emphasis in so far as its relation to Spokane is concerned. This is peculiarly and distinctly a Spokane railroad, a home institution, and the constant aim of the new management will be to retain and deserve the friendship and good will of the Spokane business men and the Spokane public.

"The only change beyond my own introduction into the question will be that C. A. Coolidge, who has been the efficient and successful manager of the Oregon Electric Railway, will in addition to his present duties assume charge of the operating department.

"Both Mr. Coolidge and I will maintain our Spokane & Inland Empire offices here and will spend a very considerable portion of our time in Spokane studying the property, its service and possibilities.

"No department of the road will be moved away from Spokane. Its business will continue to be handled and all of its departments will remain in its present general office building in Spokane."

Conference Suggested on Transit Matters in Pittsburgh

Mayor Magee of Pittsburgh, Pa., presented a long message to the Council of that city on June 27, 1911, in which he referred to various civic questions and suggested that the officers of the Pittsburgh Railways should be invited to confer with the city officials in regard to transit improvements, saying that "the future growth and development of the city are dependent more upon a wise solution of this subject than any other one factor." He referred to the reports on traffic conditions in Pittsburgh which were made by Emil Swensson and Bion J. Arnold and to the appeal by the city to the State Railroad Commission, and suggested that if the conferees failed to reach a mutually satisfactory conclusion "in regard to the rights and duties of the parties to the conference" the members of the Railroad Commission should be invited to act as umpires. The Mayor also referred to the employment of D. T. Watson by him as advisory counsel, and said that if the effort to settle the matter by conferences failed Mr. Watson had evolved a theory of legal action to be followed by the city which would bring the subject before the courts for settlement. In referring to the claims of the city he said:

"The city, on behalf of itself and the patrons of the road, claims:

"First—The implication exists in all the grants made to the underlying companies of the Pittsburgh Railways that they or their operating company are charged with the duty of rendering to the public adequate service, regardless of their financial condition.

"Second—That the expressed conditions contained in the old charters and ordinances are still in effect and enforceable.

"Third—That the duties imposed in the general regulating ordinance of 1890 in regard to street repair and street cleaning are enforceable.

"Fourth—That the capitalization of the railway system, based on the various leases and mergers, is fraudulent."

In concluding his message the Mayor said:

"This is by far the largest, the most complicated and the most difficult problem before your honorable body for solution. It seems to me to be almost beyond the comprehension of a single mind in all its phases and, without intending to anticipate the result of your deliberations, altogether beyond the capacity of the Pittsburgh Railways to contend with. Improvements necessitating the investment of many millions of dollars and capital investment that will require the additional payment of many hundreds of thousands of dollars of fixed charges to a corporation which last year failed to meet its present fixed charges by $1,300,000 seem to be almost a hopeless case."

The Mayor's message was referred to the committee on public service and surveys.

At the same meeting of the Council at which the Mayor presented his message the Rapid Transit Subway Company applied for the right to construct a downtown loop subway, a subway in the East End District and a branch subway to Schenley Park. The names of those interested in the company were not given. This measure was referred to committee. There is now pending before the Council an application from the Pittsburgh Subway Company for the right to construct subway lines in the city.

Transit Affairs in New York

The Board of Estimate on June 29, 1911, received a report of the committee of the Board of Estimate and the Public Service Commission which is designed to bring about an immediate solution of the subway problem. This report recommends the acceptance of the modifications proposed by the Brooklyn Rapid Transit Company as a condition of its taking the lines partitioned to it in the compromise plan and presents an agreement by the Brooklyn Rapid Transit Company that it will operate the entire extended subway system on the same terms if the city requires it. The Board of Estimate has the verbal assurance of Timothy S. Williams, president of the Brooklyn Rapid Transit Company, which will be confirmed in writing, that his directors and his bankers will abide by his agreement. As to the Interborough Rapid Transit Company, the supplemental report of the city's committee provides that the company be notified that the general modifications granted to the Brooklyn Rapid Transit Company shall be made applicable to it in case it accepts the city's offer, and also grants more liberal terms to the Interborough Rapid Transit Company in two particulars:

First—That if the Interborough Rapid Transit Company accept the elevated third-track franchises and the subway lines both, under an arrangement, in the case of the elevated lines, providing that the increased net profits over present earnings be divided equally with the city, any deficit below the amount of present net earnings on the elevated which might be realizzed after third-tracking shall be made cumulative, to be made up out of the future increased profits before the division with the city begins.

Second—That in the leveling of the present leases to 49-year terms the city forego the right to claim an adjustment of the rental at the end of the original terms of each lease, namely, 50 years from the beginning of operation on the Manhattan and Bronx division of the subway and 35 years from the beginning of operation on the Brooklyn extension.

No agreement was reached as to the time the company would have to make known its wishes under the amended terms.

The Public Service Commission has sent to the Board of Estimate a set of resolutions laying out a new rapid transit railroad under the East River from the Battery to Atlantic Avenue, Brooklyn, which will, under the subway plan adopted by the Board of Estimate recently, serve as the connecting link between the Brooklyn Rapid Transit Company's Broadway line in Manhattan and the Fourth Avenue subway in Brooklyn. The proposed route will be 1.9 miles in length and its cost, the larger part of which is represented by the construction of the new tunnel under the river, will be $8,200,000. The subway will have two tracks under the East River and four tracks through Atlantic Avenue.

Toronto Municipal Railway

The Ontario Municipal & Railway Board has approved of the city of Toronto's plans for proposed municipal car lines in the suburbs, which were referred to in the ELECTRIC RAILWAY JOURNAL of May 13, 1911, page 849, in a report from the city engineer showing the estimated cost of the St. Clair and Greenwood Avenue lines. In making the order approving the plans the board gave the following reasons:

"From the estimates submitted it looks as if the new lines might pay, but it is not necessary for the board at this stage to determine this question. We do know that there are a large number of people in the territory recently annexed to the city that require street cars, and should have them. The city is receiving a large sum of money each year from the Toronto Railway as the city's share of the gross receipts.

"It is only fair that the ratepayers who have street cars and who profit by the revenue, should spend some of that revenue in providing services for their less happily circumstanced citizens.

"We think we should facilitate the city in doing justice to the annexed districts by providing them with street car transit."

Some years ago the city made an attempt to compel the Toronto Railway to extend its lines into the annexed districts, and increase the present system within the older limits, but the case was defended by the company through the courts to the Imperial Privy Council at England, which court decided that the city had no power, under the agreement with the company, to compel it to build any extensions.

Governor Foss of Massachusetts Urges Utility Legislation

C. H. Scovell, who was retained by Governor Eugene N. Foss, of Massachusetts, to report to him in regard to the regulation of public service corporations in Massachusetts, says in part in his report:

"Regulation of public service commissions in Massachusetts not only lacks uniformity, but in many instances there is equally conspicuous lack of efficiency. Theory of regulation has been to restrict operations of companies by stringent laws, especially in respect to capitalization, rather than provide a rational system of regulation through a commission vested with large discretionary powers, such as in Wisconsin and New York.

"It appears to be the expressed policy of the Massachusetts Railroad Commission to act rather as 'an advisory than an executive board—one constituting in a general way a link between the community and the corporations, depending for its influence chiefly on the right to look into everything, and to make recommendations appealing to the reason and interests of the corporations.'

"In the near future Massachusetts must adopt a broader policy, particularly with respect to oversight of operations and policies of private management which are concerned with adequacy and efficiency of facilities and thus largely determine growth and prosperity of the Commonwealth.

"While there would be a substantial saving to the State from organization of one comprehensive commission rather than from development or expansion of present organizations, the greatest gain would be in the resulting uniformity of State policy in regulation of public service corporations."

In transmitting the report by Mr. Scovell to the Legislature Governor Foss said in part:

"Our present State regulation of public utilities does not safeguard the public; the policy is narrow and short-sighted in regard to such control, and a remedy may be found either in giving each commission broader power and making each live up to it, or by combining all these commissions in a single public service commission with powers to cover the whole field.

"Such joint commission may consist either of experts or men of general training. In the latter case expert assistance can be retained as needed. This latter method is followed in New York. Our present commissions are a compromise between these two methods and appear inadequate.

"Proper supervision of public service corporations by the State, to insure satisfactory service, has now become a necessity we should demand. Future growth and welfare of the commonwealth require it.

"We have fourteen commissioners supervising public utilities named, drawing aggregate pay of $59,500, and all having large and costly organizations under them. In New York this work is done under a single commission of five for the metropolitan district and a similar commission for the rest of the State. They draw larger pay than our commissions, but give their whole time and are undoubtedly the best men for their work. By combining commissions into a single board we could economize on clerical costs, as much of this work is of the same character in all present commissions.

"The greatest gain would come from resulting increase in uniformity of control over public service corporations. With such a board, properly constituted and empowered, we would get better service from the corporation, far better value for public expense incurred and a better chance of properly developing the trade, commerce and transportation of our State."

Public Utility Legislation in New York

The Public Service Commission of the First District of the State of New York, in answer to the request of the State Senate, has expressed its views on what legislation it considers necessary. It has declared that the Public Service Commissions law should be amended so as to prohibit the right of review by certiorari of the commissions' decrees regarding rates and services of public service corporations, and also that the stock corporation law should be altered so as to place under the approval of the commission the securities to be issued by reorganized companies.

The first recommendation springs from a consideration of the status of the transfer question. The commission reviews the history of transfers in New York from the time the Metropolitan Street Railway system went into the hands of receivers. Both the Appellate Division and the Court of Appeals have decided that the order for the establishment of transfers between the Metropolitan Street Railway and the Central Park, North & East River Railroad was reviewable by certiorari, and the Legislature has also made the question more difficult. Before 1910 the courts had held that the companies were entitled to a reasonable return only on the present value of the property in use, but in that year the Legislature provided that there must be consideration as well of the earning of a reasonable return on capital actually expended.

The commission already, it points out, has carefully appraised the value of the property of the street railways, and it considers that it will be much more difficult to make any order for the reduction of a rate. However, it hopes that the workings of the 8-cent and 10-cent transfers between the Central Park, North & East River Railroad and the Metropolitan Street Railway will throw valuable light on the situation.

Referring to the decision of the Appellate Division reviewing the commission's refusal to approve the reorganization plan of the Third Avenue Railroad bondholders' committee, the commission points out that the bondholders wished to issue securities until the total of the road's ob-

ligations reached $70,000,000, while its own appraisal of the property to be represented by these securities was only $40,000,000. It remarks: "The court apparently holds that the commission must approve of the plan of reorganization, if the necessary statutory steps have been taken, and is without power to limit the amount of securities to the value of the property."

In suggesting that the Legislature should exempt its power to make a rate from review by certiorari, the commission points out that the federal courts do not exercise any such rights over the acts of the Interstate Commerce Commission. Moreover, it asks whether the securities of a new company arising from a reorganization should not be submitted to the same supervision as the securities of an entirely new concern, which has not yet gone into the hands of a receiver.

The Toledo Valuation.—The appointment of Judge John M. Killits as arbitrator in the traction valuation at Toledo was discussed by the directors of the Toledo Railway & Light Company at their regular monthly meeting on June 29, 1911, but their decision had not been announced on July 1, 1911. Albion E. Lang, president of the company, stated that he was preparing the reply, but that he would have nothing to say until his letter was received by the City Council.

Fostoria-Fremont Railway.—Service has been begun on the new connecting link between Cleveland and Western Ohio known as the Fostoria & Fremont Railway. This line, of which F. D. Carpenter, Lima, Ohio, is president, is 21 miles long and connects the Western Ohio Railway at Fostoria with the Lake Shore Electric Railway at Fremont. At present, pending the completion of ballasting, only local cars are being operated, but on July 15, 1911, a two-hour local schedule will be supplemented with a high-speed through schedule from Lima to Cleveland, the limited cars making the run in five hours. The new road has been built according to the latest standard designs for d.c. operation. It is all on private right of way except through villages, and the track is laid with 70-lb. rails. The overhead work is supported by chestnut poles. The transmission system consists of a three-phase No. 4 copper wire 33,000-volt circuit; No. 000 grooved trolley and a 600,000-circ. mil copper trolley feeder. One substation containing two 300-kw Westinghouse rotaries has been built and is in operation. The track is being ballasted with crushed rock placed 1500 yards to the mile.

Report of Civic Committee on Electrification at St. Louis.—The Civic League of St. Louis, Mo., is distributing copies of the report of the committee on terminal-railroad electrification of that body, of which Prof. A. S. Langsdorf has been acting chairman. The committee was appointed in 1909 to consider the problem of the electrification of the St. Louis terminal system, largely on account of the smoke nuisance. The committee was not vested with legal power and relied on such general information as it was possible to secure from officers of the Terminal Railroad Association of St. Louis. On this account it has limited the estimate of cost to the electrical installation alone. The estimated cost of electrical equipment follows: Power house, 40,000 kw at $125, $5,000,000; locomotives, 150 at $45,000, $6,750,000; signals, 262 miles at $5,000, $1,310,000; transmission and distribution, $1,400,000; direct current, 262 miles at $5,000, $1,310,000; alternating current, 20 miles at $4,500, $900,000; substations, $1,100,000; contingencies, 10 per cent, $1,556,000; a total of $17,116,000. Total average cost per mile (262 miles), $65,300. The committee having accomplished its task, has been discontinued by the executive board.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

CONNECTICUT

The minority utilities bill passed the House on June 27, 1911, with the amendments that were made to it in the Senate, where it originated, and is before the Governor for signature. The bill provides that within fifteen days after its passage the Governor shall nominate and the General Assembly appoint three commissioners to serve for two, four and six years respectively. Each of the commissioners is to receive $5,000 a year and necessary expenses. The railroad commission is abolished. Appeal from a decision of the new commission may be made to the Supreme Court.

MASSACHUSETTS

The electrification bill before the present session has been postponed to the next General Court. The pending bill contained a provision placing the responsibility of naming dates and particulars of electrification upon the Railroad Commission, and a majority of the board has declared itself in favor of compulsory electrification. A bill has been prepared by Representative Washburn, House chairman of the committee on railroads, providing for the enlargement of the powers of the Railroad Commission. Under the terms of the act the board will have mandatory powers regarding rates and service. The commission is given power, either upon its own motion or upon complaint, to fix rates, determine facilities and examine into financial conditions. The bill has the approval of Chairman Hall, of the board.

Governor Foss has signed the bill giving a certificate of public concurrence and necessity to the Boston & Eastern Electric Railroad, which has for about five years been seeking the right to build a high-speed interurban railroad between Boston, Lynn, Salem, Beverly and Danvers, at an estimated cost of $11,000,000. The act as passed gives the company a certificate in spite of a recent adverse decision of a majority of the Railroad Commission, and is an unprecedented piece of legislation. The company announces that it expects to cut in half the running time from North Shore points to the heart of Boston. A feature of its plans is the construction of a tunnel under Boston Harbor to a terminal at Post Office Square. Bonds to the amount of $50,000 are to be filed with the State, and the tunnel, which was authorized by the Legislature of 1910, is specified to be turned over free to the city of Boston at the end of forty years. Bills were introduced into the Senate on June 27 which provide for the construction of subways in Boston from Park Street to Dorchester, under Boylston Street and in the West End, by the city; for the extension of the existing subway leases for twenty-five years from July 1, 1911, and for the consolidation of the West End Railway and Boston Elevated Railway.

NEW YORK

Governor Dix of New York has signed a bill giving the Public Service Commissions power to fix and regulate commutation rates on railroads. The measure amends a section of the public service law by making it conform with those sections relating to the power of the commission for the Second District over telephone and telegraph corporations. In approving the measure the Governor said: "In fixing the standard upon which the commission shall determine the just and reasonable rates, fares and charges for certain classes of railroad transportation, this bill provides that the commission shall do so with due regard, among other things, to a reasonable average return upon the value of the property actually used in the public service." After a protracted debate, led in behalf of the opposition by Senator Hinman, the Senate adopted the Pollock resolution calling upon the Public Service Commission of the First District of New York to explain why it has not put into effect legislation making compulsory the issuing of transfers between the various surface car lines in New York. The Assembly on June 27, 1911, passed the bill of Senator O'Brien providing for a 5-cent fare between Railroad Avenue and Flatbush Avenue, Brooklyn, on the Long Island Railroad. This is almost exactly similar to the O'Brien bill which Governor Dix vetoed a month ago, excepting that it provides for a smaller fine against the company for infractions. The Governor has instructed Public Service Commissioner Cram to urge the Public Service Commission to action on the merits of the case, and the Public Service Commission has called a hearing for July 6, 1911. On June 29, 1911, the Assembly passed the bill introduced by Assemblyman Goldberg to require the immediate restoration of free transfers between all surface street railways running north and south and those running east and west in the Boroughs of Manhattan and the Bronx.

Financial and Corporate

New York Stock and Money Markets

July 3, 1911.

Business has been rather dull in Wall Street in the past week, and the market has been irregular and weak. Trading to-day was light, influenced by the holiday. A fractional decline took place at the opening. The bond market continues active, characterized by return of interest in the long-term issues. Inquiry for call and time money was light to-day, with only mild demand for large loans. Quotations July 3 were: Call, 2¼@2½ per cent; ninety days, 2¾ per cent.

Other Markets

All of the exchanges have been quiet by reason of the holidays. Dulness prevailed in Philadelphia, and trading to-day was the highest for some time.

In Chicago there was a fair amount of trading at the close of the past week, with gains made in most of the elevated issues.

Nothing of great importance took place in the Boston market to-day and business dragged throughout the session. Price changes of the week were few and chiefly of a fractional nature.

Most of the trading in Baltimore in the latter part of the week was in the bond market. United Railways issues were in good demand.

Quotations of traction and manufacturing securities as compared with last week follow:

	June 27.	July 1.
American Light & Traction Company (common)	a295	295
American Light & Traction Company (preferred)	a108	108
American Railways Company	a44	a43¾
Aurora, Elgin & Chicago Railroad (common)	40¾	*40¾
Aurora, Elgin & Chicago Railroad (preferred)	a85¾	*85¾
Boston Elevated Railway	a128½	a129
Boston Suburban Electric Companies (common)	a14½	a15
Boston Suburban Electric Companies (preferred)	a75	a75
Boston & Worcester Electric Companies (common)	a12	12
Boston & Worcester Electric Companies (preferred)	a57	a59
Brooklyn Rapid Transit Company	81⅝	81
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	86	86⅜
Capital Traction Company, Washington	127⅜	*127⅜
Chicago City Railway	a195	a190
Chicago & Oak Park Elevated Railroad (common)	2	3
Chicago & Oak Park Elevated Railroad (preferred)	6	5
Chicago Railways, ptcptg., ctf. 1	a85	85
Chicago Railways, ptcptg., ctf. 2	a24	24
Chicago Railways, ptcptg., ctf. 3	a9½	9½
Chicago Railways, ptcptg	a5½	5½
Cincinnati Street Railway	130½	*130¼
Cleveland Railway	a96	*96
Columbus Railway (common)	*96	*96
Columbus Railway (preferred)	*101	*101
Consolidated Traction of New Jersey	a76	76
Consolidated Traction of N. J., 5 per cent bonds	a105½	105½
Dayton Street Railway (common)	a30	a30
Dayton Street Railway (preferred)	a100	a100
Detroit United Railway	a74	74
General Electric Company	162¼	160
Georgia Railway & Electric Company (common)	a155	a153
Georgia Railway & Electric Company (preferred)	a93	a93½
Interborough Metropolitan Company (common)	18	17½
Interborough Metropolitan Company (preferred)	50	a50
Interborough Metropolitan Company (4½s)	78½	78¼
Kansas City Railway & Light Company (common)	a19	19
Kansas City Railway & Light Company (preferred)	a44	44
Manhattan Railway	a137½	137½
Massachusetts Electric Companies (common)	a22¾	a23
Massachusetts Electric Companies (preferred)	a91½	*91½
Metropolitan West Side, Chicago (common)	a26	a26½
Metropolitan West Side, Chicago (preferred)	a74¼	a75
Metropolitan Street Railway, New York	15	15
Milwaukee Electric Railway & Light (preferred)	110	110
North American Company	74⅜	73¾
Northern Ohio Light & Traction Company	48	*48
Northwestern Elevated Railroad (common)	a28½	a29
Northwestern Elevated Railroad (preferred)	a69	a69
Philadelphia Company, Pittsburgh (common)	a56	a56
Philadelphia Company, Pittsburgh (preferred)	a43⅞	a43¾
Philadelphia Rapid Transit Company	a19⅛	a19½
Philadelphia Traction Company	a86½	a86½
Public Service Corporation, 5% col. notes (1913)	101	101
Public Service Corporation, ctfs	a107½	107½
Seattle Electric Company (common)	a112	a110
Seattle Electric Company (preferred)	a102½	a102½
South Side Elevated Railroad (Chicago)	a80	a79
Third Avenue Railroad, New York	10½	10½
Toledo Railways & Light Company	8	8
Twin City Rapid Transit, Minneapolis (common)	a108½	*108½
Union Traction Company, Philadelphia	a49¼	a49¼
United Rys. & Electric Company, Baltimore	a19½	*19½
United Rys. Inv. Co. (common)	a39	39
United Rys. Inv. Co. (preferred)	69⅞	69⅞
Washington Ry. & Electric Company (common)	a35⅜	35⅜
Washington Ry. & Electric Company (preferred)	a90	90
West End Street Railway, Boston (common)	a90	a89
West End Street Railway, Boston (preferred)	a103¼	a103
Westinghouse Elec. & Mfg. Co.	75¾	a75¼

a Asked. *Last sale.

ANNUAL REPORTS

Tri-City Railway & Light Company

The annual report of the Tri-City Railway & Light Company, Davenport, Ia., for the year ended Dec. 31, 1910, shows the following résumé:

Gross earnings	$2,513,486
Operating expenses and taxes	1,481,967
Net earnings	$1,031,519
Deduct:	
Interest and discount on bonds and loans	481,408
	$550,111
Sinking fund instalments	50.000
Surplus for the year	$500,111
Dividends on preferred stock	169,572
Net surplus for year	$330,539

J. F. Porter, the president, says in part in his report to the stockholders:

"The statement compared with the previous year shows an increase in gross earnings of $473,999, or 23.24 per cent; an increase in operating expenses and taxes of $341,059, or 29.89 per cent, and an increase in net earnings of $132,939, or 14.79 per cent. Interest charges paid and the proportion of discount on the company's 6 per cent three-year redeemable gold notes during the year amounted to $481,407; sinking fund provisions called for $50,000, leaving a surplus for the year of $500,111. From this amount there have been declared and paid on the outstanding preferred stock four quarterly dividends each of 1½ per cent, aggregating $169,572, leaving $330,539 over all disbursements, which has been transferred to surplus account, this being an increase of $123,919, or 59.97 per cent over the amount transferred in 1909.

"There has been charged against the surplus account of your subsidiary companies $321,640, representing deferred charges to operation incidental to the issue of the 5 per cent first lien collateral trust sinking fund gold bonds.

"During the year you authorized an issue of $20,000,000 trust sinking fund gold bonds were issued in place of a like amount of the 6 per cent first mortgage gold bonds of the Davenport & Rock Island Railway—$33,000 par value of these bonds were canceled on July 1 in accordance with the sinking fund provisions, and the same amount of the Tri-City Railway Company 5 per cent bonds were issued and are owned by your company.

"During the year you authorized an issue of $20,000,000, first and refunding, 5 per cent gold bonds, and your directors issued $500,000 of this amount up to Dec. 31, 1910.

"Extensions of franchise rights for a period of twenty years on Illinois side and twenty-five years on Iowa side, covering existing tracks, and privileges for some new extensions, were secured from the authorities in each of the three cities during the spring of 1910.

"These ordinances required the company to perform a certain amount of double tracking, extensions and paving during the next few years, and all necessary work provided for in 1910 was completed.

"The extension ordinances granted the Tri-City Railway and the People's Light Company also provide for the building of an interurban road to Muscatine. The Davenport & Muscatine Railway was incorporated during the year for this purpose and satisfactory progress is being made on the survey and acquirement of rights-of-way. The length of this road is approximately 30 miles. The cost of this line is estimated at $750,000.

"Fifteen new cars of the modern pay-as-you-enter type were purchased and put in service during the past six months, which considerably relieves the congestion of traffic during rush hours, and adequate service is now being supplied on all lines.

"Generally the street railway properties in the three cities are in excellent physical condition, with the exception of the track on Fifth Avenue, between Fifteenth and Twenty-third Streets, Moline, which will be relaid during the present year.

"The franchises of the electric companies on the Iowa and Illinois sides of the river now extend until 1935 and 1943 respectively, and the conditions contingent upon such extension are not unduly burdensome. One of the most important requirements is the placing of the feeder wires in

conduits below the surface of the streets in the fire district of Davenport, and this work is progressing rapidly.

"All work called for to maintain the integrity of the franchises in 1910 was carried out, and when that required in 1911 has been completed only such improvements and extensions as will enable the companies to keep up their properties and provide for new customers and business will be necessary.

"The sum of $739,168 was expended for new construction on the properties of your company in 1910.

"All your properties have been well maintained, the sum of $110,046 having been charged to maintenance during the year. This is an increase of $29,118 over the amount charged in 1909."

Brunswick Terminal & Railway Securities Company

The City & Suburban Railway, Brunswick, Ga., is carried on the balance sheet of this company as of Dec. 31, 1910, at $954,000. The statement of the securities company for the year 1910 shows the following: Rents, $2,990; interest and dividends, $17,048; total, $20,038. Expenses, $2,576; salaries, $2,979; taxes, $6,375; building repairs, $222; fire insurance, $168; total, $12,320. Surplus to profit and loss, $7,718.

T. D. Rhodes, the president, says in part:

"Your board submits herewith the results of its management of the company's affairs during the fiscal year, the first since it acquired the public utilities of the city and necessarily to some extent a period of transition. The unsettled conditions of the business world have had the same deleterious effect upon our enterprise that has been experienced by many others which, like it, were organized for the commercial and industrial development and upbuilding of the country, and the success and prosperity of which depend largely upon the confidence and encouragement inspired by stability and freedom from vicious assaults upon capital. Brunswick, Ga., the seat of our investment, has in common with other business communities during the past year been affected by the unfavorable general conditions but to a less extent than many others, owing to its natural advantages and the absence of anything fictitious or 'boom'-like in its growth, which has been legitimate and healthful and shows every evidence of continuance in an even greater and more prosperous ratio.

"Several large manufacturing plants have been induced during the year to locate in the city or its environs and when these plants are completed and in operation they will add very materially to the volume of business and population of the city.

"The State commission has authorized the capitalization of the City & Suburban Railway in the sum of $175,000 bonds and $100,000 capital stock, which will be issued at once to cover the amount expended by this company in the purchase of the property together with the sums advanced for its extensions and betterments, and will become a free asset in the treasury of this company.

"Instead of the annual deficit heretofore shown the company's acquirement of public utilities has enabled it to pay all the carrying charges on its property and to accumulate the nucleus of a surplus.

"There has been expended during the year by the City & Suburban Railway Company in extending and improving its property $31,000. A number of additional turnouts and sidings have been installed at points where improved service required them, and six additional cars have been purchased. The company has leased from the parent company two plots for amusement parks, erected the necessary improvements thereon, and the results of their operation have been very satisfactory both in increased earnings from the cars, and in gate and privilege receipts from the parks. The earnings of the company have shown a gratifying increase and your board believes the property will yield a very gratifying return on the amount invested therein."

American Cities Railway & Light Company, New York, N. Y.—The stockholders of the American Cities Railway & Light Company on June 28, 1911, ratified the sale of the property and assets of the company to the American Cities Company in accordance with the plans mentioned in the Electric Railway Journal of May 27, 1911, page 930.

Boone (Ia.) Electric Company.—It is officially announced that Dow, Read & Smith, Cedar Rapids, Ia., have exercised the option which they secured recently on the property of the Boone Electric Company, mention of which was made in the Electric Railway Journal of July 1, 1911, page 63.

Catskill (N. Y.) Traction Company.—The Catskill Traction Company has applied to the Public Service Commission of the Second District of New York for permission to issue $160,000 of 5 per cent thirty-year first mortgage bonds to defray the cost of an extension from Leeds to Cairo.

Columbus Railway & Light Company, Columbus, Ohio.—The meeting of the stockholders of the Columbus Railway, called for June 26, 1911, was adjourned to Aug. 28, 1911, in order to give all those interested time to determine the necessity of increasing the stock from $7,000,000 to $10,000,000. Butler Sheldon, president of the company, recommended this step after he had read his report. D. Meade Massie and John A. Poland, Chillicothe, Ohio; C. L. Poston, Athens, Ohio, and Edward Orton, Jr., and A. W. Dunn, Columbus, Ohio, were appointed a committee to investigate the relations between the company and the Columbus Railway & Light Company which operates the Columbus Railway under lease.

International Traction Company, Buffalo, N. Y.—It was announced that the semi-annual interest on the fifty-year 4 per cent collateral trust gold bonds of the International Traction Company, which matured on July 1, 1910, would be paid at the office of J. P. Morgan & Company, New York, N. Y., on and after July 1, 1911, together with 5 per cent interest thereon from July 1, 1910, to July 1, 1911. The committee which represents the holders of the fifty-year 4 per cent collateral trust gold bonds has announced that more than 97½ per cent of these bonds has been deposited under the modified plan dated Jan. 20, 1911, and that the necessary arrangements have been made for an advance to the holders of certificates of deposit of the interest due July 1, 1011, on the bonds.

Northwestern Elevated Railroad, Chicago, Ill.—The consolidation of the elevated railways of Chicago as the Chicago Elevated Railways, under the terms proposed by the syndicate organized by Henry A. Blair, was declared operative on July 1, 1911. The terms of the merger were given in the Electric Railway Journal of June 10, 1911, page 1035.

Omaha & Council Bluffs Railway, Omaha, Neb.—Redmond & Co., New York, N. Y., are offering for subscription at 97½ and interest to yield 5¼ per cent $200,000 of first consolidated mortgage 5 per cent gold bonds of the Omaha & Council Bluffs Street Railway, dated 1902 and due Jan. 1, 1928. The authorized issue is $10,000,000, of which amount $6,814,000 is outstanding. Of the remaining bonds $2,500,000 are reserved to retire all prior liens, which must be retired at maturity on May 1, 1914, and the balance, $686,000, is reserved for extensions, etc.

Republic Railway & Light Company, New York, N. Y.—The Republic Railway & Light Company, the proposed organization of which was mentioned in the Electric Railway Journal of July 1, 1911 page 62, was incorporated in New Jersey on June 28, 1911, with power to own the securities of companies operating or controlling electric light, power, gas, electric railway and other public utilities. The company has under option and is acquiring more than 97 per cent of the outstanding capital stocks of a number of companies, most of which have been in the past controlled by the Mahoning & Shenango Railway & Light Company. The officers of the company follow: James Parmelee, president; De Forest Candee, vice-president; George A. Galliver, vice-president and treasurer; G. F. Ravenal, secretary; Samuel McRoberts and Thomas A. Reynolds, National City Bank, New York; Myron T. Herrick, Society for Savings, Cleveland; Anson W. Burchard, assistant to president General Electric Company; R. E. Breed, president American Gas & Electric Company; Henry H. Wehrhane, Hallgarten & Company; Ray Morris, White, Weld & Company; James Parmelee and Parmely Herrick, Cleveland Electrical Illuminating Company; De Forest Candee and George A. Galliver, Federal Utilities, Inc.; Norman McD. Crawford, president Mahoning & Shenango Railway & Light Company; Harrison Williams, American Gas &

Electric Company, Federal Light & Traction Company, Federal Utilities, Inc., president Springfield Railway & Light Company; J. J. Bodell, Bodell & Company, Providence, director American Textile Company; John R. Turner, the Corporation Trust Company, Jersey City, directors. The advisory committee will be Frank A. Vanderlip, C. A. Coffin and J. J. Storrow.

Toledo & Indiana Railroad, Toledo, Ohio.—The formal transfer of the property of the Toledo & Indiana Traction Company to the Toledo & Indiana Railroad was made on the afternoon of June 27, 1911. The capital stock of the new company was increased from $10,000 to $1,040,000, which represents the purchase price of the property. Officers were chosen as follows: S. C. Schenck, president; S. D. Carr, vice-president; C. F. Chapman, secretary; D. B. Schenck, treasurer. The property was bid in at receiver's sale by S. C. Schenck almost a year ago.

Dividends Declared

Athens Railway & Electric Company, Athens, Ga., 2½ per cent, preferred.

Boston & Northern Street Railway, Boston, Mass., 2 per cent, common.

Boston Suburban Electric Companies, Newtonville, Mass., quarterly, $1, preferred.

Ft. Smith Light & Traction Company, Ft. Smith, Ark., quarterly, 1¾ per cent, preferred.

Holyoke (Mass.) Street Railway, 4 per cent.

Memphis (Tenn.) Street Railway, quarterly, 1¼ per cent, preferred.

Norfolk & Portsmouth Traction Company, Norfolk, Va., quarterly, 1¼ per cent, preferred.

Old Colony Street Railway, Boston, 3 per cent, common.

Ottumwa Railway & Light Company, Ottumwa, Ia., quarterly, 1¾ per cent, preferred.

Quebec Railway, Light, Heat & Power Company, Ltd., Quebec, Que., quarterly, 1 per cent, common.

St. Charles Street Railway, New Orleans, La., 3 per cent.

Springfield & Xenia Railway, Springfield, Ohio, quarterly, 1¾ per cent, preferred.

Thirteenth & Fifteenth Streets Passenger Railway, Philadelphia, Pa., $6.

West Penn Traction Company, Pittsburgh, Pa., quarterly, 1½ per cent, preferred.

Youngstown & Ohio River Railroad, Leetonia, Ohio, quarterly, ¾ per cent, preferred.

MONTHLY ELECTRIC RAILWAY EARNINGS

CHATTANOOGA RAILWAY & LIGHT COMPANY.

1m.,	May,	'11	$77,738	*$43,884	$33,854	$19,905	$13,949
1 "	"	'10	70,811	*42,472	28,339	18,265	10,074
5 "	"	'11	368,045	*211,728	156,317	97,741	58,576
5 "	"	'10	33,715	*204,220	131,495	90,402	41,093

EAST ST. LOUIS & SUBURBAN COMPANY.

1m.,	May,	'11	$193,181	*$105,656	$87,525	$45,610	$41,915
1 "	"	'10	183,478	*107,859	75,619	45,230	30,389
5 "	"	'11	905,984	*519,076	386,908	227,332	159,576
5 "	"	'10	918,799	*517,653	401,146	225,932	175,214

GRAND RAPIDS RAILWAY.

1m.,	May,	'11	$98,137	*$56,438	$41,699	$15,018	$26,681
1 "	"	'10	93,207	*50,412	42,795	14,894	27,901
5 "	"	'11	451,713	*262,192	189,521	75,344	114,177
5 "	"	'10	430,871	*240,261	190,610	75,909	114,701

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY.

1m.,	May,	'11	$46,110	*$26,557	$19,553	$13,346	$6,207
1 "	"	'10	44,669	*27,820	16,849	13,355	3,494
11 "	"	'11	481,123	*303,256	177,867	145,011	32,856
11 "	"	'10	478,221	*285,222	192,999	158,400	34,599

MILWAUKEE LIGHT, HEAT & TRACTION COMPANY.

1m.,	May,	'11	$131,786	$39,749	$92,037	$71,393	$20,645
1 "	"	'10	130,404	40,002	90,402	70,053	20,350
2 "	"	'11	611,270	187,771	423,499	346,800	76,699
2 "	"	'10	586,271	176,672	409,598	388,988	70,610

MONTREAL STREET RAILWAY.

1m.,	May,	'11	$431,690	$216,730	$214,959	$60,346	$154,613
1 "	"	'10	370,234	199,616	170,617	48,977	121,640
8 "	"	'11	3,006,914	1,787,922	1,218,992	339,890	879,102
8 "	"	'10	2,707,236	1,607,443	1,099,792	306,148	793,645

PORTLAND RAILWAY, LIGHT & POWER COMPANY.

1m.,	May,	'11	$527,931	*$243,949	$283,982	$122,162	$161,820
1 "	"	'10	466,436	*216,613	249,823	113,465	136,358
5 "	"	'11	2,560,045	*1,241,964	1,318,081	613,668	704,413
5 "	"	'10	2,166,734	*1,027,829	1,138,905	561,509	577,396

ST. JOSEPH RAILWAY, LIGHT, HEAT & POWER COMPANY.

1m.,	May,	'11	$88,759	*$56,350	$32,409	$19,379	$13,030
1 "	"	'10	79,587	*49,376	30,211	18,583	11,628
5 "	"	'11	435,301	*264,894	170,407	97,022	73,385
5 "	"	'10	408,614	*247,764	160,850	90,859	69,991

Traffic and Transportation

School Fares in New Jersey

In the ELECTRIC RAILWAY JOURNAL of June 17, 1911, page 1088, brief mention was made of the ruling by the Supreme Court of New Jersey affirming the order of the board directing the Public Service Railway to maintain 3-cent fares for school children and teachers. The question of the interpretation of the section of the New Jersey public utility law which prohibits discrimination in fares came before the court on a writ of certiorari secured by the Public Service Corporation to test the authority of the commission to suspend the order issued by the company on May 1, 1911, which required school children and school teachers to pay full fare on the lines of the Public Service Railway. In affirming the order of the board, Judge Minturn said:

"The Legislature having conferred the power of regulation and administration upon the commission, this court will not interfere in the discharge of that duty, except, in the language of the thirty-eighth section of the act, where it clearly appears that there was no evidence before the board to support reasonably such order, or that the same was without the jurisdiction of the board. Neither of these conditions existing in this case, the order of the Board of Public Utilities Commission under review will be affirmed.

"The concrete question involved is whether a system of 3-cent fares, maintained by the railway company for many years, was abrogated by the enactment of the so-called public utility law (P. L., 1911, Ch. 195). The contention that it was abrogated is based by the company upon a construction given by the Interstate Commerce Commission to Section 3 of the Interstate Commerce Act, which is substantially similar to Section 18 of the act sub judice.

"I am of the opinion that the construction adopted in that case should not be followed here—first, because the act is not the same enactment in terms; and, secondly, because the Interstate Commerce Commissioners are an administrative and not a judicial body, and their decision as an administrative body on a detail of the act is not a judicial determination. (Interstate Commerce Commission vs. Bunson, 154 United States, 447.)

"The Public Utility Act does not abrogate the system of 3-cent fares maintained by the company, because Section 18 applies only to such preferences as are undue or unreasonable. This was not the enactment of a new condition nor did it create a new legal status. It was the immemorial rule of the common law.

"The contention of the company that the effect of the enactment was to repeal this beneficent condition does not accord with the spirit and intent of the act. The clear legislative purpose was to administer and to regulate in their operation these instrumentalities, quite properly denominated public service companies, which are chartered pro bono publico and are compensated by public individual contributions for the service performed."

New Folder of Chicago & Southern Traction Company.—A new timetable, including map of the territory south of Chicago which is served by the Chicago & Southern Traction Company between Seventy-ninth Street and Kankakee, has just been issued by Robert A. Barnett, traffic agent of the company.

Detroit United Lines.—The Detroit (Mich.) United Railway has issued a folder, "Rides by Trolley," in which it describes the company's fast electric service between the principal cities of Michigan. There is a relief map, showing the connections made by the Detroit United Railway with the interurban lines to Toledo, Port Huron, Kalamazoo, Lansing and St. Johns and Saginaw and Bay City.

Trolley Trips In and Out of Baltimore.—The United Railways & Electric Company, Baltimore, Md., has issued a descriptive folder with a map of its system showing places of interest in and about Baltimore, and telling how to reach them. The map of the system used in the folder is the very striking general relief view which was reproduced in the Souvenir edition of the ELECTRIC RAILWAY JOURNAL for 1910.

Lake Shore Electric Railway and Cleveland, Southwestern & Columbus Railway Will Handle Freight.—At the instance of the Cleveland Chamber of Commerce the Lake Shore Electric Railway and the Cleveland, Southwestern & Columbus Railway will arrange early in the fall to handle freight. The Lake Shore Electric Railway will carry freight in sealed cars to Fremont, where it will be delivered to the Western Ohio Railway, by which it will be distributed over western Ohio and eastern Indiana. Both will also haul freight over their entire systems.

Service Order in Milwaukee.—The Railroad Commission of Wisconsin has issued the following order in regard to service over the Walnut Street line of the Milwaukee Electric Railway & Light Company: "That there be a regular schedule of headway on the line of eight minutes throughout the day, additional cars or trippers to be added at times so as to establish the following time space of cars during the maximum period of travel: From West Water Street and Grand Avenue to the end of the line at Lisbon Avenue from 6 a. m. to 8 a. m., three-minute headway; from 5 p. m. to 7 p. m., three-minute headway."

Directors of Lake Shore Electric Railway Make Inspection Trip and Hold Monthly Meeting Aboard Private Car.—On June 27, 1911, the officers and directors of the Lake Shore Electric Railway inspected their own line and the Fremont & Fostoria line, which has been recently put into operation. After visiting Lima the party went to Toledo, where the night was spent. The following day they made a trip over the Toledo & Western Railroad. Members of the party were Henry A. Everett, E. W. Moore, Charles Currie, B. Mahler, J. B. Hanna, J. B. Hoge, W. H. Price, J. P. Witt and F. W. Coen. The private car, "The Northern," which belongs to Mr. Everett, was used.

Ohio Electric Railway Summer Schedules.—The Ohio Electric Railway, Cincinnati, Ohio, has issued a folder showing summer schedules over its lines. Complete timetables are given of all local and limited trains between Cincinnati, Columbus, Toledo, Dayton, Hamilton, Springfield, Zanesville, Fort Wayne, Lima, Richmond, Newark, Bellefontaine, Urbana and Union City. There is a map of the Ohio Electric Railway and connecting electric railways and steam lines. The rules governing rates for children, baggage and excess baggage are explicitly set forth. The Ohio Electric Railway has also issued an illustrated folder entitled "Buckeye Lake and Indian Lake," in which both these resorts are described.

Wisconsin Commission Orders Reduction in Fare.—The Railroad Commission of Wisconsin has ordered the Rockford & Interurban Railway, Rockford, Ill., to discontinue its present rate of 10 cents for passenger fare from points within the city limits to Janesville, Wis., to points about the yards of the Chicago & Northwestern Railroad in South Janesville, and substitute a 5-cent fare. South Janesville is about 80 rods outside the city limits. The petitioner for the reduction alleged that the 10-cent fare worked a hardship on the 200 or more railroad men whose business takes them to South Janesville. An analysis of the company's earnings in Wisconsin revealed the fact that the loss in revenue occasioned by the 5-cent fare will result in a decrease in total earnings of the company of about one-tenth of 1 per cent.

Transfer Hearings in New York.—The Public Service Commission of the First District of New York has issued an order directing representatives of all the surface lines in Manhattan to appear on July 6, 1911, and show cause why the transfer system that was in force before the Metropolitan Street Railway went into the hands of receivers should not be restored. The lines affected by the order of the commission follow: Metropolitan Street Railway, Third Avenue Railroad, Dry Dock, East Broadway & Battery Railroad, the Forty-second Street, Manhattanville & St. Nicholas Avenue Railway, the Kingsbridge Railway, the Second Avenue Railroad, the Central Park, North & East River Railroad; the South Shore Traction Company and the Twenty-eighth and Twenty-ninth Street Crosstown Railroad.

Fare Hearing in Trenton.—A hearing has been held by the Board of Public Utility Commissioners of New Jersey on the complaint of Cochran, Drugan & Company, manufacturers, whose works are located across the line dividing Hamilton Township from Trenton. The Trenton & Mercer County Traction Company charges a 10-cent fare to this point, which the complainant alleged is more than is charged for greater distances in other directions by the same company, and placed it at a disadvantage in employing labor. The company contended that the terms of its franchises do not admit of its collecting more than one fare in Hamilton Township, and that if it extended the 5-cent fare zone beyond the boundary line it would be unable to collect an additional fare for a trip of several miles through the township.

Interurban Service North of Chicago.—The Northwestern Elevated Railroad on July 3, 1911, began running two through trains daily from the Union Elevated Loop in Chicago to Ravinia Park on the Chicago & Milwaukee Electric Railway. The two trains which leave for the park each afternoon enter the loop, one at 6:31 and the other at 6:41 p. m. Returning trains leave Ravinia 10 and 20 minutes after the closing of the park entertainment. These trains operate as "expresses" on the Northwestern Elevated Railroad for 12 miles to Central Street, Evanston, and as nonstop "limiteds" on to Ravinia Park, which is about 30 miles north of the Chicago Loop district. Round-trip tickets are sold at any of the stations of the elevated railroad, and through trains may be boarded at any express station. Tickets for the round trip, including admission to the park, are sold at 70 cents at stations within the city limits of Chicago and at 60 cents at stations within the Evanston city limits.

Right of Indiana Commission to Order Track Elevation.—The Indiana Supreme Court has upheld the right of the Railroad Commission of Indiana to order the elevation of railroad tracks when the safety of the public is involved. In 1909 the commission ordered the Wabash Railroad to elevate its tracks at a highway crossing near Topeka, Ind. The court said that it is well settled in Indiana that the right of a railroad to cross a public highway with its tracks carries with it the duty on the part of the company to restore the highway to its former condition of usefulness and safety and keep it so, and if this cannot be done by a grade crossing the company must do it by constructing tracks over or under the highway, or the highway over or under the tracks. The company contended that it was the duty of the township trustee to order the grade improved. The court held that the trustee may do it, but that the Railroad Commission also has the power to order the elevation. The railroad contended that the order made by the Railroad Commission was not a reasonable and practical one, but the court held that the facts clearly show that it was. The decision has an important bearing on the question of eliminating crossings at grade between steam and electric railways.

Detroit United Railway Agrees to Submit Differences with Platform Men to Arbitration.—Owing to the fact that the Detroit United Railway and its motormen and conductors could not agree upon certain sections of a service contract between them both sides have concluded to submit the matter to a board of arbitrators. The contract contains twenty-five sections, and all but four of these are to be arbitrated. George F. Monaghan and Judge James Phelan have been selected as two members of the board and they are to choose a third. The present wage agreement reads as follows: "For all motormen and conductors who have been in the service less than six months, 23 cents per hour; for all motormen and conductors who have been in the service over six months and under 18 months, 26 cents per hour; for all motormen and conductors who have been in the service 18 months or over, 28 cents per hour. No single trip shall be considered as less than one hour. It is agreed that for the purpose of rating men as to pay who may be employed after the signing of this agreement the date on which they shall receive the next highest scale of wages shall be six months from the first day of the month succeeding the day on which they were employed." The men at first made a demand for a flat rate of 30 cents an hour, but this was finally changed to a request for a uniform advance of 2 cents an hour.

Personal Mention

Mr. R. T. Chiles has been appointed superintendent of the lines of the Virginia Railway & Power Company, Richmond, Va., in Norfolk.

Mr. C. Colburn has been appointed superintendent of the lines of the Virginia Railway & Power Company, Richmond, Va., in Berkeley.

Mr. E. A. Bishop has been appointed superintendent of the lines of the Virginia Railway & Power Company, Richmond, Va., in Portsmouth.

Mr. John E. Havell has been appointed superintendent of the Petersburg division of the Virginia Railway & Power Company, Richmond, Va.

Mr. E. R. Johnston has had his jurisdiction with the Illinois Traction System extended to include outside shops as well as the shop of the company at Decatur, Ill.

Mr. E. S. Ely has been appointed chief engineer of the Portsmouth, Norfolk and Ocean View divisions of the Virginia Railway & Power Company, Richmond, Va.

Mr. H. Pollard has been appointed superintendent of railway terminals and parks of the Richmond division of the Virginia Railway & Power Company, Richmond, Va.

Mr. H. L. Smith has been appointed superintendent of railway lines and schedules of the Richmond division of the Virginia Railway & Power Company, Richmond, Va.

Mr. John G. Baukat has been appointed superintendent of equipment of the Lehigh Valley Transit Company, Allentown, Pa., to succeed Mr. C. E. Lenhart, resigned.

Mr. James McC. Moffett has resigned as purchasing agent of the Metropolitan Street Railway, Kansas City, Mo., and Mr. E. E. Stigall has been appointed to succed him.

Mr. T. Norman Jones, Jr., has been appointed chief engineer of the Richmond, Interurban and Petersburg divisions of the Virginia Railway & Power Company, Richmond, Va.

Mr. W. F. Bryce has been appointed by the Virginia Railway & Power Company, Richmond, Va., as superintendent of railway lines of the Interurban division and the line to South Richmond.

Mr. J. L. Adams has been appointed general superintendent of the railway and ferry lines of the Portsmouth, Norfolk and Ocean View divisions of the Virginia Railway & Power Company, Richmond, Va.

Mr. W. A. Whitney, superintendent of the Western division of the Southern Pacific Railroad, San Francisco, Cal., has had placed under his jurisdiction the new electric lines of the Southern Pacific Company in Alameda, Oakland and Berkeley.

Mr. Charles C. Johnson, who has been purchasing agent of the Virginia Railway & Power Company, Richmond, Va., has been appointed purchasing agent and assistant to the general manager of the company and assistant general manager.

Mr. Charles H. Hubbell, formerly an official of electric railways in the Middle West, and more recently associated with Mr. Frederic W. Throssell, a certified public accountant, of Cleveland, Ohio, has entered the employ of the Ohio Tax Commission at Columbus, Ohio.

Mr. R. C. Taylor has been appointed master mechanic of the Chicago, Ottawa & Peoria Railway, part of the Illinois Traction System, with headquarters at the new shops at Ottawa, Ill. Mr. Taylor was formerly in charge of outside shops of the Illinois Traction System.

Mr. W. M. Cutlip has been elected secretary and treasurer of the Muskogee (Okla.) Electric Traction Company, and took up his headquarters in Muskogee on July 1, 1911. Mr. Cutlip will also retain his position as secretary of the Shawnee-Tecumseh Traction Company, Shawnee, Okla.

Mr. E. C. Hathaway, general manager of the Norfolk & Portsmouth Traction Company, Norfolk, Va., has been appointed assistant general manager of the Virginia Railway & Power Company, Richmond, Va., which on July 1, 1911, absorbed the Norfolk & Portsmouth Traction Company.

Mr. C. B. Buchanan, who has been general superintendent of railways of the Virginia Railway & Power Company, Richmond, Va., has been appointed general manager of the company. On July 1, 1911, the Virginia Railway & Power Company absorbed the Norfolk & Portsmouth Traction Company.

Mr. C. A. Coolidge, who has been general manager of the Oregon Electric Railway, Portland, Ore., has been elected first vice-president and general manager of the Spokane & Inland Empire Railway, Spokane, Wash. Mr. Coolidge succeeds Mr. A. L. White as first vice-president of the company and Mr. C. M. Graves as general manager.

Mr. Charles W. Ford, formerly superintendent of the Oklahoma Railway, has been appointed general superintendent of the Grand Junction & Grand River Railway, Grand Junction, Col., a new property which includes a railway and light, gas and ice services. The property was described in the ELECTRIC RAILWAY JOURNAL for October 15, 1910, page 832.

Mr. Jacob W. Gerke, whose appointment as master mechanic of the Wilmington & Philadelphia Traction Company and the Southern Pennsylvania Traction Company, with headquarters at Wilmington, Del., was noted in the ELECTRIC RAILWAY JOURNAL of July 1, 1911, was formerly superintendent of the Washington, Arlington & Falls Church Railway, Washington, D. C., in which capacity he served for eight months. He was for five years previously assistant superintendent and master mechanic of the company. He resigned from the Washington, Arlington & Falls Church Railway to become connected with the Tri-City Railway & Light Company.

Mr. J. N. Shannahan, who resigned recently as vice-president and general manager of the Washington, Baltimore & Annapolis Electric Railway to become railway manager of the operating department of J. G. White & Company, Inc., New York, N. Y., was presented with a silver service by the employees of the Washington, Baltimore & Annapolis Electric Railway. The service is contained in a massive mahogany case, upon which is inscribed "Presented to J. N. Shannahan by his co-employees of the W., B. & A. R. R. Co. as a token of their regard and esteem. 1907-1911." A farewell banquet was given Mr. Shannahan at the Rennert Hotel, Washington, by the heads of the various departments of the company.

Mr. W. F. Raber, general manager of the Ottumwa Railway & Light Company, Ottumwa, Ia., has been placed in charge of the Pueblo & Suburban Traction & Lighting Company, Pueblo, Col., temporarily by H. M. Byllesby & Company, Chicago, Ill., by whom the property at Pueblo has been taken over. Mr. Raber is a native of Ohio. He entered business with the Bell Telephone Company more than twenty years ago, but soon took up street railway and electric lighting work. He managed lighting plants for some time and finally became general manager of the Mansfield Railway, Light & Power Company, Mansfield, Ohio. He next became connected with H. M. Byllesby & Company, Chicago, and served them for some time as manager of electric light, power and gas plants in Oklahoma. In 1906 he was appointed by H. M. Byllesby & Company as manager of the Ottumwa Railway & Light Company.

Mr. A. D. Kimmett, whose appointment as master mechanic of the Lackawanna & Wyoming Valley Railroad, Scranton, Pa., to succeed Mr. F. J. Stevens, resigned, was noted in the ELECTRIC RAILWAY JOURNAL of July 1, 1911, entered railway work in the shops of the Central Railroad of New Jersey at Mauch Chunk, Pa. Subsequently he was appointed a car inspector by this company and the following year was transferred to Ashley, Pa., where he filled various clerical positions in the office of the assistant superintendent of motive power. In 1903 he was made piecework inspector at the machine shops of the company, and in November, 1904, he commenced an apprenticeship to become a machinist. In December, 1908, Mr. Kimmett entered the employ of the Illinois Traction System at Decatur, Ill., as an air-brake inspector, and remained with that company until Jan. 1, 1910, when he accepted the position of assistant master mechanic of the Lackawanna & Wyoming Valley Railway.

Mr. Carl Raymond Gray, who was elected president of the United Railways, the Oregon Electric Railway, the Oregon Trunk Railway, the Pacific & Eastern Railway, the Spokane, Portland & Seattle Railway and the Astoria and Columbia River Railroad, with office at Portland, Ore., early in 1911,

to succeed Mr. John F. Stevens, has been elected president of the Spokane & Inland Empire Railroad, to succeed Mr. Jay P. Graves. Mr. Gray was born on Sept. 28, 1867, and was educated at the Arkansas Industrial University. He entered railway service in 1882 as a telegraph operator with the St. Louis & San Francisco Railroad, and he served that company continuously until he was elected to the United Railways, the Orgon Electric Railway and other properties previously mentioned. While with the St. Louis & San Francisco Railroad Mr. Stevens filled the position of telegraph operator and general claim agent, clerk in the transportation department, commercial agent, division freight agent, division superintendent, superintendent of transportation, general manager, second vice-president, general manager and first vice-president.

Mr. J. F. Vail has retired as treasurer, general manager and purchasing agent of the Pueblo & Suburban Traction & Lighting Company, Pueblo, Col., the property having been purchased recently by H. M. Byllesby & Company, Chicago, Ill. Mr. Vail entered street railway work with the Grand River Street Railway, Detroit, Mich., in 1879. In 1880 he became connected with the Denver Horse Railroad, then operating twelve cars. A year later he went to the Northwest, but returned to Denver in 1883 and re-entered the employ of the Denver Horse Railroad. In December, 1888, he was made manager of the Pueblo Horse Railway, which then operated eight cars. In 1890 the property at Pueblo was rebuilt and extended to Lake Winnequa under the supervision of Mr. Vail under a new franchise. In February, 1901, the Pueblo Horse Railway was sold, and Mr. Vail resigned to assist in organizing the Citizens' Electric Light & Power Company, Pueblo. This company built and operated a power plant under the management of Mr. Vail, but when this plant and other properties at Pueblo were taken over by the Pueblo & Suburban Traction & Lighting Company in 1897 Mr. Vail was appointed general manager of the company. The employees of the company recently presented Mr. Vail with a diamond stud as a token of esteem.

Mr. J. C. Collins, secretary and auditor of the New York State Railways, Rochester, N. Y., who was elected secretary of the Street Railway Association of the State of New York at the annual meeting which was held at Cooperstown, N. Y., on June 27, 1911, began his railroad career as assistant to the vice-president of the Norfolk & Western Railroad in charge of accounts. He next became connected with E. W. Clark & Company, Philadelphia, Pa., who control a number of electric railways. He was subsequently made assistant secretary of the Camden & Suburban Railway, Camden, N. J., controlled by E. W. Clark & Company, but later he returned to the main office of Clark & Company in Philadelphia, where he remained until July 1, 1904, when he was transferred by the firm to Rochester. Later he was made secretary of all the electric railways centering in Rochester in which Clark & Company were interested. Mr. Collins continued with the Rochester Railway & Light Company when the property was taken over by the Andrews-Vanderbilt syndicate and was later made secretary and auditor of the Rochester Railway & Light Company. When the New York State Railways was organized to take over the electric railways at Rochester he was made secretary and auditor of that company.



J. C. Collins

OBITUARY

William N. McGee, superintendent of the Griffin Car Wheel Company, Chicago, Ill., died on June 25.

N. W. Halsey, of N. W. Halsey & Company, bankers, New York, N. Y., died in New London, Conn., on July 1, 1911.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***West Peak Railroad, Meriden, Conn.**—Incorporated in Connecticut to build an electric railway from the connection with the Connecticut Company's line at Southington to the summit of West Peak in Meriden. C. J. Danaher, Meriden, is interested.

***Chicago, Waukegan & Fox Lake Traction Company, Chicago, Ill.**—Incorporated in Illinois to build an electric railway from Waukegan to Woodstock through the Counties of Lake and McHenry. Headquarters: Chicago. Capital stock, $2,500,000. Incorporators and first board of directors: Charles A. Spenny, Columbus, Ohio; W. P. MacCracken, Irving D. Stevens, Peter B. Olsen and H. S. Hedberg, all of Chicago.

***Hamilton (Ill.) Railway.**—Application for a charter has been made in Illinois by this company to build an electric railway from the bridge over the Mississippi River between Hamilton and Keokuk to Hamilton and Warsaw. Capital stock, $11,000. Incorporators: George Higginson, Winnetka; J. D. Harney, Geneva; J. L. Valentine, W. Walls and A. W. Harro, Carthage.

***Camp Creek Railway, Bozeman, Mont.**—Application for a charter has been made by this company in Montana to build a 20-mile line from Manhattan into the Camp Creek country. Preliminary surveys have been made and most of the right-of-way has been secured. Capital stock, $100,000. Incorporators: A. M. Harvey, Livingston; Charles L. Anceny, Salesville; F. L. Benepe, A. J. Walrash and H. S. Buell, all of Bozeman.

***Columbia Falls & Southern Railroad, Columbia Falls, Mont.**—Incorporated in Montana to build an electric or steam railroad south from Columbia Falls. Capital stock, $100,000. Incorporators: A. L. Jordan, J. T. Robinson, John Laux, W. P. Snow and H. F. Jessup.

***Republic Railway & Light Company, Trenton, N. J.**—Incorporated in Trenton on June 28 to take over certain properties in accordance with plans as recorded in the ELECTRIC RAILWAY JOURNAL for July 1, page 62. Capital stock, $17,500,000. Incorporators: M. Gregg Latimer and William Henry Hoyt, Brooklyn, and John D. Marsh, New York.

***Rapid Transit & Terminal Railway, Cleveland, Ohio.**—Incorporated in Ohio to build underground terminals in Cleveland and to give terminal facilities to all the interurban lines entering Cleveland. It is said that the company will spend $50,000,000 for this work if the co-operation of other roads can be secured. Capital stock, $100,000. Incorporators: W. R. Hopkins, B. F. Hopkins and A. G. Newcombe.

***National Power Company, Pittsburgh, Pa.**—Chartered in West Virginia to build an electric railway from Point Marion to parallel the Cheat River. Incorporators: F. B. Parriott, W. B. Beecher, E. J. Cole, W. H. Young and S. B. Kelley, all of Pittsburgh.

Amarillo (Texas) Traction Company.—Chartered in Texas to build an electric railway in Amarillo and extend it to San Jacinto Heights. Capital stock, $24,000. Incorporators: Mark Logan, W. W. Lynch and N. A. Brown. [E. R. J., Oct. 29, '11.]

***Gilmer & Parkersburg Railway, Glenville, W. Va.**—Chartered in West Virginia to build a 12-mile electric railway between Gilmer station, on the C. & C. Railroad, and Glenville, W. Va. Grading will be done in the fall. Robert L. Ruddell, Glenville, general manager.

FRANCHISES

***Tuscaloosa, Ala.**—F. G. Blair and H. B. Foster, Tuscaloosa, have asked the Council for an electric railway franchise in Tuscaloosa.

Little Rock, Ark.—The Little Rock Railway & Electric Company has received a franchise from the City Council to

extend its South Main Street line into the extreme southern limits of Little Rock.

Burlingame, Cal.—The Town Trustees have passed a resolution granting to the highest bidder a franchise for an electric railway from the Southern Pacific station at Easton through the Easton additions to Burlingame. [E. R. J., April 22, '11.]

Fowler, Cal.—The Fresno, Hanford & Summit Lake Interurban Railway, Fresno, have received a franchise from the City Council in Fowler.

Modesto, Cal.—The Tidewater & Southern Railroad Company, Stockton, has received a franchise from the Council in Modesto.

Oakland, Cal.—The Oakland & Bay Shore Railway has received a 35-year franchise from the City Council in Oakland. [E. R. J., April 29, '11.]

San Jose, Cal.—The Peninsula Railway has asked the Town Board to advertise for sale a franchise for an electric railway extending on the Milpitas Road from Twelfth Street to the Berryessa Road and thence on the Berryessa Road to Fourteenth Street in San Jose.

Santa Clara, Cal.—The Peninsula Railway, San Jose, has asked the Board of Trustees for a franchise to extend its tracks over several streets in Santa Clara.

Turlock, Cal.—The Turlock Traction Company, Modesto, has received a 50-year franchise in Turlock. This line will connect Turlock, Newman and Monesto. [E. R. J., April 29, '11.]

Williamsburg, Col.—B. F. Foor, representing the Florence Interurban Electric Company, Florence, has received a franchise in Williamsburg. This is part of a plan to build an electric railway between Florence, Williamsburg, Rockvale and Coal Creek. [E. R. J., June 10, '11.]

Kissimmee, Fla.—The Citrus Southern Electric Railway, Orlando, has received a franchise from the City Council in Kissimmee. The franchise also provides for a dock and wharf extending into Lake Tohopekalia. This line will extend from Sanford, where it will connect with the Clyde Line of steamers, via Orlando, with its terminus at Kissimmee. T. K. Miller, Orlando, president. [E. R. J., June 24, '11.]

Becket, Mass.—The Berkshire Street Railway has asked the Board of Selectmen for a franchise to extend its tracks from the Lee line through West Becket and South Becket to the Otis line in Becket.

Worcester, Mass.—The Worcester Consolidated Street Railway has received a franchise from the Aldermen to double track several of its lines in Worcester.

East Lansing, Mich.—The Michigan United Railways has asked the Council for a franchise to double track its line in East Lansing and straighten its Pine Lake division.

East Syracuse, N. Y.—The Syracuse Rapid Transit Railway has asked the Village Trustees for a franchise to double track some of its lines in East Syracuse.

***Oklahoma City, Okla.**—W. F. Harn, John F. E. Winandan Homer S. Hurst representing the Citizens' Traction Company, Oklahoma City, will ask the City Council for a franchise to build 15 miles of track in Oklahoma City.

East Youngstown, Pa.—The Mahoning & Shenango Railway & Light Company, Youngstown, has asked the Council for a franchise to double track its line in East Youngstown.

Providence, R. I.—The Old Colony Street Railway, Boston, has received a franchise from the Board of Aldermen to extend its Columbia Street line in Providence.

***Rock Hill, S. C.**—J. M. Cherry and associates have asked the Chamber of Commerce to indorse their request for a 60-year franchise to build an electric railway from Rock Hill to connect with the Seaboard & Catawba Valley Railroad near Catawba Junction, giving through connection from Rock Hill to Great Falls.

Milwaukee, Wis.—The Milwaukee Electric Railway & Light Company has asked the Common Council for two franchises in Milwaukee. One is for the continuation of the Twenty-seventh Street line north to the city limits and the other to extend its tracks on Teutonia Avenue.

Milwaukee, Wis.—The Milwaukee Western Electric Railway has asked the Common Council for a new franchise to operate its cars over the tracks of the Milwaukee Electric Railway & Light Company on the Walnut Street line in Milwaukee.

TRACK AND ROADWAY

Little Rock, Pine Bluff & Eastern Traction Company, Little Rock, Ark.—It is reported that this company has secured the right-of-way of the Little Rock & Pine Bluff Traction Company, amounting to 37 miles. This line will connect Little Rock and Pine Bluff, via Altheimer, Sturrgart, Helena and Clarenden. C. C. Kavanaugh, president. [E. R. J., May 20, '11.]

Pacific Electric Railway, Los Angeles, Cal.—It is reported that this company contemplates the immediate construction of an extension between San Bernardino and Rialto, and probably to Ontario.

***San Bernardino, Cal.**—William G. Kerckhoff, Los Angeles, president of the Ontario & San Antonio Heights Railroad, states that he will build an electric railway between San Bernardino and Upland, connecting at Upland with the Pacific Electric Railway, thus affording through service to Los Angeles. Right-of-way and franchises will be secured at once.

Peninsular Railway, San Jose, Cal.—Plans are being made by this company to build an extension south from San Jose to Palo Alto toward Paraja.

Vallejo & Northern Railway, Vallejo, Cal.—The Sacramento & Woodland Railway, a subsidiary of this company, will build the first division in the chain of railways to be built by the Vallejo & Northern Railway. This line will extend along the Sacramento River on the east side for about 15 miles and then across the Yolo basin to Woodland. The terminal will be in West Sacramento. T. T. C. Gregory, Suisun, president. [E. R. J., June 24, '11.]

Baltimore & Washington Transit Company, Washington, D. C.—This company has applied to the Public Service Commission of Maryland for authority to issue $50,000 of 5 per cent second mortgage bonds. The company contemplates an extension to Sandy Spring, Md., 14 miles.

***Forest Park, Ill.**—Henry J. Mohr, Forest Park, and associates plan to build an electric railway between Berwyn, Forest Park, Lyons and Cicero.

***Princeton, Ill.**—C. N. Gerard, Bradford, plans to build an electric railway between Kewanee, Henry, Elmira and Bradford, a distance of about 40 miles.

Indianapolis, Chicago & Meridian Railway, Indianapolis, Ind.—Preliminary surveys have been made and construction will begin with the next few months by this company on its double-track electric railway to connect Indianapolis, Sheridan, Flora, Monticello, Francisville, Koutz, Valparaiso, Hobart, Wheeler, Gary, Hammond and Warsaw. Negotiations are being made with the Illinois Central Railroad to use its tracks from Hammond to Chicago. M. J. Moreland is interested. [E. R. J., June 10, '11.]

Vincennes, Washington & Eastern Traction Company, Vincennes, Ind.—This company increased its capital stock from $100,000 to $600,000. The construction of this line has been begun between Vincennes, Washington and Loogootee. [E. R. J., July 1, '11.]

Davenport-Muscatine Railway, Davenport, Ia.—This company advises that it has begun the construction of its 30-mile electric railway between Davenport and Muscatine. It will buy power from the Tri-City Railway & Light Company, and it will furnish power for lighting purposes. It will also use the repair shops of the Tri-City Railway & Light Company. Capital stock, authorized, $1,000,000. Officers: J. F. Porter, Davenport, president; J. R. Lane, vice-president; H. E. Weeks, Davenport, secretary; J. M. Thayer, treasurer; George G. Kuhn, Rock Island, Ill., purchasing agent, and J. G. White & Co., Davenport and New York, electrical engineers. [E. R. J., July 1, '11.]

Southwestern Traction Company, New Orleans, La.—This company advises that it will begin work within sixty days on the first 17-mile section between New Iberia and Jeanerette. Headquarters, Hennen Annex, New Orleans. R. E. L. C. Reis, secretary. [E. R. J., June 10, '11.]

***Tolland County Street Railway, Stafford Springs, Mass.**

—This company, which was granted a charter several years ago has just organized to build an electric railway between Stafford Springs and Staffordville. Directors: A. S. May, B. I. Spockland and N. S. Buckingham.

Battle Creek, Coldwater & Southern Railway, Battle Creek, Mich.—The J. T. Adams Construction Company, Columbus, Ohio, has been awarded the contract by this company to build its 28-mile electric railway between Battle Creek and Coldwater. It is expected to begin work in the fall. A. C. Kingman, Battle Creek, president. [E. R. J., June 3, '11.]

Saginaw & Flint Railway, Saginaw, Mich.—Surveys are being made by this company to build an extension from Saginaw to Bay City.

Minneapolis Northern Suburban Railway, Minneapolis, Minn.—Work has been begun by this company on its 15-mile electric railway between Minneapolis and Little Falls. [E. R. J., June 1, '11.]

Cape Girardeau-Jackson Interurban Railway, Cape Girardeau, Mo.—Preliminary surveys are being made by this company to build an extension from Cape Girardeau to Jackson, Illmo, Edna and Chaffee.

Missouri & Kansas Interurban Railway, Kansas City, Mo.—This company has filed an application with the Kansas State Board of Railway Commissioners for permission to issue $300,000 of stock to double track its line from Thirty-ninth Street, Kansas City, to Overland Park, and reballast the entire line, and for the acquisition of additional power equipment.

Omaha, Sioux City & Northern Railway, Omaha, Neb.—The Kansas Construction & Irrigation Company, Garden City, Kan., has been awarded the contract by this company to build its 90-mile electric railway to connect Omaha, Blair, Tekaman, Decatur and Sioux City. B. M. McCue and E. A. Tennis, Garden City, are interested. [E. R. J., May 20, '11.]

Suffolk Traction Company, Patchogue, N. Y.—This company has completed and placed in operation its line from Main Street, Patchogue, to Blue Point. It expects to have its extension to Port Jefferson completed this summer. The company has also been granted an extension of time in which to build its line down Ocean Avenue to the Great South Bay.

Western Ohio Railway, Lima, Ohio.—An extension from Fremont to Tiffin is being considered by this company.

Oklahoma (Okla.) Railway.—This company is about to begin the construction of another extension over one of the three following routes, viz.: Yukon to El Reno, Moore to Norman or Edmund to Guthrie. Just which one of the extensions will be built at the present time will depend upon the decision of the board of directors, which will be made within the next ten days.

Johnstown (Pa.) Traction Company.—Surveys have been begun by this company to build an extension from Johnstown to Westmont.

Ephrata & Lebanon Street Railway, Lebanon, Pa.—Construction will be begun at once by this company on its 23-mile electric railway between Ephrata and Lebanon. The company is now on the market for construction material. M. H. Shirk, Lincoln, secretary. Headquarters: Mentzer Building, Ephrata. [E. R. J., June 24, '11.]

Pittsburgh (Pa.) Railways.—The Carnegie Company has been awarded a contract by this company for 500 tons of rails.

West Penn Railways, Pittsburgh, Pa.—The Crossen Construction Company, Brownsville, has been awarded the contract by this company for the grading and masonry work for a 2-mile extension from Masontown on the route to the Martin works. This is part of the contemplated extension from Masontown to Morgantown, W. Va.

Chattanooga Railway & Light Company, Chattanooga, Tenn.—The double tracking of the Oak Street division in Chattanooga has been begun by this company.

Nashville-Gallatin Interurban Railway, Gallatin, Tenn.—H. H. Mayberry, Nashville, president of the Fidelity Securities Corporation, which will build this line, states that contracts will be awarded to build the following bridges: One truss, 100 ft.; one through girder, 60 ft.; one deck girder, 60 ft.; one deck girder, 65 ft., delivery to be made at Nashville within 60 days. The Fidelity Securities Corporation has increased its capital stock to $300,000 which it has announced is fully subscribed. The number of directors has been increased from five to nine. [E. R. J., June 24, '11.]

Amarillo Improvement Company, Amarillo, Tex.—A contract has been made by this company and the Amarillo Water, Light & Power Company whereby the San Jacinto Heights electric railway will be operated by electricity. The line will extend from Amarillo to San Jacinto Heights. The service will begin on Nov. 1. [E. R. J., March 27, '11.]

Dallas, Tex.—E. T. Moore, manager of the Dallas Consolidated Electric Street Railway, Dallas, advises that a company has not yet been organized to build the 30-mile electric railway between Dallas and Waxahachie, via Lancaster, Red Oak and Sterrett. Stone & Webster, Boston, Mass., will build the line. E. Moore, Dallas, manager. [E. R. J., June 24, '11.]

***Ebenezer, Tex.**—The Alamo Land & Sugar Company will construct a 16-mile line to extend from Ebenezer to various points upon its tract of 32,000 acres of land. The construction will begin soon. It is proposed to operate gasoline motor cars at first, but later the line is to be electrified.

Gray's Harbor Railway & Light Company, Aberdeen, Wash.—Plans are being made by this company to build a three-mile extension of track in Aberdeen.

Twin City Electric Company, South Bend, Wash.—Ray Fulcher and P. Pristoni, San Francisco, said to represent Sanderson & Porter, New York, N. Y., have taken charge of the preliminary work and construction of this railway between South Bend and Raymond. J. O. Crary, who obtained the franchise for this line, has assigned it to Sanderson & Porter. [E. R. J., March 18, '11.]

Walla Walla (Wash.) Traction Company.—This company is rebuilding and repaving some of its tracks in Walla Walla.

Fairmont, Clarksburg & Grafton Railway, Clarksburg, W. Va.—Final surveys have been made, the necessary stock sold and construction will soon be begun by this company on its 22-mile electric railway between Fairmont, Clarksburg and Grafton. Charles F. Sutherland, Morgantown, president. [E. R. J., May 13, '11.]

Fairmont & Pittsburgh Railway, Fairmont, W. Va.—The entire right-of-way has been secured by this company for its 80-mile electric railway between Fairmont, W. Va., and Pittsburgh, Pa.

***Wheeling, W. Va.**—Albert M. Schenk, Wheeling, and associates have plans under consideration to build an electric railway between Wheeling, Parkersburg, Moundsville and Sistersville. Franchises will be asked for at once.

Badger Railway & Light Company, Milwaukee, Wis.—The Railroad Commission of Wisconsin has authorized this company to issue 2550 shares of common stock of the par value of $100 each. Stock of par value $216,000 is to be issued and exchanged for the right-of-way and the grading on which the company proposes an electric railway between Whitewater and Lake Geneva, a distance of about 22 miles. Stock of the par value $39,000 is to be sold for not less than par to provide funds for the expenses of construction. Gustav Pickhardt, 711 Majestic Building, Milwaukee, chief engineer. [E. R. J., March 11, '11.]

SHOPS AND BUILDINGS

Vallejo & Northern Railway, Vallejo, Cal.—This company expects to build a terminal station and repair shops at West Sacramento. T. T. C. Gregory, Suisun, president.

Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.—Plans are in progress by this company to remodel its two-story depot at Rushville.

Des Moines (Ia.) City Railway.—In connection with its plan to spend about $500,000 in improvements this company is considering the construction of a new carhouse. No site has as yet been selected for the structure.

Iowa City (Ia.) Electric Railway.—This company will construct a new waiting room in Iowa City at the north

end of its line where it intersects with the road leading to the city park at Park Bridge.

Blue Grass Traction Company, Lexington, Ky.—A two-story passenger and freight station will be constructed by this company at Paris.

Northern Ohio Traction & Light Company, Akron, Ohio.—This company has secured another block of land at the corner of Boulevard and Lakeside Avenues, Akron, Ohio, which will be added to that already purchased for its new carhouses. In addition to the carhouses the company has planned to erect a large repair and machine shop on a portion of the land.

Portland Railway, Light & Power Company, Portland, Ore.—Work will be begun at once by this company on the erection of a consolidated carhouse in Portland. The cost is estimated to be about $500,000.

Tacoma Railway & Power Company, Tacoma, Wash.—This company is having plans prepared for the erection of a depot, construction on which will be begun shortly.

Fairmont & Clarksburg Traction Company, Fairmont, W. Va.—The Owego Bridge Company, Owego, N. Y., has been awarded the contract by this company to build its new carhouse in Clarksburg. The structure will be located on the land adjoining the present interurban station. It will be 200 ft. long and of metal construction with a steel trussed roof and upon concrete foundations. It will be five tracks in width. The cost is estimated to be about $15,000. James O. Watson, Fairmont, general manager.

POWER HOUSES AND SUBSTATIONS

Connecticut Company, Hartford, Conn.—This company has completed the necessary changes in the power house at Buckland and West Streets in Hartford. [E. R. J., May 27, '11.]

Indianapolis, Chicago & Meridian Railway, Indianapolis, Ind.—It is reported that this company intends to build its new power stations at Monticello and at Indianapolis. M. J. Mooreland is interested. [E. R. J., June 10, '11.]

Boone (Ia.) Electric Company.—This company has awarded a contract to the Allis-Chalmers Company for two 1000-kw turbines, and another contract has been placed with the Edge Moor Iron Company for three 400-hp boilers. In addition to its street railway service the Boone Electric Company has a central station which has just secured a contract from the Chicago & Northwestern Railway to supply power for the operation of extensive new car shops at Boone.

Des Moines (Ia.) City Railway.—This company has announced that at the power house on East Maple Street and the river an addition will be constructed on the river end of the present plant to contain a 2000-kw low-pressure turbine with necessary condensers, switchboard and transformers. A new coal and ash-conveying plant and an electrically operated 30-ton crane will be installed at the power station. Besides the 300-kw rotary converter to be located at Klondike Junction, north of Grand View Park, a 500-kw rotary will be located at Flint Junction.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—Additions and improvements will be made by this company at once at its North Avenue power house in Youngstown. The capacity of the plant will be increased 50 per cent, making the total capacity 13,000 kw. The addition will be a one-story brick structure containing over 1500 sq. ft. of floor space. The new equipment has been contracted for and will include a 4000-kw turbine, a 12,000-sq. ft. surface condenser, a 200-hp pump for supplying water for the condenser, and two 500-hp boilers, in addition to boiler feed pumps and various other necessary auxiliaries.

Portland Railway, Light & Power Company, Portland, Ore.—This company has completed its 8,000-hp steam plant at the foot of Lincoln Street in Portland. This plant is to provide for emergencies when transmission wires break down. The structure is 160 ft. x 130 ft. and of reinforced concrete construction. The plant consists of 16 boilers, one reciprocating engine, two steam turbines and 2000-kw motor generators. In addition, there are vacuum and circulating pumps. The cost is estimated to be about $200,000. [E. R. J., March 19, '11.]

Manufactures & Supplies

ROLLING STOCK

Columbus, Marion & Bucyrus Railroad, Marion, Ohio, has purchased four 30-ton standard steam railroad gondola cars.

Portland Railway, Light & Power Company, Portland, Ore., has ordered through Pierson, Roeding & Company six Brill 21-E trucks without wheels.

Morris County Traction Company, Morristown, N. J., has ordered ten quadruple equipments of No. 101-B-8 railway motors with type K-28-B control from the Westinghouse Electric & Manufacturing Company.

Marshall (Tex.) Traction Company has ordered two double equipments of No. 307 interpole railway motors with type K-10 control from the Westinghouse Electric & Manufacturing Company.

Philadelphia (Pa.) Rapid Transit Company will shortly be in the market for thirty elevated cars. The plans for the rehabilitation of the property call for two hundred additional surface cars, but the company states that no definite time has been set for the purchase of these cars.

Houston (Tex.) Electric Company, noted in the ELECTRIC RAILWAY JOURNAL of May 6, 1911, as having ordered five double-truck, single-end cars from the St. Louis Car Company, has specified the following details for this equipment:

Seating capacity	40	Curtain material	Pantasote
Length of body	26 ft. 6 in.	Destination signs	Hunter
Over vestibule	38 ft. 6 in.	Wheel guards	H-B
Width over sills	8 ft. 4 in.	Hand brakes	Ackley
Over all	8 ft. 7 in.	Headlights	Crouse-Hinds
Height, rail to sills, 3 ft. 1½ in.		Motors	2 G. E.-219
Sill to trolley base	8 ft.	Seats	Heywood
Body	semi-steel	Trolley base	Sterling-M.
Interior trim	mahogany	Trucks	Brill 39-E
Roof	arched	Wheels	chilled iron
Underframe	composite	Drivers	33 in.
Control	GE K-36	Pony	21 in.
Couplers	radial		

Greenville, Spartanburg & Anderson Railway, Greenville, S. C., has included the following in its specifications for the seventeen four-compartment high-speed interurban cars which are being built by the Jewett Car Company:

Seating capacity	60	Curtain fixtures	C. S. Co.
Weight (body only)	38,000 lb.	Curtain material	Pantasote
Bolster centers, length, 39 ft. 5 in.		Fenders	loco. type, pilot
Over vestibule	60 ft.	Gongs	12 in.
Width over sills	9 ft. 2 in.	Heaters	Consol.
Over all	9 ft. 4 in.	Headlights	Crouse-Hinds
Height, rail to sills, 3 ft. 8 in.		Journal boxes,	A. E. R. A., Std.
Sill to trolley base	9 ft. 9⅛ in.	Motors	4-1500-volt dc.
Body	wood	Motors	inside hung
Interior trim	mahogany	Sanders	air
Headlining	Agasote	Sash fixtures	Edwards
Roof	monitor	Seats	H. & K. Walkover
Underframe	Composite	Seating material,	leather and frieze plush
Air brakes	West. A. M. M.	Trolley retrievers	Knutson
Axles	6 in.	Trucks,	M. C. B., 7-ft. wheel base
Car trimmings	bronze	Wheels	36-in. rolled steel
Control	for 1500 volt d.c.		
Couplers	Tomlinson		

The six cars ordered by the Piedmont Traction Company will also be built in accordance with the specifications of the Greenville, Spartanburg & Anderson Railway.

TRADE NOTES.

Indian Refining Company, New York, N. Y., announces that its general and executive offices are now located permanently in the Whitehall Building, 17 Battery Place, New York.

Ackley Brake Company, New York, N. Y., reports the receipt of additional orders for Ackley brakes from Seville, Spain and the Sao Paulo Tramway, Light & Power Company, Sao Paulo, Brazil.

Haskel & Barker Car Company, Michigan City, Ind., has awarded a contract to the American Bridge Company for

about 2500 tons of structural material to be used in the construction of its new steel car shops.

Duffy & Boyd Hardened Copper Company, Gardiner, Me., has been chartered in Maine to manufacture copper trolley wheels. The authorized capital stock is $100,000. C. A. Messer is president and J. Boyd, Togus, is treasurer.

Rush, Otis & Company, Chicago, Ill., has been formed by C. G. Rush and H. B. Otis to continue the old business of C. G. Rush & Company. The new firm will act as electrical contracting engineers, with offices at 69 West Washington Street, Chicago.

Sangamo Electric Company, Chicago, Ill., has removed its Chicago office to 617-631 West Jackson Boulevard, where it will occupy joint offices with the Delta-Star Electric Company, whose president, H. W. Young, is also manager for the Sangamo Electric Company.

Pittsburgh, Transformer Company, Pittsburgh, Pa., announces that its Western sales agency is now conducted by the Delta-Star Electric Company, 617-631 West Jackson Boulevard, Chicago, Ill. The Western agency was formerly held by the Republic Electric Company, controlled by stockholders of the Delta-Star Electric Company. The officers of the Delta-Star Electric Company are: H. W. Young, president, and A. S. Pearl, secretary.

Wonham, Sanger & Bates, New York, N. Y., are circulating a significant passage from the report of the Birmingham (Eng.) Tramways for the year ending March 31, 1911, to the effect that the adoption of C-H ampere-hour meters on the cars resulted in a current saving of about £5,000 for the first nine months' service. As previously noted in these columns, the successful work of this meter abroad led to its introduction to American electric railways by Wonham, Sanger & Bates.

Col. Henry G. Prout, vice-president and general manager of the Union Switch & Signal Company, Swissdale, Pa., and formerly, for sixteen years, 1887-1903, editor-in-chief of the *Railroad Gazette,* received last week from the University of Michigan the honorary degree of Doctor of Laws. Colonel Prout graduated from the University of Michigan in 1871, with the degree of C. E., and in 1902 received from Yale University the honorary degree of Master of Arts.

The J. G. Brill Company, Philadelphia, Pa., has received the following orders for export: M. E. Curwin, London, Eng., fifty Brill 21-E trucks; Noyes Brothers, for Wanganui Corporation Tramways, New Zealand, eight Brill 21-E trucks without wheels and axles; Agar Cross & Company, for La Plata Electric Tramways Company, Argentina, ten Brill 21-ft. 4-in. semi-convertible car bodies mounted on Brill 21-E trucks; Sao Paulo Tramway, Light & Power Company, Brazil, 25 Brill 21-E trucks without wheels; Thomas Barlow & Son, for Durban Corporation Tramways, Durban, Natal, six Brill 21-E trucks without wheels and axles.

Davis-Bournonville Company, Chicago, Ill., announces that it has been appointed by the Davis-Bournonville Acetylene Development Company and the National Pneumatic Company to act as their exclusive selling agent for welding and cutting apparatus, and has added largely to its working capital and executive force. The business of the Davis-Bournonville Company will be divided into the Eastern department, with offices in its present quarters, 90 West Street, New York, N. Y., and the Western department, with offices at 515 Laflin Street, Chicago, the present quarters of the welding department of the National Pneumatic Company.

American Mason Safety Tread Company, Boston, Mass., has shipped to the American Car & Foundry Company, New York, at its Jeffersonville, Ind., shops red car karbolith surfacing material for 19,500 sq. ft. and car karbolith for 21,000 sq. ft. for new passenger coaches for the Baltimore & Ohio Railroad. This company is shipping to the Pressed Steel Car Company car karbolith for flooring twenty-five postal cars for the New York Central & Hudson River Railroad; also 17,760 sq. ft. of red karbolith for passenger coaches, and 2280 sq. ft. of karbolith for table tops. The Interborough Rapid Transit Company, New York, has recently received several consignments of carborundum karbolith surfacing material.

Jones & Laughlin Steel Company, Pittsburgh, Pa., on July 1 opened its own office in the Penobscot Building, Detroit, Mich. It has been represented in Detroit heretofore by F. A. Goodrich & Company. Frederick H. Holt, now in charge of the office of F. A. Goodrich & Company, will be district sales manager in Detroit. The Jones & Laughlin Company will also open offices in the Pierce Building, St. Louis, Mo., where the F. A. Goodrich Iron & Steel Company has been representing it. E. D. Batchelder, now in the sales department of the general offices of the Jones & Laughlin Steel Company, will be district sales manager in St. Louis. A. C. Pollock, in the sales department of the general offices, has been put in charge of the newly established Pittsburgh sales district.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has received orders for power equipment from the following companies: Chicago, Ottawa & Peoria Railway, Ottawa, for substation equipment consisting of nine 110-kw, 33,000-volt oil-insulated, self-cooling transformers, three five-panel switchboards and the necessary lightning protective apparatus; Merchants' Light & Power Company, Ogden, Utah, for four 500-kw oil-insulated, water-cooled transformers and five 75-light metallic flame arc lamp outfits; Kentucky Electric Company, Louisville, Ky., for one 1500-kw air-blast transformer with blower outfit. Foreign railway motor business recently secured includes an order from Walter Brothers & Company, Rio de Janeiro, Brazil, for fifteen double equipments of No. 101-G motors with type K-10-A control.

Standard Underground Cable Company, Pittsburgh, Pa., calls attention to the longevity of one of its underground cables which was removed from a duct in Philadelphia Sept. 22, 1910, owing to a re-arrangement of circuits. This cable was installed during May, 1886, having been manufactured by the Standard Underground Cable Company. It had been in operation therefore continuously for over twenty-four years, and at the time of its removal showed absolutely no indication of deterioration in any way, notwithstanding the fact that while the cable was sold to operate under a working pressure of 600 volts, the circuit had for years been used for 2000-volt arc-light service. The insulation is of a saturated fiber, a type that, due to the increasing demand for higher voltage, has been largely superseded. The cable is a No. 4 B & S. gage stranded conductor made up of sixteen No. 16 B. & S. gage wires. The original specifications called for a braid of cotton yarn over the lead and its saturation with No. 2 P. & B. paint, to protect the lead cover against chemical action.

ADVERTISING LITERATURE

Ansonia Brass & Copper Company, New York, N. Y., is mailing a 36-page catalog which describes Tobin bronze. The publication also contains tables showing the results of various tests and commendatory letters from users of Tobin bronze.

Standard Steel Works Company, Philadelphia, Pa., has issued a new catalog on steel tires, giving in detail the specifications which were adopted by the American Society for Testing Materials. Illustrations, diagrams and a facsimile of dimension blank for sending orders are included.

General Electric Company, Schenectady, N. Y., has issued Bulletin 4818, which describes and illustrates its flange and flexible couplings. Bulletin 4832 describes a line of commutating-pole generators in which commutating trouble is eliminated. These range in capacity from 20 to 150 kw and are wound for 125, 250 and 575 volts. They may be equipped with sliding base or with belt tightener, as desired. Bulletin 4846 describes the company's alternating-current switchboard panels. Bulletin No. 4852 contains a description of the company's standard 50-ton electric locomotive and its equipment, and a statement of features of construction which have made it particularly suitable for the requirements of the heaviest interurban roads. The bulletin also contains an information sheet for the use of those considering the adoption of such a locomotive. Bulletin 4829 describes and illustrates electric locomotives for industrial railways. These locomotives are built for both standard and narrow gage.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVIII NEW YORK, SATURDAY, JULY 15, 1911 No. 3

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. McGRAW, President.
HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.
CURTIS E. WHITTLESEY, Secretary and Treasurer.
TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

HENRY W. BLAKE, Editor.
L. E. GOULD, Western Editor.
Associate Editors:
RODNEY HITT, FREDERIC NICHOLAS, WALTER JACKSON.
News Editors:
G. J. MACMURRAY, FRANK J. ARMEIT.

CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1021 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Thursday, 9 A. M., of the week of issue.

Copyright, 1911, by McGRAW PUBLISHING COMPANY.

Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL 8500 *copies are printed.*

NEW YORK, SATURDAY, JULY 15, 1911.

CONTENTS.

Car-Roof Nomenclature..... 103
Transfers in New York..... 103
Problems of Midsummer..... 104
Interurban Coupler Standardization..... 104
Economy in the Carhouse..... 105
Venice Power Station of the Illinois Traction System..... 106
Hearing in Regard to Fares on Long Island Railroad..... 114
Hoops for Train Orders..... 114
Meeting of the Committee on Equipment..... 115
Fare Hearing in Massachusetts..... 120
Hearing on Joint Rates and Through Routes in New York..... 121
New York Meeting of Committee on Way Matters..... 122
Block Signals on Beebé Syndicate Lines..... 122
New Work of the South Shore Single-Phase..... 123
New Timetable of the Albany-Southern Railroad..... 123
Gasoline Weed Burner..... 124
Trolley Hart and Aligning Ear..... 125
Turbo-Generator Ventilating Device..... 125
New Freight Cars of Michigan United Railways..... 126
Non-Parallel Axle Truck Cars for Kankakee, Ill..... 127
Multiple Coupon Transfer Used in New York..... 127
More Storage Battery Cars for the Third Avenue Railroad, New York City..... 128
New Material for Car Headlining..... 128
News of Electric Railways..... 129
Financial and Corporate..... 133
Traffic and Transportation..... 136
Personal Mention..... 137
Construction News..... 138
Manufactures and Supplies..... 141

Car-Roof Nomenclature

In every industry new names from time to time must be coined or adapted to distinguish new methods, devices or constructions. In the early days of electric railways the word "interurban" was fittingly applied to cross-country lines connecting different towns and cities, and many other terms might be mentioned which have found their way into the nomenclature of electric railway work. In car design some of the names which have been invented or adapted have been truly descriptive, while others have been colloquial and almost meaningless. In some cases several different names have been applied to the same part or type of construction. One of the most striking examples of this diversified nomenclature is the variety of names which have been applied to the type of car roof in which no monitor deck is used and the roof is formed in a smooth symmetrical curve from one side to the other. Some of the names which have been applied to this construction are "turtle-back roof," "segmental roof," "elliptical roof," "flat-arch roof" and "arch roof." All of these are intended to be synonymous and their indiscriminate use leads to unnecessary confusion. The name "arch roof" is more nearly descriptive and general in its application to different variations of design than any of the others, and this term has been used throughout in the new Electric Railway Dictionary. One of the objects in preparing the Electric Railway Dictionary was to bring about standardization of terms such as these, and carbuilders, master mechanics and others cannot do better than to follow the Dictionary as a guide.

Transfers in New York

In spite of the fact that the rapid transit question is by no means settled in New York City, the Public Service Commission, First District, has decided to begin an immediate investigation into the desirability of requiring the surface railways to adopt air brakes on all of their cars and has also begun a series of hearings at which the railway companies are requested to present reasons why a practically universal system of transfers should not be required on all the lines in Manhattan Borough. The first hearing on this subject was held July 6, and while the proposed order of the commission does not require the exchange of transfers at every junction point a sufficient number are mentioned so that most of the independent cross-town and longitudinal lines are concerned. It is somewhat difficult to know just what additional testimony on this subject is expected or desired. The topic was investigated by the commission very thoroughly about two years ago and the testimony elicited at those hearings was published in this paper. We know of no material developments since that time which would warrant the companies in looking upon the

issue of transfers between independent lines with any greater favor than they did at that time. But there has been agitation on the subject at Albany, and an official repetition of the facts which should be obvious may be needed for the education of the up-State legislators. If this is the case, the campaign of education should be thorough and those Assemblymen and Senators who stood sponsors for the bills and strongly advocated them should be required to be present in New York at all the hearings until the entire series is completed. This would be a punishment to fit the crime.

Problems of Midsummer

The extraordinary period of hot weather which has extended over the greater part of the eastern half of this country during the past two weeks has brought its problems to electric railway managers. While men engaged in other work have been able to flee to the seashore or mountains for relief, railway operation has had to go on with the added burdens of providing a service for those who have to get their fresh air and their recreation on the electric cars and with a force of employees enervated by the torrid heat. The verdict as to the cause of the terrible disaster on the New Haven railroad has not yet been rendered, but it is not at all unlikely that the engineer who appears to have caused the accident by having disobeyed or forgotten an order was rendered less alert in mind by the tropical period through which the country has been passing. Certainly it is not at all unusual for accidents on electric railways to increase during warm weather. This is partly due to the fact that the employees are less quick to realize opportunities for accidents and avoid them, and also because the public is in the same condition and is unable to take care of itself. At one time a continuance of the thermometer for a week or more among the nineties would have meant a large increase in number of motor burn-outs. This was when the factor of safety, or rather the character of construction and the overload capacity of railway motors, was lower than at present. Fortunately, improvements in insulation have reduced this trouble. A greater possible source of danger lies in overloaded and poorly ventilated generating and transforming apparatus and in transmission cables forced to carry greater loads than those for which they were intended. The heated season, however, is the time of greatest traffic to a great many companies. The three months or so of summer form the principal reason for their existence. On such roads the training of employees forms a special and very serious problem because, as a rule, the greater part of the force of both motormen and conductors have to be broken in just for this period. It is a satisfaction to know, however, that the ideas of both the public and the management as regards the proper dress for railroad employees are more sensible than formerly. At one time it would have been considered undignified, if that is the proper term to use, for motormen to discard their coats at any time. Now the men have that privilege even on Broadway, New York. Even the rule of increased traffic in hot weather has its exceptions, and several roads have reported that traffic has fallen off somewhat during the past two weeks because it has been "too hot to ride."

INTERURBAN COUPLER STANDARDIZATION

A standard coupler for interurban service is greatly needed by the interurban railways of the Central States and should be adopted by all roads operating large cars in trains of more than one unit. Briefly, the reasons which urge this course are safety, facility of interchange and economy. The need for greater facility of interchange is probably the most important factor now urging coupler standardization. All interurban roads, to a greater or less extent, handle steam cars over their lines and most of the roads at present use some form of shackle bar, even for pushing and pulling cars on straight track. Similarly, the network of interurban lines in Ohio and Indiana has seen such a rapid growth in its freight and passenger traffic during the last few years that interline service with trains of several cars has become necessary. Some electric roads regularly handle interline freight in connection with steam roads and so uniform coupling devices are required. A number of groups of roads now operate or are planning to operate trailers in interline service. The trail car, either passenger or freight, is drawn in turn over each separately owned portion of the route by being attached to a regular train. At junction points the trailer is uncoupled from the motor car of the delivering road and coupled to the motor car of the connecting line, which hauls it over another division of the route and in turn delivers it to destination or to another road for transportation to destination. Thus, through trail cars on these long routes are handled by the motor cars of several companies, and service can be operated with safety and facility only when all cars are equipped with uniform couplers. The groups of roads operating this through trailer service have, of course, equipped their cars with the same type of coupler, but the couplers used by one group of roads frequently will not satisfactorily intercouple with those used by another group, and so, when a variation in routing is required, some compromise coupling, such as a shackle bar, must be used.

Economy in first cost and in maintenance charges should also follow coupler standardization. At the present time a manufacturer must be prepared to supply a variety of types of couplers which, if reduced in number and manufactured in larger quantities, could be sold at a lower price. In like manner, the purchaser of couplers, when only a standard design is used, will need to carry in stock the minimum number of repair parts.

About a year ago, urged by the foregoing reasons, the Central Electric Railway Association's standardization committee held several meetings and recommended to the association fourteen requirements for a standard coupler. Later these requirements were approved by the association. Now the equipment committee of the Engineering Association, as reported in this issue, has concluded several conferences with coupler manufacturers and also a joint meeting with the Central Electric standardization committee, so that it has information available with which to formulate at least tentative requirements for a standard coupler. The equipment committee is not going so far in the recommendation of details as did the Central Electric Railway Association, the reasons no doubt being the newness of the problem and the desire on the part of the equipment committee to lay down

only such requirements as may now serve to point the roads and coupler manufacturers toward a uniform type that will meet present requirements and yet allow sufficient freedom for development.

The chief controlling requirements as finally considered by the committee at the Indianapolis meeting are worthy of special mention. The first was that couplers must couple by impact with all M.C.B. couplers used by steam roads. This means the use of the M.C.B. contour and vertical-plane type of coupler. The second, "couplers must have radial drawbars," is a necessary requirement on account of the long overhang of interurban cars and the sharp curves around which they must operate. These conditions call for comparatively long drawbars, which generally are pivoted so that a coupler may swing through an arc of 120 deg., or to the limits imposed by the car steps, which in some cases have to be cut away to provide for a maximum swing when 65-ft. cars are hauled around 33-ft. radius curves.

Another requirement, that the coupler must provide for successful operation over irregularities in grades met in interurban practice, is fair because it qualifies the design for the service to be performed. The committee also, after considerable discussion regarding the repair problem in interchange service, inserted a clause to the effect that couplers should have shanks of such dimensions that in an emergency an M.C.B. coupler might readily be substituted. This method of repairing couplers probably would be used very infrequently in the interchange service as now given, but the continued growth of interchange between steam and electric roads warranted the committee in making such a provision for the future. The limit of angularity between the axes of two couplers was put at 8 deg., so that slack would not unduly accumulate in long trains and the requirement was inserted that couplers must withstand the stresses occasioned by pushing cars around curves. Other requirements were that all couplers must permit uncoupling without requiring employees to go between cars and must have knuckles limited in height to between 11 in. and 16 in.

In part these recommendations of the committee for standard requirements which the Engineering Association should lay down for standard couplers are incomplete because they do not say whether coupler heads should or should not be rigidly locked together against vertical movement. The committee requires, however, that all makes of interurban couplers must couple and operate properly with each other. At the present time there is considerable controversy as to whether coupler heads should be held together rigidly, as with the center lock, or should be permitted to have vertical movement to the full height of the knuckle. Couplers designed according to each of these principles have found favor in the field, and, while each will meet all the other requirements, the two types of couplers will not operate properly with each other, although they will intercouple. The combination of a coupler with a center lock and one with a bracket-arm attachment for preventing lateral movement would operate satisfactorily so long as the coupler heads were under tension. But buckling will occur when cars are pushed around curves because the anti-buckling devices on the two couplers will not mate with each other and therefore will be inoperative.

Thus the committee has left leeway for the development and the acceptance by the roads of either the coupler with center locks or that without. Similarly the committee has not definitely stated whether standard couplers should provide for operation over irregularities in grade by the slipping of one knuckle inside of the other, as in M.C.B. practice, or by flexible carriers, as in the case of rigidly locked coupler heads. Both methods are satisfactorily followed in electric railway practice. The two foregoing indefinite points are very important, and until they are arbitrarily decided coupler standardization cannot proceed to the extent that is desired.

ECONOMY IN THE CARHOUSE

Although it is difficult to evaluate possible small improvements in the conduct of work in the carhouse, there are few places on the system where the introduction of labor-saving methods pay better. It is surprising how many tasks performed here are repeated in the course of a year. In the large repair shop a considerable quantity of new work is usually being carried forward with routine maintenance, but in the carhouse, which is frequently confined to the handling of lighter repairs, the greater part of the work done resembles what has been often performed before, and it is consequently susceptible to minor betterments to a multiplied degree.

Among the possible lines of attack on the problem of carhouse economy of operation is the matter of stock distribution. Experience tends to show that it is advisable to maintain, at least during the daytime, some degree of substorage outside the main stockroom. The practice of keeping a few brakeshoes at the pit where repairs are made and of carrying a few sizes of bolts in portable tool boxes saves time otherwise spent in trips to and from the stockroom, and this material can easily be checked as sent out. Although it is an old story, too much emphasis cannot be laid upon the importance of labeling all bins accurately in the stockroom and of providing enough bins to forestall any need of miscellaneous storage of supplies on the floor. Another improvement worth considering is the equipment of transfer tables with brakes, so that the sudden kick of the car as it is leaving the table for the permanent track will not result in a derailment. The proper tagging and requisitioning of material sent to the shop or main storehouse from the carhouse as a sample to be duplicated is a potent source of economy, since the failure to handle this particular task accurately and completely sometimes results in the receipt of spare parts which do not fit the equipment at the local house, with resulting delay in returning cars to service and increased costs of transporting supplies over the system. The wear of parts to the limit of reliability also deserves consideration. Controller fingers should be retained even when the tips need renewal, and the life of tips is almost always increased if they are reversed and thus have the opportunity to wear more evenly. With the multiplicity of parts in modern car equipment it is easy to make the wrong attachments at times, as in mixing relay studs in multiple-unit-control maintenance. Upon such small points may rest the integrity of high-powered motors when carrying their service loads.

Venice Power Station of Illinois Traction System

This Station Was Made Necessary by the Entrance of the Illinois Traction System into St. Louis. It Has Recently Been Completed and Possesses Many Interesting Features.

Before the completion of the large new St. Louis terminal facilities of the Illinois Traction System energy for the 100 miles of line south of Springfield was transmitted at 33,000 volts from the generating station near Springfield. The large increase in interurban freight and passenger traffic in and out of St. Louis, the addition of thirty street cars for service between St. Louis and the tri-cities—Alton, Granite City and Venice—and the recent acquisition of commercial power customers for the local lighting systems of this company made necessary the construction of a generating station at some point near St. Louis. Accordingly, as announced in earlier issues of this paper, plans were made about two years ago for the construction of the first half of a large, modern type station to be located in Venice near the east approach to the McKinley Bridge over the Mississippi River. This station was put into service on Oct. 1, 1910, and now handles the load of the local street car lines, the interurban passenger and freight lines and the lighting and commercial business of the Madison County Light & Power Company. Local current for railway operation is distributed at 650 volts. The interurban substations for the 100 miles of line are supplied over a 33,000-volt transmission line and the city feeders of the local lighting companies are supplied with 2300-volt, 60-cycle current from frequency converters in the large new station.

Some of the constructional features of the new Venice station which are of particular interest are the foundation work designed to meet a 40-ft. rise of water in the Mississippi River, the intake and discharge system designed to meet the same water conditions and built in quicksand, and the coal-handling facilities. The latter provide for the automatic handling by gravity of coal to the boilers and ashes from the boilers with the use only of standard steam railway cars. In addition, the electrical section of the new station has been designed with high regard for continuity of service and, as in the case of the steam equipment, an especially generous amount of room has been apportioned to each piece of apparatus. The present steam and electrical generating units have sufficient capacity to handle the existing load, but provision has been made in the design so that the largest generating units now available may be installed when the expected increase in load makes this a necessity. The accompanying illustrations from drawing and photographs show the controlling dimensions and appearance of the large new station.

BUILDING LOCATION

The site of the new Venice power station is about 3.5 miles from the business center of St. Louis. It is located close to the Illinois approach to the McKinley Bridge and about 800 ft. from the average shore line of the Mississippi River. The elevation of the double tracks on the bridge is 5 ft. higher than the elevation of the double tracks over the coal bunkers in the boiler house, and thus, by means of a steel trestle, coal trains are shunted directly over the bunkers from the main-line tracks.

The soil conditions and the probability of a variation in water level of about 40 ft. required that particular attention be given to the foundations of the power-station structure and machinery. The Traction System owns sufficient property so that the size of the station can be doubled later.

FOUNDATION WORK

The ground dimensions of the completed portion of the new station are 138 ft. 6 in. x 192 ft. 3 in., and the structure from the level of the sub-basement floor to the top of the side walls is 92 ft. high. The two most important factors considered in the building of the foundations for the structure and the machinery were the underlying bed of quicksand on the shore of the river and the known water-level variation of 38 ft.

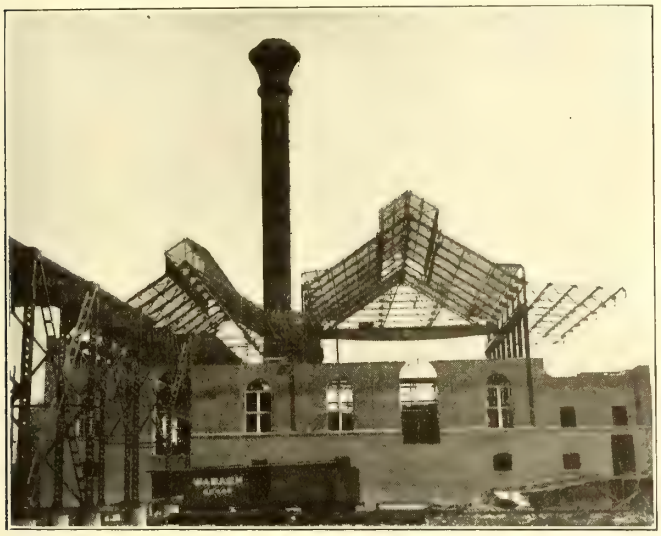


Illinois Traction Power Station—View from Southwest

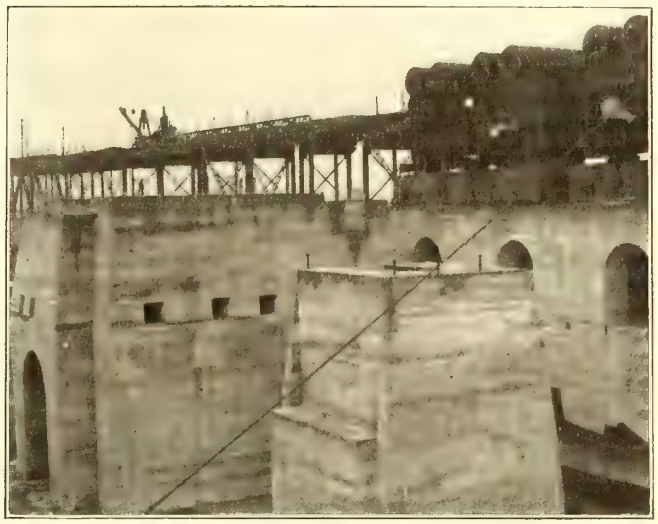
The height of the condenser and piping floor is at the high-water level, and the machinery floor is still 12 ft. 6 in. higher. The sub-basement floor is 17 ft. below high-water level and 21 ft. above low-water level. The basement and sub-basement form a concrete box whenever the water level reaches 21 ft. above the floor. The hydrostatic pressure tending to lift the sub-basement floor will be very great, and to have provided for the stresses would have required considerable reinforcing material in the heavy concrete work. If this sub-basement had been utilized for machinery the foundation work must also necessarily have been watertight. Therefore, it was decided to place below the high-water level none of the power-plant machinery except that which might be submerged. This would allow the sub-basement to be filled with water whenever the water level outside of the station became so high as to put the sub-basement floors and walls under stress. Thus no reinforcing was needed and it was not necessary to waterproof the large substructure. A section and plan of this intake appear on page 112.

CONCRETE PILING

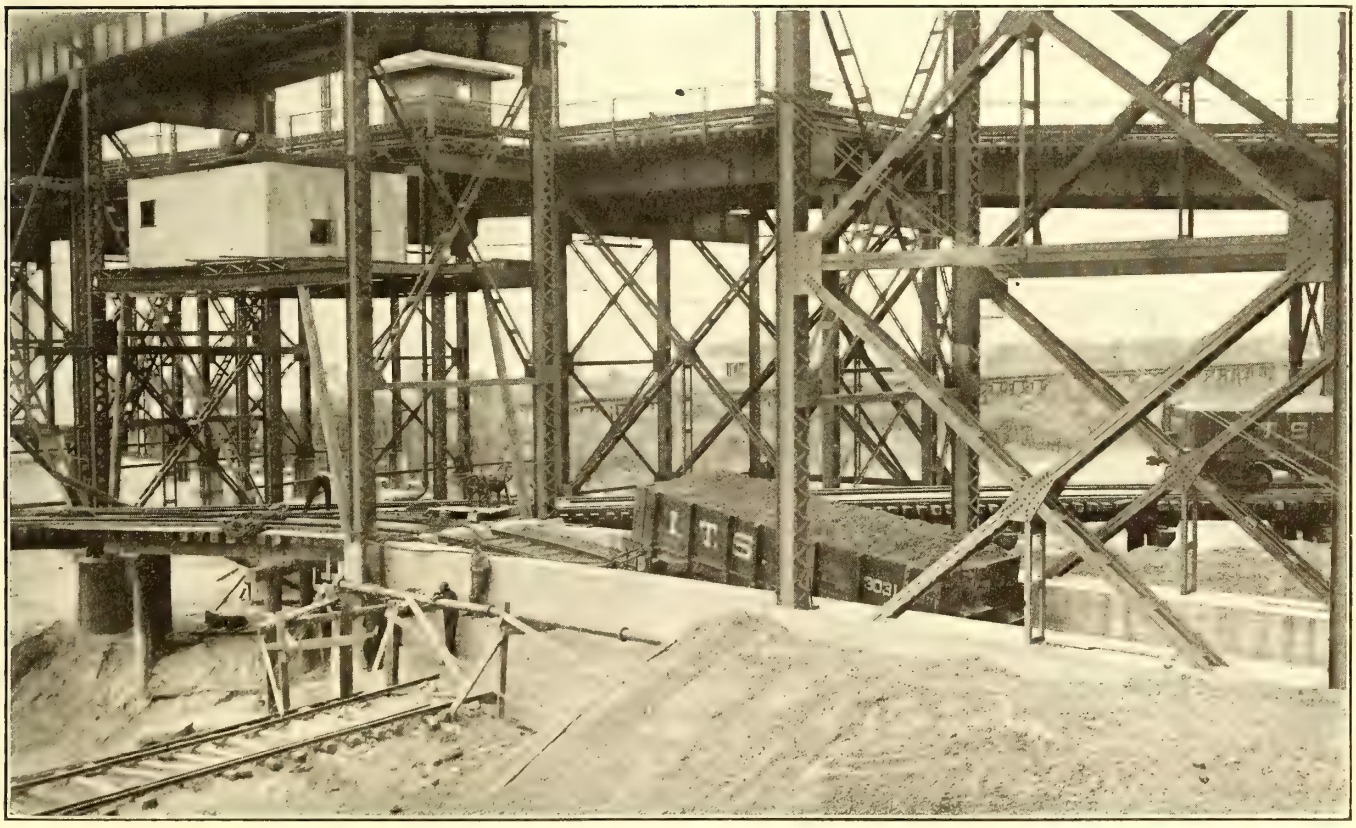
The concrete foundations of the power plant and its machinery rest upon 500 concrete piles having an average length of 22 ft. 2½ in. These piles were built in the ground according to the Raymond process. A sheet-steel metal core inclosed in a steel shell was driven in to sufficient penetration and then the core was withdrawn, leaving the steel casing in place. Concrete was then deposited in the casing up to the desired height. In general, the piles were 8 in. in diameter at the bottom and 18 in. in diameter at the top. Those piles which were tested stood loads of 60 tons each. The engineers state that by the use of this method of pile-sinking considerable economy was effected over the use of ready-made concrete piles. With the latter type, after penetration had been reached, it would have been necessary to cut off the piles at the floor level, while with the Raymond piles no concrete was placed above the desired elevation. The piling was grouped under the side walls and under the machinery foundations, according to the loads to be sustained. After the 500 piles had been sunk their heads were covered with a sub-floor slab of concrete 3 ft. thick. This slab is approximately 200 ft. x 140 ft. in area, and ties the tops of all the piles together and also distributes the stresses imposed by the superstructure and its foundation walls. Approximately 9000 cu. yd. of concrete were used in the substructure and foundations installed in this power station. About $75,000 was spent for raising the elevation of the floors above water level. This expenditure would not have been necessary had it been possible to locate the plant on higher ground.



Illinois Traction Power Station—Steel Work During Erection



Illinois Traction Power Station—Foundations During Erection



Illinois Traction Power Station—Ash Pit, Track and Coal Crusher

BUILDING SUPERSTRUCTURE

The superstructure of the building consists of three principal sections: a boiler house, 80 ft. wide, an engine room, 73 ft. wide, and a series of electrical galleries, 30 ft. wide. All three sections are 134 ft. long. The walls of the superstructure are of red brick, trimmed with white stone. The roofs are made of book tile covered with Cary roofing. The structural steel work weighed 750 tons and was installed by the McClintic-Marshall Company. The concrete substructure was placed by the Myers Construction Company, and the concrete and brick superstructure by the Fruin & Colnon Construction Company.

All partitions and floors are made of fireproof material. The floors are carried by the structural steel work, which in turn supports arched concrete slabs reinforced with Clinton wire cloth. The interior walls are laid with light-colored sand-lime brick and a white enamel-brick wainscot. Metal stairways are installed and have steps made of inverted channel iron filled with concrete treads. The chief engineer's office on the switchboard gallery is finished in oak. Close to the office are the toilet facilities, which include shower baths and Merritt steel clothes lockers with expanded metal doors.

The engine room is served from end to end by a 30-ton Case crane with its runway placed 47 ft. 6 in. above the floor. This vertical clearance will permit the installation of large steam turbines or marine engines, according to the future requirements.

BOILER PLANT

The boiler plant, as so far required, includes six O'Brien water-tube boilers of 608 hp each. These are equipped with the Illinois Stoker Company's chain grates. Each boiler has a Foster internal superheater adding about 80 deg. superheat. The stokers are operated by a line shaft driven either by an electric motor or by a stoker engine and the draft of the stack is controlled by a Spencer damper regulator.

As will be noted from the plan, the boiler-house space provides for duplicating the boiler equipment and the stack. The stack into which the present boilers exhaust is of the self-supporting steel type and is 12 ft. in diameter and 200 ft. high. It has a brick lining extending to the top. The lining is not tied to the steel work because of the possibility of damage by reason of unequal expansion. A tapered sheet-steel smoke flue connects the furnaces with the stack. As the ultimate plant will include two stacks, each serving twelve boilers symmetrically placed on either side in groups of six, the layout of the smoke flue has been designed to take care of the future boiler installation. Only one opening into each stack will be made.

COAL-HANDLING FACILITIES

Fuel is received over the interurban line, and thus can be brought from either the nearby steam connections or from the mines owned and served by this company. The location of the new plant near the McKinley Bridge made feasible the very economical coal-handling arrangements which have been provided. Two standard-gage tracks connecting with the main-line tracks on the Illinois approach to the bridge are carried on a steel trestle which leads directly to the end of the boiler house and then over the full length of the coal bunkers. In this way an electric locomotive may handle a train of ten cars directly from the main line into the boiler house, where the coal may be dumped into a series of steel hopper-bottom bunkers having a storage capacity for 800 tons. Elevated track space is also provided for storing about 300 tons additional fuel.

The elevation of the bunkers in the boiler house is such that coal will flow by gravity directly to the chain-grate stokers. The ashes from the furnaces fall into concrete storage hoppers. Gates at the front of these hoppers permit the cinders to be dumped easily by gravity directly into a standard gondola car on a track extension into the sub-basement of the boiler house. Thus when the cinders have been placed in these cars they do not require to be rehan-

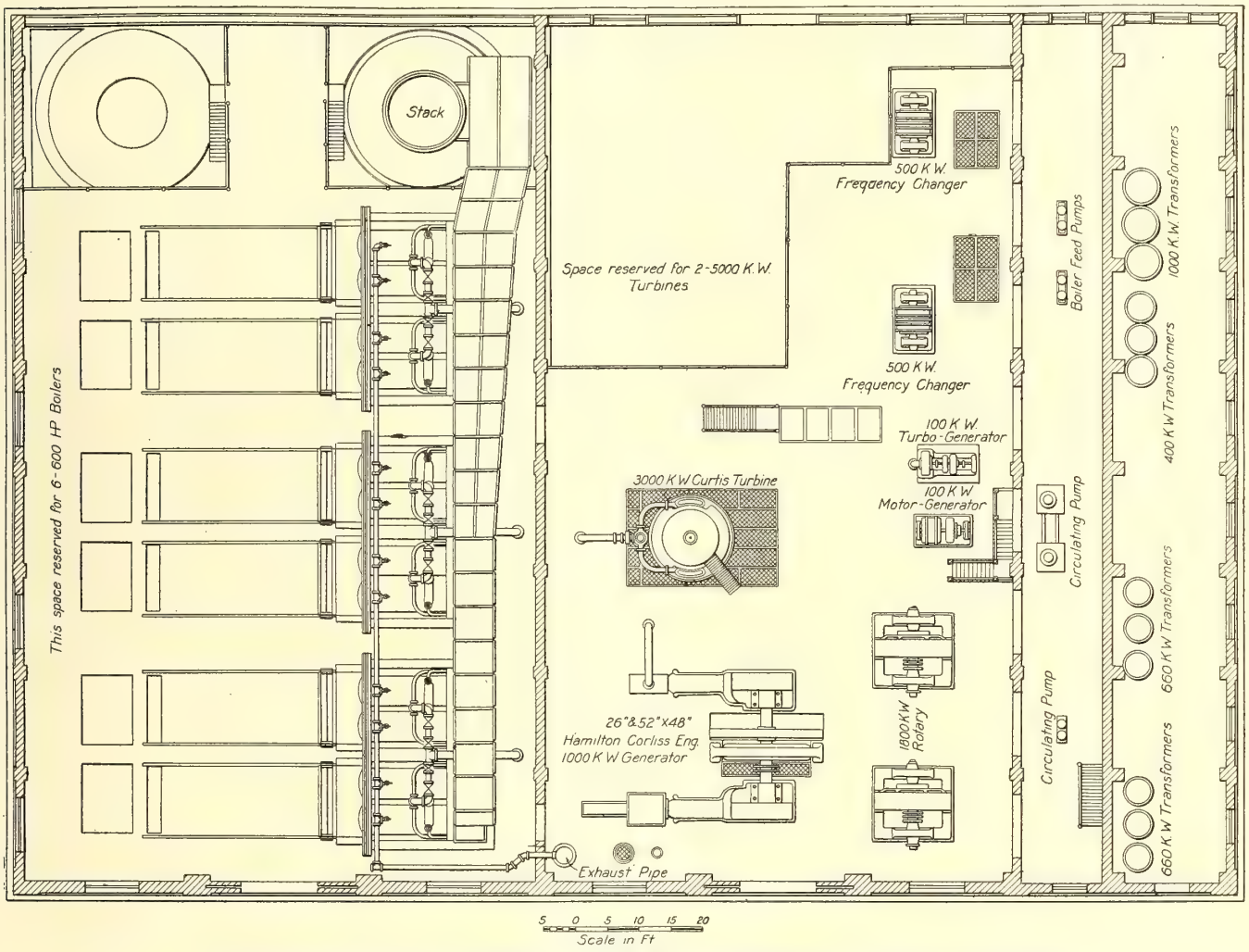


Illinois Traction Power Station—Engine Room from East End

dled before they are shipped along the road for use as filling.

The method of handling fuel as just described presupposes that the coal is small enough for use with the stokers. Whenever lump coal is received the cars are spotted on the approach trestle directly over a steel hopper, which holds two carloads. Beneath this hopper is a motor-driven crusher from which the coal in turn falls directly into another car located on a track at an elevation midway between the main tracks which lead from the bridge approach and the ash track below the boiler-house floor. After a carload of coal has been run through the crusher the yard locomotive takes it around a "Y" and up on to the bridge approach and then into the boiler house above the bunkers.

The motor which drives the coal crusher also drives a winding drum which, with its cable, is designed to pull a gondola car loaded with ashes out of the basement. The cars of ashes, in moving out of the boiler-plant basement, have to ascend a short length of 12 per cent grade. Nevertheless, with the electric winch the entire run of ashes for one day's operation can be removed from the plant in ten minutes.



Illinois Traction Power Station—Plan of Station Showing Location of Machinery

STEAM PIPING

The main steam header is located on the boiler side of the partition wall between the engine and boiler rooms. It is 20 in. in diameter and at an elevation of 8 ft. below the boiler-house floor. The header and its fittings are firmly supported on a row of concrete pedestals. Steam connections from the boilers above are 10 in. in diameter, and the engine connections pass directly through the power-station division wall and up through the engine-room floor to the throttle valves. Because of this arrangement no steam piping extends above the engines or turbines to restrict the use of the overhead crane. Moreover, the high-pressure piping and the heavy fittings are easily supported and are in such position that a man can work upon them without ladders or scaffolding.

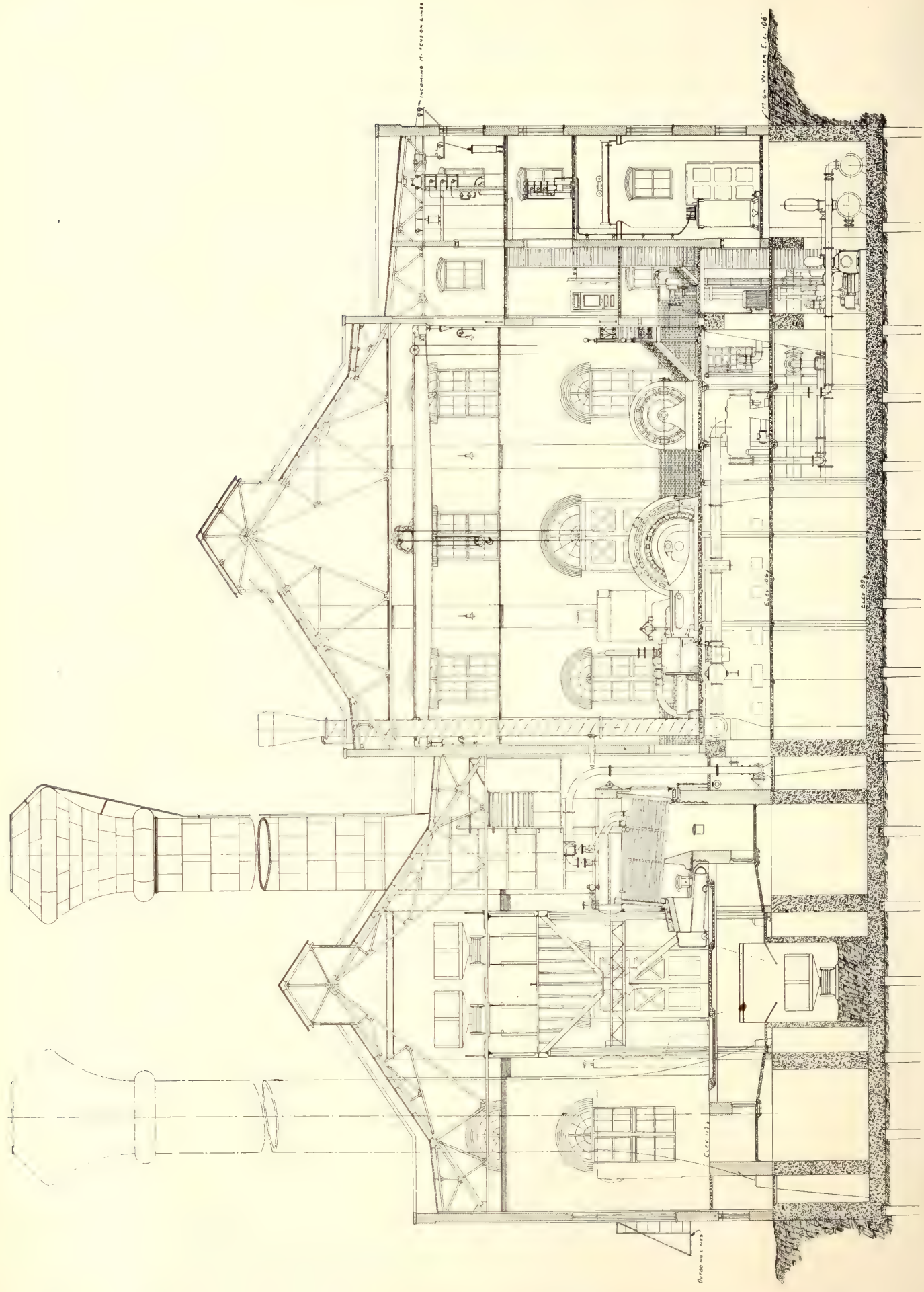
A free exhaust main, 36 in. in diameter, extends the full length of the engine-room basement and is connected with the atmosphere by a 36-in. spiral-riveted pipe, extending through the roof of the engine room.

When the boiler equipment is duplicated on the opposite side of the firing aisle the high-pressure steam header will be continued in a loop around one end of both rows of boilers and cross-connected at two points, thus making it possible to subdivide the boiler plant into any desired number of units of two boilers each.

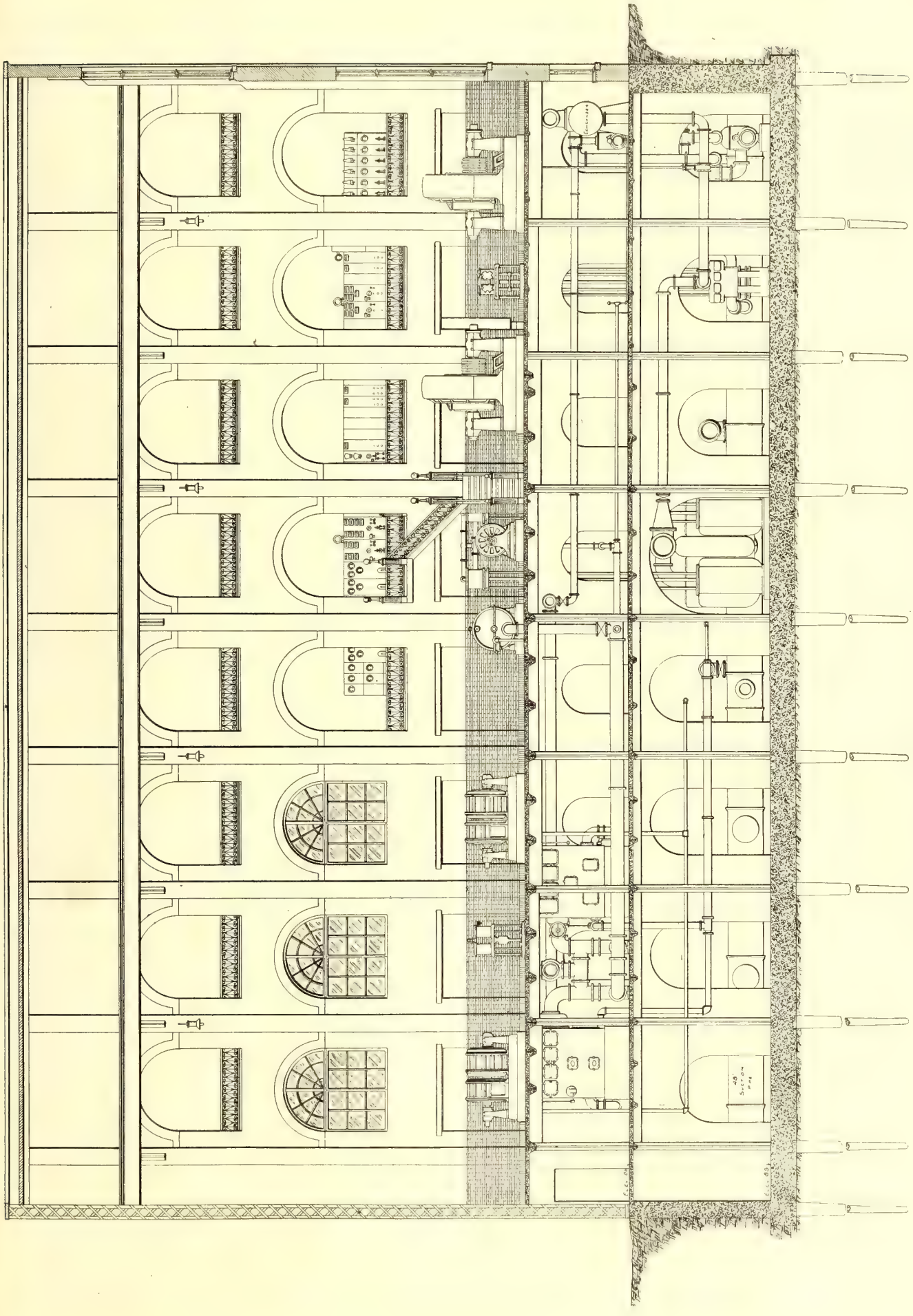
GENERATING EQUIPMENT

The present generating equipment occupies but one-half of the floor space provided for engines and turbines. Thus space is available for doubling the generating equipment if units of the present size are installed, or for greatly increasing the capacity if desired, since the building, sub-foundations, etc., are arranged to accommodate much larger units than now are used. The present main units include one 1000-kw General Electric 2300-volt, 25-cycle generator, driven by a Hooven-Owens-Rentschler cross-compound, horizontal engine with cylinders 26-in. and 52-in. x 48-in. stroke, and a 3000-kw Curtis turbine also delivering 2300-volt, 25-cycle current. These two generating units are run in parallel and the station, when desired, is paralleled over a 33,000-volt transmission line with the Riverton power station located near Springfield, 112 miles away.

Alberger condensers are used for both the Corliss engine

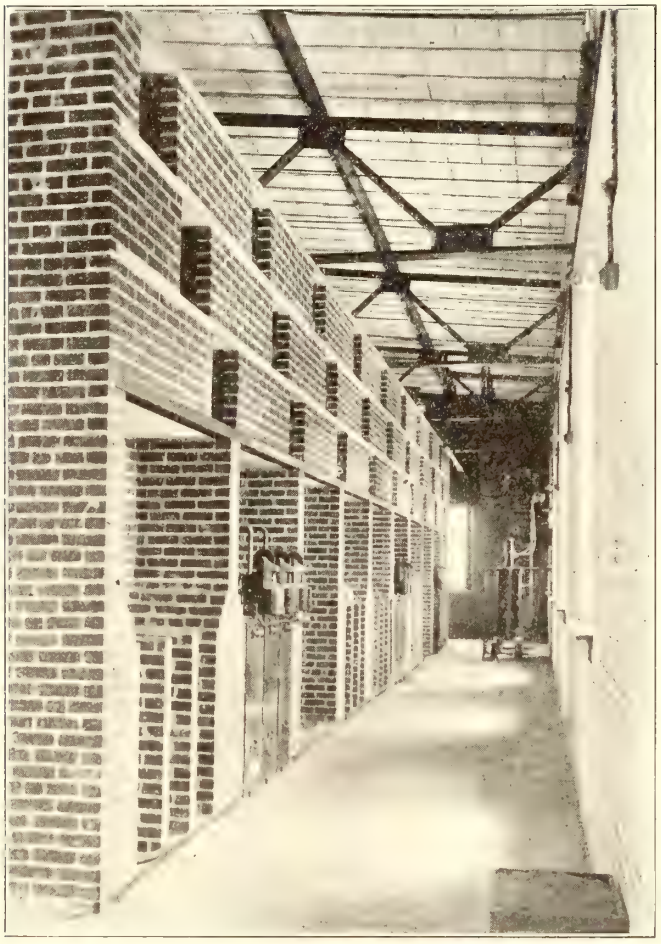


Illinois Traction Power Station—Cross-Section of Station



Illinois Traction Power Station—Longitudinal Section Through Boiler Room

and the Curtis turbine. The turbine condenser is of the base type subdivided into two sections. The engine condenser is of the standard form having 2400 sq. ft. of cooling surface. The wet-vacuum pump for the latter condenser is connected so that it may be used to remove air from the intake and assist the smooth running of the large circulating pumps. All the condensing machinery is located in the



Illinois Traction Power Station—33,000-Volt Busbar Room

basement beneath the generating machinery, as are the pumps for the Turner oil-filtering system and the step-bearing pressure pumps.

Two 4000-hp feed-water heaters have been installed, one of Cochrane and the other of Webster manufacture. These heaters are so connected by piping that either one may be run singly or the two may be run in multiple. They use only the exhaust from the steam auxiliaries.

Two H. R. Worthington boiler-feed pumps, each large enough for the ultimate installation, have been installed. The main boiler-feed pipes leading from the pumps to the boilers are black iron lined with copper. This copper lining has been provided so that any precipitate will not collect on its smooth surfaces as it would on iron pipe.

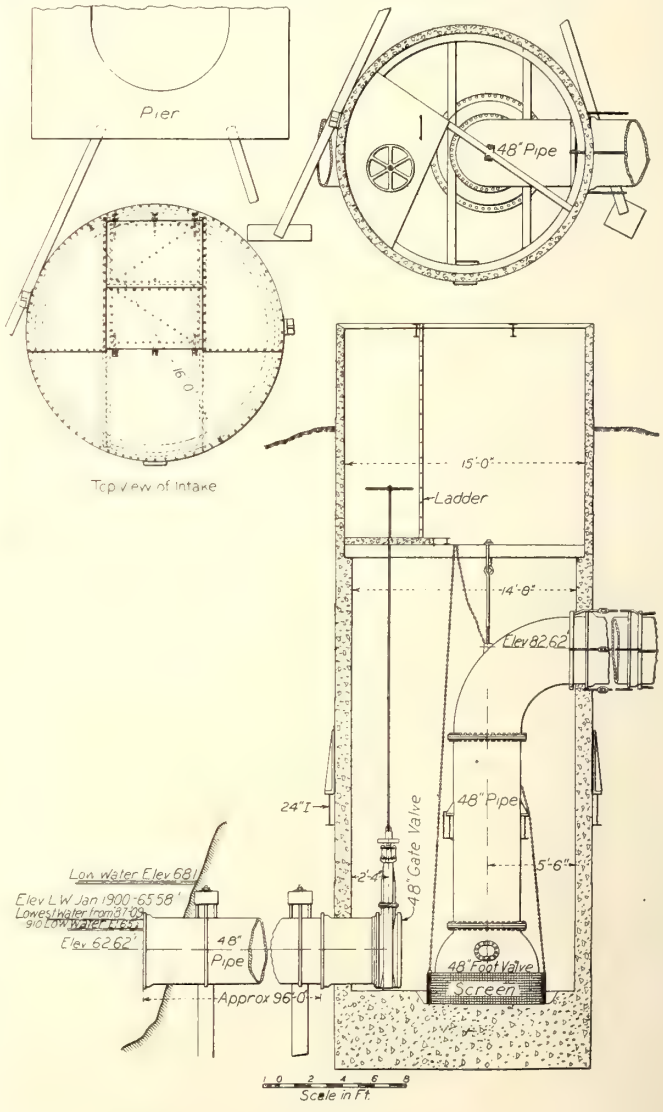
It is interesting to note the efficiency of the feed-water heating system in purifying the Mississippi River water used for boiler feeding. This water, as taken from the river, contains on an average 16.32 grains of solid matter per gallon. After the water has been passed through the heaters but 5.24 grains of solid matter per gallon remain, and as the river water is soft it is good for boiler feeding.

SUPPLY OF CIRCULATING WATER

The circulating water for the condenser equipment is taken from the Mississippi River and a system of intake and discharge piping has been installed which is sufficient for 28,000-hp engine capacity, the proposed ultimate capacity of this plant. The river side of the power plant is 800 ft. from the average river's edge. Briefly, the water is led by gravity to an intake well near the shore line. Circulating pump suction is taken from this well to the power house, where vertical steam pumps lift the water through the condensers. The sub-basement of the section of the power plant utilized by the electrical galleries incloses the intake and discharge pipes.

The most important feature in connection with the intake conduit is the steel-and-concrete caisson or intake well. This well is connected with the river through a cast-iron bell-and-spigot gravity intake pipe 48 in. in diameter. The pipe is carried in saddles fastened to piling. Originally it was planned to obtain water by means of a gravity intake from the river to the power house, but the presence of quicksand made it desirable to arrange for locating the intake pipe near the surface of the ground.

An illustration shows the arrangement of the gravity suction connections to and from the intake well and also shows the design of the well. The intake well is a steel caisson lined with concrete and having a concrete floor 6 ft. thick. This caisson was built in sections above the surface of the ground and sunk by its own weight. It is 16 ft. in diameter. At the commencement of the work a steel cylinder 16 ft. in diameter and 6 ft. high was equipped with cutting edges



Illinois Traction Power Station—Section and Plan of Intake

and placed directly over the final location. Then a lining of concrete 1 ft. thick was placed within the shell and as the earthen core was removed the shell sank into the ground. Other steel shells were added until the caisson had been sunk to a depth of about 40 ft. Then the quicksand was reached and it was seen that unless some special provision was made the caisson would sink below the desired

level. Accordingly a temporary concrete bulkhead was placed near the top and air locks were provided. The interior of the caisson then was put under an air pressure of 10 lb. while the work was completed. When the caisson had been sunk to the desired level a floor or base of concrete 6 ft. thick was placed. This extreme thickness of concrete was found necessary in order to give the caisson sufficient weight to overcome its buoyancy.

After the caisson structure had been completed the 48-in. gravity intake pipe from the river was installed and provided with a gate valve and operating staff extending nearly to the top of the well. The 48-in. intake connection from the pipe leading to the power house was placed in the well. This is provided with a foot valve and a circular screen which may be raised for cleaning. The intake well is located on the harbor line just below one of the large piers of the McKinley Bridge. This pier rests on solid rock and thus effectually protects the intake well from damage. The connection between the intake well and the power plant is made with 48-in. bell-and-spigot pipe buried at a depth of 18 ft. below the ground surface. The pipe sections are 12 ft. long and weigh 8000 lb. each. Each section of pipe rests on two saddles, each in turn supported by two piles. The three lengths of pipe nearest the caisson are secured to it by tension rods provided with turnbuckles. The piece of land through which this pipe extends is protected from the action of the water by a riprap deflection levee 80 ft. wide located under the approach to the McKinley Bridge.

Within the power station sub-basement the circulating-water pipes connect with the intake openings of two duplex outside-packed steam pumps having water cylinders at the level of the intake pipe and steam cylinders located on the engine-room floor about 30 ft. above. The circulating pump for the turbine condenser has a capacity of 9000 gal. per minute and that for the Corliss engine condenser 1500 gal. per minute. Both pumps are of Blake manufacture.

ELECTRICAL MACHINERY

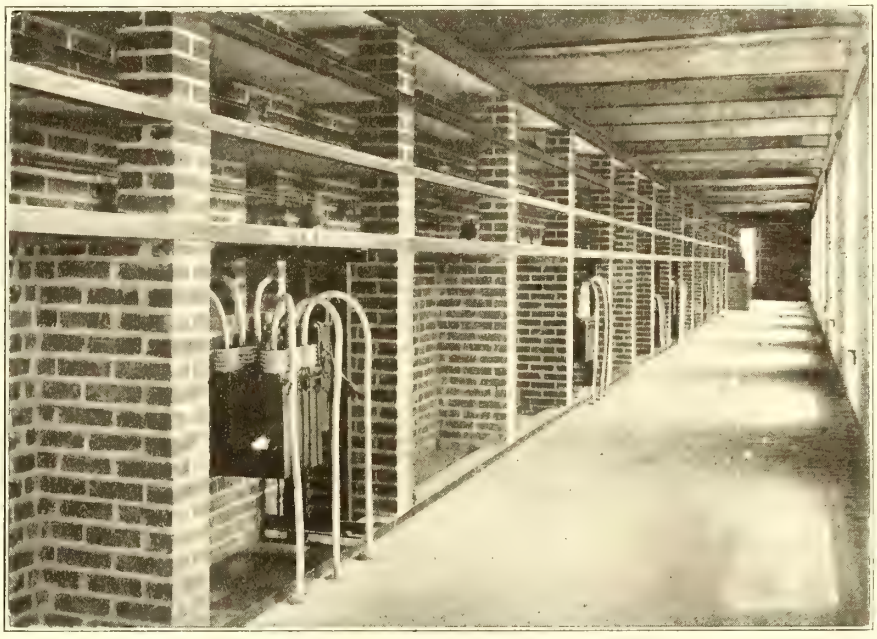
In addition to the two 2300-volt, 25-cycle main generating units the following machines have been installed on the engine-room floor:

Two General Electric 1800-kw railway rotary converters.

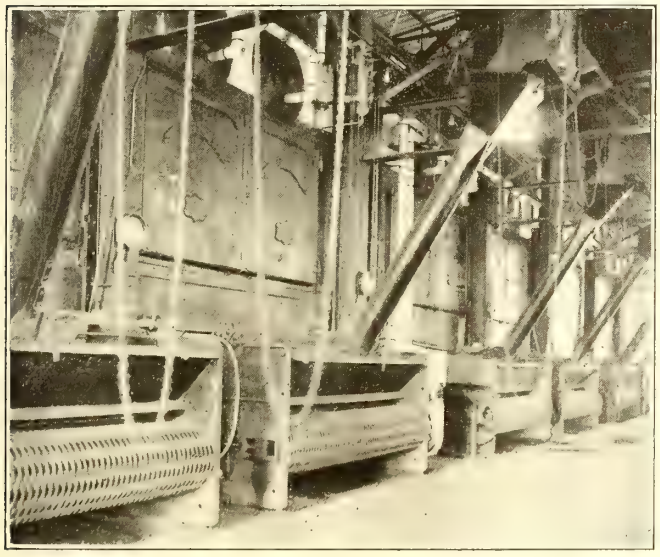
Two 500-kw a.c. motor generators for changing frequency from 25 cycles to 60 cycles for lighting distribution.

Two Westinghouse exciter sets of 100-kw capacity each, one driven by a motor and the other by a horizontal turbine.

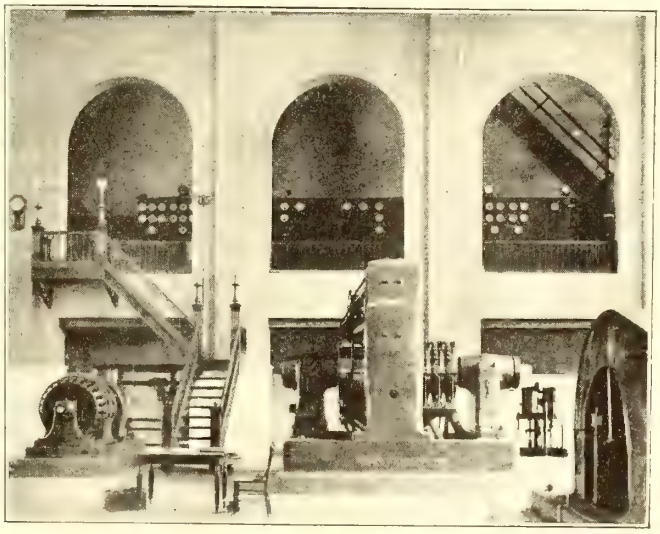
The electrical galleries, as earlier stated, are located in a fireproof subdivision of the power plant parallel with the engine room. The sub-basement of this section contains circulating water pipes; the section at the engine-room basement level contains the step-up transformers and above this are a 2300-volt switch room and a 33,000-volt switch room. The switchboard gallery overlooks the engine room and is directly above the pump room. The switchboard, which is largely of Westinghouse manufacture, is 70 ft. long and contains forty-two panels. Fourteen of these panels are for 2300-volt, 60-cycle lighting distribution to Venice, Granite City and Madison, and carry Terrill regulators for the 60-cycle side of the frequency changers. There are also three exciter panels, three 33,000-volt transformer panels with Westinghouse remote-control oil circuit-breakers, seven extra panels for additional generators and lines, one



Illinois Traction Power Station—2300-Volt Busbar Room



Illinois Traction Power Station—Boiler Room



Illinois Traction Power Station—Switchboard Gallery

engine and one turbine panel equipment with motor-operated speed control, six rotary-converter panels, of which two are not used, and seven d.c. trolley feeder panels.

The switchboard is illuminated by lamps which are placed about 6 ft. in front of the board and are provided with projecting reflectors.

The switchboard transformers and high-tension and low-tension a.c. connections and outlets are symmetrically arranged in accord with the arrangement of switchboard panels. The busbar and transformer sections of the electrical galleries, as already described, are subdivided into three separate rooms, one above the other, each room extending throughout the length of the building. The room at the intermediate elevation contains the 2300-volt buses, which are fed directly from the solenoid-operated oil switches connecting with the main generating units. From the 2300-volt buses current is taken downward through the floor to the transformers in the room below, where it is either stepped up to 33,000 volts for transmission to substations or stepped down to be converted in the rotaries. The step-up transformers are oil-insulated, water-cooled Westinghouse units, three of 400-kw capacity and three of 1000-kw capacity. Provision has been made for duplicating this equipment. The rotary-converter transformers are also oil-insulated and water-cooled, but are of General Electric manufacture. There are six of these, each of 660-kw capacity.

The 33,000-volt connections from the step-up transformers are carried up wall chimneys to the top room, in which the buses and line switches are located. A Westinghouse gravity break fuse on two of each of the three-phase lines connects with a potential transformer located in a fireproof compartment. Current transformers for the switchboard ammeter are placed on each leg. The outgoing transmission lines are protected by banks of electrolytic arresters.

The arrangement of buses in this station is similar to that in the other generating stations of the Illinois Traction System at Danville, Riverton and Peoria, so that operators may quickly learn to handle the equipment in the different stations.

The transformer room is served throughout its length by a 10-ton crane built by the Curtis & Company Manufacturing Company. Sufficient space is available in each of the bus rooms and in the transformer room to double the installation of the electrical apparatus. The bus structures are made with walls of red brick and horizontal markings of marble. The oil switches, which are of the solenoid-operated type, are installed in compartments directly under the bus structures.

The engineering and construction work on this station was executed by the members of the engineering department of the Illinois Traction System, of which department H. C. Patterson, electrical and mechanical engineer, Decatur, Ill., is the head.

HEARING IN REGARD TO FARES ON LONG ISLAND RAILROAD

A hearing was held before J. Sergeant Cram, of the Public Service Commission of the First District of New York, on July 6, 1911, in regard to the extension by the Long Island Railroad of its 5-cent fare zone on its Atlantic Avenue electric division from Warwick Street, Brooklyn, to Railroad Avenue, Brooklyn.

Counsel for the Long Island Railroad explained that the company was prepared to reduce the fare in either direction between Flatbush Avenue and Railroad Avenue to 5 cents and that such reduction would be put into effect as soon as the traffic department of the company could arrange the change. He said that a delegation had been told by Ralph Peters, president of the company, about six months ago that the question of fare would be carefully considered. Despite this a bill had been passed by the Legislature designed to compel the reduction in fare and imposing severe penalties. This bill the Governor vetoed because it tended to usurp the power of the commission.

The assurance that a reduction would be made satisfied Commissioner Cram and those who were in attendance, and it was announced that a formal order in regard to the reduction would be issued by the commission.

HOOPS FOR TRAIN ORDERS

The Puget Sound Electric Railway, which operates observation-car trains between Seattle and Tacoma, Wash., uses hoops, as shown in the accompanying illustration, for delivering train orders while trains are under way. This plan of operation is followed at any way station where it is



Delivery of Orders with Hoops, Puget Sound Electric Railway

desirable to deliver orders to a train without causing it to stop. Usually the hoops are used for delivering orders conferring rights of trains or giving them a check on the train register, but they are never used for orders restricting the rights of trains.

The hoops used are made of light wood, generally willow, and are fitted with a spring of brass wire to hold the order. The supply of hoops at a way station is equalized by the conductor throwing off a hoop at the same time that the operator delivers one. The train operation on this road is in charge of F. A. Boutelle, superintendent.

The Bradford Corporation Tramways, Bradford, England, operated several illuminated floats over its lines during the recent coronation festivities. The arrangement of these cars was intended to symbolize a crown upon a pedestal, the crown proper being in gold bronze suitably lined. The crown band was perforated, and behind were fixed colored celluloids and lamps representing jewels. On one side of the car was a ribbon with a groundwork of royal blue and the words "Long Live the King—1911." A ribbon on the opposite side of the car carried the words "God Save the Queen—1911," and a gold shield with the monogram "M," in white. About 1050 lamps were used.

Meeting of the Committee on Equipment

At This Meeting the Principal Subjects Discussed Were the Heating and Ventilation of Cars, Light-Weight Car Bodies, Electrical Equipment, Trucks and Couplers.

A meeting of the committee on equipment of the American Electric Railway Engineering Association was held at Indianapolis, Ind., on July 6 and 7. The following members of the committee were present: M. V. Ayres, Boston & Worcester Street Railway; H. A. Benedict, Public Service Railway; J. M. Bosenbury, Illinois Traction System; A. T. Clark, United Railways & Electric Company, Baltimore, and W. Thorn, Board of Supervising Engineers, Chicago. During these sessions letters relating to the committee's work were received from F. R. Phillips, Pittsburgh Railways, and F. G. Grimshaw, West Jersey & Sea Shore Railroad, who were unable to be present. The sessions on the second day were attended by the following members of the Central Electric Railway Association Standardization Committee: H. H. Buckman, chairman, Louisville & Northern Railway & Lighting Company; W. H. Evans, Indiana Union Traction Company; L. M. Clark, Terre Haute, Indianapolis & Eastern Traction Company; C. E. Morgan, Indianapolis, Crawfordsville & Western Traction Company, and R. M. Hemming, Ohio & Southern Traction Company.

HEATING AND VENTILATING

Wray Thorn, division engineer of cars, Board of Supervising Engineers, Chicago Traction, submitted a written discussion on the subject of heating and ventilating cars. This discussion was carefully considered by the committee and will be included in the committee report. Mr. Thorn first classified the various methods of furnishing heat to cars and said that in order to bring out the characteristics of the various methods of heating the types of heating equipment should be considered with regard to the following features: (1) Ability to heat car to uniform temperature. (2) First cost completely installed on car. (3) Maintenance, including repairs, renewals, replacements, etc. (4) Cost to operate. In the case of hot-water heaters this includes fuel and labor only; in the case of electric heaters, power, and in case of hot-air blast heaters, fuel, labor and power. (5) Weight of system complete as installed in the car ready to operate. (6) Effect on insurance rates on car barns and contents. (7) Reliability. (8) Regulation, i. e., ability to regulate the heat to outside temperature. (9) Space occupied. (10) Appearance. (11) Attention required from car crew. (12) Cleanliness, including dust, ashes and obnoxious gases. (13) Adaptability and relation to ventilation systems.

He next called attention to the need for more carefully analyzing the heating requirements when purchasing heaters for different types of cars in different localities. Each type of heater was defined and considered according to the foregoing thirteen qualifications. In the order of their presentation the heating systems considered were as follows: (1) Ordinary coal stoves, which have been largely used on account of low first cost. (2) Hot-air heaters in which the air is heated either by coal or electricity and forced through suitable ducts by a motor-driven fan. (3) Hot-water heaters as generally used on interurban and on some city systems operating large cars. (4) Electric car heaters, as usually installed under car seats.

To present clearly the comparative cost of heating a car by the three modern methods, that is, by forced hot air, water circulation and electric heaters, Mr. Thorn gave a detailed estimate based in general on results obtained in practice. This estimate showed the total cost for one year chargeable to car heating subdivided as follows: Cost of power; repair and maintenance; interest and depreciation; coal; labor of attendance; hauling weight; insurance charge. The committee had several suggestions to make regarding the detailed figures, which will be incorporated in the report.

Mr. Thorn said that in calculating the energy consumption of electric heaters the following method probably would give the most accurate results: "Obtain from the Weather Bureau the temperature readings for each winter for several years; plot a curve showing variations of temperature for each day of the heating season; find what point of heat is carried for the different temperatures and then plot a power curve from which the average kw-hours per day can be obtained readily."

In connection with the use of hot-water or hot-air heaters he called attention to the tendency on the part of car crews to use less coal than would have been used if the car were kept at a uniform temperature during the time it was in service, while with electric heaters the tendency was to turn on three points when two points would suffice. These conditions had given false ideas of the relative cost of operating the various heating systems. He said that when a practical, low-cost heater regulator was brought out suitable for general use the cost of electric heating would be largely reduced. The cost of car heating would be somewhat reduced and the comfort of passengers considerably increased if storm sash were more generally used. Experiments in the Middle West had shown that on the same type of cars, with the same heating equipment and running on the same street, there was a difference of about 9 deg. Fahr. between the temperature of cars with and without storm sash. The advantage of storm sash for interurban cars was being recognized more widely. He said that the maintenance cost of heating systems would be reduced greatly if more care were given to the installation of new equipment, particularly in the case of electric heaters.

VENTILATION

Mr. Thorn's contribution on ventilation called attention to the need for some standard of air purity which should be selected before making a choice of a ventilating system. Monitor deck or clere-story sash ventilation was ineffective because the ventilating action did not extend far enough down into the car body to change the air in the breathing zone. Studies of ventilation by the monitor deck-window method showed that it was almost impossible to secure a reasonable standard of air purity without the presence of strong drafts and the chilling of the air below the desired temperature. Mr. Thorn discussed the standards of ventilation and air purity required in Chicago, which, based on the maximum standing and seated load, are 350 cu. ft. of air per hour per passenger and not more than ten parts of carbon dioxide in 10,000 parts of air. These requirements are believed to be reasonable, and they can be met by several ventilating systems. Furthermore, he said tests showed that no more energy for heating was required when handling the above amount of air through floor intakes and then over the heating surface than when using deck-sash ventilation. He said that an essential feature of a ventilating system was a set of air intakes placed in the floor or near it and so connected with the heating system that the cold air must pass over the heating surface before coming into the car body. Provision should be made for excluding or separating the dust.

Mr. Thorn then defined the various types of ventilating systems, and concluded by saying:

"From the results of tests it is safe to say that there are now on the market several ventilating systems for cars which will provide a reasonable standard of air purity and which are not very high in first cost or cost of maintenance."

DISCUSSION ON HEATING

In discussing Mr. Thorn's remarks on heating, Mr. Benedict said that coal stoves could be made as safe as hot-water heaters if the stoves were carefully inclosed in heat-resisting casings. Mr. Bosenbury said that the insurance conditions varied greatly, and the roads which had unheated carhouses or stored their cars in open yards could reduce the fire risk by pulling the fire in the stoves. This, however, could not be done with hot-water heaters on account of danger of freezing.

It was stated that the Pittsburgh Railways Company had just purchased fifty cars with heating equipment which included thermostats operating in connection with the electric heaters. The thermostats will be set to cut off the current when the temperature of the air in the car exceeds the temperature required by city ordinance. These instruments were designed so that the heater circuit could be operated on one, two or three points and yet be governed by the thermostats. It was expected that the use of thermostats would reduce the total energy consumption in electric heaters by practically 50 per cent.

A general discussion then followed on the maintenance costs of hot-air versus hot-water heating equipments, and it was decided that not enough experience had been had with the forced hot-air heater to rate definitely its maintenance. The variation in radiating qualities of hot-water pipe as influenced by kind and color of the paint used in covering the pipes was also discussed. In connection with Mr. Thorn's assumption that the peak load on the power plant came in the heating season, Mr. Benedict gave a word of caution regarding the calculations necessary for additional feeder copper to provide for distributing energy for electric heating. He had had the feeder capacity of one road figured on the basis of the amount of additional copper necessary if electric heaters were to be used instead of stoves. Theoretically this would require the purchase and erection of $200,000 worth of additional feeders, but on careful study it was found that on many sections of the road actual conditions would not require the additional copper, and so the real additional investment cost might safely be reduced to $50,000.

In discussing the proper methods of installing electric heaters Mr. Bosenbury called attention to trouble which the Illinois Traction System had had with some tight-fitting conduit in which condensation had accumulated. Other members of the committee had experienced trouble from wash water getting into flexible conduit. Conduit was considered preferable for use if good inspectors saw that it was well installed. The Illinois Traction System had successfully used metal hose for conduit.

The committee next discussed the proper amount of fuel to be included in Mr. Thorn's estimate of coal consumption per day for hot-water heaters, and also the proper cost of current to be used in basing the energy charge for electric heaters. As the result of the latter discussion it was the opinion that 1.4 cents per kw-hour would be approximately correct for energy delivered to the car.

Regarding the cost of fuel Mr. Bosenbury said that an estimate had been made covering all the interurban cars of the Illinois Traction System for the season of 1909. Using the total number of cars equipped with hot-water heaters and the total amount of fuel burned, which was coke, the cost for fuel per day per car was 16.5 cents.

LIGHT-WEIGHT TRUCKS

Mr. Benedict's contribution on light-weight trucks was next presented. He showed data, photographs and blueprints of a number of light-weight trucks, and the committee discussed these with a view to incorporating them in its report. Considerable interest was shown in Mr. Benedict's description of the Halsey radial truck, which had been operated in owl-car service on one of the large Eastern city systems for nearly a year. Other trucks considered were those manufactured by the Mohawk Welding Company, Schenectady; Baldwin Locomotive Works, Standard Motor Truck Company and The J. G. Brill Company. Mr. Clark said that by giving careful attention to the reduction of weight he had co-operated with The J. G. Brill Company in the removal of 500 lb. of weight from one of its types of trucks. The committee invited Mr. Clark to prepare a discussion on the reduction of truck weights by redesigning small castings and parts.

LIGHT-WEIGHT CAR BODY

Mr. Ayres read a contribution for the committee report which had been prepared by Mr. Phillips, giving his ideas on light-weight car bodies. He spoke of the development in designing methods which had resulted from the increased attention which the roads recently had given to the subject of car weights. The use of straight-sides for cars assisted in reducing the weight and worked out very well in the designs. Mr. Phillips also discussed the use of steel underframes and bodies.

Mr. Thorn spoke of the good service obtained with open-hearth cast-steel bolsters on 1000 cars in Chicago. These had been purchased under rigid specifications. Only two had bent and these had been straightened at low cost. Mr. Bosenbury favored the use of cast-steel bolsters for interurban service, but said that the diaphragm type was lighter. However, it was subject to weakening by rust. The committee then discussed the use of steel in the superstructure and the use of wooden posts with steel-girder side frames. It was the opinion of several members that the latter combination of parts would withstand severe service satisfactorily. The relative merits of the arched and monitor type roof were next discussed. The consensus of opinion was in favor of the arch roof. Several members spoke of the increased use of refined steel in car design.

Mr. Phillips presented as part of his contribution a description of a car in which the weight had been reduced by 25 per cent. He also suggested subdividing the parts of a car when comparative weights were being considered. These subdivisions for weight comparison would be (1) bodies, (2) trucks, (3) power brakes and (4) electrical equipment. The committee after a long discussion thought it desirable to add subhead No. 5, which would include the auxiliary equipment of a car body that might or might not be the same in different parts of the country. This subhead No. 5 would be used to compare the weights of all such fittings and parts as seats, parcel racks, toilet equipment, fire extinguishers and other miscellaneous fittings and equipment which if considered as a part of the car body might affect the true merit of the structural design.

Mr. Bosenbury spoke of the necessity for taking into account the operative speed in designing car bodies. Because of a shortage of equipment his company had operated some large city cars in interurban service and shortly thereafter found them to be racked on account of the high speeds, while similar cars in city service at St. Louis were in excellent condition. The committee then discussed the choice of a unit for comparing the weights of car bodies. Mr. Phillips suggested pounds per cubic foot, but the general opinion of the committee was that pounds per square foot of floor area inside of the finish would be the best unit.

COUPLERS

On Thursday evening a long discussion took place on interurban car couplers. Mr. Bosenbury led this discussion by presenting an extended history of the M. C. B. coupler, which was illustrated and accompanied by reports of several tests and other data. He also described the development of the present M. C. B. type coupler on the Illinois Traction System. A drawing of this type of coupler is reproduced.

ELECTRICAL EQUIPMENT WEIGHTS

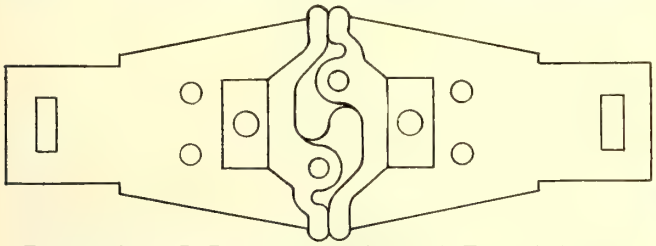
At the beginning of the second day's session Mr. Ayres read a contribution for the committee report on methods of reducing the weight of electrical equipment. This was based on the following methods which were not inconsistent with each other: (1) Redesigning and excluding some

material; (2) higher armature speeds; (3) forced ventilation; (4) the use of some higher type of coil insulation; (5) field control.

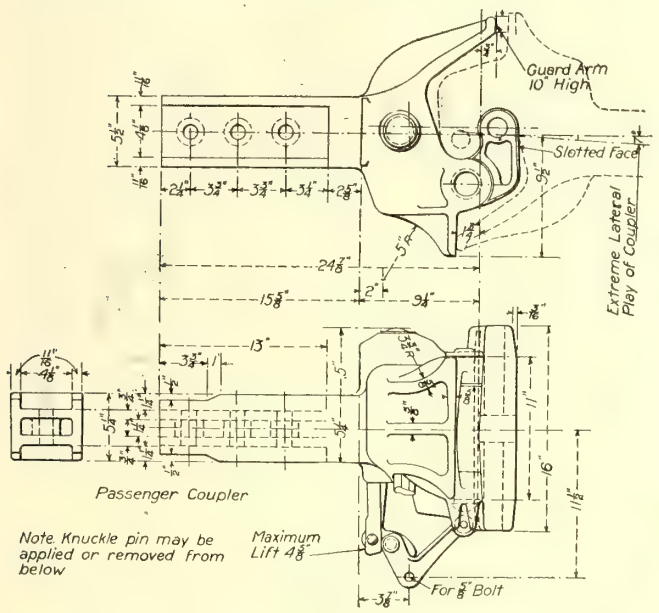
The committee discussed the possibilities of welding or brazing commutator leads. The use of pure block tin was not approved because the tin attacked the copper. Better results were obtained by using 85 per cent tin. Mr. Ayres spoke of the use of Bakelite as an important improvement which would possibly reduce the weight of coils. He also spoke of the increased favor which was being shown toward field control for motors. Mr. Bosenbury called attention to the possibility of saving weight in field coils by the use of thin sheets of oxidized aluminum for insulation.

MEETING WITH CENTRAL ELECTRIC STANDARDIZATION COMMITTEE

The members of the Central Electric Railway Standardization Committee, as earlier mentioned, were next introduced, and the subject of a standard design of coupler which would operate with M. C. B. couplers was discussed at length.

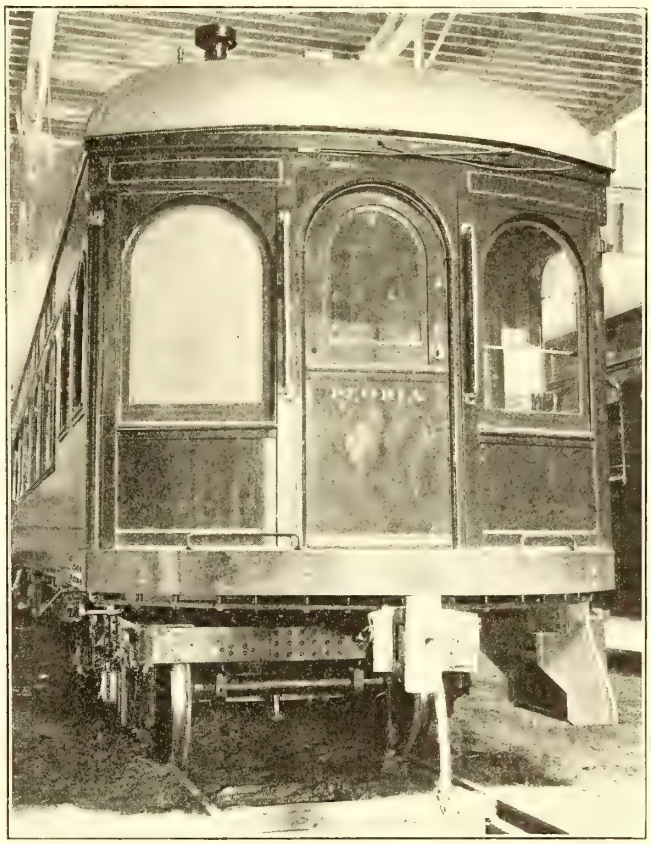


Proposed M. C. B. Type Coupler with Extended Arms



Illinois Traction Standard M. C. B. Type Coupler

On invitation from Mr. Ayres Mr. Hemming read a report of the work of the Central Electric standardization committee, together with the recommendations of that committee as adopted by the Central Electric Railway Association. At the request of Mr. Ayres Mr. Evans then read a letter which the Central Electric committee had written to Mr. Grimshaw, of the equipment committee, stating the reasons for adopting standard couplers with spring carriers. In brief these were as follows: The Central Electric Railway Association considered standard couplers necessary on account of the increased interchange of equipment and because of safety and flexibility. The M. C. B. contour was chosen because a majority of the roads had to do more or less switching of steam road cars, and also because it gave the most strength in the head and could be used with a shackle bar if open knuckles were inserted. The limits of height of the face of the knuckle were placed at 11 in. minimum and 15 in. maximum. A flexible drawbar carrier and a locking device were chosen. The reason for the height of knuckle being made from 11 to 15 in. was to accommodate variations in height of equipment due to uneven loading or uneven track. The flexible carrier was intended to relieve the shock on the vestibule framing which might be occasioned by rough track. In the choice of a flexible drawbar carrier the committee had not committed itself to the use of any patented device of one manufacture. Neither did it recommend any particular design of interlocking device. The C. E. R. A. coupler was not intended for city service. The membership of the C. E. R. A. was vitally interested in the general adoption of a standard coupler. This was due to the increased growth of steam railroad interchange, both freight and passenger. Some of the roads now doing interchange business included the following: Chicago, Lake Shore & South Bend; Ft. Wayne & Northern Indiana; Ohio & Southern; Ohio Electric; Western Ohio; Lake Shore Electric; Terre Haute, Indianapolis & Eastern; Indiana Union Traction; Indianapolis & Cincinnati Traction; Winona Interurban; Evansville & Southern Indiana; Chicago, South Bend & Northern Indiana.



Standard Coupler of Illinois Traction System

The flexible drawbar carrier was thought necessary to prevent binding if the vertical play was limited. As to the center locking device, not all makes of couplers were fitted with this, and the couplers of no two manufacturers would interchange now with each other. The committee of the Central Electric Railway Association thought a locking device should be used to keep the coupler heads from opening vertically as well as horizontally.

Mr. Ayres said that he could not see that the Central Electric Railway specifications contained any requirement limiting the degree of horizontal angularity which might take place between couplers. Another member said that some of the so-called "rigidly locked" couplers had a horizontal angularity in service of from 9 to 12 deg., according to the wear.

L. M. Clark said there was no evidence that the manufacturers were getting together regarding a uniform lock

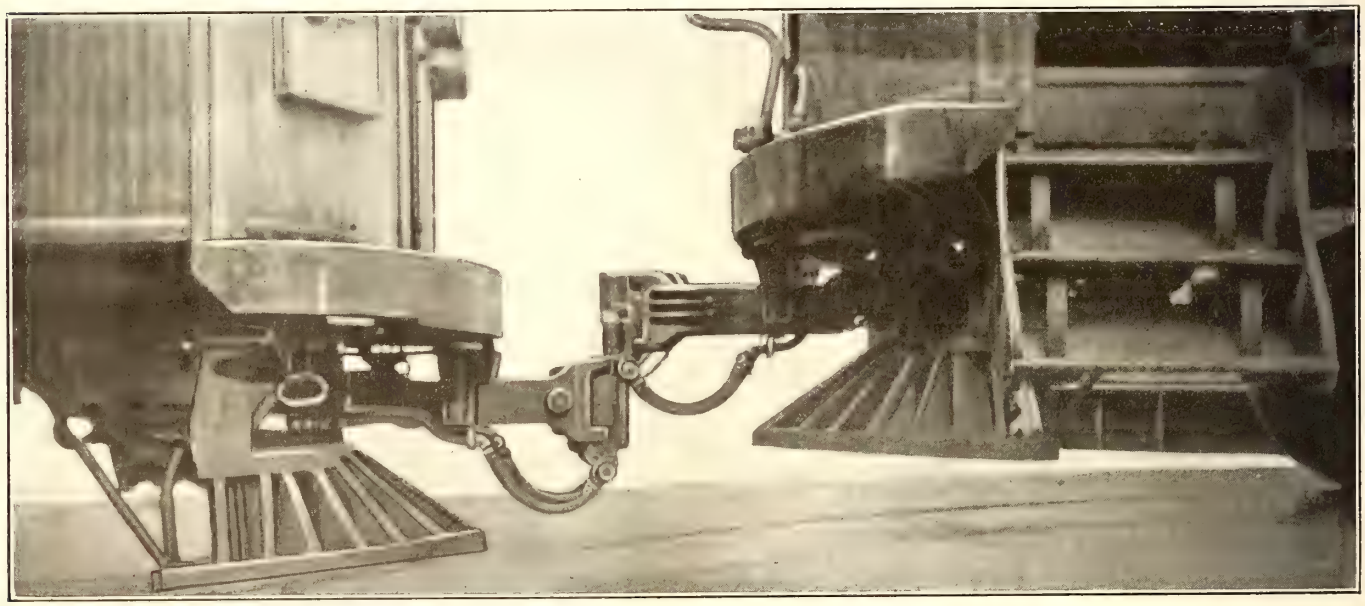
for couplers, even though the Central Electric Railway Association had recommended it.

Mr. Bosenbury said that if vertical uncoupling was prevented, as in some types of interurban couplers, then in event of derailment the platforms or coupler anchorages would be severely damaged. While it might be necessary, on account of rough track at railroad crossings or curves, greatly to increase the height of the knuckle on M. C. B. couplers, Mr. Bosenbury did not believe any limiting stop should be added to prevent the parting of the coupler in event of derailment.

Mr. Bosenbury mentioned one steam road which used M.C.B. knuckles 21 in. high which were designed to accommodate the difference in elevation occurring when handling cars on and off ferry boats. The Illinois Traction coupler had a 16-in. knuckle and had frequently been operated in steam freight as well as passenger service. Close observation showed that the vertical movement was about 9 in. in regular service on the interurban lines. The worst condition for vertical uncoupling was at a multiple railroad crossing on a curve where one of the steam railroad tracks was higher than the other.

ing horizontal angularity of more than 7 deg. Manufacture of these couplers was not restricted by patents. The National Malleable Castings Company and the Simplex Coupler Company had at times furnished these couplers, which were designed with a view to universal service with all M.C.B. couplers, whether or not those couplers had ribs and reinforcements on the sides. Experience had shown that they would operate satisfactorily with all couplers used in steam service. The use of a spring drawbar carrier was unnecessary. Mr. Hemming said the C.E.R.A. standards called for a "flexible" rather than a "spring" drawbar carrier and required no particular design. Mr. Evans said it was unfortunate that the Central Electric Railway Association committee had made sketches to illustrate its standards. It would have been better to have used only dimensions and thus no ambiguity would have occurred. Mr. Evans also called attention to the need on the part of the American Association for adopting a coupler conforming to steam railroad practice so that renewals could be made on foreign roads, whether steam or electric.

Mr. Bosenbury said the Illinois Traction coupler had the standard M.C.B. shank and that the vertical faces of the



Extreme Variation in Height of Couplers on Interurban Cars Due to Change of Grade

Mr. Evans said that while he was not a member of the Central Electric standardization committee when it adopted its present M.C.B. type of coupler he had been a member when standard axles were adopted several years ago. This was two years in advance of the adoption of standard axles by the American Association and the latter association had found it necessary to make only a few slight changes in the C.E.R.A. standards. Mr. Evans felt that the Central Electric Railway Association would be much pleased if the American Association should adopt a standard coupler having similar lines to that which the C.E.R.A. had adopted, but eliminating any errors which might have crept in. It would be very desirable to hasten the adoption of some standard coupler.

Mr. Bosenbury said that whatever specifications were drawn up for couplers should provide leeway for improvements in design and the addition of new features. His road had tried a number of patented couplers and had spent a considerable sum in standardizing all car platforms so that the M.C.B. coupler height could be used. As a result of the study of couplers the design now in use was adopted. This had an M.C.B. contour. The knuckles were 16 in. high and the casting had an extension on the guard-arm side and a shoulder on the other which engaged with similar projections and shoulders when intercoupling, thus prevent-

M.C.B. contour in it had been slightly curved to permit breaks in grade of 7 per cent. A height of 9 in. of the coupler face was straight to provide the full M.C.B. wearing surface.

Mr. Evans said that such slight compromises were desirable because when radial couplers were used on sharp curves the cars were canted and unless one coupler had some freedom of movement on the other they would tend to twist. Mr. Bosenbury said that his company had 300 cars equipped with standard couplers, which were operating satisfactorily. So far as rubbing of the faces was concerned he said that some steam roads had considerel lubricating the knuckles.

Mr. Ayres understood from the preceding discussion that the Illinois Traction type of coupler as described by Mr. Bosenbury would meet all the C.E.R.A. specifications except that it did not have a center lock or a spring carrier.

Mr. Evans spoke of the need for definite recommendations to guide the design and hasten the adoption of a standard coupler.

Summing up the discussion thus far, Mr. Ayres said that the committee was agreed that couplers must intercouple with the M.C.B. type couplers, must operate radially and must be designed to accommodate sharp curves and breaks in grade.

Regarding the severity of breaks in grade and curves on

some interurban roads Mr. Evans did not feel that too much weight should be put on local conditions, but rather the coupler design should conform to modern track-work practice.

Mr. Bosenbury again spoke of the desirability of having strictly vertical-plane couplers which would part automatically in event of the overturning of one car. He showed photographs of derailed cars which illustrated this point and he said that if rigidly locked coupler heads had been used the car platforms or coupler anchorages would have been severely damaged. Similarly, if the extension arms on the sides of the couplers had been restricted in vertical movement, the coupler heads or platforms must have been injured when the car was derailed.

Mr. Bosenbury said that his first idea for adding the brackets to the sides of the couplers came from a test which he had made in his own shops. Two couplers—a Tower and a Simplex—had been mounted so that they could be tested to destruction by bumping with a steam locomotive. During the test it was seen that the guard arm on one of the couplers gouged the side of the other coupler. This showed the need for extensions on the sides to prevent horizontal movement. The next traction couplers made were built with side brackets and guard arm extensions, but the design was too weak for the service and a heavier pattern was made. Thus the size of the coupler had grown with the service until now it was thought that a design had been secured which was suitable for all electric and steam railway interchange service. The couplers on the 62-ton locomotives, which at times hauled forty cars in a train, were manufactured by the Simplex Coupler Company according to the Illinois Traction System's standard design.

COUPLER EXHIBITION TEST

Immediately after lunch on the second day of the committee meeting the American and Central Electric committees, together with representatives of several coupler manufacturers, were taken for a ride over the Indianapolis Traction & Terminal Company's line leading to the west end of the city on two cars of the Indiana Union Traction Company equipped with McConway & Torley couplers of M. C. B. design. The couplers were not provided with any horizontal or vertical locking devices. The test train was run to a railroad crossing at the edge of the city, where there was a severe break in the track grade and the action of the couplers was observed under severe operating conditions. On the return trip the train was run around a "Y" of 35-ft. center radius to show the extreme platform movement and the radial action of the couplers.

COUPLER DISCUSSION CONTINUED

After the test run the committee reassembled and continued the discussion on couplers. Mr. Clark said the cost of installing M. C. B. couplers on the cars of the Terre Haute, Indianapolis & Eastern Traction Company was about $150 per car complete with air-pipe extensions and fittings conforming to C. E. R. A. specifications. Mr. Bosenbury said that on the Illinois Traction System the cost was $87 per car for couplers installed.

Mr. Ayres then read a contribution from Mr. Grimshaw on standard couplers and air signal and control connections. Mr. Grimshaw said that the requirements of interchange justified the vertical plane M. C. B. type coupler and some special attachments to provide against lateral buckling. Mr. Grimshaw recommended that the association arrange to learn by test the requirements that must be met and make definite recommendations on the coupler problem.

Mr. Buckman spoke in favor of locking couplers to provide against uncoupling on breaks in grade. Mr. Thorn thought that if couplers were provided with locking devices it would be very difficult to recouple on a bad break in grade if the couplers had once parted or if it was necessary to make up a train on a sharp curve.

Mr. Bosenbury spoke of the need for having a design of coupler to take the buffing strains, and criticised the reduction of section which might be necessary if center locking was adopted. He also favored the adoption of a slotted knuckle to permit the use of shackle bars until all roads should be equipped with standard couplers.

L. M. Clark said that the committee ought to decide upon some controlling recommendations which would guide purchasers along the right lines until a completely designed coupler could be accepted as standard by all the roads.

Mr. Bosenbury said such designs were desirable and that they should have in view the possibility of interchange of coupler shanks with steam roads. He presented a long argument in opposition to limiting the vertical movement of couplers, and said the straight M. C. B. coupler with the high knuckle, as used on the Illinois Traction System, successfully handled heavy 57-ft. sleeping cars when pushed around 33-ft. radius curves. He was now applying similar couplers to freight cars 65 ft. 8 in. long. These cars had 55-ft. 8-in. truck centers and were designed for handling theatrical scenery.

Mr. Evans suggested that later it might be found desirable to have what might be called a standard electric railway contour with the understanding that this would conform to the M. C. B. contour and make intercoupling possible, but would have the vertical faces curved over a part of their height to provide against cramping on sharp vertical grades and curves.

DISCUSSION BY COUPLER MANUFACTURERS

The committee next put the following question to representatives of the coupler manufacturers for a five-minute discussion by each: What are your arguments for or against the recommendation by the committee of a coupler which does not have horizontal or vertical limiting devices?

Mr. Tomlinson, of the Ohio Brass Company, spoke first. He said in part that it was desirable for a pair of couplers in service to be as nearly like a straight bar as possible because then the combination would be best able to resist stresses. The M. C. B. coupler without provision for horizontal locking would open sidewise as soon as it was worn. The high knuckle, if provided to prevent vertical uncoupling, would bend and strain the carry iron and framing of a car. After considerable study it had seemed to him that the only way to meet the conditions of interchange service was to lock the coupler heads solidly and use a yielding carrier. He thought that the extensions or pockets on the side, as used with some couplers, would interfere with the reinforcing ribs on the outside of the Buckeye, Major and Simplex couplers. Extremely high knuckles would also interfere with the close coupling of car platforms. Because of these reasons he had put the lock on the inside of the type of coupler which bore his name.

I. H. Milliken, of the McConway & Torley Company, then spoke. Mr. Milliken said that no brackets were used on the sides of the couplers made by his company because experience had shown that they were not necessary. If continued use should indicate that the guard arms would prevent horizontal angularity, then this condition could be taken care of by making the present coupler stronger. The addition of guard arms of sufficient strength would increase the weight of the couplers about 100 lb. per car. When guard arms were used they had to be closely in contact with the brackets on the opposing couplers. This interfered with coupling unless ½-in. play was allowed, and then angularity occurred when cars were being pushed. Regarding the vertical movement of the coupler, Mr. Milliken said that if brackets were used on the sides of the coupler and vertical stops were carried on the brackets, then there would be interference on sharp curves and the stops would be broken off. With many cars as now operated the coupler movement in actual service was not so severe as calcu-

lations seemed to show. The adoption of devices to prevent the free movement of coupler heads vertically would place undue strain on the platform sills and coupler anchorages. His company, he said, was making knuckles as high as 15 in. and obtaining good results. Those couplers of his company which the committee had seen in operation had knuckles only 11 in. high.

The next speaker was Herbert Van Dorn, of the W. T. Van Dorn Company. Mr. Van Dorn said that if the stops were not put on the coupler brackets and a long train of cars was handled, buckling would occur on account of the accumulation of slack. Steam roads overcame the tendency to buckle in long passenger trains by the use of spring buffers, which kept the coupler under tension. Because of this reason his company had put the extensions and pockets on the outside of the couplers to provide against lateral movement. These extensions and pockets lined up the couplers to positive fits when a coupling was being made and also prevented buckling out. With such couplers a coupling could be made with couplers several inches more out of line than when couplers without extensions were used; thus time was saved in switching. In the Van Dorn type of coupler the extensions and pockets were placed far enough back to clear the lugs on all heavy, reinforced steam railroad couplers. When the Van Dorn coupler was first designed a number of heavy steam railroad couplers were purchased and experimented with so that practical results were obtained and no interference with lugs had followed. He also stated that if the high knuckles were used it would be impossible to place the couplers so that the car buffers would come close together unless the drawbars were of the same radius as the buffer bands. The knuckle on the Van Dorn coupler was 11 in. high and the stops on the top of the pockets prevented uncoupling when the cars passed over severe breaks in grade.

W. H. Bloss, Ohio Brass Company, said the center-locking feature of the Tomlinson coupler was designed not only for convenience of operation, but also for safety. The interlocking lug entered into the opposite knuckle far enough to hold the coupler in line so that cars would not come uncoupled even if the tailpiece were broken. He felt that his company was offering the regular M. C. B. coupler with a safety device added. The interlocking feature was used because it was thought desirable to have the coupler heads rigid.

Mr. Milliken called attention to the fact that when M. C. B. couplers were worn 5/8 in. between the knuckle and the guard arm they needed attention, but would not come unlocked.

RECOMMENDATIONS OF THE COMMITTEE

After the remarks by the coupler manufacturers' representatives the committee prepared tentative recommendations for inclusion in its report. So far as determined these will require couplers to have the following characteristics:

1. Must couple by impact with all M. C. B. couplers now used by steam roads.

2. Must have radial drawbar.

3. Must provide for successful operation over irregularities in grade met in interurban practice.

4. It is desirable that the shank have such section as to be readily replaced by an M. C. B. coupler in emergency.

5. Must be so constructed as to limit lateral movement in head to not more than 8 deg. between the longitudinal axes of the two couplers, and when two similar couplers are intercoupled must withstand coupling impact and the stresses occasioned by pushing cars around curves.

6. All makes of interurban couplers must couple and operate properly with each other.

7. There should be an arrangement for uncoupling without necessity for employees getting between cars.

8. The faces of the knuckle, vertically, shall be 11 in. minimum and 16 in. maximum and preferably shall be provided with slots for shackle-bar connections.

FARE HEARING IN MASSACHUSETTS

A hearing was held on July 11, 1911, before the Massachusetts Railroad Commission on the petition of the Middlesex & Boston Street Railway for permission to continue the practice of charging 6 cents on its Newton Street Railroad division when transfers are issued to its connecting lines. The Middlesex company comprises the Newton & Boston Street Railway, Newton Street Railway and two or three smaller lines and controls the Lexington & Boston Street Railway. All these lines except the Newton Street Railway charge a 6-cent fare and issue transfers without extra charge. The Newton Street Railway, operating mainly in Newton and Waltham, charges 5 cents on its own line and 6 cents when a transfer to a connecting division is issued.

The attorney for the company stated that the amount received from the extra cent for transfers netted a profit of $5,433.35, after deducting from the total amount received the amounts paid the connecting lines. This charge he claimed was justified by the increased cost of maintenance and better service rendered than originally prevailed. The company was first granted permission to make this added charge about two and one-half years ago, and while the net revenue from this source is comparatively small, the company claims that it is a proper charge. The Middlesex & Boston Street Railway declared a dividend for the year ended June 30, 1911, of 5 per cent on its capital stock of $1,462,000. A surplus of $2,000 was left, but no allowance was made for depreciation. The citizens of Waltham and Newton appearing at the hearing claimed that the charge was unfair and unnecessary.

George Cox, acting manager of the Middlesex & Boston Street Railway, argued that when the roads comprising the present system were built and passengers were carried for a 5-cent fare the business was done at a loss. The proprietors did not realize the fact until some time had passed and the equipment had to be taken care of or renewed. At present, he said, the physical condition of the property was better than ever before, and it had been brought about by the added revenue provided by the 6-cent fare.

Mayor Walker, of Waltham, asked whether the company would favor the idea of carrying laborers during stated hours of the day without exacting the added 1 cent for transfer. Mr. Cox replied that he did not consider it good policy for a transportation company to make cut rates for any special class of passengers. The business furnished by the laborers is necessary, he said, to make a street railway pay at all, and if discrimination were to be made in their favor the company would suffer financially.

The hearing was adjourned to some date between July 20 and Aug. 1, when the company will present a detailed report of its condition.

From Aug. 1, 1910, to June 30, 1911, the Newton Street Railway division of the Middlesex & Boston Street Railway received the following revenue on account of charging 1 cent for each transfer issued:

Total transfers issued, 678,376, at 1c.	$6,783.76
Less amount paid—	
Lexington & Boston Street Railway, for 42,139 at ½c. add'l.	210.69
Newton & Boston Street Railway, for 227,944, at ½c. add'l.	1,139.72
	$1,350.41
Net gain to Newton Street Division.	$5,433.35
Gross passenger receipts, Newton Street Division of the Middlesex & Boston Street Railway Company, Aug. 1, 1910-June 30, 1911.	$354,934.16
Passengers carried.	7,775,042
Transfers issued.	678,376
Transfers received.	670,998

The Swiss government has just granted a concession for the construction of a 19-mile narrow-gage electric railway from Meiringen to Engelberg, over the Joch Pass. The new line is to be built by the same company that constructed the electric railway from Stansstad to Engelberg.

HEARING ON JOINT RATES AND THROUGH ROUTES IN NEW YORK

A hearing was held before Commissioners Willcox, Maltbie, Eustis and Cram, of the Public Service Commission of the First District of New York, on July 6, 1911, on motion of the commission as to rates of fare upon connecting or intersecting lines of street railways in the Borough of Manhattan. The Third Avenue Railroad and the other companies of which Frederick W. Whitridge is receiver were represented by William D. Guthrie, of Guthrie, Bangs & Van Sinderen. The Metropolitan Street Railway was represented by Charles F. Mathewson and J. P. Cotton, Jr., of Masten & Nichols. The Central Park, North & East River Railroad was represented by Chase Mellen. The Second Avenue Railroad was represented by Brainard Tolles. The Twenty-eighth Street & Twenty-ninth Street Crosstown Railroad was represented by Julius Mayer. The commission was represented by Arthur Du Bois and Oliver C. Semple, of counsel.

Mr. Du Bois said that he had the names of a number of gentlemen who desired to speak, but asked to be permitted to call E. G. Connette, the transportation engineer of the commission, and offer in evidence a map which Mr. Connette had prepared showing the points of intersection of the surface lines in Manhattan Borough, the points at which transfers were given prior to the general disintegration of the systems in 1908, and the transfers that have been abolished since then. On this map the various surface lines were indicated by different colors and the transfer points between lines of the same company were indicated by colored dots or dashes. Points where transfer stations formerly existed were marked by a red circle. Where one company now transfers to another two colors were shown.

Mr. Connette was excused at this point to permit the introduction of testimony to show the necessity of restoring the transfers. One of the witnesses, Millard J. Bloomer, of the Harlem Board of Trade, asked if he was right in his understanding that Chairman Willcox, of the commission, had said that the board had power to order the restoration of the transfers. The section of the law covering this point was read and the witness repeated his question. Commissioner Eustis then explained that that commission did have the necessary right if the facts warranted an order and that the hearing was being held to determine just that point. Mr. Bloomer asked why it was that one could ride on three cars in the Bronx on a transfer with coupons attached. Commissioner Eustis, who represents the Bronx on the commission, said that the lines in the Bronx do not claim that it is confiscatory to give transfers while the lines in Manhattan do make such a claim.

Mr. Connette was recalled. In his department records had been kept and observations had been taken showing the extent to which 107 transfer points of the total of 151 abandoned and indicated on the exhibit were used before the abolition of the transfers at these points. Briefly, 219,773 persons transferred in a day at the 107 transfer points before the abolition of the transfers, whereas 73,378 persons left the cars after the abolition of the transfers. The number of passengers inconvenienced was estimated at 146,395.

Mr. Guthrie took exception to the methods adopted in reaching this conclusion in regard to the number of passengers inconvenienced by the discontinuance of the transfers. Taking the first entry in the table, the transfer point at 145th Street and Amsterdam Avenue, which showed the number of persons transferring before the abolition of the transfers to be 3607 and the number of passengers leaving the cars after the abolition of the transfers to be 2235, he said that the witness had gratuitously assumed that the difference between these two figures, namely, 1372, represented the number of people who had been inconvenienced and who would otherwise have asked for transfers. He said that "if there ever was anything more absurd as a basis of proof it has not been called to my attention."

A. F. Weber, chief statistician of the commission, testified that the total revenue car miles of the surface lines in Manhattan in 1908 was 60,719,724, as compared with 55,257,283 in 1909; that the number of revenue passengers in 1908 was 366,690,345 and in 1909 only 362,077,655, and that the number of transfers collected in 1908 was 196,672,167, as compared with 139,607,266 in 1909, or a decrease of more than 57,000,000.

Mr. Weber also offered in evidence a statement which he had compiled from the annual reports of the companies in Manhattan from 1908 and 1909 showing the increase in the fare passengers and the annual percentage of increase. The largest number of discontinuances of transfers by the companies was in the latter part of the fiscal year ended 1909. For the year ended June, 30, 1909, the decrease in the number of fare passengers was more than 4,500,000, or 1⅓ per cent. In the Borough of the Bronx, where no transfers had been discontinued, the increase in the number of revenue passengers for the same period was upward of 6,000,000, or 14½ per cent. A statement was offered in evidence showing the results of operation of the joint rate in force on the Fifty-ninth Street crosstown line between the Metropolitan Street Railway and the Central Park, North & East River Railroad for December, 1910, January, February, March and April, 1911. The summary of this table showed that during these five months the Metropolitan Street Railway carried 376,593 passengers who paid to it 4½ cents per passenger under the joint rate, that the Metropolitan Street Railway carried 39,733 passengers who paid the additional 2-cent rate under the 10-cent joint rate, and that the Central Park, North & East River Railroad received 3½ cents from 378,588 passengers who traveled on the joint rate across town.

Mr. Connette was recalled and said: "In Nashville, Syracuse and Worcester, where I managed street railway properties, we gave universal transfers at all intersecting points in the same general direction, and it was my opinion that it was profitable to do this because it encouraged and educated people to ride. All the lines in Nashville were consolidated and equipped with electricity. That, of course, had a tendency to increase traffic, but the receipts were abnormally high compared with what they had been previously when transfers were not issued. A central transfer station was established in Nashville and all cars radiated

TABLE SHOWING THE NUMBER OF FARES COLLECTED, THE ANNUAL INCREASE IN FARE PASSENGERS AND THE ANNUAL PERCENTAGE OF INCREASE BY YEARS ON THE SURFACE RAILWAYS IN MANHATTAN AND THE BRONX.

Year ended June 30.	Number of Fares Collected.		Annual Increase in Fare Passengers.		Annual Percentage, Increase.	
	Manhattan.	Bronx.	Manhattan.	Bronx.	Manhattan.	Bronx.
1899.....	343,559,120	17,295,761	38,443,582	1,330,491	12.6	8.3
1900.....	360,002,672	21,364,690	16,443,552	4,068,929	4.8	23.5
1901.....	373,569,677	26,992,990	13,567,005	5,628,300	3.8	26.3
1902.....	388,947,169	28,020,185	15,377,492	1,027,195	4.12	3.8
1903.....	396,570,432	30,714,781	7,623,263	2,694,596	2.0	9.
1904.....	389,928,464	34,763,809	*6,641,968	4,049,028	*1.7	13.
1905.....	374,554,075	37,124,805	*15,374,389	2,360,996	*3.9	6.
1906.....	391,708,063	39,893,116	17,153,988	2,768,311	4.6	7.7
1907.....	377,017,192	42,186,533	*14,690,871	2,293,417	*3.8	5.9
1908.....	366,690,345	44,237,229	*10,326,847	2,050,696	*2.7	4.5
1909.....	362,077,665	50,671,779	*4,612,680	6,434,556	*1.3	14.

*Decrease.

TABLE SHOWING THE NUMBER OF JOINT RATE PASSENGERS BETWEEN THE METROPOLITAN STREET RAILWAY AND THE CENTRAL PARK, NORTH AND EAST RIVER RAILROAD.

	Receivers Met. St. Ry. Number at		Central Park, North & East River. Number at
	4½ Cents.	2 Cents.	3½ Cents.
December 1910.....	19,379	2,280	19,443
January, 1911.....	95,825	10,613	96,399
February, 1911.....	83,695	8,802	83,792
March, 1911.....	91,022	9,206	91,522
April, 1911.....	86,654	8,832	87,432
Total	376,593	39,733	378,588

There are also reported a certain number of passengers at 0 cents.

from and passed through the station, and passengers were permitted to transfer there to any car they chose."

Mr. Mathewson said that in a matter of such importance it did not seem right to compel the companies to continue at this time of the year.

In reply Commissioner Eustis said: "We have had this question in mind for some time, but we hoped that the various reorganization schemes would be finished by now. We then expected to take up and adjust this transfer matter. You have heard this morning how this commission was taken to task for not doing anything under the amended law. We cannot sit here for three or four months and do nothing just because it is summer. I will adjourn this hearing until Monday, July 10, 1911, when we will have the whole commission here and you can then apply for a further adjournment."

At the hearing held on July 10, 1911, Chairman Willcox made the following statement:

"The commission has determined to adopt at its meeting on July 11, 1911, an order directing the street surface railways in Manhattan Borough to establish, on or before Aug. 10, 1911, through routes and joint fares over the connecting and intersecting railway lines shown on Exhibit 1 at this hearing, and that transfers be given at all the points of intersection shown on said exhibit. In the meantime, this hearing will be adjourned to Aug. 15."

NEW YORK MEETING OF COMMITTEE ON WAY MATTERS

The committee on way matters of the American Electric Railway Engineering Association held a meeting at the New York office of the association July 6, 7 and 8. The following members of the committee were present: J. M. Larned, engineer of way, Pittsburgh Railways Company, chairman; C. B. Voynow, assistant engineer of way, Philadelphia Rapid Transit Company, vice-chairman; M. J. French, engineer maintenance of way, Utica & Mohawk Valley Railway; R. C. Cram, assistant engineer, Connecticut Company; C. S. Kimball, engineer maintenance of way, Washington Railway & Electric Company; B. E. Tilton, engineer maintenance of way, New York State Railways, Rochester Lines; C. L. Crabbs, engineer of way and structures, Brooklyn Rapid Transit Company.

The first subject taken up was the report of sub-committee No. 2, of which M. J. French is chairman, on "organization and rules for the proper government of the way department." The following definition of the way department was formulated and approved: "The way department is that division of the company organization having charge of right-of-way, tracks, bridges and all matters pertaining to their construction and maintenance and such other duties as may be assigned to it." It was decided to recommend the title "engineer of way" for the chief officer of the way department.

After a discussion on the details of organization a chart was prepared showing the principal employees of the way department, their titles and respective channels of communication. The remainder of the afternoon session on Thursday was devoted to a discussion of the proper form and scope for the code of rules for the government of way department employees, there having been two tentative sets submitted by the sub-committee, one for interurban lines and the other for city lines. It was decided that these should, if practicable, be combined into one code, and a revision of the two codes was thereupon undertaken by the committee as a whole, each rule receiving separate consideration.

At the session on Friday morning E. R. Mason, representing the Electric Service Supplies Company; F. J. Drake, representing the Lorain Steel Company, and G. S. Vickery, representing the Pennsylvania Steel Company, were present at the request of the committee to give the committee the benefit of their views regarding the practicability of the proposed standard 9-in. grooved rail section which had been designed by a sub-committee of which Mr. Voynow is chairman.

Mr. Mason called the attention of the committee to the necessity for providing sufficient space under the joint plates for bonds of the proper size. His company recommended bonds having a conductivity of 10,000 circ. mils per pound of weight per yard of the rail section. Thus, a 125-lb. rail should have bonds with a section of 1,250,000 circ. mils.

Both Mr. Drake and Mr. Vickery objected to a vertical side on the head of the rail next to the groove. They thought that much more satisfactory results could be secured in rolling if the side of the head was made at an angle of from 3 deg. to 6 deg. from the vertical. They preferred a rail section with a 6-in. base, but assured the committee that rails with a 6½-in. base could be rolled provided the distribution of the metal in the head of the rail was nearly symmetrical. They also made a number of other suggestions relating to minor details of the section which had been designed by Mr. Voynow's committee. On Friday evening the committee on way matters, after carefully considering the criticisms offered by the manufacturers, gave definite instructions to the chairman of the sub-committee with reference to modifying the proposed design of grooved girder rail in accordance with the suggestions which had been made by the manufacturers on the ground of difficulty in rolling. The chairman of the sub-committee was instructed to revise the proposed section at an early date so that it could be submitted with the remainder of the report of the committee on way matters. The 9-in. rail section only was considered in this connection.

On Friday afternoon and on Saturday the committee continued the consideration of the code of rules, which it will present as part of its report to the convention.

BLOCK SIGNALS ON BEEBE SYNDICATE LINES

The Rochester, Syracuse & Eastern Railroad has recently put in service a 16-mile section of automatic block signals controlled by alternating-current track circuits on its line between Rochester and Macedon. The signal equipment includes eleven style B, 110-volt signals having separately suspended blades as manufactured by the Union Switch & Signal Company. The power for this signaling is obtained from the railroad company's substation at Macedon, where the voltage is stepped up from 360 volts to 2200 volts for transmission to the signals on No. 8 insulated copper line wires. At each signal location special transformers are installed having primaries wound for 2200 volts, and three secondaries, one wound to give 110 volts for the operation of the signals, motors, line relays, etc., and each of the other two wound to give a proper voltage for track circuits. The two track secondaries can be connected in series for the operation of extra-long track circuits.

The track circuits are of the double-rail type, both rails being available for the return propulsion current. Inductive bonds of 500 amp capacity are installed at the end of each track circuit for the accommodation of this return propulsion current. The majority of the track circuits are end fed, i. e., the current is fed into the track circuits at one end of the block, an impedance coil being installed between the transformer and track, the relay connections being made at the other end of the track circuit in the usual manner. The relays used for track circuits are of the galvanometer and vane types, the vane type relays being used on the short track circuits and the galvanometer relays on the long track circuits. The vane-type relays are used for all line circuits and are wound to operate on 110 volts.

The Syracuse, Lake Shore & Northern Railroad now has under installation an 8-mile section of automatic block

signals embodying six style B signals with track circuits and control arranged substantially as on the Rochester, Syracuse & Eastern Railroad.

Both of these installations were made by the Union Switch & Signal Company's forces under the direction of R. A. Dyer, mechanical engineer of the Inter-State Financing & Construction Company.

NEW WORK OF THE SOUTH SHORE SINGLE-PHASE LINE

The Chicago, Lake Shore & South Bend Railway, known as the "South Shore Route," operating a high-speed, 6600-volt, single-phase road from South Bend, Ind., through Michigan City and Gary to 103d Street, Chicago, has under way a number of interesting improvements which have been brought about largely by a rapid growth in traffic.

This company transmits power along its right-of-way at 33,000 volts single phase for railway operation, and at 6600 volts and 33,000 volts, three phase, for commercial use. A contract has just been closed for supplying from the railway generating station at Michigan City a daily twenty-hour load which will approximate 1,000,000 kw-hours per year. This energy will be delivered as 6600-volt, 60-cycle, three-phase current for local use and as 33,000-volt, 60-cycle, three-phase current for long-distance transmission.

The boiler and generating equipment at the Michigan City plant of the railway is being increased by the installation of a 3000-kw, three-phase, 60-cycle horizontal turbine, one 1000-kw motor-generator set and one 1000-kw step-up transformer with a ratio of 6600 to 33,000. The existing equipment included two 500-kw motor-generator sets installed last year and these, in combination with the new 1000-kw set, are used as frequency changers, converting single-phase, 25-cycle current into three-phase, 60-cycle, or the reverse, as the loading of the two different types of turbo-generators may require. The addition of a new step-up transformer gives the plant a capacity of 4000 kw in transformers. The new generating equipment will require the addition of 1000 hp in boiler capacity, which will shortly be purchased and installed.

LIGHTNING PROTECTION

The electrical department of this road has just received material for the erection of a ground wire to be carried above the tops of the transmission lines for the full length of the road. This will be for lightning protection. It will consist of a ⅜-in. steel cable grounded to 8-ft. lengths of galvanized pipe, driven into the earth. The connections to ground will be at every fourth pole, the poles being 166 ft. apart on tangents. The steel cable will be carried at a height of 4 ft. above the transmission wires and will be supported by heavy angle irons, fastened to the pole tops by two ¾-in. bolts. The wire will be fastened to the angle irons by Crosby clips.

DOUBLE TRACKING

The South Shore route enters Chicago over 8.5 miles of double-tracked right-of-way owned jointly by the electric road and the Illinois Central Railroad. This portion of the line extends from the Illinois-Indiana state line to Pullman, the junction with the Illinois Central suburban service. Heretofore one track only has been used by the electric line, but a trolley wire is shortly to be strung over the second track, which originally was built for use by the Illinois Central Railroad. The installation of this trolley will give the South Shore route a high-speed double-track line from Pullman, Ill., to Gary, Ind., a distance of 24.5 miles, through the congested industrial district southeast of Chicago.

The new trolley construction is of particular interest because the catenary will support a steel contact wire. The design of the suspension of the messenger cable is similar to that followed in the original construction of the road. The messenger consists of a ⅝-in. seven-strand steel cable supported by mast arms and in turn carrying a No. 0000 grooved copper trolley wire. Underneath this trolley wire on the new double-track work will be supported a No. 000 capacity hadd-drawn grooved steel contact wire. This steel wire will be hung 3 in. below the copper trolley wire and the hangers will be placed midway between the messenger hangers, thus providing the maximum elasticity.

C. N. Wilcoxon, general manager of this property, states that unless one is familiar with the practical conditions surrounding distribution of trolley current at 6600 volts he will be amazed at the results obtained. For example, the gravel pit of this road is three-quarters of a mile away from the main line and the trolley wire leading to the gravel pit is a seven-strand steel guy wire erected to obtain lowest cost and to avoid theft of copper. This single steel-cable trolley wire is not supplemented by any feeders, yet conducts ample power to permit handling eight loaded 80,000-lb. Rodger ballast cars out of the gravel pit and onto the main line. Similarly one of the electric locomotives of this company has handled forty-five empty 100,000-lb. capacity steel-bottom Rodger ballast cars with ease up a 1 per cent grade and also a train of twenty-four such cars fully loaded with ballast. The locomotives are equipped with four Westinghouse 125-hp a.c. motors.

NEW TERMINAL FACILITIES

At the junction of the South Shore route and the Illinois Central suburban service in Kensington, Ill., near the southern limits of the city of Chicago, a new interlocking plant is to be installed to permit the electric cars to cross the four main-line tracks of the Illinois Central and thus reach and use the platform of the Illinois Central steam suburban service at Pullman. This work will require the construction of about a mile of new electric track which will extend along the west side of the Illinois Central right-of-way and will terminate at the nine-acre property owned by the electric road between 103d and 111th Streets, Chicago, adjoining the Illinois Central right-of-way. This terminal will provide both freight and passenger facilities and when trains enter it terminal passengers will not be required to pass over the foot bridge from one side of the Illinois Central's right-of-way to the other as at present.

NEW TIMETABLE OF THE ALBANY SOUTHERN RAILROAD

On Sunday, June 25, the Albany Southern Railroad, Albany, N. Y., put into effect its summer timetable No. 10. The new working timetable for the use of employees has been issued in a novel form. Heretofore the working timetables of this road, in accordance with the practice of most interurban electric railways, were printed on the inside pages of a four-page folder, measuring 12 in. by 36 in. The new working timetable is designed to be much more convenient. It is in book form and measures 4⅛ in. x 6¾ in. The list of stations and the distances are printed on a left-hand page, which when unfolded extends out beyond the cover and the other pages of the book. In this way one list of stations can be used to refer to the columns of train times shown on any of the following eight pages. Each page of the working timetable contains ten columns, each 5/16 in. wide. Four pages are used for showing the times of thirty-five first-class trains and one second-class south-bound train and the next four pages are used for an equal number of north-bound trains. Sufficient space is left at the top for the name of the railroad company, the direction of the train movement, the number of the timetable and the class of the trains shown. At the bottom of each page is printed a brief instruction to motormen or conductors relating particularly to the prevention of accidents.

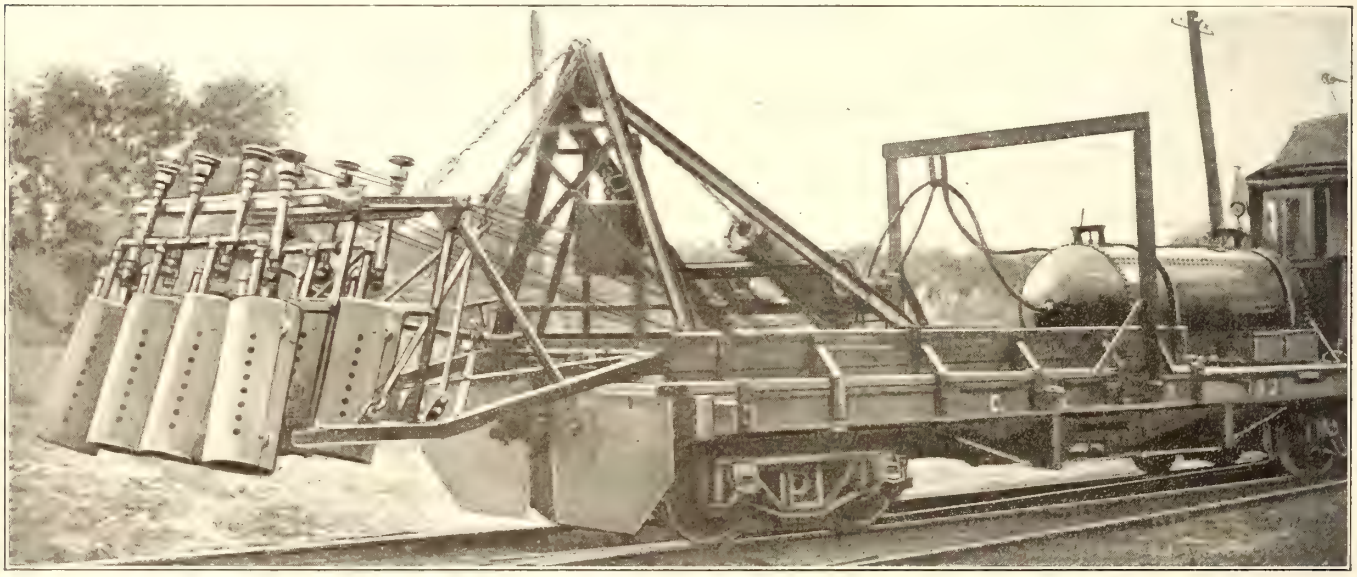
In addition to the working timetable the pamphlet contains sixteen pages of special instructions, extracts from the rule book of the company, instructions on the prevention of accidents, and a list of physicians and hospitals in the

different towns reached. This printed matter in the timetable is not intended in any sense to take the place of the standard rule book of the company. Considerable information, however, has been included which is usually contained in special notices which are issued from time to time, and which would not appear in the standard rule book. The files of special notices on the bulletin boards in the carhouses have been removed and all of the instructions in force have been incorporated in the working timetable. The company believes that it is practically impossible to get all the motormen and conductors to study a large file of old special notices frequently enough to keep the instructions contained therein fresh in their minds.

It is not believed that the cost of future issues of this timetable will exceed the cost of the old form of timetable formerly used.

GASOLINE WEED BURNER

The accompanying illustration shows the Lamb weed burner for destroying weeds on railway right-of-way. These burners are in service on a number of electric railways in Illinois and California and are said to have proved very efficient. The Lamb weed burner is constructed entirely of metal and is mounted on a standard flat car. The framework is made up of steel angle bars and is supported on a metal carriage which is mounted on small wheels. It is so constructed that the burners may be raised and lowered or shifted forward and backward on the car at will. These movements are controlled by air cylinders which are connected up with the train air-brake line. The manufacturers are Wheelock & Buchanan, Aurora, Ill.



Gasoline Weed Burner

As shown in the illustration, there are seven self-generating burners of the Bunsen type, mounted side by side. These burners are 14 in. in diameter and 30 in. long, and they are so made that the heat does not injure the metal. On the inside at the upper end of these burners the supply pipes are coiled in such a way as to provide ample generating surface. These pipes are carried direct from the generators to a 1200-gal. gasoline tank which is located at the rear end of the car. The flow of gasoline is regulated by means of safety and automatic emergency valves. The flow of gas to each burner is separately controlled by the aid of cables which lead from the burners to a point back of the steel carriage where the operator is located. From this point the operator is able to regulate the intensity of the heat, control the flow of gasoline, raise or lower the burners or move the steel frame to any desired position. This flexibility in the apparatus overcomes the serious objections found in other types of weed burners and eliminates the possibility of burning ties, wooden bridges, crossing planks and other wood material ordinarily used in track construction.

The burners are normally set for burning the vegetation between the rails and for a distance of 30 in. on either side, but their position may be changed so as to cover a greater area outside of the rails.

Under ordinary conditions it is claimed this weed burner will effectively destroy all vegetation while the car on which it is mounted is run at a speed of from 6 to 12 m.p.h. The speed at which the car is propelled is regulated according to the age and quantity of the vegetation to be destroyed.

INSTRUMENT FOR TESTING FIELDS

A novel field testing device is in use in the shops of the Western New York & Pennsylvania Traction Company at Olean, N. Y. It consists of a slotted wooden case, in which are mounted a spiral spring and an iron plunger with an enlarged base. The amount of compression of the spiral springs is indicated by a pointer, in the same manner as on an ordinary spring balance. In the upper end of the wooden case a common compass is inserted and covered with glass. To detect a wrongly connected or short-circuited field coil the following procedure is used: If a single coil is defective for any reason in any way the magnetism due to the current flowing through that coil will be weaker than that produced by the other coils in series with it. As this effect extends to the leakage magnetism existing behind the poles of every excited machine the test may be applied around the outside of the motor from pole to pole while a current is sent through the motor. The pull on the iron plunger behind a pole surrounded by a defective coil will be much less than that behind the others. Having located a weak pole, the compass is used to detect whether the weakness is due to a wrong connection or to some short-circuit condition.

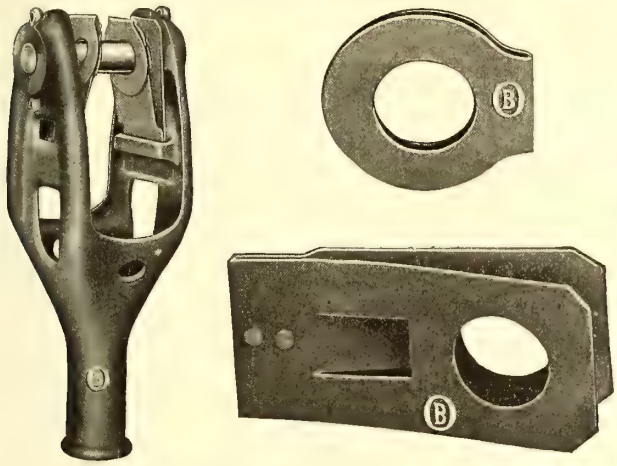
During 1910 the tramway company of Cairo, Egypt, extended its system along different lines branching in all quarters of the capital, their total length now amounting to 139 miles. The company carried 53,492,219 passengers in 1910, an increase of 4,000,000 over the previous year. The receipts amounted to $1,384,330 in 1910.

12626

TROLLEY HARP AND ALIGNING EAR

The Ohio Brass Company, of Mansfield, Ohio, is listing a new design of trolley harp for which several commendable features are claimed.

The harps are so designed as to eliminate all sharp corners or projections which would be liable to catch in the trolley wires. Great strength has been obtained with light weight. The body casting is made of malleable iron and is provided with a rope hole on each side so that it may be reversed when one side is worn.

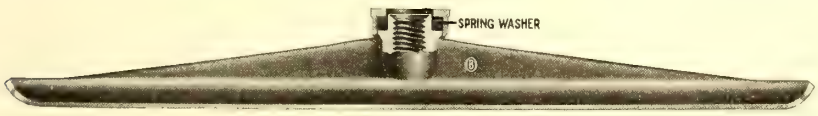


Trolley Harp, Contact Spring and Washer

The contact springs are made of phosphor bronze and are held in place without the use of any rivets or other fastening devices so that they may be easily and quickly renewed when worn. They are provided with reversible wearing washers which may be worn on both sides before renewal is necessary.

The company has also brought out a new type of trolley ear which can be tightened upon a round top hanger and brought into alignment with the trolley wire without the necessity of backing off. A tight joint is always maintained between the top of the ear boss and the insulation of the hanger and eliminates danger of the threads stripping in service.

The ear is simple in construction, entirely self-contained and positive in its action. It consists of a cap rolled in place on the boss and a positive lock washer interposed between the cap and a shoulder on the boss. There is



Aligning Ear

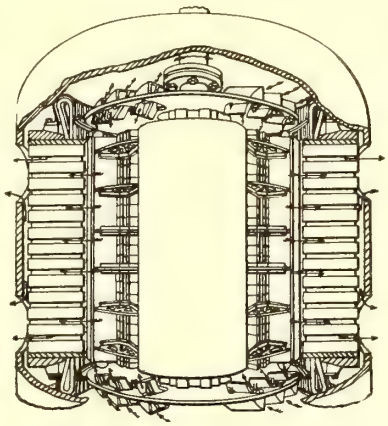
sufficient compression to the lock washer to permit the ear being turned one complete revolution after the top of the boss first comes in contact with the insulation of the hanger.

The ear is made in 15-in. length with a 5/8-in. boss, and in two sizes for No. 00 and No. 0000 round wire.

According to a report from Max J. Baehr, United States Consul, Cienfuegos, Cuba, the Cienfuegos, Palmira & Cruces Electric Railway & Power Company is proceeding with its enterprise, and the government has conceded it a subsidy for 60 miles of road at the rate of $8,400 per mile. There is also a bill before the Cuban Senate to allow this company to import all material necessary for the construction and operation of its proposed line within the Province of Santa Clara duty free. This would mean a considerable saving to the company on the 350 miles of railway. The bill has passed the House of Representatives and will pass the Senate.

TURBO-GENERATOR VENTILATING DEVICE

During the past year Charles E. Baker, consulting engineer and formerly superintendent of motive power and machinery Boston Elevated Railway, has been assisting C. E. Bancroft, superintendent of motive power and machinery Boston & Northern and Old Colony Street Railways, in remodeling and making numerous changes in some of the power houses of those companies. At the Quincy Point



Sectional View of Generator, Showing Path of Air Currents



Buckets Applied to Top and Bottom of Rotor

power station, which contains five 2000-kw Curtis turbo-generators and ten 650-hp boilers, some interesting experiments have been made to determine the efficiency of air-cooling the generators by means of a large detached motor-driven blower and also a compound pressure blower designed by Mr. Baker, which is attached directly on the shaft of the generator. After testing both methods of ventilation it was found that the blower designed by Mr. Baker was much more efficient than the detached blower and was noiseless and invisible. It does not require large air ducts to be connected to each end of the generator, which would occupy a large amount of space and spoil the appearance of the engine room, and it can be applied at comparatively small cost.

The tests showed that with this device it was possible to increase the capacity of the generators 50 per cent above their normal rating without undue heating, and it was found possible also to increase the steaming capacity of the boilers correspondingly by making a few minor changes. The device has been applied to four of the five generators in the Quincy Point station and the capacity of the station has been increased thereby from 10,000 kw to 15,000 kw. As the increased capacity has been obtained with practically no additional cost for labor, maintenance and depreciation and with only a small capital expenditure, the cost of the additional power is only the cost of the additional fuel burned under the boilers.

The device consists of a steel plate disk rigidly fastened at each end of the rotor and a series of curved buckets on each disk for entraining and forcing the air through the disk into the spaces between the field poles on the rotor. The inside retaining ring on the stator forms a seal with the edge of the disk on the rotor shaft so that air is drawn in at each end of the rotor through the buckets on the disks and is forced through the vertical spaces between the pole pieces of the rotor from both the top and bottom. The air then passes across the air gap, through the horizontal ventilating passages in the stator and out into the room through the holes in the outer casing. If desired, the casing can be inclosed with an air duct to lead the hot air to the outside of the building, or to the boiler room. The intake

air also can be drawn through a duct from outside the building if the air in the engine room is too dirty or carries much oil in suspension.

While no tests have been made at Quincy Point to determine the actual volume and pressure of the air forced through the generators with this attachment, some idea of its capacity and efficiency in distributing the air throughout all parts of the generators can be gained by comparing the performance of a generator ventilated with a detached fan blower. A 100-in. steam-driven Sturtevant blower was attached to both ends of one of the 2000-kw machines and run at sufficient speed to produce a pressure represented by 2½ in. of water. The air was drawn from outside the building. Under these conditions the generator carried a load of 3000 kw for four hours with a rise in temperature above the surrounding air of 55 deg. C. With the Baker attachment on the rotor and drawing air from the room the generator carried a load of 3000 kw with a temperature rise of only 38 deg. C., which was 6 deg. less than the temperature at the normal rating of 2000 kw before any changes were made.

This type of ventilating device can be applied to many of the existing types of turbo-generators at small cost. A patent covering the application of the device to generators and also to compound-pressure blowers has been granted to Mr. Baker, who is perfecting plans for their manufacture and installation on generators now in use which have been built with the old style of rating, providing for a momentary overload capacity of 100 per cent. The only reason that these generators cannot carry an average or commercial load of 50 per cent or more in excess of their normal rating for any considerable length of time is their rise in temperature to the destructive point of insulation, etc., because the steam end is amply large for a 75 per cent increase output above normal. It is also a fact that generators operated with a low power factor will show greater rise in temperature per kilowatt output than those with a high power factor, and it is often found that they cannot be operated with safety at over 75 or 80 per cent of normal rating in kilowatt output.

Work has been begun on the rebuilding of the Graham Building, owned by John R. Graham, president and general manager of the Bangor Railway & Electric Company, a business block in the heart of the city, which was destroyed in the fire on April 30. This will be six stories of buff brick, and will be leased largely for headquarters offices for the Bangor & Aroostook Railroad.

NEW FREIGHT CARS OF MICHIGAN UNITED RAILWAYS

The Michigan United Railways Company, Jackson, Mich., has recently added to its equipment eight large arch roof express-freight cars for use on its third-rail and trolley divisions. The express and freight business of this road is growing rapidly as the result of extended territory and intensive solicitation. Five of the new cars are equipped with motors and three are trail cars. One of the motor cars, with trailer attached, is illustrated.

The car bodies and trucks were built by the McGuire-Cummings Manufacturing Company at Paris, Ill., and were equipped at the Albion shops of the railway company. The following dimensions apply to the motor cars: Length over the bumpers, 50 ft.; length over all, 52 ft. 6 in.; distance between the truck centers, 31 ft.; width over the sheathing, 8 ft. 11 in.; height from rail to trolley base, 13 ft. 7½ in.; capacity, 80,000 lb., 2,325 cu. ft. The motor cars are mounted on No. 20-A trucks, with 37-in. Midvale steel wheels. The axles have 5 in. x 9 in. journals and Symington journal boxes.

The principal dimensions of the trail cars are as follows: Length over the bumpers, 41 ft. 5 in.; length over all, 43 ft. 11 in.; distance between the truck centers, 28 ft. 6 in.; width over the sheathing, 8 ft. 11 in.; capacity, 60,000 lb., 2000 cu. ft. The trail cars have Wolf cast-steel trucks and 4¼-in. x 8-in. journal axles.



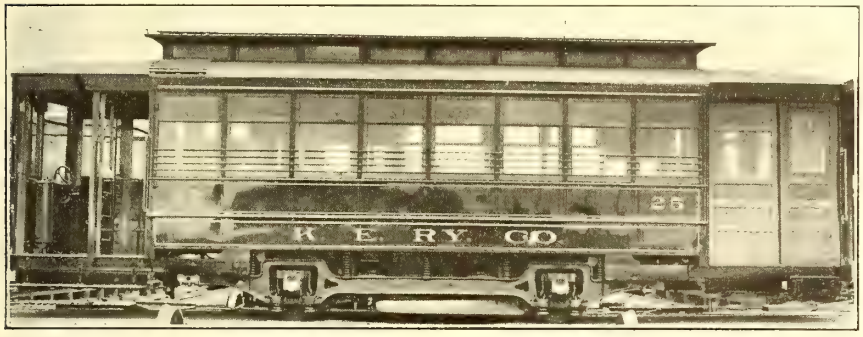
New Express-Freight Car of Michigan United Railways

The motors are GE-214, rated at 75 hp each. The electric equipment also includes K-34-D controllers, U. S. 13 trolley bases and G. E. luminous arc headlights. No. 2 Knutson trolley retrievers are used. The air-brake equipment was supplied by the General Electric Company. It is designed for operation on electric and steam roads. Two motorman's valves are employed, straight air being used when cars are operated singly, the automatic when operated in trains. The compressor is of the C.P.-23 type and has a capacity of 24 cu. ft. of free air per minute.

Both motor and trail cars are equipped with automatic couplers of the radial type which are designed to couple on a 35-ft. radius curve. The motor cars have three door openings on each side, 6 ft. x 6 ft., and one swinging door at each end for the use of the train crew. The trail cars are provided with one door on each side, 6 ft. x 6 ft., and one door at each end for convenience in loading and unloading long materials. Two electric signal lights are provided at each end of the cars and they are also equipped with standard marker and flag brackets, and have projecting running board along the roofs for the use of the crews.

NON-PARALLEL AXLE TRUCK CARS FOR KANKAKEE, ILL.

The Kankakee (Ill.) Electric Railway has recently received from the St. Louis Car Company two vestibuled single-truck prepayment cars of the design shown in the accompanying cut. The most interesting feature is the use of Warner 10-ft. wheel base non-parallel axle trucks. The general dimensions of these cars follow: Length of car body over the corner posts, 21 ft.; length of car over the buffers, 34 ft.; length of the car platforms, 6 ft. 6 in.; width over the panels and sills, 8 ft. 2 in.; height from underside of sill to the top of trolley board, 9 ft. 3 in. The general design



Car with Non-Parallel Axle Truck

calls for eight windows on each side fitted with a stationary top sash and a lower sash which drops into a flap-covered pocket. The cars are for double-end operation. One side of the vestibule has a single exit sliding door and folding step which are operated together by the motorman; the conductor's side has double folding doors. The long step opposite these doors is hooked up when not in use. Both types of steps have Mason treads.

The bottom framing consists of two 3¾-in. x 5-in. and 1¾-in. x 5-in. yellow pine sills with 12-in. x ⅜-in. steel plates sandwiched between and bolted together. Two sub sills, one on each side of the car, are gained into and bolted to all cross-bars. The end sills and cross-bars are of white oak. The two end cross-bars that support the platform knees are reinforced with iron plates 6 in. x ⅜ in. Both platforms are 6 ft. 6 in. long. The center platform knees are 2¾-in. x 5-in. oak, while the side platform knees are 2¾-in. x 7¾-in. oak reinforced by bolted 6-in. x ½-in. plates. The buffers are 6-in. x ½-in. plates with an oak crown piece and cast-iron buffer shield. The body framing is of ash and yellow pine, but the side panels are of sheet steel. The boards of the monitor-type roof are of poplar, which is covered with No. 8 canvas laid in white lead and given three coats of roof paint. The rafters are of ash strengthened with steel carlines.

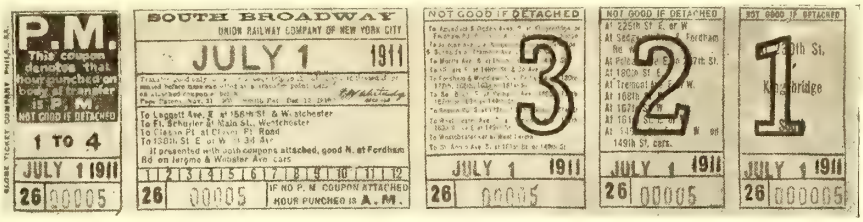
The inside finish, including the doors, sash and moldings, is of mahogany. No. 16 sheet steel, painted and grained mahogany, is used for the side lining below the window rail. The lower and upper ceilings are of three-ply birch veneer. All metal trimmings inside the car are of polished and lacquered solid bronze. Bronze is used also for the grab-handle brackets at each step opening, for the end window and vestibule door sash guards. The seats are of rattan. They consist of six reversible cross seats on each side of a 24-in. aisle and four longitudinal seats in the corners. Pantasote curtain material is used for the curtains and double sliding body end door. The curtains have Forsyth ring fixtures.

The cars are equipped with the builders' drawbars, sandboxes, dash headlights and illuminated signs. A dry battery push-button system is provided in connection with the prepayment system of fare collection. The hand-brake equipment consists of the car builders' vertical wheel brake with staff and Peacock gears.

MULTIPLE COUPON TRANSFER USED IN NEW YORK

The Union Railway Company, which operates in the borough of the Bronx, New York City, placed in operation on July 1 a new transfer system, whereby a single ticket gives the user the privilege of securing the maximum ride in the same general direction without asking for a second transfer slip. This is obtained by making the tickets with as many extra stubs as could possibly be used for riding in the same general direction to a given point. An additional stub is employed for p. m. use. The transfer ticket reproduced shows that the holder can have four distinct transfers as follows after the first ride on a cash fare:

The first transfer in this case is at 230th Street traveling south on the Kingsbridge line. Stub No. 1 is an emergency transfer because this line is now divided by a steam railroad crossing at grade over which electric cars are not permitted to run. Stub No. 2 is good for traveling crosstown east or west, but when the passenger uses stub No. 3 he can travel south only in accordance with the original direction. Stub No. 4 is good for east or west crosstown riding in accordance with the statement on the transfer, but one exception is made in favor of northerly riding if the passenger reaches the point named on the ticket with two coupons still unused. The p. m. stub is on the left-hand of the complete transfer and therefore remains on the last transfer used. The p. m. coupon is torn off by the conductor if the transfer is issued during a. m. hours. Only the last transfer slip is provided with an hour indication, which serves for all. The printed instructions on the transfers



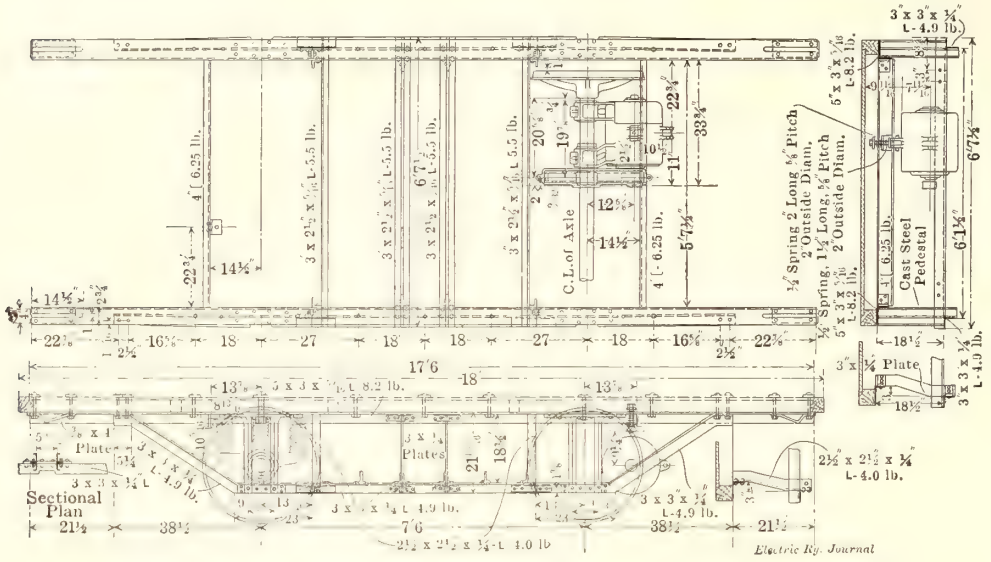
Multiple Coupon Transfer

show the permissible transfer routes and directions, but a color scheme is used for the convenience of the conductors. Thus, north is green, south is rose, and crosstown is white, except where crosstown lines converge to the same point like the sides of an angle. In the last instance the east crosstown line tickets are gold and the west crosstown lines are blue. The multiple coupon transfer was introduced to prevent continuous riding on the Union Railway System where the peculiar routing of the lines necessitates the use of several transfers by most riders. These transfers are 8 in. long and 2 in. wide.

F. A. Lipsi and A. W. Below propose to organize a company to construct and operate an electric railway from Moscow, Russia, to the Ssergievski Possad, with branches to the Northern Railway. The lines would be about 46 miles long, and the cost of construction is estimated at $4,575,000. The project has been submitted by the Ministries of Finance and Ways of Communication to the Council of Ministers.

MORE STORAGE BATTERY CARS FOR THE THIRD AVENUE RAILROAD, NEW YORK CITY

Early in 1910 the Third Avenue Railroad, New York, began to operate storage battery cars over some of the lines previously served by horse cars. The first cars, which were five in number, proved so successful that twenty-five more were installed before the end of the year and now an order has been placed with The J. G. Brill Company for another thirty-five cars. The new cars will not vary in any important respect from the previous storage battery rolling stock, except that the truck will be designed to permit the batteries to be placed under the body if necessary and that standard railway motor gearing will be used instead of chain drive. Each of the new cars will be equipped by the Electric Storage Battery Company with "Hycap-Exide" batteries, each equipment having a rating of 420 amp-hours. The manufacturer has agreed to maintain the batteries for five years, during which period the output must not fall below 75 per cent of the original rating. All battery maintenance and replacements are handled by the manufacturer on a cents-per-car-mile basis.



Plan and Side Elevation of Truck for Third Avenue Railroad Storage Battery Cars

As an instance of the excellent service given by the Gould storage batteries in use on the first thirty cars it may be stated that one car, after making over 12,000 miles in commercial service, ran 114.08 miles on a single charge. The actual discharge of the battery was 492 amp-hours, which was equivalent to an overload of 72 amp-hours, or 16 2/3 per cent. The statistics of charging station output show that the average power consumption of all the storage battery cars now in service is about 500 watts per car mile, which is equivalent to 70 watts per ton mile when all losses are included.

The motor equipment per car will consist of two 4½-hp GE-1022 automobile type motors, similar to the original outfits, except that they will be furnished with axle bearings owing to the adoption of gearing in place of chains. The chains will also be removed from the old cars. In order to make this alteration the original motors will have to be furnished with axle bearings. The bearings will be bolted and then welded to the frame of the motor, after which the armature bearings will be lined up in a boring mill to make them absolutely parallel to the motor bearings. The decision to substitute the gears for a chain was caused by trouble from chain breakage. It was found that after some wear of the sprocket the chain did not mesh for proper riding and the individual links wore very rapidly. As an experiment, one car was equipped with gearing and runs were made with it for about 6000 miles. It was found that the efficiency of this gearing was practically the same as that of a chain in good working order. The gears will practically eliminate all maintenance trouble due to the driving mechanism and will take up less space. All the gears to be installed will be of high-grade steel.

The accompanying drawing of the new truck and motor suspension gives the principal dimensions and shows the sizes of the framing members. The truck will be built up of commercial shapes throughout to insure ease in maintenance. It is to be furnished with Lobdell cast-steel wheels and the Railway Roller Bearing Company's anti-friction journal bearings. The principal dimensions of the new cars will be as follows: Length over the vestibules, 26 ft. 1½ in.; length of the body, 18 ft.; width over all, 7 ft. 6 in.; width over the sills, 6 ft. 5½ in.; height from the rail to the sills, 2 ft. 5½ in.; height from the sills to the roof, 8 ft. 2½ in. The longitudinal seats will be for thirty passengers. The general construction of the car will be of wood, with white ash interior trim and Agasote head linings. Among the specialties to be placed on these cars are Columbia sanders, Shroyer curtain fixtures and Pantasote curtain material.

A NEW MATERIAL FOR CAR HEADLINING

The Gardner Artificial Lumber Company, Barberton, Ohio, has recently entered the electric railway field with a new composition material suitable for the headlining and interior finish of cars. The material is being sold under the trade name "Galco." It is made in sheets of any desired thickness and in sizes up to 16 ft. long and 72 in. wide. The material has insulating qualities against heat and cold, which, it is claimed, are greater than any other material of a similar nature, and it is impervious to oil or water. By heating it to approximately 200 deg. it may be bent or pressed into any desired shape without cracking the surface and after being allowed to cool for ten minutes it will retain its shape indefinitely. It becomes harder with age, and as it has a perfectly smooth surface it takes a fine finish when used for headlining. The company has installed machinery for making this material which has a capacity of 10,000 sq. ft. per day of any thickness so that immediate shipments can be made at all times. The Marflo Railway Appliance Company, Cleveland, Ohio, is the general sales agent for the material, and the United States Metal & Manufacturing Company, New York, is general Eastern agent.

It is estimated that the purchase of the Tokio (Japan) Tramways will cost about $50,000,000, and that the placing of a foreign loan for that amount will be necessary.

The *Electrical Review*, London, has published as a special supplement to the issue of June 30, 1911, a list of the electric tramways, tube railways and electrified steam railways in Great Britain. The supplement gives the names of the companies, the names of the manager and electrical engineer, the route mileage, number of cars, equipment of power stations, amount of capital invested, car mileage and number of passengers carried. Included are 191 tramway companies and fourteen tube railways and electrified steam railways.

News of Electric Railways

Chicago Subway Progress

The municipal law department of the city of Chicago has transmitted to the Chicago City Council an opinion stating that the city can build its own subway system, using for the purpose to secure a bond issue the fund which is being accumulated from the percentage of earnings of the surface railways which the city now receives. Some of the other conclusions of the committee follow:

"The city has the right to construct a system of subways by day labor if the statute passed by the last General Assembly is a valid one. In the absence of such legislation the city would not have the right so to do.

"The city has the right to construct a system of subways by contract for local transportation of passengers.

"The city has no right to construct or own a system of subways for the transportation of merchandise.

"The city has the right to provide for underground municipal utilities owned by the city.

"The city, in the construction of the system of subways, is not limited to its present needs, but may provide for its future growth.

"The city may allow utilities owned by individuals and private or quasi-public corporations to use a portion of the space in the subway, provided such use does not in any way interfere with the primary object of street railway transportation. The expense, however, of reconstruction and readjustment of such utilities must be borne by such individuals or corporations.

"The city has no power to operate a street railway in the system of subways without a popular vote approving of the proposition. The question was submitted to the people and was defeated.

"The city has the power to lease the system of subways constructed by it to railways incorporated under the laws of the State for the purpose of operating street railways for a term not exceeding twenty years.

"The city has the power to issue bonds for the construction and equipment of subways, provided said bonds are a lien upon such property and income only, and are not included in the bonded debt of the city.

"The city has the right exclusively to pledge and pay the traction fund as interest upon such bond issue and to use any portion of such fund for the purpose of funding such bonds.

"The city has the right further to use any net revenue received, either from the operation or the leasing of such subways when constructed, for the purpose of retiring such bonds.

"The city has the power to pay out of such bond issue the cost of reconstruction or replacement of underground municipal utilities owned by itself which may be disturbed by the building of the subways.

"The city has no power to pay out of such bond issue the cost of reconstruction or replacement of underground municipal utilities owned by individuals and private or quasi-public corporations which may be disturbed by the building of the subways."

City officials report that $12,700,385 in bonds would be available for immediate use in subway construction if the voters should approve such an issue.

Shirlaw D. Gookins, secretary of the Chicago Subway Arcade & Traction Company, recently presented a comprehensive plan for a passenger subway system, an outer harbor and a boulevard link between the North and South Sides, including a bridge over the Chicago River, at the public hearing of the Chicago City Council local transportation committee. Complete construction, according to Mr. Gookins' plans, would cost about $96,000,000. The plan provided for a subway system 59 miles in length under the principal thoroughfares. The cost of this portion of the work would be about $72,000,000. The construction of an outer harbor was incorporated in the plan because the dirt removed for subway excavation could be used in building the harbor. The subway system would provide a number of loops and terminal points in the downtown district and a number of through routes between the different sides of the city, as well as a terminal in Grant Park on the lake front.

J. W. Pearl, a former member of the Chicago city engineer's staff, appeared before the committee on local transportation of the Chicago City Council on July 5 to explain his plans for combined routes or interlocking subways for the city of Chicago. The scheme outlined by Mr. Pearl contemplates the construction of a number of intermeshed loops in the downtown district, north side tracks sharing the island platforms with west side tracks, and other west side tracks sharing island platforms with south side tracks, so that transfers across town are made easily. Through north and southbound traffic would be handled by a straightaway subway on State Street. Mr. Pearl also proposed loops for reaching the west side stations and underground arcades for the downtown stations, either of which, however, could be served by moving platforms if desired. As proposed, the plan would require 13¾ miles of tunnels, which, the designer estimates, could be built at a cost of $15,000,000, the tunnels being driven by air pressure.

Transit Negotiations in New York

On July 12, 1911, the Board of Estimate and Apportionment of New York extended until July 15, 1911, the time given to the Interborough Rapid Transit Company to submit a new offer to the city in regard to constructing any of the rapid transit routes recommended to be divided between that company and the Brooklyn Rapid Transit Company in the report of the joint committee of the Board of Estimate and the Public Service Commission. Beginning July 10 the Board of Estimate proposed to hold daily sessions until the subway matter is adjusted. On July 10 President Shonts, of the Interborough Rapid Transit Company; E. J. Berwind, a director of the company; Edward M. Grout, of counsel for the company; Seth Low, chairman of the joint committees of the Chamber of Commerce and the Merchants' Association; H. P. Davidson and J. P. Morgan, Jr., of J. P. Morgan & Company, and E. F. C. Gaynor, auditor of the company, conferred with Mr. McAneny, the chairman of the joint committee of the Board of Estimate and the Public Service Commission, and members of the commission.

On July 12, 1911, it was stated that the Interborough Rapid Transit Company desired to be guaranteed a return of 8 per cent or 9 per cent, or between $10,000,000 and $11,250,000, on its present estimated subway investment of $125,000,000 as a condition of accepting the lines apportioned to it in the joint report of the Board of Estimate and the Public Service Commission, the company to receive the deficit from the city or to be allowed to issue bonds to make the deficit good if the earnings on the new subway and its present subway system should be insufficient to realize the amount mentioned. On this proposal the Board of Estimate and Apportionment is said to be divided. Mayor Gaynor, President Mitchel and Controller Prendergast have declared that they would oppose any arrangement to have the city guarantee a return on the stock of the company. On this point Mayor Gaynor issued a statement on July 13, in which he said that he was not only opposed to the principle of any such subsidy, but he doubted its legality in view of the provisions in the constitution of the State forbidding any municipal corporation to "loan its money or credit to or in aid of any individual, association or corporaton." He thought that it would be a serious question whether the city would not violate this provision if it put its money to the free use of a railroad corporation until the latter had earned 10 per cent or 6 per cent or any other profit on its capital. In the same way he said he was opposed to making an agreement with the Brooklyn elevated company that it retain 6 per cent or any other per cent on its present capital before the city is paid interest on its corporate stock.

Seth Low, chairman of the joint committee of the Chamber of Commerce and the Merchants' Association, sent to the Board of Estimate on July 12, 1911, a letter urging

prompt and favorable action in the subway matter in which he said in part:

"I am under the impression that an agreement can be made with the Interborough Company substantially on the following terms: That the Interborough Company shall agree to furnish $75,000,000 of new capital, more or less, for the construction and equipment of that part of the McAneny plan assigned to it, if the city in any way that may be found legal will permit it to earn 3 per cent above interest and amortization charges on its old and new private capital. I think that it is of the utmost consequence to the city to carry out in its entirety the programme of construction outlined in the McAneny report. Without the cooperation of the Interborough Company, as well as of the Brooklyn Rapid Transit Company, this is impracticable. The great defect of the original rapid transit contract was in its failure to provide a method by which additions to the system could be made from time to time as desired by the city. The arrangement now proposed with both the rapid transit companies contains such a provision, so that by this agreement with the Interborough Rapid Transit Company the city will not only get the immediate result at which it aims but also it will avoid all danger of the cessation of rapid transit development in the future.

"The proposed arrangement with the Interborough Company will give to the city complete control of the entire system at the end of forty-nine years from the completion of the proposed extensions. It is true that in shortening the time by thus 'leveling the leases,' as it is called, the city agrees that the Interborough Company may enjoy both leases on existing terms up to the time when they are surrendered to the city—that is to say, in about fifty-four years from now. No doubt the advantage to the company under this arrangement is considered by it a fair offset to its concession to the city, but it is a very great advantage to the city to shorten by fourteen years the period during which these roads remain outside of its control. By entering into the proposed relations with both the rapid transit companies the city becomes absolute master of the rapid transit system of the city and its development.

"If any one questions the arrangement it will be upon the ground that the allowance to the Interborough Company is too large. Under the arrangement suggested that allowance is to be 3 per cent above interest and amortization charges on the total amount of private capital involved in the enterprise represented by bonds, which it is estimated will be about $125,000,000; that is to say, the Interborough company will receive $3,750,000 a year in excess of its interest and amortization charges. I do not hesitate to say that I think the terms agreed upon are fair, and it is altogether in the city's interest to have agreed to them. The Interborough's present stock capital is $35,000,000, and its investment in the subway, covered by bonds, is about $48,000,000 above this capital. Upon this stock last year it earned over $4,000,000 after providing for the amortization on its bonds.

"Under the agreement proposed the Interborough Company will furnish $75,000,000 of new capital for construction and operation; will put in at $3,000,000 the Steinway tunnel, which cost it $8,000,000, and it will receive for operating the enlarged system $3,750,000 a year instead of $4,000,000, which it is earning to-day for operating the smaller system.

"If it be assumed that the company's working capital will remain at $35,000,000, as it is to-day, notwithstanding the enlarged system to be operated, the allowance to the company upon its capital is about 10¾ per cent. The public must bear in mind that this is the entire reward which the company will receive for operating this great system during the term of the lease, for the company does not own the subway, and all of the increased value of the subway passes to the city automatically when the lease expires.

"There are many who regret that the original leases run for so long a term; but it is easy to be wise after the fact. At the time, the opinion was general, not to say universal, that the city had been most fortunate in being able to conclude such leases. Probably everybody will be glad that, through this arrangement, the leases would fall into the city fourteen or fifteen years earlier than otherwise; but this result is obtainable only by agreement with the Interborough Company and no agreement can be made at the present time on better terms than are herein suggested."

Special Message on Taxation in New York

Governor Dix of New York sent his third message on taxation to the Legislature on July 12, 1911. He calls the attention of the houses to two bills already introduced and recommends their passage. One of the bills concerns taxation of special franchises and the other provides for a simpler method of taxing corporation franchises. The Governor says that laws on both subjects ever since they were passed have been fruitful of litigation, and that while the law covering taxation of special franchises has been interpreted by the courts so that in most particulars it is intelligible and serves its purpose, in one point the law is so phrased as to throw unnecessary and constant work upon the courts. This concerns the equalizing of special franchise valuations to the same percentage of full value as that given to ordinary real estate by local assessors in making out their tax rolls. The courts have decided, says the Governor, that such equalization is right, but in practice it has become necessary for owners of special franchises to get out writs of certiorari before the lower valuation is entered on the tax rolls.

The Governor recommends that the State Board of Tax Commissioners be empowered to equalize these assessments before certification to the local authorities. He says that Assembly Bill 1835, framed in accordance with recommendations of taxing authorities, will serve this purpose, and he asks that it be passed. The Governor also says that the law governing corporation taxes is inequitable in its operations upon different corporations. Some corporations are assessed upon assets and others upon capitalization. This was owing, says the Governor, to insufficient clearness in phrasing the amendment of 1906. The State loses more than $400,000 a year by reason of this uneven incidence of the tax. The Governor says:

"If this franchise tax upon corporations is computed upon the par value of issued stock its collection will require only a simple mathematical calculation, which any taxpayer can understand and which will avoid the necessity for the exercise of judgment on the part of the assessing official, which frequently, and of necessity, must be arbitrary.

"Senate Bill 1577, by Mr. Harte, proposes a simple mathematical rule for the assessment of this tax, following as closely as possible the general theory of the existing statute and conforming to the recommendations of the Comptroller's office.

"This bill proposes a minimum tax of three-quarters of one mill on each dollar of issued capital stock employed within the State. This amounts to a charge of $75 on a capitalization of $100,000 for the privilege of using a corporate name and exercising corporate powers. When dividends higher than 3 per cent are declared the tax is increased one-quarter of a mill for each 1 per cent of dividends, thus being equivalent to an income tax of 2½ per cent. On corporations paying 6 per cent of dividends or over the rate and amount of tax would be exactly the same as under the existing law. All necessity for appraisal and all possibility of dispute and litigation in regard to corporations paying less than 6 per cent dividends will be eliminated."

The Questions of Betterments and Franchise Amendments in Cleveland

At the regular meeting of the City Council of Cleveland, Ohio, on the evening of July 3, 1911, G. M. Dahl, street railway commissioner, read correspondence to the effect that the Cleveland Railway refused to guarantee the expenditure of $2,500,000 at once for betterments and extensions, and objected to the proposed amendments to the Tayler franchise to give the city power to dictate betterments and extensions through the last fifteen years of the life of the franchise and to take over the property at any time the State laws permit, instead of after 1918, as originally fixed. The letters were written by J. J. Stanley, president of the company, and were based upon the action of the directors.

Mr. Dahl stated that he had written the company that he would recommend that the amendments be defeated or tabled in case the company would not agree to the guarantee, and that he would work against their adoption if they

came up for passage. On June 27, 1911, Mr. Dahl asked the directors of the company to take steps to insure the expenditure of $2,500,000 for betterments and extensions, and suggested a form of personal guarantee for the directors to sign, which was as follows:

"In the event that said sum cannot be raised by the company by either an increase in the floating debt or the sale of the company's bonds, the undersigned individually agree to take and subscribe for $2,500,000 par value of stock of the Cleveland Railway at par prorated among the undersigned in proportion to their present holdings of stock in said company."

In his letters to the company Mr. Dahl argued that the officers of the company had indicated in the past that they would be willing to give this guarantee and that they wanted such legislation as would bring their stock up to par. He said that the refusal was given without a suggestion of an alternative.

Councilman Haserodt offered an amendment to the ordinance which would make it void in case the company did not furnish the proper guarantee. This was referred to the street railway committee for consideration.

During the last week in June Commissioner Dahl and Chairman Kramer of the street railway committee of the Council conferred with the officers and attorneys of the company in an effort to adjust the matter. Andrew Squire, attorney for the company, gave the officials of the city to understand that the differences might be adjusted if members of Council would take a more reasonable view of the matter. Mr. Squire said the company was opposed to accepting the amendment giving the city power to require extensions during the last fifteen years of the life of the grant, and that it was opposed to giving a guarantee in the form proposed because it implied a lack of confidence in the financial ability of the company and might affect the sale of the stock.

Mr. Dahl said that the company's letter was so worded as to lead him to believe that the company would consider no alternative in the matter of guaranteeing the expenditure for betterments.

At the regular meeting of the Cleveland City Council on the evening of July 10, 1911, the amendments to the Tayler grant, which have been under discussion for some time, were adopted, with some changes demanded by the company. On July 11 they were accepted by the company and if a petition is not presented for a referendum vote within thirty days they will become operative. The amendment relating to the date after which the city may take over the property was changed from Jan. 1, 1912, to Jan. 1, 1918. The section giving the city the right to dictate betterments and extensions during the first ten years of the franchise was allowed to stand. The amendments require that the company shall expend $2,500,000 for extensions and betterments at once and provide that the amendments may be repealed if this is not done. The amendment relating to the extension of low fare to the suburbs was changed so that Collinwood or a part of the town may have the benefit of the reduced fare, but the fare in the city cannot be extended to other suburbs that may be made part of the city in the future.

J. J. Stanley, president of the company, states that the company will probably order fifty or sixty cars and that when the power is increased sufficiently others will be ordered until the desired 200 are secured. As to other improvements no decision has yet been reached.

It is reported that the State Tax Commission has placed a tentative value of $17,500,000 on the property of the Cleveland Railway. This is the value arrived at by the late Judge Tayler when he prepared the grant under which the company now operates. A hearing will be given the company.

From an unknown source the land along Kingsbury Run has been offered the city for a public park, provided a street or electric railway is allowed to operate through the property for its entire length. This would give a right-of-way from the city limits to within 300 ft. of the Public Square. It is said that this is a plan to bring the interurban cars from the south and east into the city over a private right-of-way which will permit of rapid transit. Men interested in the Shaker Heights Land Company and the Shaker Heights Improvement Company are thought to be behind this plan, as it will open for improvement a vast amount of land in the neighborhood of their properties. George J. Sandrock, W. H. Gartwick and O. P. Van Sweringen are officers of these companies.

Max L. Goodman has announced that he will ask Council for a franchise for a double-track electric railway on the East Side, to operate as a belt line, and at the same time take care of cross-town business.

Hearing to Be Held in Regard to Use of Power Brakes in Greater New York

The Public Service Commission of the First District of New York has decided to hold a public hearing on July 20, 1911, to determine the advisability of requiring all the surface railways in Greater New York to equip their cars with power brakes and folding steps pursuant to a vote taken at a meeting of the commission upon a report of its engineers. Commissioner Eustis will conduct the hearings. The new cars of the Third Avenue Railroad and some of those of the Metropolitan Street Railway are equipped with power brakes and folding steps, but a majority of the cars in service in New York are equipped with hand brakes. The Brooklyn Rapid Transit system has power brakes on 462 convertible cars and hand brakes on 545 of the same kind of cars. Its open cars, numbering 911, and its closed cars, numbering 597, are equipped with hand brakes only. The Coney Island & Brooklyn Railroad has hand brakes on all its cars, numbering 450. The Metropolitan Street Railway has hand brakes on 947 and power brakes on 549 of its closed cars. Its open cars number 455 and are equipped with hand brakes only. The Third Avenue Railroad has 201 closed cars and 379 convertible cars, its entire equipment in these two types being equipped with power brakes, while it has seventy-five open cars with hand brakes. The Union Railway has hand brakes on 498 cars and power brakes on seventy-eight of its convertible cars. The Yonkers Railroad has power brakes on 122 cars and only six cars with hand brakes. With most of the other companies hand brakes are the rule, although the New York & Queens County Railway has 121, the New York & Long Island Traction Company thirty and the Ocean Electric Railway twenty-four cars equipped with power brakes. As a result of a study of the question made by E. G. Connette, the transportation engineer of the commission, he has recommended that all cars weighing 25,000 lb. or more should be equipped with power brakes. If the commission should order power brakes for all double-track cars it would mean the equipment of a total of 3630 cars, distributed among the following companies:

Metropolitan Street Railway	622
Second Avenue Railroad	250
Brooklyn Rapid Transit	1,807
Coney Island & Brooklyn Railroad	459
Long Island Electric Railway	16
New York City Interborough Company	40
Richmond & Midland Companies (Staten Island)	20
Union Railway	416

In 1910 455 accidents were reported with double-truck cars equipped with hand brakes.

Selecting the Third Arbitrator in Toledo

On the evening of July 3, 1911, Albion E. Lang, president of the Toledo Railways & Light Company, sent a letter to Mayor Brand Whitlock in regard to the appointment of Judge Killits, of the United States Court for the Western District of Ohio, as the third member of the board to appraise the property of the company. In this letter Mr. Lang stated that the board of directors of the company thought a man with technical training should be selected. Mr. Lang said substantially:

"I am instructed by the board to advise you of their appreciation of the city's desire of an equitable settlement of the transportation problems and your approval of the appointment of an umpire or arbitrator in the appraisement of the properties of the company for the purpose of fixing the rate of fare in the contemplated ordinance. Our board of directors, however, remains of the opinion, as heretofore expressed, that such umpire or arbitrator should also be a man, by training and experience, thoroughly qualified to

pass upon the technical questions certain to come before him for consideration.

"To appraise a property embracing so many elements necessarily requires extensive knowledge of values and expenses only to be had by personal experience and study or by that instruction which is derived from the hearing of evidence and arguments as in court. We can find no means by which the attendance of witnesses can be had and their testimony given under oath. An arbitrator or umpire, inexperienced in the construction and operation of street railways, uninstructed by witnesses speaking under the sanction of an oath and subjected to the explanations and qualifications which are assured by cross-examination, would necessarily be acting upon insufficient information. That, it seems to us, would prove unsatisfactory.

"We shall hope to name an appraiser who in experience, ability and skill will stand with Prof. E. W. Bemis, and feel that their differences, if any, should be passed upon by some disinterested person qualified by technical knowledge and experience to decide between them without outside assistance. Such an appraisal would doubtless be practically unanimous and of great value, reflecting not only credit on the appraisers as individuals, but upon the city administration in originating a modern and progressive method of bringing to the citizens a just basis upon which a fair and proper settlement of the question can be had unattended by the disagreements, delays and great expense which have attended the consideration of the subject in other communities.

"I am therefore directed by the board to request your further consideration of the subject in the hope that in this matter, so necessary for a mutually satisfactory conclusion of the negitiations, the city and company may be in entire accord."

Rehabilitation Contracts in Philadelphia

The directors of the Philadelphia (Pa.) Rapid Transit Company have approved the first of the contracts entered into by Thomas E. Mitten, acting chairman of the board of directors of the company, for the rehabilitation of the property. The company has contracted with The J. G. Brill Company, Philadelphia, Pa., for thirty elevated cars and has entered into an agreement with the Philadelphia Electric Company by which that company will supply the railway with power, it not being possible for the company's own plants last winter fully to meet the demands of traffic at times.

Mr. Mitten retained Frederick Sargent, of Sargent & Lundy, Chicago, Ill., consulting engineer of the Commonwealth Edison Company, Chicago, Ill., to study the plans for developing the Delaware Avenue power house of the company, with the result that by Jan. 1, 1912, the capacity of the plant will be increased by 6,000 kw. The contract with the Philadelphia Electric Company is to run from Nov. 1, 1911, to Oct. 31, 1916.

Strike in Mexico City

Because their arbitrary demands for an increase in wages were not granted summarily by the company many of the conductors, motormen and inspectors of the Mexico Tramways, Mexico City, Mex., went on strike at noon on July 3, 1911. Conductors, who received 15 cents an hour, demanded 20 cents an hour; motormen, who received from 17 cents to 24 cents an hour, demanded 25 cents an hour, and inspectors, who received 25 cents an hour, demanded 30 cents an hour. The company made no effort to operate cars immediately following the strike, but announced that it would resume service on July 5, 1911, if adequate police protection was afforded. All the American places of business in the city were closed on July 4, 1911, and the city took on a general holiday aspect, being patrolled by squads of mounted police ready to deal with the incipient disorder which was much in evidence. Late on July 4, 1911, a committee of the employees signed an agreement with the management, but many of the striking employees refused to be bound by the terms of the protocol, and the men who returned to work were severely maltreated. In one case of disorder the police fired into the mob and injured several persons. On July 6 there was also a serious tilt between the police and the mob near the Indianalla car house. On July 7 the men on strike evidently became convinced that the police proposed to deal severely with all lawbreakers, and they voted to return to work on what are said to be precisely the same conditions of service as the committee representing them had previously agreed to accept in their behalf.

Petition to Abolish Los Angeles Commission.—Two petitions have been filed with the Council of Los Angeles, Cal., to abolish the Board of Public Utility Commissioners of Los Angeles.

New Line Opened at Atlanta.—The Fairburn & Atlanta Railway & Electric Company has placed its line in service between Fairburn and College Park, Ga., where connections are made with the lines of the Georgia Railway & Electric Company for Atlanta.

Engineers Appointed to Study Chicago Electrification.—Louis H. Evans, former chief engineer of Chicago Junction Railway, and Hugh Patterson, who was connected with the electrification of the New York terminals of the Pennsylvania Railroad, have been appointed special engineers by the Chicago Association of Commerce to study plans for complete electrification of all steam terminals in Chicago.

Offer Made by City for Seattle, Renton & Southern Railway.—The Board of Public Works of Seattle has voted to offer the Seattle, Renton & Southern Railway $386,053 for its property. The offer will be made in accordance with the resolution passed at the last municipal election to authorize an issue of bonds to the extent of $800,000 to purchase the road. The company has sixty days in which to accept the terms made. If the offer is refused then it is provided that the price to be paid for the property shall be fixed by arbitration.

Public Invited to Inspect Nashville Property.—The Nashville Railway & Light Company, Nashville, Tenn., is inviting the public in a series of advertisements in the daily papers to inspect the plant and shops of the company at stated times. One of the advertisements follows: "You are cordially invited to honor us with your presence this afternoon on a tour of inspection through our mammoth power plant, car shops, carpenter shop, paint shop, Y. M. C. A. and other departments. Parties will leave the general office in the Watkins Building, at 3 p. m. Come—and bring a friend."

Onerous Franchise Conditions in Louisville.—Public agitation regarding the term of the so-called cross-town ordinance which is now pending in the General Council at Louisville, Ky., has been aroused by the commercial organizations, which have petitioned the Council not to pass the measure as it stands at present, but to include provisions for exchange of service with future interurban lines, to fix the "maximum" fare at 5 cents, so as to make it possible to bring about reductions in the future, and to require the purchaser of the franchise to give a bond for the construction of the line. The Louisville Railway is satisfied with the measure in its present form, but it is doubtful if it will bid on a privilege with restrictions such as have been suggested.

S. M. Felton on Electrification of Railroads Operating Into Chicago.—S. M. Felton, president of the Chicago Great Western Railroad, who has recently returned from Europe, has suggested that a committee of mechanical experts and firemen should be sent abroad to study some of the English ideas as to correct locomotive-firing and smoke-consuming devices with a view to applying at once the knowledge thus gained to alleviate conditions in Chicago. Mr. Felton is quoted as follows: "Electrification is necessarily far off, but a great deal may be done in three months in the way of preventing smoke. There are twelve roads entering London, all operated by steam and carrying more passengers than ours do, without smoke and without any complaints of a smoke nuisance. This is due to their methods of firing and their handling of locomotives. The English roads are far ahead of ours in their success with devices to insure proper consumption of the coal gases before they become smoke."

Financial and Corporate

New York Stock and Money Markets

July 12, 1911.

The market opened with fair activity on Monday upon news of rainfall in important crop sections, but prices reacted when the government report on crops was made public. The bond market is a shade less active than heretofore and the condition is regarded as a result of sufficing investment demand temporarily. Trading to-day was light, with stocks reactionary, and the money market was a trifle firmer. Quotations July 12 were: Call, 2¼@2½ per cent; ninety days, 2¾@3 per cent.

Other Markets

Tractions have been the leading issues in Philadelphia the entire week and new levels were reached to-day by Philadelphia Rapid Transit and Union Traction.

The Chicago market has been strong throughout the week and prices have advanced. Trading to-day was in good volume and gains were made in nearly every issue on the list. Lake Street Elevated Railways 5s opened at 85 and reached 87, at which sales were made. Interest was shown in the elevated notes.

Very little business is being effected on the Boston exchange, and trading to-day was light, with few price changes.

The Baltimore list is firm but quiet. United Railways 5 per cent notes were in demand in the market to-day and slight gains were registered.

Quotations of traction and manufacturing securities as compared with last week follow:

	July 1.	July 12.
American Light & Traction Company (common)	295	a310
American Light & Traction Company (preferred)	108	a108
American Railways Company	a43¾	44
Aurora, Elgin & Chicago Railroad (common)	*40¾	a45
Aurora, Elgin & Chicago Railroad (preferred)	*85¾	a87
Boston Elevated Railway	a129	a129
Boston Suburban Electric Companies (common)	a15	a15
Boston Suburban Electric Companies (preferred)	a75	75
Boston & Worcester Electric Companies (common)	12	a13
Boston & Worcester Electric Companies (preferred)	a59	a57½
Brooklyn Rapid Transit Company	81	83⅝
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	86¾	87⅞
Capital Traction Company, Washington	*127⅜	a127
Chicago City Railway	a190	a190
Chicago & Oak Park Elevated Railroad (common)	3	*3
Chicago & Oak Park Elevated Railroad (preferred)	5	*5
Chicago Railways, ptcptg., ctf. 1	85	a90
Chicago Railways, ptcptg., ctf. 2	24	a26½
Chicago Railways, ptcptg., ctf. 3	9½	a10
Chicago Railways, ptcptg.	5½	5½
Cincinnati Street Railway	*130¼	a130½
Cleveland Railway	*96	a27½
Columbus Railway (common)	*96	81½
Columbus Railway (preferred)	*101	92
Consolidated Traction of New Jersey	76	a76
Consolidated Traction of N. J., 5 per cent bonds	105½	a105
Dayton Street Railway (common)	a30	a25
Dayton Street Railway (preferred)	a100	a100
Detroit United Railway	74	79
General Electric Company	160	162½
Georgia Railway & Electric Company (common)	a153	a163
Georgia Railway Electric Company (preferred)	a93½	152
Interborough Metropolitan Company (common)	17½	18
Interborough Metropolitan Company (preferred)	a50	50⅝
Interborough Metropolitan Company (4½s)	78¼	78¼
Kansas City Railway & Light Company (common)	19	a19
Kansas City Railway & Light Company (preferred)	44	44
Manhattan Railway	137½	137½
Massachusetts Electric Companies (common)	a23	a23⅛
Massachusetts Electric Companies (preferred)	*91½	a94¾
Metropolitan West Side, Chicago (common)	a26½	27½
Metropolitan West Side, Chicago (preferred)	a75	a75
Metropolitan Street Railway, New York	15	15
Milwaukee Electric Railway & Light (preferred)	110	*110
North American Company	73¾	a74½
Northern Ohio Light & Traction Company	*48	a49¾
Northwestern Elevated Railroad (common)	a29	a30
Northwestern Elevated Railroad (preferred)	a69	70
Philadelphia Company, Pittsburgh (common)	a56	56
Philadelphia Company, Pittsburgh (preferred)	a43¾	a43½
Philadelphia Rapid Transit Company	a19½	a20¾
Philadelphia Traction Company	a86½	a86¾
Public Service Corporation, 5% col. notes (1913)	101	101
Public Service Corporation, ctfs.	107½	a107
Seattle Electric Company (common)	a110	a111
Seattle Electric Company (preferred)	a102½	102½
South Side Elevated Railroad (Chicago)	a79	a80¼
Third Avenue Railroad, New York	10½	a10½
Toledo Railways & Light Company	8	a7¾
Twin City Rapid Transit, Minneapolis (common)	*108½	a108½
Union Traction Company, Philadelphia	a49¼	a50⅛
United Rys. & Electric Company, Baltimore	*19½	*19½
United Rys. Inv. Co. (common)	39	a39
United Rys. Inv. Co. (preferred)	69⅞	70
Washington Ry. & Electric Company (common)	35⅜	a42¾
Washington Ry. & Electric Company (preferred)	90	a89
West End Street Railway, Boston (common)	a89	a89½
West End Street Railway, Boston (preferred)	a103	a103
Westinghouse Elec. & Mfg. Co.	a75¼	75½
Westinghouse Elec. & Mfg. Co. (1st pref.)	119	a120

a Asked. *Last sale.

ANNUAL REPORTS

Cleveland, Painesville & Eastern Railroad

Earnings and expenses of the Cleveland, Painesville & Eastern Railroad for the year ended Dec. 31, 1910, with a comparison, were as follows:

Earnings.	1910.	1909.
Passenger revenue	$286,185	$263,564
Special car revenue	3,931	4,147
Mail revenue	250	77
Express revenue	19,522	16,924
Milk revenue	8,696	7,382
Station and car privileges	1,270	964
Telephone and telegraph service	701	711
Rent of tracks and terminals	6,081	11,099
Rent of equipment	9,908	9,165
Rent of building	1,468	376
Power	4,238	689
Miscellaneous	13,219	6,075
Total	$355,469	$321,173
Expenses.	1910.	1909.
Maintenance of way and structures	$34,854	$34,006
Maintenance of equipment	21,445	24,026
Conducting transportation	78,948	65,935
General	39,922	39,942
Total	$175,169	$163,908
Net earnings	$180,300	$157,265
Interest and taxes	106,618	101,283
Surplus	$173,682	$55,982

E. W. Moore, the president, says in part:

"During the latter part of the year work was started on a culvert and fill at Willoughbeach Park to eliminate the reverse curve and trestle at this place.

"A new overhead system was put up in the Willoughby carhouse yards to go with special work.

"A building 20 ft. by 40 ft. was built in the rear of the station at Willoughby having a basement and first floor, which is used for the Electric Package Agency, storage and cleaning of lamps, etc."

Traffic statistics are as follows:

	1910.	1909.
Per cent of operation	49.27	51.03
Car-miles	923,705	917,124
Income per car-mile, cents	38.48	35.02
Operating per car-mile, cents	18.96	17.87
Net earnings per car-mile, cents	19.52	17.15
Passengers carried	2,311,090	2,072,179
Earnings per passenger, cents	12.38	12.72

Easton Consolidated Electric Company

A report of operations of the Easton (Pa.) Consolidated Electric Company for the year ended Dec. 31, 1910, shows the following:

Gross revenue—rail lines	$381,492	
Operating expenses	226,089	
Earnings from operation		$155,402
Deduct:		
Interest on bonds, taxes, etc	$54,945	
Deficit Easton Amusement Company	3,796	
		58,741
Net earnings from operation of railway lines		$96,661
Edison Illuminating Company—rentals, less taxes and expenses		27,759
Interest received		385
Total earnings		$124,805
Deduct charges of Easton Consolidated Electric Company :		
Interest on collateral trust bonds	$61,850	
Expenses and taxes	8,459	
		70,309
		$54,496

Joseph S. Lovering, the president, says in part:

"The earnings from railway operations for the year ended Dec. 31, 1910, were $381,492, as compared with $352,408 for the previous year, an increase of $29,083, the number of passengers carried being approximately 600,000 in excess of those carried during the year 1909, while the car mileage was 1,606,435 as against 1,644,243, a decrease of 2.29 per cent.

"The ratio of operating expenses to gross earnings was 59.26 per cent, a decrease of 3.78 per cent as compared with the previous year.

"The item of $58,741 shown in the above statement, comprising interest on bonds, taxes, etc., is approximately $5,700 in excess of similar expenses for the year 1909. This is due in the main to the increase in the amount of taxes paid.

"The remaining items on the statement do not show any material change as compared with the previous year. The net profit for the year was $54,496, an increase of $19,065 over the net profits for the year 1909."

American Light & Traction Company

Earnings for the year ended Dec. 31, 1910, compare with the previous year as follows:

Year ended, Dec. 31.	1910.	1909.
Earnings on stock of subsidiary companies owned by this company	$3,387,883	$3,033,668
Miscellaneous earnings	444,668	311,772
Gross earnings	$3,832,551	$3,345,440
Expenses	119,688	106,261
Net earnings	3,712,863	3,239,179
Surplus and reserve, Dec. 31, previous year	5,999,065	5,683,137
Total surplus earnings	$9,711,928	$8,922,316
Cash dividend on preferred stock	$854,172	$854,172
Cash dividend on common stock	997,560	778,494
Stock dividend on common stock	997,565	1,290,585
Total dividends	$2,849,297	$2,923,251
Surplus balance	$6,862,631	$5,999,065

Proposed Increase in Capitalization of Columbus Railway

A meeting of the stockholders of the Columbus (Ohio) Railway was held in Columbus on June 26, 1911, to consider the proposition to increase the capital stock of the company from $7,000,000 to $10,000,000, the increase to be divided equally between common and preferred stocks, as noted in the Electric Railway Journal of July 8, 1911, page 94. A resolution to increase the stock was introduced, after which Butler Sheldon, the president of the company, made a statement showing the necessity of the increase in order to take care of the business of the company. At the close of his statement, he suggested that the meeting adjourn to some future day, in order to admit of an audit of the accounts of the company from the time of the execution of the lease to be made by some certified public accountant and that a committee of stockholders be appointed to confer with the board of directors in reference to such audit. This recommendation was favorably received and upon motion of Mead Massie, Chillicothe, a resolution was adopted providing for the adjournment of the meeting to Aug. 28, 1911, and that the chairman should appoint a committee of five stockholders to take up the matter of such audit with the board of directors. The following committee was appointed: D. M. Massie, Chillicothe; C. L. Poston, Nelsonville; Angus Dunn, Columbus; Prof. Edward Orton of the Ohio State University, and John A. Poland, Chillicothe. The committee organzed by the election of Mr. Massie as chairman and Mr. Poland as secretary.

Mr. Sheldon concluded his statement as follows:

"You will understand that when an increase of the authorized capital of $3,000,000 is requested it is with no idea of issuing any more of the authorized capitalization than is absolutely necessary to pay for your new property and betterments under the lease, nor will the Columbus Railway & Light Company acquire any more new property for you nor make any more betterments to your property than are necessary, because upon each new share of stock issued it must pay the guaranteed dividend. The amount of the proposed increase may seem to you large, but your board believes that it is none too large to provide capital for the future needs of your company and avoid the necessity of going through the publicity of legally increasing your capital stock, which often has a depreciating effect on the market value of your shares.

"At the time of the execution of the lease in 1903, the number of passengers carried on your lines was 34,709,000, while the estimated number of passengers to be carried in 1911 is 51,000,000. This statement will show you how rapidly new property and new betterments are required to take care of the necessary development of your company's business. In 1906 the lease was amended in three particulars, all of which are in favor of your company.

"First—Under the original lease, when we paid bills for new property and betterments in our 4 per cent bonds, it was provided that the Columbus Railway & Light Company should take these bonds at 92½ per cent because they were worth only that in the market. By the amendment these were to be taken at par. The reason for this change was that at that time your company had practically no profit and loss account with which to take care of this discount.

"Second—The amendment provides that on the maturity of the bond issues of your company the Columbus Railway & Light Company must provide the funds with which to retire the bonds and shall be reimbursed by your company. In the original lease the burden of financing this matter devolved on your company.

"Third—The provisions of Section 8 were still further elaborated to carry out the method of arriving at the amount of the replacement cost to be charged to your company.

"The stock of your company is in the hands of about 1700 persons, many of them being women and estates. Some of our stockholders think that there should be an audit of these accounts from the time the lease was executed, a plan which I, speaking for myself, and on behalf of your board of directors, most heartily approve, and I also approve of the plan of having such audit brought down to date each year in advance of the annual meeting of stockholders. I, therefore, suggest that if it meets with your approval, this meeting be adjourned to some future date in order that such audit may be made by a certified public accountant, and that a committee of stockholders be appointed to confer with your board as to such audit and also to go over the affairs of the company."

Buffalo & Lackawanna Traction Company, Buffalo, N. Y.—The Public Service Commission of the Second District of New York has authorized the Buffalo & Lackawanna Traction Company to expend $196,000, part of the proceeds of the sale of bonds heretofore authorized, to purchase rolling stock and equipment. Of this sum $101,000 was originally provided to reconstruct a bridge over the ship canal and a viaduct over the tracks of the Erie Railroad, but it is found that it is not necessary that it be used for that purpose at this time. The company also has $95,000 saved from the amount thought necessary to construct its roadbed originally, and it is proposed to devote these two sums to the purchase of rolling stock and equipment.

Chicago (Ill.) Elevated Railways.—The National City Bank, New York, received subscriptions until 3 p. m., July 10, 1911, for the $30,000,000 of Chicago Elevated Railways' three year 5 per cent gold notes at 98½ and accrued interest, at which price the notes yield 5½ per cent. The issue was oversubscribed. The notes are dated July 1, 1911, and are due on July 1, 1914, and will be in coupon form of $1,000 each, interest being payable on Jan. 1 and July 1 in Chicago and in New York. The issue is callable as a whole on thirty days' notice at 100 and accrued interest. The committee, consisting of F. A. Vanderlip, Henry A. Blair and Samuel McRoberts, notified holders who had not deposited their stock of the South Side Elevated Railroad, Metropolitan West Side Elevated Railway and Northwestern Elevated Railroad, under deposit agreement dated May 22, 1911, that the time for delivery would be extended until July 17, 1911.

Chicago (Ill.) Railways.—The National City Bank, New York, N. Y., and Harris, Forbes & Company, New York, N. Y., are offering for subscription at 99¾ and interest $5,000,000 of the first mortgage 5 per cent gold bonds of the Chicago Railways, dated Feb. 1, 1907, and due Feb. 1, 1927. The report of the company for the year ended June 30, 1911, follows: Gross earnings, $15,538,860; operating expenses, including taxes and maintenance, $10,790,225; net earnings, $4,748,635; annual interest charge, including the present issue, $2,297,750; balance, $2,450,855.

Citizens' Railway & Light Company, Ft. Worth, Tex.—The railway property of the Citizens' Railway & Light Company was sold under foreclosure on July 3, 1911, for $400,000 to G. H. Clifford, general manager of the Northern Texas Traction Company, Ft. Worth, representing Stone & Webster, Boston, Mass. The lighting property of the company was sold at the same time to S. B. Cantey, who is said to represent the J. R. Nutt Company, Cleveland, Ohio.

Concord, Maynard & Hudson Street Railway, Maynard, Mass.—The Railroad Commissioners of Massachusetts have approved the petition of the Concord, Maynard & Hudson Street Railway for approval of terms of consolidation with the Lowell, Acton & Maynard Street Railway; also its petition for authority to issue 350 additional shares of stock of

a par value of $100, to be issued to carry out the terms of contract, and to be exchanged share for share for the outstanding stock of the Lowell, Acton & Maynard Street Railway.

Orange County Traction Company, Newburgh, N. Y.—The Public Service Commission of the Second District of New York has authorized the Orange County Traction Company to issue $83,500 of 5 per cent fifty-year bonds, the proceeds to be used to pay for property at Orange Lake Park and a second track from West Street and Broadway, Newburgh, to Orange Lake Park and also for new equipment at its power house and for its new carhouse in Newburgh.

Pennsylvania-Jersey Traction Company, Easton, Pa.—The Board of Public Utility Commissioners of New Jersey has approved an issue of $100,000 of 6 per cent serial collateral notes by the Pennsylvania-Jersey Traction Company to refund outstanding obligations of the company.

Riverside Traction Company, Trenton, N. J.—The Board of Public Service Commissioners of New Jersey has refused to approve the petition of the Riverside Traction Company for the issuance of bonds to the value of $100,800.

Sedalia Light & Traction Company, Sedalia, Mo.—Judge Pollock, in the United States Circuit Court at Jefferson City, Mo., on June 27, 1911, granted the Sedalia Light & Traction Company forty days in which to adjust its indebtedness of $807,000 to the City Trust Company, Boston, Mass. E. F. Swinney, Kansas City, Mo., has been named as master to carry into effect the order of the court, which is a decree of foreclosure subject to the limitation named.

Twenty-eighth & Twenty-ninth Streets Crosstown Railroad, New York, N. Y.—The committee representing the holders of the first-mortgage 5 per cent bonds of the Twenty-eighth & Twenty-ninth Streets Crosstown Railroad submitted to the Public Service Commission of the First District of New York, on July 11, 1911, a plan for the reorganization of the company which provides for the sale of the $1,500,000 of first-mortgage bonds to the Third Avenue Railroad at 30 per cent of their par value, and for scaling down the capital liabilities of the company from $3,000,000 to $1,500,000. At present there are outstanding $1,500,000 of bonds and $1,500,000 of stock. Under the reorganization plan, it is said, there will be $1,000,000 of first-mortgage bonds and $500,000 of stock. The commission has set Sept. 22, 1911, as the date for a hearing on the plan.

Twin City General Electric Company, Ironwood, Mich.—The Gogebic Electric Railway & Light Company has taken over the Twin City General Electric Company, the Ironwood Water Works Company and the Hurley Water Works Company, and now controls all the electric railway and light properties in Gogebic County, Mich.

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.—McCoy & Company and Devitt, Tremble & Company, Chicago, Ill., are offering for subscription the unsold portion of $500,000 of an authorized issue of $1,800,000 of first-mortgage sinking fund 5 per cent gold bonds of the Waterloo, Cedar Falls & Northern Railway, dated Jan. 1, 1910, and due Jan. 1, 1940. The bonds are redeemable on any interest date on or after Jan. 1, 1915, at 105 and accrued interest. The First Trust & Savings Bank, Chicago, Ill., is trustee of the issue. A statement follows of the earnings of the company for the year ended March 31, 1911, published in connection with the offer of the bonds: Gross earnings, $276,419; operating expenses and taxes, $131,563; net earnings, $144,855; interest on first mortgage bonds outstanding, $90,000; surplus for corporate purposes, $54,855.

West Penn Traction Company, Pittsburgh, Pa.—All of the lighting and power companies in Greene and Washington Counties and in the Ohio River valley, west of Pittsburgh, have been purchased by the West Penn Traction Company, and an offering of bonds will be made shortly by a syndicate composed of J. S. & W. S. Kuhn, Inc., Pittsburgh; Newburger, Henderson & Loeb, and Brown Brothers & Company, New York and Philadelphia; H. B. Hollins & Company, New York, and the Commonwealth Trust Company, Pittsburgh, Pa. The new plants will add greatly to the electric light and power department of the West Penn Traction Company.

Dividends Declared

Birmingham Railway, Light & Power Company, Birmingham, Ala., 3 per cent, preferred; 3 per cent, common.

Brooklyn (N. Y.) City Railroad, quarterly, 2 per cent.

Cedar Rapids-Iowa City Railway & Light Company, Cedar Rapids, Ia., 3 per cent, preferred.

City Railway, Dayton, Ohio, quarterly, 1½ per cent, preferred; 1¾ per cent, common.

Danbury & Bethel Street Railway, Danbury, Conn., 2 per cent.

Dayton & Troy Electric Railway, Dayton, Ohio, 1¼ per cent, preferred; 1¼ per cent, common.

East St. Louis & Suburban Railroad, East St. Louis, Ill., quarterly, 1¼ per cent, preferred.

Indianapolis Traction & Terminal Company, Indianapolis, Ind., 2 per cent.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., quarterly, 1½ per cent, preferred.

Montreal (Que.) Street Railway, 2½ per cent.

New Orleans City Railroad, New Orleans, La., $2.50, preferred; $1, common.

Public Service Investment Company, Boston, Mass., quarterly, $1.50, preferred, quarterly; $1.50, common.

Union Traction of Indiana, Anderson, Ind., 1 per cent, common.

York (Pa.) Railways, 50 cents, preferred.

MONTHLY ELECTRIC RAILWAY EARNINGS

AMERICAN RAILWAYS.

Period.			Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1m.,	May,	'11	$354,618	.....	.....	.....	.....
1 "	"	'10	335,208	.....	.....	.....	.....
11 "	"	'11	3,667,417	.....	.....	.....	.....
11 "	"	'10	3,448,024	.....	.....	.....	.....
BROOKLYN RAPID TRANSIT.							
1m.,	Mar.,	'11	$1,806,278	*$1,285,626	$520,652	.....	.....
CENTRAL PARK, NORTH & EAST RIVER RAILROAD.							
1m.,	Mar.,	'11	$48,639	*$55,809	$7,169	.....	.....
CLEVELAND, PAINESVILLE & EASTERN RAILWAY.							
1m.,	May,	'11	$33,138	*$18,096	$15,042	$8,113	$6,930
1 "	"	'10	30,255	*15,289	14,967	8,226	6,741
5 "	"	'11	127,953	*73,221	54,732	40,804	13,928
5 "	"	'10	120,318	*66,730	53,588	39,904	13,684
CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY.							
1m.,	May.,	'11	$97,116	$53,698	$43,418	$29,946	$13,273
1 "	"	'10	90,161	50,205	39,955	29,794	10,161
5 "	"	'11	424,028	247,352	176,676	150,095	26,580
5 "	"	'10	386,283	238,758	147,525	148,970	1,445
COMMONWEALTH POWER RAILWAY & LIGHT COMPANY.							
1m.,	May,	'11	$422,709	*$249,004	$173,705	$103,281	$70,424
1 "	"	'10	392,792	*218,632	174,160	103,926	70,234
5 "	"	'11	2,196,470	*1,249,577	946,893	511,494	435,399
5 "	"	'10	2,003,264	*1,133,739	869,525	510,230	359,295
CONEY ISLAND & BROOKLYN RAILWAY.							
1m.,	Mar.,	'11	$103,575	*$75,752	$27,824	.....	.....
DETROIT UNITED RAILWAY.							
1m.,	June,	'11	$903,130	$540,749	$362,382	$176,149	$186,234
1 "	"	'10	807,577	476,301	331,277	163,368	167,908
5 "	"	'11	3,943,772	2,462,778	1,480,994	880,099	600,895
5 "	"	'10	3,574,228	2,257,789	1,316,439	804,527	511,912
HUDSON & MANHATTAN RAILROAD.							
1m.,	Mar.,	'11	$263,049	*$117,458	$145,591	.....	.....
INTERBOROUGH RAPID TRANSIT COMPANY.							
1m.,	Mar.,	'11	$2,742,785	*$1,306,704	$1,456,081	.....	.....
LAKE SHORE ELECTRIC RAILWAY.							
1m.,	May,	'11	$105,322	*$54,439	$50,892	$34,584	$16,308
1 "	"	'10	100,425	*52,983	47,441	35,036	12,405
5 "	"	'11	444,636	*254,947	189,689	173,398	16,291
5 "	"	'10	423,194	*246,453	176,741	173,859	2,882
METROPOLITAN STREET RAILWAY.							
1m.,	Mar.,	'11	$1,117,582	*$845,843	$271,739	.....	.....
NEW YORK & QUEENS COUNTY RAILWAY.							
1m.,	Mar.,	'11	$89,936	*$99,411	$9,474	.....	.....
NORTHERN OHIO TRACTION & LIGHT COMPANY.							
1m.,	May,	'11	$228,693	*$124,657	$104,037	$44,329	$59,708
1 "	"	'10	207,323	*111,250	96,074	43,375	52,699
5 "	"	'11	977,579	*562,041	415,538	221,774	193,764
5 "	"	'10	865,662	*501,105	364,557	216,542	148,015
THIRD AVENUE RAILROAD.							
1m.,	Mar.,	'11	$290,411	*$158,623	$131,789	.....	.....
TOLEDO RAILWAYS & LIGHT COMPANY.							
1m.,	May,	'11	$256,268	$154,171	$102,097	$79,191	$22,906
5 "	"	'11	1,303,603	821,848	481,756	396,321	85,435

*Includes taxes.

Traffic and Transportation

Additional Powers for the Illinois Railroad & Warehouse Commission

At the last session of the General Assembly of Illinois two statutes conferring additional power on the Railroad and Warehouse Commission of Illinois were enacted. They became effective on July 1, 1911. The first, entitled "An act defining and regulating express companies and carriers by express within the State of Illinois, declaring them to be common carriers and placing them under the jurisdiction and control of the Illinois Railroad & Warehouse Commission," places all express companies under the supervision and control of the commission. The second statute materially increases the authority and jurisdiction of the commission. In order to advise the companies coming under the jurisdiction of the commission of the changes in the law the commission on June 13, 1911, addressed a circular to the companies which contained in condensed form the more important features of the new legislation. In this circular the commission said in part:

"The term 'common carrier,' as defined by Section 21, includes all railroad corporations, express companies, steamboat lines or other common carriers by water, private car line companies, sleeping car companies, fast freight line companies and also includes every other corporation, company, etc., operating any agency for public use in the conveyance of persons or property.

"Section 22 defines the term 'railroad' to include all railroads, other than a street railroad, by whatever power operated for public use in the conveyance of persons or property, with all bridges, ferries, tunnels, equipment and facilities used in its business.

"Section 24 provides that it shall be the duty of all common carriers to furnish transportation at reasonable rates upon order of the commission.

"Section 25 makes it unlawful to charge or receive a greater compensation in the aggregate for the transportation of passengers, or a like kind of property, for a shorter than for a longer distance over the same line or route in the same direction, and also provides that in special cases the commission may upon application and investigation authorize a common carrier to charge less for a longer than for shorter distances. No rate lawfully in existence at the time of the passage of this act shall be required to be changed prior to the expiration of six months after its passage.

"Section 26 provides that common carriers shall afford all reasonable, proper and equal facilities for the interchange of passengers and property traffic and prompt transfer of the same with every other common carrier and not discriminate in respect to rates, fares or charges between two or more common carriers.

"Section 27 authorizes the commission after hearing to establish through rates and joint rates for the transportation of persons and property and prescribe the division of such rates and the terms and conditions under which they shall be operated.

"Section 29 authorizes the commission to compel physical connections between railroads and establish reasonable switching limits and rules, regulation and rates therefor.

"Section 30 grants power to the commission to inquire into the business management of common carriers and to make and enforce orders for the safety and accommodation of persons or property transported.

"Section 32 directs the commission to make for each common carrier a schedule of reasonable maximum rates or charges, classification, rules and regulations for the transportation of persons or property, and to change or revise the same from time to time.

"Section 33 provides the penalty for unlawful neglect or refusal or failure to obey the order of the commission.

"Section 34 provides the method for the enforcement of the orders of the commission.

"Section 35 makes provision for appeal from the findings or order of the commission."

The statute providing for annual reports and the reports and investigation of accidents was not changed materially by the additional powers which have been conferred on the commission.

Freight Line Up Lookout Mountain.—The Chattanooga (Tenn.) Railway is considering a plan to establish freight service on the tracks formerly used by the company for its incline line up Lookout Mountain.

Additional Transfer Privileges in Boston.—Nine new transfer points were established by the Boston (Mass.) Elevated Railway on July 1, 1911. On the same day certain additional transfer privileges were extended to patrons of the company.

Collision on New Hampshire Electric Railways.—More than thirty persons were injured on July 4, 1911, in a head-on collision between two cars of the Lawrence Division of the New Hampshire Electric Railway, near Haverhill Junction.

Passes Discontinued in Sacramento.—The Sacramento Electric, Gas & Railway Company, Sacramento, Cal., has discontinued all passes and will in the future give each employee only four free rides a day. Policemen and firemen when not on duty will be required to pay fare.

Transfer Complaint Against Pittsburgh Railways.—William R. Mazurie, Swissvale, Pa., has filed a complaint with the Railroad Commission of Pennsylvania against the Pittsburgh Railways, alleging discrimination in the management of the transfer system, setting forth that a passenger can go from McKeesport to Pittsburgh for 10 cents via one route while the same trip via another route costs 15 cents.

Complaint Against Lewisburg, Milton & Watsontown Passenger Railway.—The Business Men's Association of Milton, Pa., has filed a complaint against the Lewisburg, Milton & Watsontown Passenger Railway. It is alleged that the trip books used by the company are acceptable only during certain hours in the morning and evening. The complainants feel that this is a discrimination and want the fare question investigated.

Sanitary Drinking Cups on the Aurora, Elgin & Chicago Railroad.—The Aurora, Elgin & Chicago Railroad, Chicago, Ill., has distributed several thousand sanitary drinking cups since July 1, 1911, when the act abolishing public drinking cups took effect in Illinois. The cups are made of paraffin paper and each is inclosed in a Manila envelope, which carries an attractive display advertisement of the company's high-speed suburban and interurban service.

Question of Transfers on Chicago Elevated Railways.—The City Council of Chicago has adopted a resolution introduced by Alderman Foell to direct the corporation counsel to report to the City Council as soon as possible the details of the consolidation of the elevated railways of Chicago and whether the city has power to enforce the section of the municipal code regarding transfers in the event of the merger of the traction companies.

Commutation Fares on Chautauqua Traction Company's Line.—The Chautauqua Traction Company, Jamestown, N. Y., announced that, effective on July 1, 1911, it would sell twenty-trip commutation ticket books, containing twenty coupons, each good for transportation of one person between stations named, at the following rates per book: Between Jamestown and Chautauqua, also between intermediate points, $4; between Jamestown and Mayville, also between intermediate points, $5. Tickets are good for use on or before Sept. 15, 1911.

Traffic Analysis in Lincoln.—The Lincoln (Neb.) Traction Company has engaged R. W. Harris, traffic service expert with the Wisconsin Railroad Commission, to study and analyze traffic conditions in Lincoln and to report on the most economical routing to meet the present and future demands for service as unconsciously fixed by the traveling public. A substantial start has been made and many interesting characteristics of the lines have already been brought out. It is the object to obtain accurate information regarding the demand for service, the extent of the neutral zone and to measure the resourcefulness of the various territories served by the several lines, as well as the adequacy of the present routing, schedules, etc.

Shorter Day for Women Agents in Chicago.—The following statement has been issued in regard to the plan of the elevated railways of Chicago to meet the requirements of the new law which prohibits women being employed more than ten hours a day: "On and after July 1, 1911, the women employed as ticket agents on the various elevated

railways will be on duty ten hours a day in compliance with the new law. As to the pay which they will receive, it seems only fair that it should be proportioned to the number of hours on duty. The management has under consideration payment on this basis. It further believes that many agents who formerly 'lay off' several days a month will under the new conditions feel no necessity for so doing and therefore their average monthly or yearly earnings will be about the same as heretofore."

Conference with Employees in Philadelphia.—T. E. Mitten, acting chairman of the board of directors of the Philadelphia (Pa.) Rapid Transit Company, held a second conference on June 30, 1911, with representatives of the employees in regard to wages and terms of service. Following the meeting a joint statement was made public as follows: "The meeting resolved itself into an earnest discussion of co-operation between organized labor and the management of the company in bringing about a more efficient operation of the property. Mr. Mitten signified it as being his intention to be absent from the city for a much-needed rest following the directors' meeting of July 17. During the period of his absence, which will be for about four weeks, the matters discussed to-day will be carefully considered and another meeting will be arranged for as soon as practicable after his return."

Through Service Between Warrensburg and Schenectady.—The Public Service Commission of the Second District of New York has approved certain contracts made between the Schenectady Railway, the Hudson Valley Railway, the Electric Express Company, the Delaware & Hudson Company and the United Traction Company for the operation of through cars by the Hudson Valley Railway from Warrensburg to Schenectady, using the tracks of the Schenectady Railway from Saratoga to Ballston Junction, in addition to using the tracks of that company as at present from Ballston Junction to Schenectady. The only opposition to the approval of the contracts which developed was the fact that fear was entertained by some residents along the Hudson Valley Railway that the old Hudson Valley Railway line now used between Saratoga and Ballston Junction might be abandoned and the present 10-cent fare be increased to 15 cents. This objection was overcome, however, when it was explained that before any abandonment can take place the consent of the commission would have to be obtained and the question of the increase in fare is within the control of the commission. The contract in which the express company is interested relates to the carriage of cars of express over the lines of these railroads.

Additional Owl Service in Philadelphia.—The Philadelphia (Pa.) Rapid Transit Company has issued the following notice in regard to increased service at night on its Market Street elevated line and some of the surface lines which connect with the elevated railway: "Commencing Monday, July 10, 1911, trains will be operated all night on the Market Street elevated line. Commencing on the night of July 10 the Haverford Avenue night line (surface cars), now operating at twenty-four-minute intervals, from Haddington and over Market Street to the ferries, will between the hours of 12 o'clock midnight and 5 a. m. run from Haddington to a terminus at Fortieth Street Station on Market Street, where it will make a transfer with the elevated night service by the use of the free transfer. Commencing on the night of Aug. 1, 1911, the Spruce Street night line, which now operates at intervals of thirty-five minutes, from Sixtieth and Spruce Streets, over Chestnut and Walnut Streets, to a terminus at Tenth and Chestnut Streets, will between the hours of 12 o'clock midnight and 5 a. m. run from Sixtieth and Spruce Streets to the Fortieth Street station of the elevated at thirty-minute intervals, where it will make a transfer with the elevated cars by the use of the free transfer. Night line service on the elevated at such frequent intervals, ten minutes apart, should prove so much more popular than the night line surface cars running parallel thereto as to enable the company later to withdraw the service therefrom, and to give night service at more frequent intervals on the surface lines to a transfer connection with the elevated at the City Hall and Fortieth Street stations instead of continuing to operate parallel with the surface lines eastward to the ferries."

Personal Mention

Mr. Ray Taurman has been appointed master mechanic of the Richmond, Interurban and Petersburg divisions of the Virginia Railway & Power Company, Richmond, Va.

Mr. William L. Ransom, a lawyer with an office in New York, has been appointed assistant secretary of the Public Service Commission of the First District of New York.

Mr. W. A. Russell, superintendent of the Elgin & Belvidere Electric Railway and former superintendent of the Public Service Company, of Kenosha, Wis., has resigned, effective Aug. 1, 1911.

Mr. W. L. Arnold has resigned as general manager of the Elgin & Belvidere Electric Railway, Chicago, Ill., to take effect Aug. 1, 1911, on which date he will sail for an extended trip in Europe.

Mr. D. C. Bell has been appointed chief dispatcher and car accountant of the Cedar Rapids & Iowa City Railway, Cedar Rapids, Ia., to succeed Mr. J. A. DuBois, who has accepted a position with the Hartford Life Insurance Company.

Mr. B. W. Slocum, who has been chief engineer of power stations of the Portland Railway, Light & Power Company, Portland, Ore., for the last six years, has been appointed general manager of the Oregon Dry Dock Company, Portland, Ore.

Mr. L. W. Jeffords, who was formerly connected with the office of the auditor of the Metropolitan Street Railway, Kansas City, Mo., has been appointed secretary to Mr. John M. Egan, president of the company, to succeed Mr. J. T. Walmsley, resigned.

Mr. Edward Butts, who has been connected with the Metropolitan Street Railway, Kansas City, Mo., for twenty-five years, most of the time as chief engineer but more recently as assistant to the president, has resigned from the company to engage in private business.

Mr. H. A. Mitchell, who has been secretary and auditor of the Central California Traction Company, San Francisco, Cal., has been appointed general manager of the company to succeed Mr. Samuel L. Naphtaly, who has resigned to become connected with the Great Western Power Company.

Mr. Angus Clark, who has been connected with the Oakland Traction Company and the San Francisco, Oakland & San Jose Consolidated Railway, Oakland, Cal., for four years, has been appointed assistant secretary of the companies to succeed Mr. Frank W. Frost, who has been elected secretary of the companies.

Mr. Fred A. Stowe, who resigned recently as assistant to the president of the Chicago (Ill.) City Railway, has been appointed Chicago traffic agent of the Illinois Traction system. The Illinois Traction system has through freight service with steam railroads into Chicago and Mr. Stowe will devote his energies to increasing the interchange business.

Mr. John H. Marble has been appointed secretary of the Interstate Commerce Commission, Washington, D. C., to succeed Mr. Edward A. Moseley, deceased. Mr. Marble has been connected with the commission for more than five years and has appeared as its attorney in a number of cases. Mr. Marble is now attorney for the committee of the United States Senate which is investigating the election of Mr. William Lorimer as Senator from Illinois.

Mr. Sydney Alfred Williams has been appointed secretary to Mr. J. Sergeant Cram, who was recently appointed a member of the Public Service Commission of the First District of New York. Mr. Williams was graduated from the New York Law School in 1906. He was for a time managing clerk in the law offiffiffice of Mr. Walter C. Shoup, of New York, and then became executive clerk to Borough President Ahearn.

Mr. John N. Shannahan, formerly vice-president and general manager Washington, Baltimore & Annapolis Railway, was tendered a dinner in New York by a number of friends on July 6 to celebrate his change of residence to that city. The dinner was given in one of the private dining rooms at Rector's Hotel, and about fifty were present. Mr. S. W.

Trawick acted as toastmaster. On July 1 Mr. Shannahan assumed his duties with the operating department of J. G. White & Company, Inc.

Mr. E. E. Downs, until recently general manager for the receivers of the Chicago & Milwaukee Electric Railway, Chicago, Ill., has been appointed general manager of the Elgin & Belvidere Electric Railway, Chicago, Ill., to succeed Mr. W. L. Arnold, general manager, and W. A. Russell, superintendent, whose resignations are announced elsewhere in this column. A biography and a portrait of Mr. Downs were published in the Electric Railway Journal of May 21, 1910.

Mr. Mason B. Starring, president of the Northwestern Elevated Railroad, Chicago, Ill., since 1907, has been elected president of the Chicago & Oak Park Elevated Railroad to succeed the late Clarence A. Knight. Announcement of Mr. Starring's election was made July 11, 1911. Mr. Starring was born and educated in Chicago and has been in the railway business since early youth. He began his career in the operating department of the Chicago, Burlington & Quincy Railroad and was also connected with the Pennsylvania Railroad. In 1888 he became connected with the Chicago City Railway as a clerk. He was subsequently transferred to the office of Judge J. S. Grinnell, general counsel of the company, and in 1894 was made assistant general counsel. On May 12, 1904, he was made general manager of the company. Later he was elected vice-president of the company.

Mr. Milan V. Ayres has resigned as electrical and mechanical engineer of the Boston & Worcester Street Railway, Boston, Mass., to undertake the creation of a department of scientific management for the Rockland Light & Power Company, Nyack, N. Y. He will enter upon his new duties July 17. Mr. Ayres has been connected with the Boston & Worcester Street Railway since the fall of 1902, when the road was under construction. He was formerly with the General Electric Company at Schenectady. He is a graduate of the Newton public schools and of the Massachusetts Institute of Technology. Mr. Ayres has concerned himself for some time largely with the study of power problems, especially the reduction of car weights, and has contributed articles on this subject to the Electric Railway Journal and to the *Proceedings* of the Engineering Association. He is chairman of the equipment committee of the American Electric Railway Engineering Association and will continue his work with this committee until after the convention of the American Electric Railway Association in Atlantic City in October, 1911.

Mr. John A. Cleveland, whose appointment as general manager of the public utilities in Saginaw and Bay City, Mich., was noted in the Electric Railway Journal of July 1, 1911, is thirty-one years old. He was graduated from Williams College in 1901 with the degree A. B., and from Cornell University in 1904 with the degree E. E. He became connected with the Rochester Railway & Light Company, Rochester, N. Y., serving the company from July, 1904, to May, 1906, as electrical engineer and as commercial engineer in the sales department. In May, 1906, he entered the employ of the Saginaw Power Company as superintendent in charge of new business and the sales department and continued in these capacities until September, 1909, when he was appointed local manager of the Bay City Gas Company, Bay City Power Company and the Bay City division of the Saginaw-Bay City Railway. In June, 1911, Mr. Cleveland was appointed general manager of the Saginaw-Bay City Railway, the Bay City Gas Company, the Bay City Power Company, the Saginaw City Gas Company and the Saginaw Power Company.



John A. Cleveland

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Waycross Street & Suburban Railway, Waycross, Ga.**—Application for a charter has been made in Georgia by this company to build a 30-mile electric railway to connect Hebardville, Deenwood, Winona Park, Blackshear, Waresboro and Waycross. Capital stock, $500,000. Incorporators: L. J. Cooper, A. M. Knight, J. L. Walker, Dan Lott, J. S. Williams, J. M. Cox, George W. Deen, T. H. Calhoun, L. A. Wilson, John W. Bennett and W. W. Lambdin.

***St. Louis & Jennings Railway, St. Louis, Mo.**—Incorporated in Missouri to build a 1-mile electric railway from the end of the Union-Florissant line to West Walnut Manor in St. Louis. Capital stock, $15,000. Directors: David Leahy, Richard J. Baldwin, Frank J. Steiner, Philip A. Smith and Henry T. Woodward.

***Ardmore, Duncan & Lawton Railway, Ardmore, Okla.**—Incorporated in Oklahoma to build a 100-mile electric or steam railway from Ardmore northwest through Duncan to Lawton. Capital stock, $3,000,000.

Lebanon & Campbelltown Street Railway, Lebanon, Pa.—Application for a charter will be made on July 25 in Pennsylvania by this company to build an electric railway between Campbelltown and Lebanon, via South Londonderry, South Annville and North Cornwall. Incorporators: M. S. Hershey, J. B. Leithiser, John B. Snyder, S. C. Stecher and F. B. Snavely. [E. R. J., Feb. 18, '11.]

***Storry Electric Company, Tamaqua, Pa.**—Incorporated in Pennsylvania to build electric railway through Schuylkill County to connect Tamaqua, Rush and McDoo. Capital stock, $10,000.

***Ft. Worth (Tex.), Southern Traction Company.**—Incorporated in Texas to build an electric railway between Ft. Worth and Cleburne. Capital stock, $1,500,000. Incorporators: G. H. Clifford, W. C. Forbes and W. A. Hanger, all of Ft. Worth.

***Morgantown (W. Va.) Interurban Railway.**—Chartered in West Virginia to build an electric railway between Fairmont and Morgantown, W. Va., and Marion and Waynesburg, Pa. Capital stock, $25,000. Incorporators: Joseph McDermott, Harry R. Warfield, manager of the Union Utilities Company, and John A. Purinton.

FRANCHISES

Mobile, Ala.—The Mobile Light & Railroad Company has asked the City Council for a franchise to extend its tracks in Mobile.

New Westminster, B. C.—The British Columbia Electric Railway has asked the City Council for a franchise to extend its tracks in New Westminster to the Fraser River mills.

Los Angeles, Cal.—The Pacific Electric Railway, Los Angeles, has received permission from the Board of Public Works to use the municipal railway tracks to the municipal wharves at the harbor of Los Angeles.

Redwood City, Cal.—Edward S. Fitzpatrick has received a franchise from the Board of Trustees to build an electric railway from Redwood City to Woodside, a distance of about 6 miles. [E. R. J., June 3, '11.]

San Diego, Cal.—The San Diego Electric Railway has asked the Common Council for a franchise to extend its tracks in San Diego.

San José, Cal.—The Peninsular Railway has received five extensions of franchises from the Board of Supervisors to build 12 miles of new track in various parts of Santa Clara County.

Oakland, Cal.—The Southern Pacific Company has asked the City Council for a franchise to electrify its lines east of Fallon Street to the boundary line of Oakland.

Woodland, Cal.—The Vallejo & Northern Railway, Vallejo, has received a franchise from the City Trustees to extend its line on Main Street from the eastern to the

western town limits of Woodland. [E. R. J., June 24, '11.]

***Waycross, Ga.**—The Waycross Street & Suburban Railway has received a franchise from the City Council to build an electric railway in Waycross. This is part of a plan to build a 30-mile railway to connect Deenwood, Hebardville, Waresboro, Blackshear and Waycross. L. J. Cooper is interested.

East St. Louis, Ill.—The Alton & Southern Railroad, East St. Louis, has asked the City Council for a franchise to extend its tracks on certain streets in East St. Louis and to connect with the St. Louis & Belleville Electric Railway. C. B. Fox, East St. Louis, is interested. [E. R. J., July 9, '11.]

Webster City, Ia.—The Fort Dodge, Des Moines & Southern Railroad, Fort Dodge, has asked the City Council for a franchise in Webster City.

Shelbyville, Ky.—The Louisville & Interurban Railway, Louisville, has received a franchise from the Town Council over the main street in Shelbyville.

Takoma Park, Md.—The Baltimore & Washington Transit Company, Washington, has received a thirty-five-year franchise from the Town Council in Takoma Park to extend its tracks from the District line and Carroll Avenue to the Washington Sanatorium on the Maryland side.

Inver Grove, Minn.—The St. Paul Southern Electric Railway, St. Paul, has received a franchise from the Council in Inver Grove. [E. R. J., June 10, '11.]

***St. Louis, Mo.**—The St. Louis & Jennings Railway has asked the Municipal Assembly for a franchise to build a 1-mile line from the end of the Union-Florissant line to West Walnut Manor in St. Louis.

Middleport, N. Y.—The Buffalo, Lockport & Rochester Railway, Rochester, has asked the Village Board of Trustees for a franchise to extend its lines in Middleport.

Salem, Ore.—The Portland Railway, Light & Power Company has received a franchise from the City Council to extend its lines on Nebraska Street and Belmont Street, in Salem.

Ellwood City, Pa.—The Beaver Falls, Koppel & New Castle Street Railway has received a franchise from the City Council in Ellwood City. This is part of a plan to build an electric railway between New Castle, Koppel, Ellwood City and Beaver Falls. J. S. Herron is interested. [E. R. J., June 24, '11.]

Irwin, Pa.—The Pittsburgh, McKeesport & Greensburg Railway, McKeesport, has received a franchise from the City Council to construct a line on Fourth Street, from Main Street to the west boundary of Irwin. Connection with the Pittsburgh Railways Company will be made at Trafford.

Chattanooga, Tenn.—The Chattanooga Railway & Light Company has asked the Board of Commissioners for a franchise to extend its tracks on Highland Park Avenue and Vance Avenue, in Chattanooga.

Memphis, Tenn.—The Memphis Street Railway has received a new franchise from the City Commission to build a crosstown line in Memphis.

***Brownsville, Tex.**—J. C. deBruin, Brownsville, has asked the City Council for a franchise in Brownsville.

Wenatchee, Wash.—The Wenatchee Traction Company has received an electric railway franchise in Wenatchee. Louis W. Pratt, president. [E. R. J., June 24, '11.]

Poynette, Wis.—The Chicago & Wisconsin Valley Railroad, Madison, has received a franchise from the Village Board in Poynette.

TRACK AND ROADWAY

San Francisco, Vallejo & Napa Valley Railroad, Napa, Cal.—Construction has been begun by this company on its extension from St. Helena to Calistoga. It is also building a new bridge across York Creek at the terminus of the line at St. Helena.

Oakland (Cal.) Traction Company.—Preliminary work has been done and ties are being laid by this company on its 1½-mile extension in San Leandro from East Fourteenth Street to the foothills.

San José (Cal.) Railways.—Construction has been begun by this company on its new 7-mile line to Alum Rock Park, via Berryessa.

Lake Weir, Ocala & Silver Springs Suburban Railroad, Ocala, Fla.—D. S. Woodrow, Ocala, writes that as yet the plans of this company to build an electric railway between Lake Weir, Ocala and Silver Springs are in a preliminary stage. [E. R. J., June 24, '11.]

Fairburn & Atlanta Railway & Electric Company, Fairmont, Ga.—This company has completed and placed in operation its 10½-mile gasoline motor line between Fairburn, Atlanta, Union City and College Park.

***Rockmart, Ga.**—J. S. Davitte, Rockmart, is reported to be making preliminary arrangements to build a 10-mile electric railway extending through Rockmart.

***Nampa, Idaho.**—The right-of-way has been secured and work will be begun soon on the construction of an electric railway between Nampa and Caldwell. W. E. Pierce, Boise, is the promoter of this line.

Cicero & Southwestern Railway, Chicago, Ill.—This company has been organized to build an electric railway in the western suburbs of Chicago. Capital stock, $200,000. Franchises will be asked for at once through the towns through which it will extend. Officers: Frank Hunt, president; William H. Sweet, secretary, and Howard W. Hayes, attorney. [E. R. J., June 10, '11.]

Chicago, Waukegan & Fox Lake Traction Company, Chicago, Ill.—This company advises that work will be begun within ninety days on the construction of its interurban railway to connect Waukegan, Fox Lake and Woodstock. Gasoline motor cars will be used. Capital stock authorized, $1,500,000. Capital stock issued, $275,000. Officers: W. P. MacCracken, Chicago, president; Peter B. Olsen, vice-president; Charles A. Spenny, 709 Tacoma Building, Chicago, secretary and general manager; I. D. Stevens, treasurer, and L. C. Roberts, Chicago, chief engineer. [E. R. J., July 8, '11.]

***Galena, Ill.**—The Galena Commercial Club is considering plans to build a 14-mile interurban railway between Sinsinawa Mound, Hazel Green and Galena.

Alton, Jacksonville & Peoria Railway, Whitehall, Ill.—The construction has been begun by this company on its extension from Godfrey to Jerseyville.

Gary & Southern Traction Company, Crown Point, Ind.—It is said to be the intention of this company to extend its line to Cedar Lake and Lowell, and eventually to Kankakee.

Indianapolis, Chicago & Meridian Railway, Indianapolis, Ind.—It is reported that bids will soon be asked for by this company to build its electric railway to connect Indianapolis, Sheridan, Flora, Monticello, Francisville, Hammond and Warsaw. M. J. Mooreland, secretary. [E. R. J., July 8, '11.]

Kokomo, Frankfort & Western Railway, Kokomo, Ind.—W. H. Schott & Company, Chicago, Ill., have been awarded the contract by this company to build the 26-mile railway to connect Middletown, Russiaville, Michigantown and Forest. The power house and repair shops will be located at Kokomo. Officers: George J. Marott, Indianapolis, Ind., president; T. C. McReynolds, Kokomo, secretary and general manager. [E. R. J., June 5, '11.]

Indianapolis, New Castle & Toledo Railway, New Castle, Ind.—This company will award contracts in the near future for the construction of its extension from New Castle to Muncie.

Iowa City (Ia.) Electric Railway.—This company advises that it has under construction local lines in Iowa City. It has completed and placed in operation about 3 miles of track in Iowa City. The company operates five motor cars and purchases its power from the Cedar Rapids & Iowa City Railway & Light Company, Cedar Rapids. J. O. Schulze, Iowa City, general manager. [E. R. J., Dec. 31, '11.]

Iowa Traction Company, Oskaloosa, Ia.—C. E. Coon & Company, Omaha, have been awarded a contract by this company for grading its 10-mile railway between Oskaloosa, Barnes City, Montezuma, Malcom, Tama, Toledo, Traer,

Eagle Center and Waterloo. George E. Wodehouse, Oskaloosa, president. [E. R. J., Nov. 26, '11.]

Boston & Northern Street Railway, Boston, Mass.—Plans are under consideration by this company to build an extension from the bridge in Groveland through School Street to Georgetown.

Oak Bluffs (Mass.) Street Railway.—This company expects to purchase rail joints for about 1000 ft. of new track.

Berkshire Street Railway, Pittsfield, Mass.—This company placed in operation on July 3 its extension from Great Barrington to Ashley Falls.

Shelburne Falls & Colerain Street Railway, Shelburne Falls, Mass.—Surveys are being made by this company on its extension from Colrain to Wilmington, Vt.

Springfield (Mass.) Street Railway.—Work has been begun by this company on an extension of the Indian Orchard line in Springfield to Ludlow. The company will also build two other extensions this summer; one will be in Chicopee and the other will be along the south bank of the Mill River in Springfield.

St. Paul Southern Electric Railway, St. Paul, Minn.—Contracts have been awarded by this company to the Hoy, Elzy Company for the construction of its line between Inver Grove and Hastings. Work will be begun within thirty days. The final route has been settled. The cars will come into St. Paul from Inver Grove over the Twin City Rapid Transit Company's tracks. From Inver Grove it will extend on the west side of the Mississippi River direct to Hastings. This will obviate the necessity of building a new bridge at Hastings. It is reported that negotiations are also under way for the projection of this line to St. Paul Park, Newport and Langdon. When completed it will connect St. Paul, Hastings, Red Wing, Fontenac, Lake City, Mankato, Inver Grove and Faribault. [E. R. J., June 10, '11.]

United Railways, St. Louis, Mo.—The reconstruction of 25 miles of track is being done by this company in St. Louis.

Helena Light & Railway Company, Helena, Mont.—This company has about finished its Cherry Street extension in Helena.

Omaha, Sioux City & Northern Railway, Omaha, Neb.—Preliminary surveys have been completed and contracts are now being made for right-of-way by this company to build an electric railway from Omaha to Sioux City, on the west side of the river. B. M. McCue, Garden City, is interested. [E. R. J., July 8, '11.]

Chautauqua Traction Company, Jamestown, N. Y.—Work has been begun by this company double tracking some of its lines in Jamestown and rebuilding the old Lakewood Railway from the Jamestown city line to the underground crossing of the Erie Railway.

***Rexford, N. Y.**—A meeting for the purpose of forming a permanent organization, the object of which will be to build a 22-mile railway between Rexford and Watertown, has been held and the following officers elected: John Richmond, Waterford, president; C. B. Hawley, Halfmoon, vice-president; James W. Dickey, Halfmoon, secretary, and A. C. Newton, Cresent, treasurer.

Buffalo, Lockport & Rochester Railway, Rochester, N. Y.—Plans are being considered by this company to build an extension from its Church Street line, in Middleport, north on Harland Street to Main Street, over the Erie Canal to Mill, and west with spurs to several mills and factories.

***Cresent-Halfmoon Railway, Troy, N. Y.**—This company has been formed to build an electric railway between Rexford Flats and Cohoes.

Elmira, Corning & Waverly Railroad, Waverly, N. Y.—Track has been laid for the Corning end of this railway. Work of wiring has been begun.

Piedmont Railway & Electric Company, Burlington, N. C.—Grading has been completed and construction has been begun by this company on its line to connect Burlington, Graham, Haw River, Big Falls, Carolina and Glencoe. J. W. Murray, Burlington, is interested. [E. R. J., Jan. 3, '11.]

Grand Forks (N. D.) Street Railway.—Surveys have been completed and the necessary capital secured by this company to build its 1-mile extension from Grand Forks to East Grand Forks, Minn.

***Riverport, N. S.**—T. G. Nichol, Mahone Bay, plans to construct a 12-mile electric railway between Lunenburg and Riverport, with a spur to Park Creek. Surveys are being made.

Alliance-Akron Railroad, Alliance, Ohio.—About 6 miles of grading has been done and bonds to the amount of $800,000 have been issued by this company to cover the cost of the construction of its 26-mile electric railway between Alliance and Akron via Tallmadge, Mogadore, Marlboro, New Baltimore, Brimfield and Rootstown. A. Swinehart, Akron, president. [E. R. J., April 22, '11.]

Columbus, Urbano & Western Electric Railway, Columbus, Ohio.—The appropriation of $50,000 for building a branch from the line of this company to the Girls' Industrial Home a few miles from Delaware has been approved. The company will have to complete its line from Fishingers to Dublin before the extension can be built, however. It is said that work will be commenced within a short time both on the extension to Dublin and on this branch.

Dayton (Ohio) Street Railway.—Plans are being made by this company to construct an extension from the loop on Salem Avenue, in Dayton, about 1½ miles north of Dayton, to Harrison.

Portland Railway, Light & Power Company, Portland, Ore.—This company is relaying its double track with heavy steel rails on nearly all its East Side lines in Portland.

Central Pennsylvania Traction Company, Harrisburg, Pa.—An extension is being built by this company of its Second Street line, in Harrisburg, to the Harrisburg Academy at Riverside. The company also contemplates the extension of its Ft. Hunter line to Dauphin.

***Owego, Pa.**—Henry Gibbs and James J. Walker, Owego; J. C. Tripp, Warren Center, and associates are making preliminary arrangements to build a 22-mile electric railway to connect Owego and LeRaysville via Warrenham, Warren Center, Wapaseening Creek, South Warren, Potterville and Ellis Creek Valley.

Allegheny & Northwestern Street Railway, Pittsburgh, Pa.—The McComb Construction Company, Olean, N. Y., has been awarded the contract by this company to build the 27-mile gasoline motor line between Evans City, Mars and Harmarville. John Schaffer, Butler, is interested. [E. R. J., June 10, '11.]

Texas Traction Company, Dallas, Tex.—This company advises that it will begin construction at once on 2½ miles of track in Dallas. It is expected to extend this line to Bonham and McKinney. The company's power house and repair shops will be located at McKinney and five cars will be operated. J. H. Strickland, Dallas, president. [E. R. J., July 1, '11.]

Northern Texas Traction Company, Ft. Worth, Tex.—Construction has been begun by this company on the extension from Forest Park to the Texas Christian University.

Marshall (Tex.) Traction Company.—Arrangements have been made by this company to extend its line in North Marshall.

San Benito (Tex.) Interurban Railway.—About 30 miles of new track will be constructed by this company upon the land of the San Benito Land & Water Company.

***Mercer Electric Railway, Athens, W. Va.**—It is reported that this company will soon be in the market for 56-lb. rails to build 7 miles of line to connect Athens and Princeton. R. G. Meador, Athens, is interested.

Fairmont & Clarksburg Traction Company, Fairmont, W. Va.—Work is being rushed by this company on its new lines and improvements are being made at different points on its entire system.

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—Plans are being considered by this company to build a new carhouse to be located in one of the small towns south of Los Angeles.

Illinois Traction System, Champaign, Ill.—This company will build a temporary passenger station at Lucas Street

and High Street, in St. Louis. The structure will be two stories high, 120 ft. x 40 ft., and of brick construction. The company is considering plans to build a large new passenger station in St. Louis.

Orange County Traction Company, Newburgh, N. Y.—This company expects to build a new carhouse at Newburgh.

POWER HOUSES AND SUBSTATIONS

Bristol & Plainville Tramway, Bristol, Conn.—This company has placed an order with the General Electric Company covering a complete power plant equipment which includes two 937-kva horizontal turbine generator units, switchboard, rotary converters, motor-driven and turbine-driven exciters, etc. The switchboard contains twenty-five panels, forming one main station board and one substation board. The main station switchboard will be a.c. and will control two 937-kva generators and two 25-kw exciters provided with voltage regulators. The substation switchboard, which will control three 300-kw, 600-volt rotary converters, consists of three a.c. and three d.c. rotary converter panels and three a.c. rotary converter starting panels. Provision is also made for two panels controlling single-circuit power feeders and five panels controlling single-circuit railway feeders.

New York, New Haven & Hartford Railroad, Stamford, Conn.—This company has placed an order with the Bigelow Company, New Haven, Conn., for twelve 625-hp Bigelow-Hornsby water-tube boilers for its new power station at Cos Cob, Conn.

Alton, Jacksonville & Peoria Railway, Whitehall, Ill.—This company will soon build a new power house on Piasa Creek about 9 miles beyond Alton.

Indianapolis, Chicago & Meridian Railway, Indianapolis, Ind.—This company will soon ask for bids for the construction of its new power house in Monticello.

Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.—This company has placed an order with the General Electric Company for two 300-kw rotary converters, fifteen 100-kva transformers and a switchboard. The rotary converter and six of the transformers will be installed in the Maywood substation. Six of the transformers will be installed in the Mooresville substation and three in the Martinsville substation. The transformers are oil-cooled, 25-cycle units, 33,000 volts primary and 390 volts secondary, and are provided with 50 per cent starting taps on the secondary. The switchboard will be installed in the Maywood substation and will control the 33,000-volt incoming lines, the bank of step-down transformers and the rotary converter. It will consist of an a.c. rotary converter panel, two d.c. rotary converter panels, rotary converter starting panel, and a blank a.c. rotary converter panel. A triple pole, automatic K-10 oil-break switch will protect the transformers. The order also included 33,000-volt, three-phase aluminum-cell lightning arresters with horn-gap disconnecting switches.

Des Moines (Ia.) City Railway.—This company has ordered a portable substation for its Grand View line to be delivered in Des Moines by Aug. 1.

Morris County Traction Company, Morristown, N. J.—This company has begun work on its new power plant to be erected in Chatham.

United Traction Company, Albany, N. Y.—This company is considering plans to construct a new transformer station near Quail Street in Albany.

Orange County Traction Company, Newburgh, N. Y.—This company will install a new rotary converter and switchboard at its power house in Newburgh.

Northern Ohio Traction & Light Company, Akron, Ohio.—The Northern Ohio Power Company, Akron, Ohio, has awarded a contract to the Carmichael Construction Company to construct a reinforced concrete dam 500 ft. long and 60 ft. high across the Cuyahoga River at Cuyahoga Falls to operate a generating plant of 2000 hp. A steam plant of 18,000 hp. is being built above the site of the dam. This company will furnish power for the railroad and lighting systems of the Northern Ohio Traction & Light Company.

Wheeling (W. Va.) Traction Company.—This company is improving its power house in Wheeling.

Manufactures & Supplies

ROLLING STOCK

Cleveland (Ohio) Railway will probably order fifty or sixty new cars.

Texas Traction Company, Dallas, Tex., has ordered two 20-ft. 8-in. closed cars mounted on Brill 21-E trucks from the Danville Car Company.

Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., has ordered three 40-ft. freight trailer cars from the Cincinnati Car Company.

Woodstock & Sycamore Traction Company, Sycamore, Ill., has ordered a standard 55-ft. gasoline motor car from the McKeen Motor Car Company.

Sherbrooke (Que.) Street Railway has ordered two 30-ft. single-truck pay-as-you-enter car bodies mounted on Brill trucks from the Ottawa Car Company, Ltd.

Columbus Railway & Light Company, Columbus, Ohio, has ordered twelve 28-ft. 8 5/16-in. pay-as-you-enter car bodies from the G. C. Kuhlman Car Company.

Philadelphia (Pa.) Rapid Transit Company has ordered thirty 49-ft. 7¼-in. steel elevated motor cars complete with Brill 27-MCB-3 trucks from The J. G. Brill Company.

Oakland (Cal.) Traction Company has ordered ten equipments of type HL non-automatic, unit-switch control from the Westinghouse Electric & Manufacturing Company.

Muskegon Traction & Lighting Company, Muskegon, Mich., has ordered one 33-ft. 4-in. semi-convertible car body mounted on Brill 27-G trucks from the G. C. Kuhlman Car Company.

Springfield (Mo.) Traction Company has ordered six double equipments of No. 323 railway motors with type K-10-A control from the Westinghouse Electric & Manufacturing Company.

Toledo & Indiana Railroad, Toledo, Ohio, has just put into service a new locomotive weighing forty tons, which is equipped with four Westinghouse No. 304 interpole motors rated at 90 hp each on 600 volts.

San Francisco, Oakland & San Jose Railroad, San Francisco, Cal., has ordered twenty-five double equipments of No. 302 railway motors and type M control from the Westinghouse Electric & Manufacturing Company.

International Railway, Buffalo, N. Y., has ordered sixty semi-convertible near-side cars 45 ft. 2½ in. long over all, mounted on Brill 30-E truck, and one 49-ft. 6-in. freight and utility motor work car body from The J. G. Brill Company.

Piedmont Traction Company, Charlotte, N. C., has ordered a quadruple equipment of No. 308B-5 railway motors and special type HL non-automatic control from the Westinghouse Electric & Manufacturing Company. These motors are insulated for operation on 1500 volts.

Greenville, Spartanburg & Anderson Railway, Greenville, S. C., has ordered five quadruple equipments of No. 308-B-5 railway motors for operation on 1500 volts with special type HL non-automatic, unit-switch control from the Westinghouse Electric & Manufacturing Company.

Boston (Mass.) Elevated Railway, noted in the Electric Railway Journal of July 1, 1911, as having issued specifications for fifty surface cars, has ordered twenty-five cars from the St. Louis Car Company through Wendell & MacDuffie Company, New York, and the same number from the Osgood-Bradley Car Company.

Trenton & Mercer County Traction Corporation, Trenton, N. J., has ordered ten 28-ft. double-truck cars from The J. G. Brill Company. These cars are to have large platforms and will be 38 ft. 10 in. long over all, but they will not be equipped for prepayment operation. They will have Westinghouse air brakes, two GE-210 motors and Brill maximum traction trucks.

TRADE NOTES

Grip Nut Company, Chicago, Ill., has appointed W. G. Willcoxson sales manager with headquarters in the Old Colony Building, Chicago.

Hale & Kilburn Manufacturing Company, Philadelphia, Pa., has moved its Chicago office from the Fisher Building to the McCormick Building.

Standard Underground Cable Company, Pittsburgh, Pa., will establish a Canadian branch in Hamilton, Ont. The plant will cost, it is estimated, $500,000.

Bontempi Rust-Proofing Company, New York, N. Y., has leased a plot of land, 70 ft. x 142 ft., in Bridgeport, Conn., on which it will erect furnaces for commercial purposes.

Ball & Wood Company, Elizabeth, N. J., manufacturers of stationary engines, has been placed in the hands of former Judge J. Kearny Rice, of New Brunswick, as receiver, by Judge Rehlstab in the United States District Court at Trenton.

Lord Electric Company, New York, N. Y., has moved from 213 West Fortieth Street to its new offices at 105 West Fortieth Street, giving up the entire building at the former address to the Lord Manufacturing Company, which will occupy these quarters until its new factory is completed next spring.

Railway Roller Bearing Company, Syracuse, N. Y., has equipped with rollway journal boxes two cars with Brill 39-E trucks for the Frankford, Tacony & Holmesburg Street Railway, Philadelphia. These cars are equipped with motors of 25 per cent less rated capacity than required for cars with plain bearings.

Baldwin Locomotive Works, Philadelphia, Pa., has appointed John P. Sykes general superintendent to succeed S. M. Vauclain, who held that position twenty-six years and who has now become vice-president. Mr. Sykes was formerly assistant general superintendent and has been connected with the company in various capacities since 1879.

Sangamo Electric Company, Chicago, Ill., has completed a new building, 160 ft. x 40 ft. x 42 ft., two stories high, of steel, brick and concrete construction. The lower floor contains the shipping department, instrument testing room, generator room, machine and tool room and pattern shop. On the upper floor are located the assembling and general testing rooms, office and drafting room. The new building is connected by a passageway on the second floor with the main building, which is 180 ft. x 30 ft.

Sprague Electric Works, New York, N. Y., has appointed Frank W. Hall manager of hoist sales. His headquarters after July 15 will be at the New York office. Mr. Hall was formerly manager of the Philadelphia office. James A. Clifford, manager of the Baltimore office, has been appointed to succeed Mr. Hall as manager of the Philadelphia office. The Baltimore office will be continued as in the past under Mr. Clifford's direction, but as subsidiary to the Philadelphia office and with Henry S. Patterson in charge.

General Electric Company, Schenectady, N. Y., has sold to the Union Switch & Signal Company all of its patents relating to railway signaling, together with its stock and manufacturing equipment in this line of work. The Union Switch & Signal Company is now prepared to furnish the signaling apparatus heretofore supplied by the General Electric Company. While this sale does not include accessory apparatus such as switchboards, rectifiers, motor-generator sets, generators, etc., the Union Switch & Signal Company will now be able to offer General Electric accessory appliances to supplement effectively its lines of signal material when making complete signal installations.

Wagner Electric Manufacturing Company, St. Louis, Mo., announces the formation of the Wagner Electric Manufacturing Company, Limited, of Canada, under a Dominion charter, and with a capital stock of $50,000, full paid. The Canadian corporation becomes the exclusive Canadian licensee under patents owned and controlled by the St. Louis company. Alfred Collyer, for many years representative of Wagner interests in Canada, has been appointed manager of sales of the new company. The officers of the new company, besides Mr. Collyer, are S. M. Dodd, president; W. A. Layman, vice-president and general manager; W. S. Thomas, treasurer. The previous headquarters of the Wagner Electric Manufacturing Company in the Bell Telephone Building, Montreal, becomes the headquarters of the new company.

J. G. White & Company, Ltd., London, held their annual meeting June 29. Mr. White presided. The report showed a net profit for the year of £91,466, against £64,801 for last year. The report stated that the investments fall into three classes, namely, associated companies, syndicates and general investments. Those of the first class are practically fixed and permanent and include a controlling interest in the Building Construction Company, Ltd., which has built a number of important buildings in London recently. The syndicate class of investments are usually taken in connection with efforts to secure new business, either financial or engineering. The general investments are the securities taken in connection with contracts or promotions, or are purchased with the expectation of selling at a profit. During the ten and one-half years of the company's life it has pursued a very conservative policy in regard to dividends. It has paid out in dividends £160,708 and has retained in the business out of profits £182,787. The chairman then said: "Had all the company's profits for the last five years been distributed to shareholders, leaving the reserve at about £57,000, the preference shareholders would have received, including the proposed dividends for July 1 next, a total of 60 per cent instead of 45 per cent, and the ordinary shareholders would have received 302 per cent instead of 95 per cent." The chairman then recommended a distribution, including the interim dividends of 5 per cent paid Jan. 1, of 12 per cent on the preferred and ordinary shares, with an extra dividend of 50 per cent on the ordinary shares, making the total on the ordinary shares 62 per cent for the year.

American Car & Foundry Company, New York, N. Y., reports total earnings from all sources for the year ended April 30, 1911, as $6,240,324, as compared with $5,725,098 for the previous year. The net earnings for the year ended April 30, 1911, were $4,234,789, as compared with $4,089,478 for the previous year. The surplus for the year ended April 30, 1911, after paying dividends at the rate of 7 per cent on the preferred stock, dividends on the common stock and charging up a reserve of $750,000 for general overhauling, improvements and maintenance, was $784,789, as compared with $1,389,478 for the previous year. Fred H. Eaton, president of the company, says that the demands of the railroads for new equipment were in the aggregate much less for the fiscal year 1910-11 than for 1909-10, and that because of this orders were taken on an even more strongly competitive basis than heretofore and consequently on a lower margin of profit. The construction of the proposed additional steel-car plant has not yet begun because the conditions which prevail have not favored such action. The additional shop at St. Charles has been completed and the company's all-steel passenger-car plant at that place is practically completed. For this work and for additions to the company's plants at Berwick, Detroit, Chicago and Milton there was expended from the reserve for additions to steel-car plants the sum of $434,225. It was deemed prudent to make up in part the depletion of this reserve and $250,000 of net earnings was appropriated to it, making the total to be carried forward $1,277,795, as against $1,462,020 in this reserve on May 1, 1910. From the reserve for general overhauling and improvements and maintenance, amounting to $628,167, there was expended during the year $349,561 for installing new machines and improvements.

ADVERTISING LITERATURE

United States Electric Company, New York, N. Y., has issued Bulletin No. 502, which contains suggested rules for telephone train dispatching.

Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., is mailing a bulletin in which dispatchers' signals for electric interurban railroads are described and illustrated.

Railway Improvement Company, New York, N. Y., is mailing a binder containing reprints of several commendatory letters from users of the company's coasting time recorders.

Carnegie Steel Company, Pittsburgh, Pa., has printed a pamphlet entitled "Furnace Slags in Concrete," in which are presented the results of a series of tests of blast-furnace slag, in various forms, for use as an ingredient in the making of concrete.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVIII NEW YORK, SATURDAY, JULY 22, 1911 No. 4

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. McGRAW, President.

HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.

CURTIS E. WHITTLESEY, Secretary and Treasurer.

TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

HENRY W. BLAKE, Editor.

L. E. GOULD, Western Editor.

Associate Editors:

RODNEY HITT, FREDERIC NICHOLAS, WALTER JACKSON.

News Editors:

G. J. MACMURRAY, FRANK J. ARMEIT.

CHICAGO OFFICE.....1570 Old Colony Building

CLEVELAND OFFICE.....1021 Schofield Building

PHILADELPHIA OFFICE.....Real Estate Trust Building

EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Thursday, 9 A. M., of the week of issue.

Copyright, 1911, by McGRAW PUBLISHING COMPANY.

Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL 8500 *copies are printed.*

NEW YORK, SATURDAY, JULY 22, 1911.

CONTENTS.

The Milwaukee Valuation..... 143
Philadelphia Transit Report..... 143
Employees' Social Organizations..... 144
The Joint Use of Poles..... 144
New York Subway Situation..... 145
Combined Carhouse and Shop, Bridgeport, Conn..... 146
Association Bulletin on Convention Arrangements with Atlantic City Hotels..... 152
Hearing on Taunton and Pawtucket Fares..... 152
Social Activities of Employees of the Public Service Railway..... 153
Trackless Trolleys in Bradford and Leeds, England..... 155
Depreciation Account of the Kokomo, Marion & Western Traction Company..... 156
Curious Subway Suggestions..... 157
Award of Arbitrators in the Richmond Case..... 158
Meeting of the Committee on Express and Freight Traffic..... 158
Cost of Maintaining Motor Car Equipments on the Brooklyn Rapid Transit System..... 159
Open Doors on Cleveland Pay-Within Cars..... 159
Exhibit Committee of the Manufacturers' Association..... 159
Chuck for Boring Bearings..... 160
Valuation of Milwaukee Properties..... 160
The Arch Roof..... 161
Creosoted Wood Paving in the Chicago Business District..... 161
Block Signals to Be Tested in Indiana..... 161
Special Committee on Associate Membership of the American Electric Railway Association..... 161
Prepayment Cars for the "Key Route," California..... 162
Large Gas-Electric Motor Cars..... 163
Order for Near-Side Cars..... 164
Interurban Cars for British Columbia..... 164
Telephone Apparatus for Train Dispatching..... 164
Outdoor Oil Circuit-Breakers..... 165
A Simple Headlight..... 166
Roller-Bearing Trolley Base..... 166
News of Electric Railways..... 167
Financial and Corporate..... 170
Traffic and Transportation..... 173
Personal Mention..... 175
Construction News..... 176
Manufactures and Supplies..... 179

The Milwaukee Valuation

Different values were determined by the companies and the Railroad Commission of Wisconsin in connection with the Milwaukee fare case. The values on which the company claimed a return were published in the issues of the ELECTRIC RAILWAY JOURNAL at the time of the hearings in the case before the commission during 1909. The Railroad Commission has now made public its figures of the values in connection with the announcement that a final decision in this long-pending case will be rendered by this fall. One of the problems which enter into the consideration of this case is the fair division of the total values between the different elements of the plant which furnish the railway service and the electric power and lighting service respectively. Many questions of fundamental importance are concerned in this segregation. The report of the commission indicates that in its segregation it allowed 62 per cent of the total cost new of the property of the Milwaukee Electric Railway & Light Company for the railway plant. Of the balance the principal item was the light and commercial property, which is placed by the commission at 27 per cent of the total cost fixed. By reason of its joint operation of railway and electrical power and lighting plants the company is able to conduct its business at a lower cost than if as an independent railway company it produced the smaller amount of power that would be sufficient for the needs of the railway alone. Probably both the railway and the power and lighting customers of the company would like to secure the benefit of this saving, but this appears to be one of the advantages arising from economical management and combination which should accrue to the company as one of the returns to which it is entitled because of its form of organization.

Philadelphia Transit Report

The Philadelphia Rapid Transit Company gave publicity on July 17 to its annual report for the year ended June 30, 1911, and both the statistics and the discussion, published elsewhere in this issue, contain indications of the new policy upon which the system is now operated. The new method of the provision of 15 per cent of gross earnings for maintenance and renewals is that recommended by Thomas E. Mitten, the expert adviser to the interests represented by Mr. Stotesbury. One of the principal features of the report is the improvement in gross passenger earnings. The aggregate receipts from passenger sources are much larger than in any previous calendar year, showing an increase of 14.57 per cent over the results reported for the fiscal year ended June 30, 1910. In that year the operations were affected adversely by the strike of trainmen. The gross

passenger earnings of $20,612,687 reported for 1911 compare with $18,317,530 for 1909 and $18,300,080 for 1908. It is of particular interest to note that in connection with the readjustment of the affairs of the company which is now under way Mr. Mitten, in estimating future requirements and probable earnings, figured upon an average annual increase of 4 per cent in gross earnings for five years. The actual increase from 1902 to 1909 averaged 4.2 per cent per annum. This average was exceeded in 1911, not only as compared with 1910, but when the average increase from 1909 to 1911 is computed. Another change is in the operating ratio, which, including taxes and the larger provision for maintenance and renewals, amounted to 61.07 per cent of total gross earnings from all sources. Interest and rentals were 40.86 per cent of the total revenue, leaving a net deficit equal to 1.93 per cent. In the fiscal year 1909 rentals and interest were equal to 43.6 per cent of gross.

Employees' Social Organizations

The transportation employees' social clubs of the Public Service Railway of New Jersey, which are described elsewhere in this issue, demonstrate how successful such associations can be when the men are thrown practically on their own resources for means of entertainment. The management does little more than to provide an assembly room in each carhouse, to offer prizes for divisions competing in a few lines of sport and, occasionally, to make up a deficit arising from some sociable. The men do the rest and do it well, too. The Public Service Railway has a very large mileage, which is spread over a great deal of territory. As a result the clubs are quite numerous and in some cases as independent of one another as if they were on the properties of different companies. Most of these organizations are, therefore, comparatively small. This condition, however, is really a benefit because it enables a much larger percentage of the men to take an active part in the work than is the case on railways where there is but one association to cover all divisions. The officials make it a point to be present at the festivities as often as possible, but in accordance with the policy of the management they wisely refrain from talking "shop." The time to talk business to the men is at business meetings, which are also held on the Public Service Railway, and not when the men are surrounded by their families and friends. It is often a matter of astonishment, when such organizations are formed, to discover the amount of latent talent for different forms of entertainment which will be found among the men. Some of this will be in the musical line, and it is not at all uncommon on systems of even moderate size to find an amateur band superior to many of the professional organizations of similar character in the same city.. Dramatic talent is also not unusual. We have seen performances given by men whose daily work is on the platform of an electric car which would be of credit to any vaudeville stage in New York or Chicago. Athletes there will be, of course, in abundance and of all kinds, and where an electric railway system has several divisions contests for supremacy in baseball, boxing, bowling and other sports between teams representing these different divisions can usually be arranged with ease, without interfering with the regular work and to the benefit of all.

THE JOINT USE OF POLES

The joint use of poles by telephone and telegraph, electric light and electric railway companies involves many complex questions of engineering practice, franchise requirements and public policy. The National Electric Light Association has already adopted a standard form of agreement and specifications for the joint use of poles by electric light and telephone and telegraph companies which was prepared by its committee on overhead line construction in co-operation with representatives of the telephone and telegraph companies. The committee on power distribution of the American Electric Railway Engineering Association also has been drafting a form of agreement and specifications which it expects to present at the next October convention. At the Cooperstown meeting of the Street Railway Association of the State of New York, W. J. Harvie presented still another form of agreement and specifications as the report of a committee of that association. The latter agreement and specifications differed in many important respects from those adopted by the National Electric Light Association, and were accepted and referred back to the committee for further consideration. While some preliminary steps have been taken looking toward a general conference at which an agreement and specifications acceptable to all concerned will be drawn up, nothing yet has been done along this line.

Because of the extended use of poles by two or more companies on the basis of joint ownership or rental for attachments applied, it is very desirable that a standard form of agreement and specifications covering the construction of all classes of attachments on such poles be formulated and used wherever joint occupancy is necessary or economical. Such an agreement should provide first of all for standard types of construction which will insure maximum safety to all circuits on the poles and to employees who may be working on the poles. Secondly, it should be broad enough to cover the wide variety of conditions which are to be found in large cities, small towns, and in open country; and, finally, it should provide for practicable working arrangements in such matters as maintenance, liability for damages, apportionment of rental charges, abandonment of attachments and extensions of lines not covered in the original agreement.

For such a purpose the standard forms of the National Electric Light Association would be inapplicable, one reason being because they have been drafted primarily for the joint use of poles by electric light and telephone and telegraph companies only. Provision for wires of railway companies is made in one article in the specifications, but seems to have been inserted only as an afterthought. Even this article does not cover poles used for lighting and railway attachments. As a matter of fact, the National Electric Light Association form agreement and specifications are substantially the same as those prepared and generally used by the American Telephone & Telegraph Company. Some of the construction drawings accompanying the specifications are copies of those used by the telephone company and the notes contain references to such titles as "chief engineer" and "division plant engineer." The agreement also contains certain restrictions which might prevent its

use by many companies. Thus, in Article 11 the right is denied the lighting company to permit any other telephone or telegraph company to use any of its poles for any purpose whatever within the territory already occupied by the telephone company. The same restriction applies to the telephone company, with respect to competing with the electric light companies. Such restrictions are contrary to the spirit which should underlie a general and equitable agreement, designed for use by any and all interests.

The form of agreement and specification submitted to the Street Railway Association of the State of New York is much broader than that of the National Electric Light Association and the text has been greatly simplified and condensed. It includes ten of the twelve construction plates which form part of the National Electric Light Association specifications. Plate 6 is modified so as to show railway bracket-arm attachments on poles carrying electric light wires, telephone wires, railway feeders and an arc lamp attached to the pole. Plate 9 is modified to show electric light wires, telephone wires and telephone cable boxes. The right to sell, assign, lease or in any way dispose of any portion of any of the poles or attachments covered by the agreement is conditional upon obtaining the written consent of all parties to the agreement, but it is specifically stated that this shall not be construed to limit the right of any party to the agreement to make a general lease or assignment of all its rights, property and franchises or to enter into any combination authorized by law. Another important difference between this agreement and that of the National Electric Light Association is in the matter of liability for damages. The latter specifies that the liability assumed by each of the two companies is one-half of the damages for injury to persons not in the employ of either of the companies, one-half of the damages for injury to property not belonging to either of the companies and the entire damage for injury to each company's employees. The New York agreement provides that each party shall be responsible for the effect of its own attachments and the acts of its employees and agents.

It is not necessary at this time to discuss at length other differences in the two forms of agreement and specifications which have already been made public. There are no insurmountable obstacles preventing the drafting of a form of agreement and specifications which will be fair to all interests concerned and will provide safe and economical construction. It may be necessary for each of the companies to waive its preferences on some points, but we feel sure that none of the interests involved would seriously insist on the incorporation of provisions which were unfair to any of the others.

Such an agreement would be beneficial to all of the coöperating companies in other ways than simply in the reduction of the cost of construction and maintenance of their aerial lines. In many cases it would remove the principal cause for a demand for the burial of all overhead wires, which has some excuse when an unreasonable attitude of the different electrical companies requires three, four and even five sets of poles on the same street. But where this unsightly forest is replaced by a single line of neat overhead structures to carry all of the wires there is very little to which even a most captious critic can object.

THE NEW YORK SUBWAY SITUATION

The feature of the subway situation in New York City during the present week has been the rejection on July 20 by the Board of Estimate of New York of the final proposal of the Interborough Rapid Transit Company to build the subways assigned to it by the McAneny committee. At the time of going to press with this issue the indications were that the city authorities would grant to the Brooklyn Rapid Transit Company the opportunity of constructing the subway lines north on Lenox Avenue into Bronx Borough and of building the Queens extensions and the Eastern Parkway line, declined by the Interborough; but the situation changes so rapidly that it is impossible to predict what the outcome will be.

From the beginning of the negotiations and up to within a week ago Mayor Gaynor seemed to be favorable to the general plan under which the Interborough Rapid Transit Company was to construct a portion of the rapid transit system. But his announcements of July 13 and July 20, in which he stated that he was strongly opposed to any guarantees by the city of the rate of return to the railway companies under the proposed franchises, showed clearly that the Interborough plan could not expect his approval. The profits which would have been derived by the company if it had constructed the routes covered by its proposal are, of course, entirely a matter of conjecture. Its experts believed that these profits would not have been large; the experts of the city took a more optimistic view. But the majority in numbers (although not in votes) of the Board of Estimate had agreed that the offer of the company should be accepted.

Undoubtedly the Interborough decided that it would be better not to jeopardize its present excellent financial condition for the problematical benefits of a greatly extended subway system under any less advantageous terms than those which it offered. Its decision is closely parallel to that reached by the Berlin Elevated & Underground road some years ago. That company, like the Interborough, had a financially successful rapid transit enterprise in the heart of Berlin and was urged by the city to extend this system into the suburbs, but declined. The outcome in that case has been the construction by one outlying suburb, which is a separate municipality, of an extension which is to be operated as part of the main subway system on a profit-sharing basis by the old company. In London the situation was, or is, not greatly different. The success of the Central London Railway, the first long underground tube line in that city, was followed by the construction of a number of other similar lines which have not proved so profitable. In Paris the subway system is still confined to the congested parts of the city, and it yet remains to be shown that subways can be built and operated at a profit except in the cities of the largest size and on routes of the greatest traffic.

The Interborough has always claimed that the terms accorded it were less favorable than those offered to the Brooklyn Rapid Transit Company, on which it would now seem the problem of providing rapid transportation within the greater city may devolve. Such an undertaking would be greater than ever before assigned to any urban railway corporation, but we have no doubt that it would be vigorously prosecuted and successfully accomplished.

Combined Carhouse and Shop, Bridgeport, Conn.

This Building Is a Noteworthy Example of a Reinforced Concrete Fireproof Carhouse, Supplemented by an Elaborate Aisle Sprinkler System.

The Connecticut Company, which operates most of the electric railway mileage in the State of Connecticut, recently completed a car maintenance structure which will serve as the principal storage and repair depot of the lines of its Bridgeport division. The new building is interesting not only for its durability and fireproof construction, but also for the incorporation of various conveniences for the employees of the car maintenance and transportation departments.

The structure is of the double-ended type, and comprises a ground floor, 331 ft. 8 in. long x 241 ft. wide, with an upper floor, 210 ft. long x 51 ft. 8 in. wide, for part of the shop and transportation department quarters. As shown on the accompanying plan, the ground floor is divided as follows: A car storage section, 134 ft. 4 in. wide, which contains ten through tracks, spaced 12 ft. or 15 ft. centers, depending upon the position of the roof columns; a truck overhauling section, 120 ft. 10 in. long x 54 ft. wide, which contains four tracks, two of which are continued into the carpenter shop, which extends to the opposite end of the carhouse, and the other two into the paint shop; a utilities section, 49 ft. wide throughout. The utilities rooms on the first floor comprise a blacksmith shop, 30 ft. 10 in. long; a machine shop, 120 ft. long; a fan room, 30 ft. long; a fire pump room, 15 ft. x 24 ft. 6 in.; a carpenter shop and mill room, 30 ft. long; a main stock room, 79 ft. 8 in. long, and toilet, locker and office rooms, with a hallway leading to the Congress Street end. The second floor arrangements, shown on another plan, comprise a hallway, office, locker and toilet rooms; men's room, 34 ft. 8 in. x 49 ft.; men's locker room, 30 ft. x 49 ft.; stockroom, 15 ft. and 75 ft. x 49 ft.; and armature room, 30 ft. x 39 ft. Access to the second floor is had by stairways in the hall, from the lower to the upper stock room, and from the machine shop to the armature room. There is also a 1-ton capacity electric freight elevator between the lower and upper stock rooms, and a 1-ton capacity trolley electric hoist working through the extended hatchway at the stairs between machine room and armature room, with a track over the benches of the latter room.

The several divisions mentioned are separated by fireproof partitions of various kinds. The carhouse proper has no partitions, but is divided into seven bays by reinforced concrete columns which are spaced 15 ft. apart. This car storage section is separated from the several repair shops by a 12-in. brick wall, furnished with five pairs of gravity fire doors. The other side of the repair shop section is separated from the utilities rooms by a similar brick wall and double fire doors leading into each room. The paint shop, which is a part of the general shop section, is isolated from the rest of the structure by the first 12-in. brick wall mentioned, by a fireproof partition made up of 6-in. porous hollow tile blocks and by rolling steel doors at each end. The block partition mentioned is also furnished with three gravity fire doors. The several utility rooms are separated by fireproof partitions of 6-in. tile. In general, the openings in these partitions are protected by gravity fire doors, which, like those in the rest of the structure, are 2½ in. thick, covered with tin and fitted with fusible links and other appurtenances of approved fire doors. All of the doors shown on the first and second floor plans are of the sliding type except the hinged doors in the stock and armature rooms on the second floor.



Bridgeport Carhouse—General Exterior View of Track Work, Carhouse Entrance, Side and Skylights; Also Shop Section at the Left

General Construction

The nature of the ground on which this structure was erected is such that part of the foundation is on rock and part on piling. The footings are of concrete. The walls and main partitions are of brick, while terra cotta tiling is used for coping the walls and parapet. The carhouse portals are formed by steel columns made up of L's and plate which carry horizontal steel girders composed of paired I-beams supporting the brick front. The roof beams are of reinforced concrete. The roof is of hollow tile, covered with slag, and between skylights it is pitched ½ in. to the foot in the carhouse section. A terra cotta tile parapet 4 ft. high separates this section from the rest of the first floor roof, which is pitched ¾ in. to the foot. The first floor roof is built to carry its own weight plus 40 lb. live load per square foot, while the floor on the same level over which the second story portion is built can carry a live load of 150 lb. per square foot.

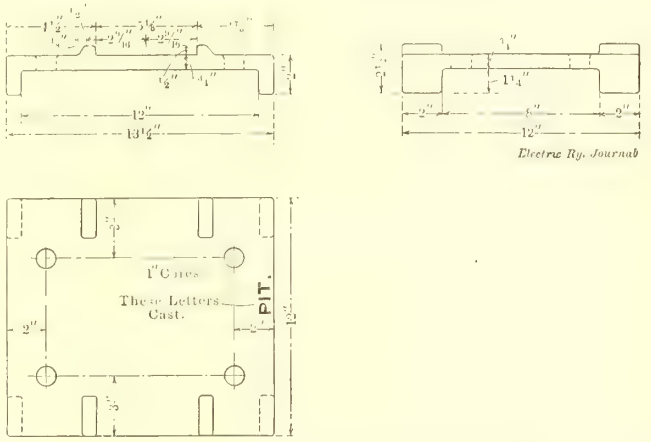
Concrete is also used in the construction of the carhouse floors and for the devil strips. The floors are laid on 8 in. of gravel and are 5 in. thick, with a 1-in. cement finish. The devil strips are built up on steel beams, expanded metal and concrete, with a like cement finish, and

are capable of carrying a live load of 100 lb. per square foot. All flooring in the carhouse, except that of the pits, is divided into 4-ft. x 4-ft. squares, with sand joints for the full depth. All of the tracks throughout the storage and repair sections are finished with open pits, as shown in the halftone illustrations on page 150.

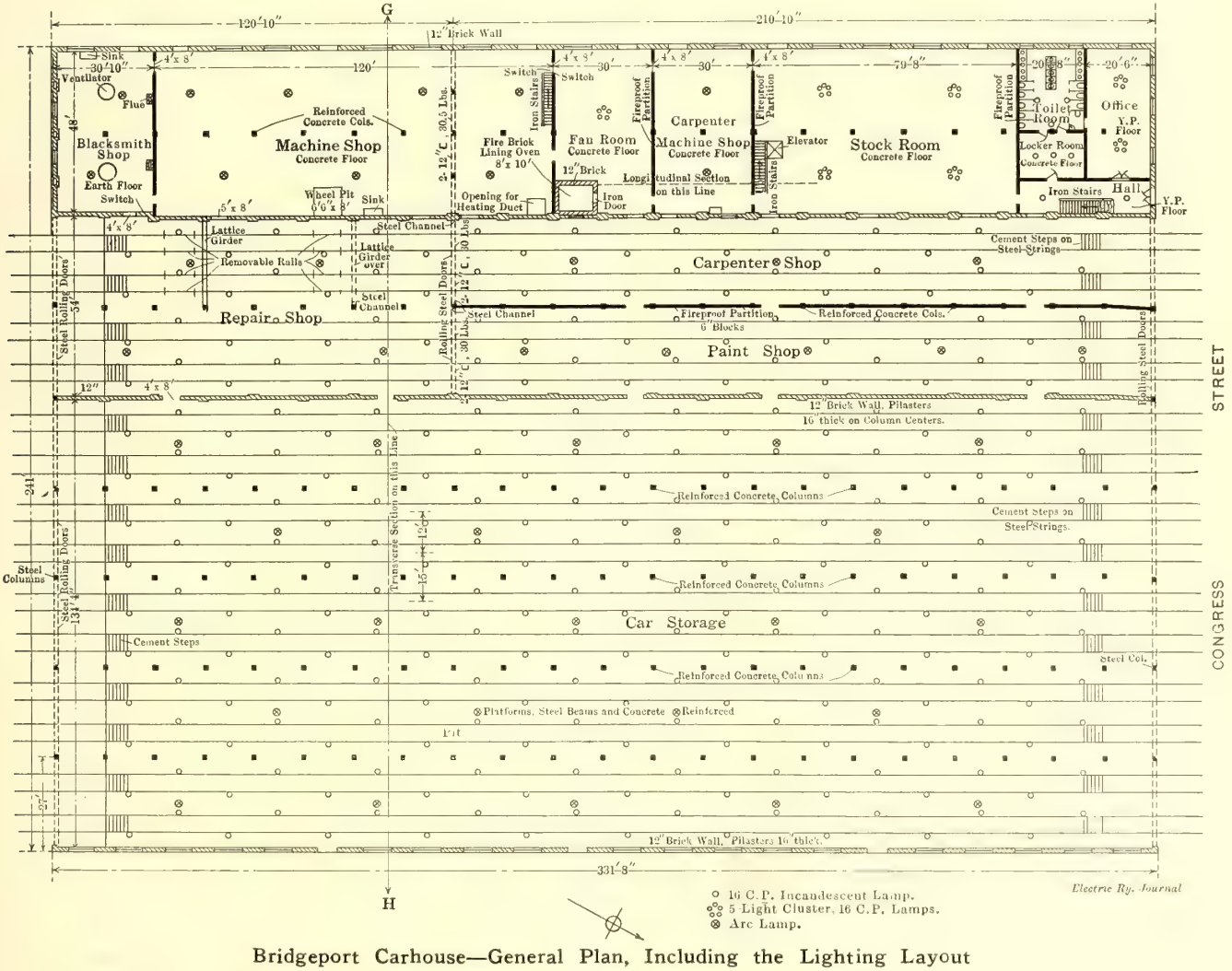
The devil strips are carried on concrete piers 5 ft. high. One of the accompanying drawings shows the cast-iron shoe with which each pit pier is fitted to give a base for the girder running rails. The pit floors are pitched ⅛ in. to the foot to 6-in. drains under the devil strips, as shown in the cross-section of the carhouse, so that the pits are dry at all times. These drains lead to a main cross drain, which in turn leads into a manhole where an electric sump pump of 100 gal. per minute capacity raises the water through a trapped discharge pipe to the sewer, the pump starting automatically when the water reaches elevation 90.0, the pit floor being at elevation 94.6. The carhouse is on the harbor front and mean tide is at elevation 93.0, with a maximum high tide some 2 ft. higher. To prevent back flooding, the discharge from the pump is carried up to elevation 96.0 and then dropped to the sewer at elevation 94.0. The pits are illuminated by lamps placed under the devil strips at intervals of 15 ft. The pit steps are made up of steel channels filled with cement.

steel angles, bolted to the steel channels and covered with 1¼-in. slate treads. This stairway has a wooden railing.

Different mixtures of concrete were used in the construction of this building, according to the service required. The concrete for walls, floors and other non-reinforced sections was made up of one part of cement, three parts of



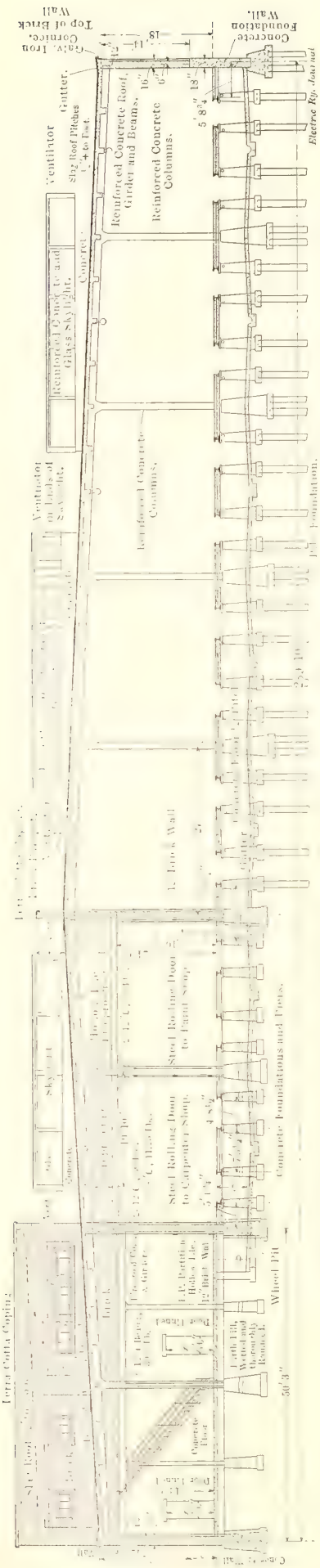
Bridgeport Carhouse—Cast-Iron Shoe for Girder Pit Rail



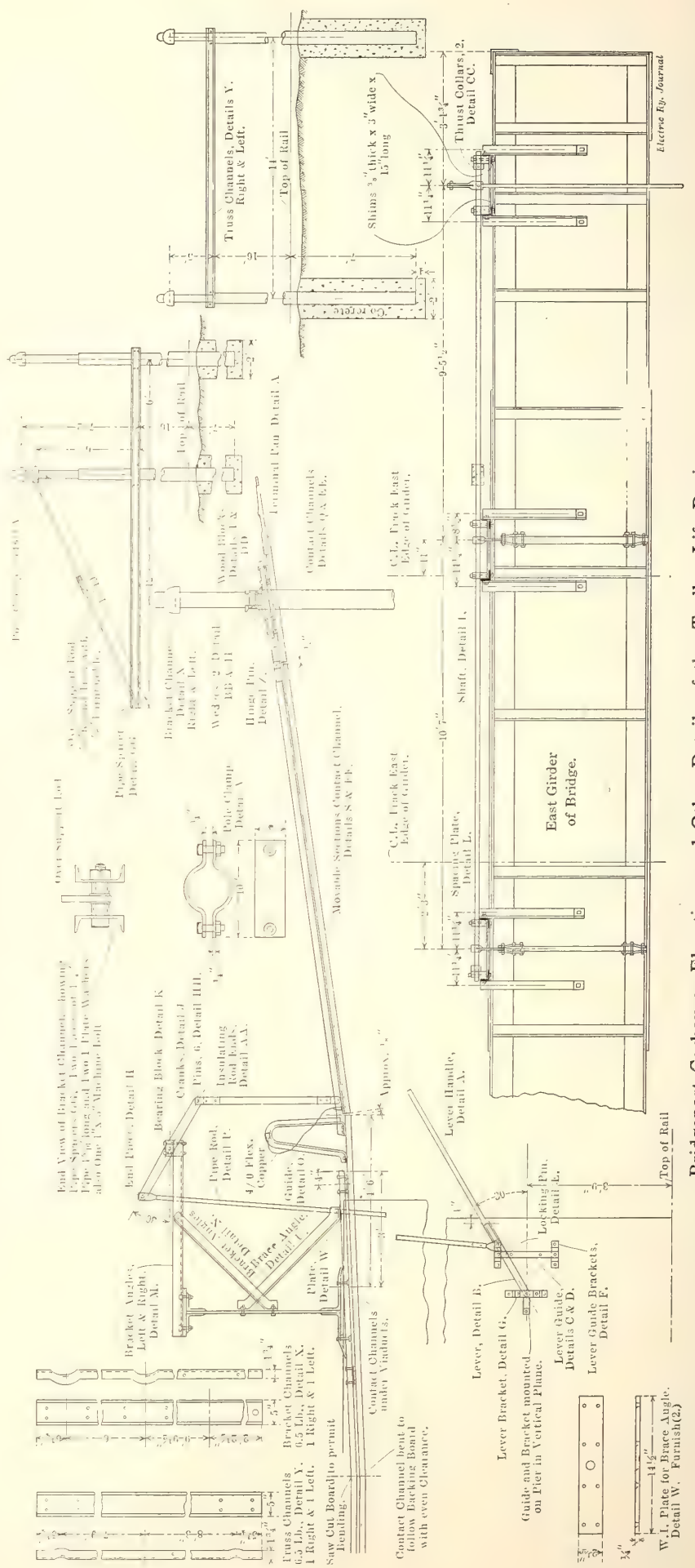
Bridgeport Carhouse—General Plan, Including the Lighting Layout

The general construction of the utilities section is also fireproof except that in some of the offices and employees' rooms wooden floors are used over the concrete and that ash wainscoting is installed. The stairways in the machine and stock sections are built up of channels, cast-iron treads with open risers and a pipe railing. The stairway in the main entrance hall at the Congress Street end is built up of

sand and five parts of broken stone or gravel. The concrete for reinforced work, such as columns and roof girders for the floor or roof slabs, was composed of one part of cement, two parts of sand and four parts of gravel or broken stone, the broken stone not being permitted to exceed ½ in. in diameter. Partly for efficient protection from fire, the minimum concrete coats specified were as follows: Reinforced



Bridgeport Carhouse—Transverse Section through the Line H-H on the General Plan of the First Story.



Bridgeport Carhouse—Elevations and Other Details of the Trolley Lift Devices

columns, 2 in.; steel in reinforced slabs, 1 in.; girders and beams, 1½ in.

All windows opening into the carpenter, repair and paint shops on the first floor, and the windows on the second floor which open on the roof, have double wrought-iron shutters. Wire glass of double thickness is used for all windows opening onto the repair and carpenter shops from the west wing of the building; also from all windows which face the second story roof.

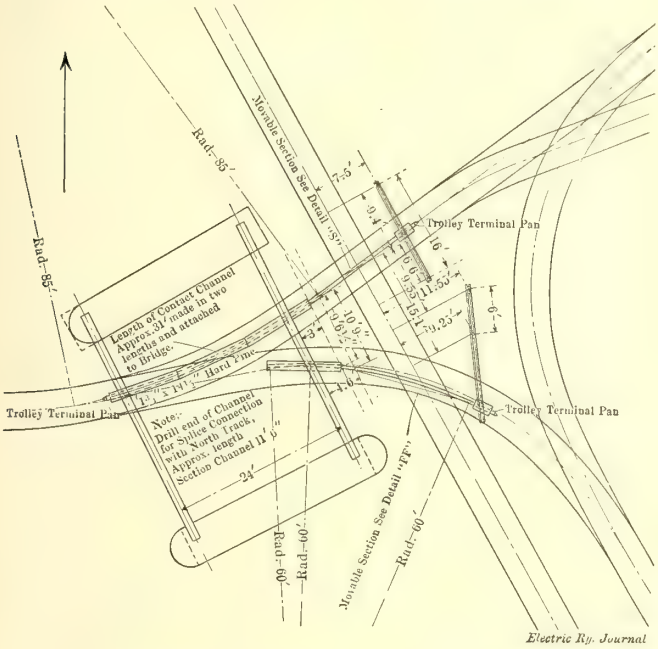
FIRE PROTECTION

The fireproof nature of this structure is clear from the preceding description, but its construction alone will not be relied upon to prevent fires. As shown in the half-tone illustrations on pages 150 and 151 there has been installed a comprehensive system of automatic sprinklers with sprinkler heads spaced to cover not over 200 sq. ft. of floor area per head. The main storage structure has aisle sprinklers opposite the upper sash of car windows, and spaced 7 ft. apart, all on the dry-pipe system. No ceiling heads are used in this section. Aisle sprinklers also are used in the paint, carpenter and repair shops, but as these sections are well heated they are on the wet-pipe system, as are the heads in the utility section, where ceiling heads only are used. In controlling wet and dry valves, pump, pressure tank and annunciator are in a fireproof pump room with no opening into the rest of the structure. Water is supplied by the city mains, through a 4500-gal. pressure tank. An electric pump of 1500 gal. per minute capacity automatically maintains a pressure of 80 lb. per square inch in case the city pressure drops below this pressure, while a 12-in. suction to the harbor gives an independent supply in case of the total failure of the city service. Steamer and hose connections outside the building permit the fire department to reinforce the system or the pump to be made available against exposure fires.

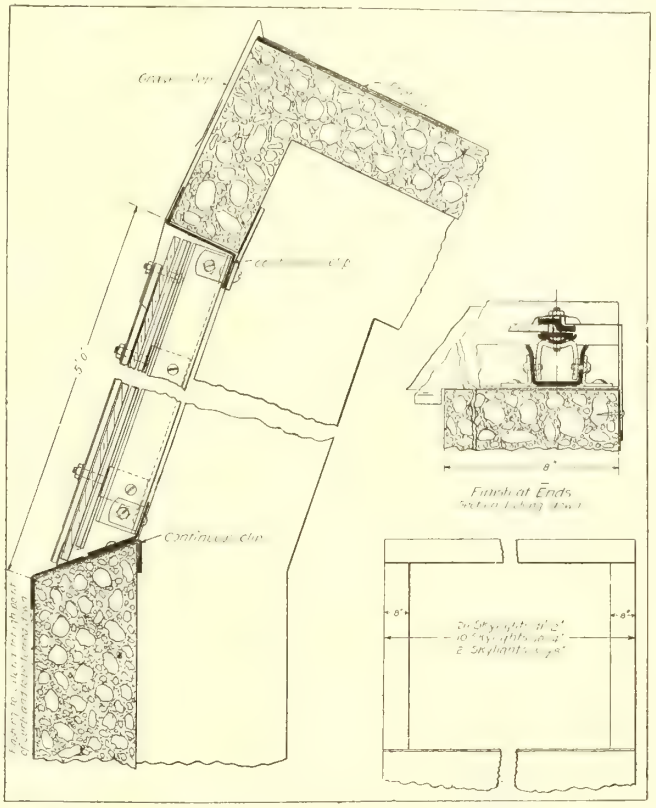
There is further a system of alarm boxes in the building, connected with a private box of the Bridgeport fire department, while an extension of the annunciator circuit of the sprinkler system gives duplicate indication in the main office, as well as in the valve room. The patrol inspection is checked by a watchman's clock system.

TRACK ENTRANCES

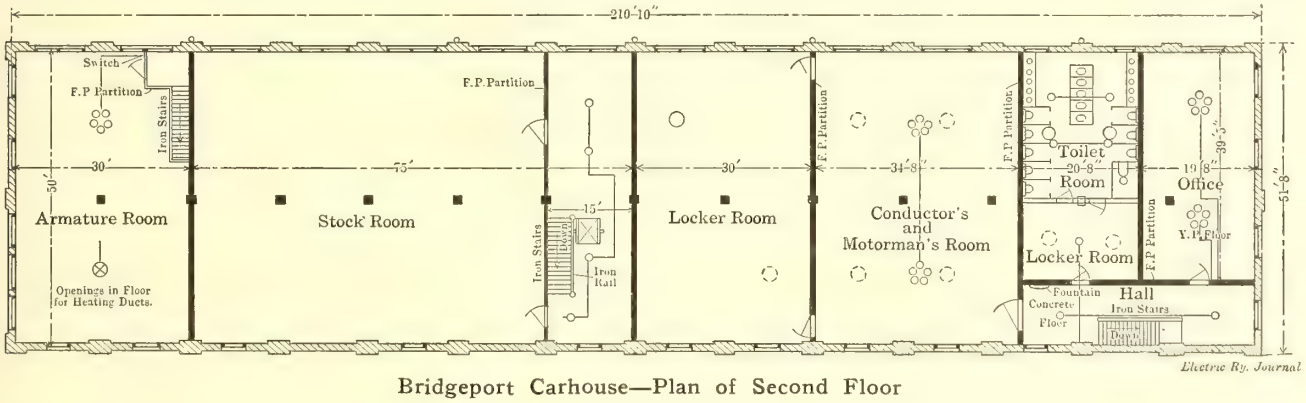
The track entrances at both sides of the carhouse are protected by rolling steel doors which are built in two sections with central guide post because the width of 27 ft. to 27 ft. 6 in. between the columns required too heavy single doors for hand operation. As the width of the carhouse was too limited to give good clearance for both tracks, the sections were made unequal. One section in each door gives full clearance for the largest car; to handle large cars on the other track requires raising both doors and swinging up the post by means of the chain tackle shown in the illustration.



Bridgeport Carhouse—Track Layout and Application of Trolley Lift Device



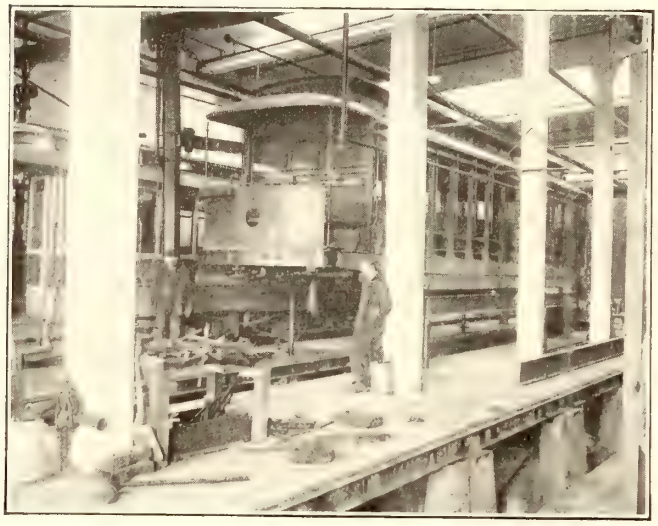
Bridgeport Carhouse—Section and Details of Puttyless Saw-Tooth Skylight



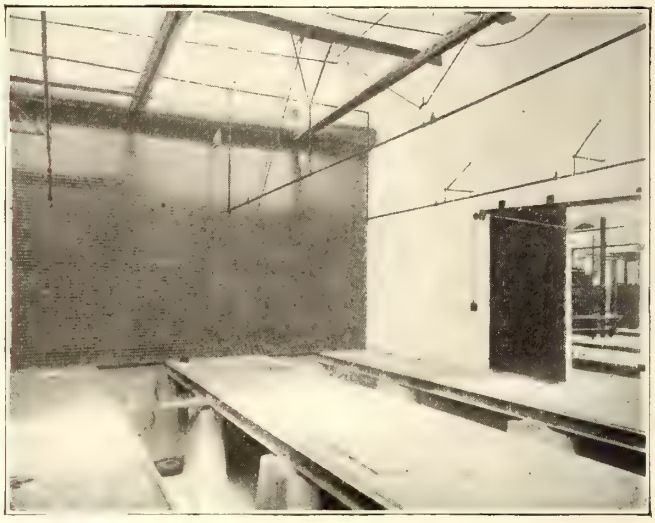
Bridgeport Carhouse—Plan of Second Floor

LIGHT, VENTILATION AND HEATING

The excellent natural lighting of the carhouse is obtained through thirty-two saw-tooth skylights, each approximately 40 ft. long, 5 ft. wide and totaling 6500 sq. ft. in area. These skylights are inclined at an angle of about 71 deg. Each light of glass is bedded on cow hair with a top covering of cow-hair felt and a rust-resisting metal cap which is held by brass nuts to brass studs placed at intervals of 16 in. and set into the skylight rib. As no cement or putty



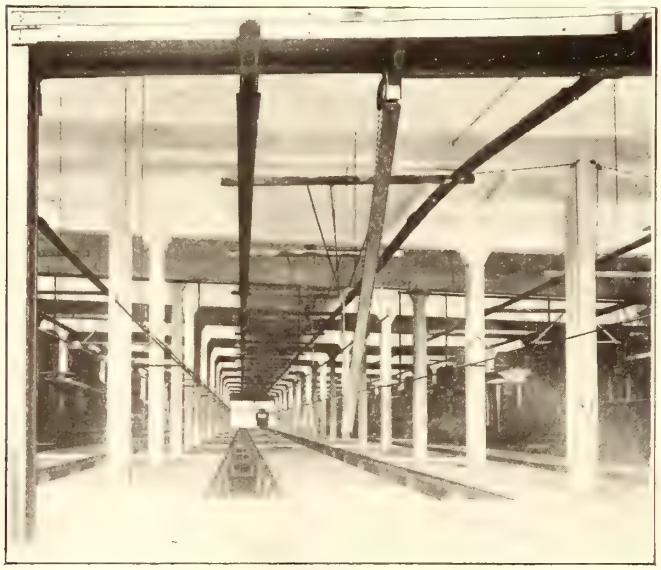
Bridgeport Carhouse—Maintenance Section, Adjacent to the Machine Shop



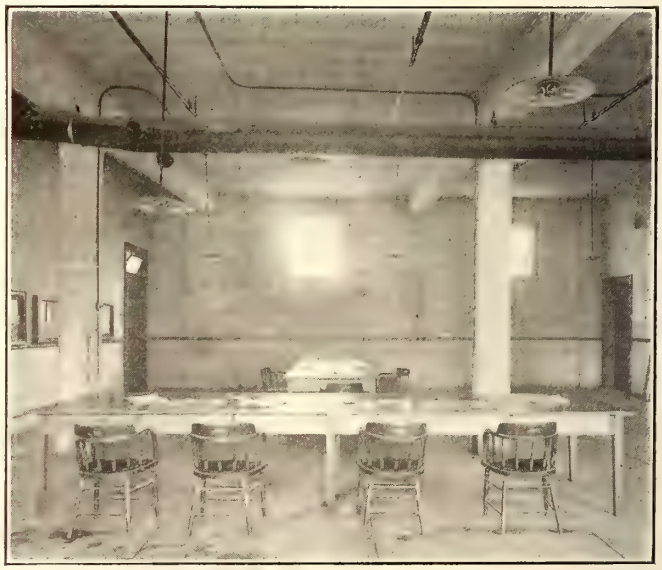
Bridgeport Carhouse—Steel Shutter for Isolating the Paint Shop from Rest of Maintenance Section

is used, this construction permits the easy removal of any light of glass at any time for cleaning or replacement. The illustration on page 149 of a typical saw-tooth skylight also shows the continuous clip which permits the light to be attached to the building structure despite the differences in the angle of the concrete at each end.

The artificial illumination of the carhouse is furnished by 100-volt series arc lamps with clear globes overhead, and



Bridgeport Carhouse—View Through a Storage Bay



Bridgeport Carhouse—Motormen's and Conductors' Room

110-volt series 16-cp incandescents in the pits. Arc lamps are also used in the shop rooms in addition to incandescent lamps placed singly or in clusters, as shown on the general plan.

The carhouse is ventilated through louvers which are set at both ends of each skylight. The carhouse proper, the shops and the various utility rooms are heated on the indirect system from an equipment which is installed on the first floor of the utilities section. The apparatus consists of two single-inlet, multiple-vane fans, each of which can deliver 60,000 cu. ft. of air per minute at its normal speed. These two fans are set side by side. Their inlets are connected by a steel plate inlet box to the chamber formed by the jacket surrounding the heater coils. Each is driven by a direct-connected center-crank horizontal engine which operates the fans at normal speed with a steam pressure of only 25 lb. An outside-packed, brass-fitted pump with receiver is placed near the heating apparatus to return the water of condensation from the heating coils to the boilers which are located in a passenger station adjoining the carhouse. The exhaust steam from the fan engines is utilized in the heating coils and the rest of the steam required is supplied from the boilers at a pressure of 25 lb., as noted before.

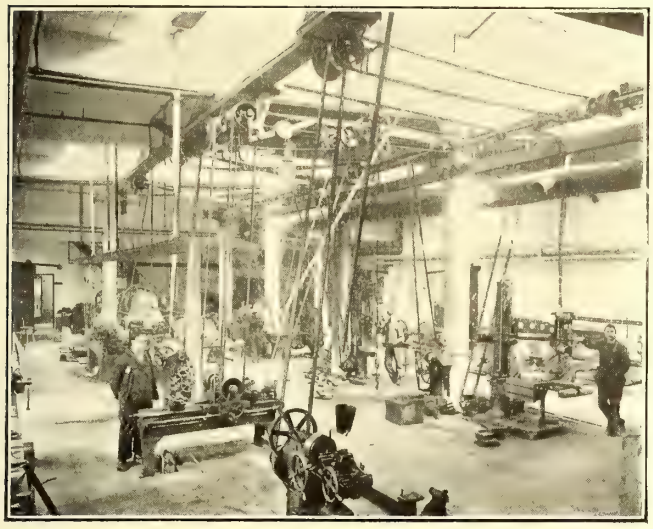
The air from the fans is carried across the carhouse by means of a galvanized-iron duct from which branches are run to the underside of the devil strips. These branches have outlets at suitable intervals so that the hot air is discharged directly into the pits. The utilities sections, both on the first and second floors, are heated by means of galvanized-iron ducts with outlets in each room, all of which are supplied from a galvanized-iron riser from the fan-discharge chamber.

In order to make the heating as economical as possible, most of the air is taken from within the operating portion

of the building. This is done by connecting together the ends of one row of skylights on the roof so that they form a continuous passage and then bringing a connection from the fan room up through the second story of the building and continuing it to the end of the return duct thus formed.

UTILITIES ROOMS

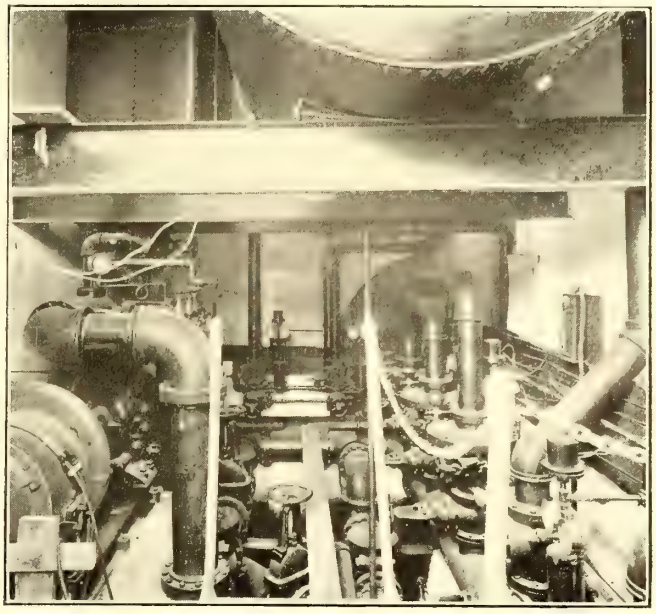
The dimensions of the utilities rooms on the first floor have already been given. The blacksmith shop contains two down-draft forges with motor-driven blowers and ex-



Bridgeport Carhouse—Machine Shop Section on the First Floor

hausters, one 150-lb. helve hammer, a combined punch and shear, and a babbitting furnace. The hammer and punch are driven by a shaft extended from the machine shop.

The main machine shop has a 42-in. steel-tire wheel lathe with motor-operated tailstock, a 300-ton wheel press, a 200-ton wheel press and a vertical-wheel boring mill, each with individual motors. In addition, there are two vertical-drill presses, a horizontal cotter and key seat slotter, a 36-in. radial-drill press, a 25-in. back-geared shaper, three engine lathes, a pipe-threading machine, a small planer, a babbitt boring mill, a double 12-in. emery grinder, a 30-in. automatic knife grinder and a magazine hack saw, all belt-driven from a 15-hp motor. An overhead trolley rail carries a 1-ton triplex hoist which serves the larger tools; in addition, the wheel drill has a small motor-operated crane attached to its pillar.



Bridgeport Carhouse—Valve Room with Fire Protection Apparatus

The wood-working shop contains a two-spindle shaper, a single-head tenoner, capacity 20 in. x 7 in., a 20-in. x 84-in. buzz planer, a 26-in. x 8-in. single-surface planer, a 36-in. band saw, a rip saw, a 14-in. variety saw bench, a 16-in. swing saw, a mortiser and borer, two vertical wood-boring machines, and a 14-in. emery wet grinder, all belt-driven from one 7-hp motor, also a 20-in. patternmaker's lathe with individual-motor drive.

The armature room on the second floor has an electric hoist for handling armatures from the machine shop below



Bridgeport Carhouse—Interior, Showing Construction of Roof, Aisles and Pits; Also Aisle Sprinkler System

to the benches, an oven, and the motor-driven combination banding, heading, grooving and turning lathe. The electrically heated armature oven has brick compartments with counterbalanced sliding doors of iron and asbestos. It is a modification of a design originated by W. D. Wright, master mechanic of the Rhode Island Company.

REPAIR SHOP

In the repair shop on the ground floor of the main section is a motor-driven wheel grinder for truing wheels without removing from car; two 5000-lb. capacity pneumatic jib cranes with 11-ft. arms and 5-ft. lift; and four car lifts, each consisting of four screw jacks, two on each side, each pair carrying a 12-in., 31½-lb. I-beam 30 ft. long. Needle beams placed on these and under the car body allow the jacks to lift the latter. The jacks are motor-driven by worm gears affording a positive lock in all positions, each hoist having its own motor. One of these lifts is shown in an illustration on page 150.

In addition, air piping with outlets every 25 ft. is provided for small pneumatic tools, and there is a portable vacuum car cleaner.

MISCELLANEOUS

The overhead trolley circuit inside the building consists of a 2-in. x 2½-in. 3.7-lb. angle on a 2-in. x 12-in. strip of spruce hung from the roof beams. Outside, a No. 0000 grooved trolley wire is used An interesting feature is the drawbridge shown on page 148. The track from Congress Street passes under a low viaduct with but 13-ft. 7-in. clearance, immediately alongside of which is a service freight track over which must be had at least 15-ft. clearance to pass large box cars. This condition made a fixed trolley wire impossible for either the straight crossing or for the crossing by a branch-off to the run around the carhouse track. The problem was solved by an angle-iron conductor, hinged at one end to an overhead support and at the other to a bell-crank lifting device with a locking quadrant about 4 ft. from the ground. As a precaution against attempted mischief the operating lever can be detached and kept in the carhouse office except when needed.

This structure was designed and built for the Connecticut Company by the engineering department of the New York, New Haven & Hartford Railroad under the direction of E. H. McHenry, vice-president in charge of engineering; Edward Gagel, chief engineer; Charles Rufus Harte, assistant engineer in charge of the construction department; C. W. Lord, chief draftsman, and R. J. F. Gerstle, resident in charge. The track work, overhead work, tool installation and lighting were done by company forces; all other work was done by contract.

BULLETIN ON ATLANTIC CITY HOTELS

The American Electric Railway Association has issued convention Bulletin No. 2, which presents information on the hotel rates and facilities for the next convention, to be held in Atlantic City, N. J., Oct. 9 to 13, 1911, inclusive. The exhibit of the Manufacturers' Association will again be held on Young's Million Dollar Pier. The hotels selected as headquarters for the 1911 meeting of the several associations are as follows: American Association and Manufacturers' Association, Marlborough-Blenheim; Accountants' Association, Chalfonte; Engineering Association, Dennis; Claim Agents' Association and Transportation & Traffic Association, Traymore. The schedule of rates and accommodations given in the bulletin covers the thirty-three hotels which have combined to defray the expenses necessary to provide proper facilities for convention purposes. Reservations should be arranged for directly with the hotels. Mistakes may be avoided by stating that such reservations are desired in connection with the convention. The request should be accompanied by an explicit statement as to the kind of room desired, whether with or without bath, and the dates of arrival at and departure from the hotel. Special rates have been made with the understanding that hotel charges will be for the full time of reservation. It is recommended that convention visitors communicate promptly with their respective hotels regarding reservations in order that the best choice of rooms may be obtained. The bulletin contains a half-tone of the exhibit pier and a map of Atlantic City showing the location of the principal hotels. Subsequent bulletins will give details of transportation matters, registration, programs, meeting halls, etc.

HEARING ON TAUNTON AND PAWTUCKET FARES

The Massachusetts Railroad Commission recently gave a public hearing at Boston upon the petition of Representative Bellamy for the introduction of free transfers on the Taunton & Pawtucket Street Railway between Taunton, Attleboro and Pawtucket. Mr. Bellamy represented the petitioners, and the company was represented by J. W. Burke, Attleboro, Mass. The principal points brought out by the company follow: The Bristol County Street Railway, preceding the Taunton & Pawtucket Street Railway, had a total through fare in 1904 of 15 cents, divided in three 5-cent fare zones. In 1905 the company went into the hands of a receiver, and was purchased by the present interests. The earning capacity, after the property had been improved, was tested and the necessity of raising fares became apparent. In 1908 four zones of 5 cents each were established, making the through fare 20 cents. The mileage in the different townships required that in Taunton, where the ride was more than 6 miles, the mileage would have to be split so as to provide a full zone and part of another zone. In connection with the establishment of the four zones a petition for a change was presented to the Railroad Commission, and the board approved of the new fares.

The petition presented by Mr. Bellamy aimed to permit all riding in Taunton to be enjoyed for 5 cents, embracing a present zone wholly in Taunton and in addition a part of an adjacent zone. No change by way of increase in the total earnings of the company warranted such a concesssion. Nothing in the earnings of the company warranted the change; the number of local passengers affected was found to be very limited, and the petitioners appeared to fail to consider the effect of a change upon the company's through fares. The commission has since sustained the company in the following finding:

"The petition, briefly stated, is an application for a recommendation by the board that the Taunton & Pawtucket Street Railway establish a 5-cent fare zone coextensive with its line in Taunton. However desirable a single 5-cent fare within the limits of a municipality may be, the question reserved for the board's consideration in all cases of this character must be the reasonableness of the rate. Among other factors to be taken into consideration, and by no means the least important, in making any adjudication with respect to such reasonableness, is the return upon the capital invested, and the necessity of permitting the carrier to make adequate provision for maintenance.

"On May 21, 1908, the board dismissed a petition for a recommendation that there be a decrease in rates then effective on the Taunton & Pawtucket Street Railway. At that time the board made a careful study of the whole situation, including the finances of the company. A further examination, made at this time, convinces us that the fares established by the company on that part of its line in the city of Taunton are not unreasonable. Upon the filing by the company of the return for the year ending June 30, 1911, the board will have before it certain additional information that may tend to modify its present views, and in such event will be prepared to modify this finding if in its opinion the public interest so requires."

Social Activities of Employees of the Public Service Railway

The Transportation Employees of This Company Have a Remarkable Group of Social Organizations Which Have Done Much to Foster Good Feeling Throughout the System.

The Public Service Railway Company, which operates throughout the greater part of New Jersey, has always been a strong believer in the policy of maintaining the most pleasant relations among the employees themselves and between the employees and the officials. As a result of this attitude there are in existence on the Public Service system to-day a large number of social organizations made up of the transportation men of the various divisions. There are five clubs on the Essex Division, four on the Hudson Division, two on the Central Division, one on the Southern Division, etc. The dues paid by the members are nominal, namely, 5 cents or 10 cents a month, except for slight assessments to cover the expense of special entertainments. The clerk of the local division headquarters always acts as the secretary-treasurer and the expense accounts may be seen by interested parties at any time.



Public Service Employees—A Hallowe'en Celebration at the Camden Carhouse

All of these bodies are of a purely social character. They have no financial connection with the sick benefit and pension fund which was instituted the first of this year by the Public Service Railway Company, nor with the original employees' sick and death benefit societies, which were organized long before the different properties were consolidated under one management. The direct financial participation of the company is limited toward making good any small deficits which a club would find embarrassing if it relied entirely upon the resources of the men. It is not the policy, however, to promise any predetermined sum for such purposes.

The headquarters of every society is the club room at the carhouse. These club rooms vary in size according to the number of men employed, but in all cases their seating capacity is large enough to seat an additional number of people at entertainments; thus the West Hoboken club room serves 400 employees but has room for 600 people. Officers of the company, prominent local citizens and public officials are frequently invited to attend the entertainments and annual dinners given by the men, but there is an unwritten law that the visitors must not unburden themselves of speeches on "shop" subjects. When the management considers it necessary to give a talk on discipline, rules or similar matters the superintendent of transportation, his assistant or division superintendents provide a special smoker where nothing but the subject of the meeting is discussed as man to man.

It is natural that in an organization employing thousands of men there should be found all kinds of musical, dramatic and athletic talents for club room festivities. Each organization has plenty of entertainers in its own ranks, but occasionally "star" performers from one division are invited to entertain at other club rooms. The men greatly favor the presentation of comedy sketches, such as "Ye Olde Districkt Skule," because they give many of them as well as their families an opportunity to appear in all kinds of amusing costumes. Barn dances are also very popular for the same reason. Two of the accompanying illustrations show the high degree of skill in make-up attained by participants in theatricals of this kind.

At Camden, in the Southern Division, the regular organization is reinforced by a Ladies' Auxiliary composed of relatives of the motormen and conductors. The auxiliary renders much help in decorating the club room for gala occasions, and on several occasions has arranged entertainments for the trainmen in the carhouse auditorium. One of the illustrations shows the interesting effects obtained by the use of pumpkins and holly at a Hallowe'en celebration. The Camden club is the only one that has a ladies' auxiliary. It is also unique in possessing a brass band of twenty pieces. The instruments were furnished by the company.

Christmas, of course, is the time when the entertainments are devised with the special view of pleasing the children. The club rooms are appropriately decorated and jolly-spirited carmen discard their customary uniforms for the

traditional garb of Santa Claus to distribute toys and candies to the eager youngsters. The funds for these donations are raised by the men by means of annual balls, barn dances and the like. In addition, every married man is taxed 25 cents and every bachelor 50 cents. Each man is entitled to distribute two gift tickets. One of the illustrations shows a typical Christmas celebration at the West Hoboken club room. At Paterson last year Santa Claus was provided with a sleigh which was driven by a horse, as reindeer are not found in the environs of the Silk City.



Public Service Employees—The Pavonia Boys Ready for a Barn Dance



Public Service Employees—Santa Claus in the Carhouse at West Hoboken

Practically all of the club rooms are equipped with gymnastic apparatus of some kind, including boxing gloves and wrestling mats. Two employees of the company are professional bag-punchers, who go on tour for two months every year and serve the company as trainmen the rest of the time. Probably the greatest attention has been paid to boxing at the West Hoboken carhouse, owing to the fact that it is the training headquarters of a noted colored pugilist who was formerly a car cleaner on this system. Quite a number of the men have become proficient boxers under his instruction.

Aside from the local entertainment, to which members from foreign divisions are always welcome, other events are given to bring together men from several districts. The main attraction is a general entertainment and ball which is given twice a year at the expense of the company. This affair is conducted both afternoon and evening, so that the greatest possible number of men will be able to attend with their families. An interclub feature which has always aroused considerable interest among the men is the annual pool tournament for the silver loving cup offered by the president. It has been decided to provide a new cup for the ensuing year, owing to the fact that the Montclair carhouse has won this cup for five years in succession, and shows no likelihood of losing it in the immediate future.

At the present time there is a baseball league composed of eight teams, each of which plays twenty scheduled games. First, second and third prizes are awarded to the teams which have scored the greatest number of runs respectively. These prizes are usually presented by the winning nines to their best or most popular players. The pennant-winning team becomes the custodian of a silver loving cup which is an object for annual competition. The carhouse teams also play games with nines from the police department, fire department and large manufacturing organizations. To enable the men to enjoy this athletic feature to the greatest advantage the company has laid out a park at Springfield Avenue and Forty-third Street, in the suburbs of Newark. The first baseball game at the new field was played on Saturday, May 20. These grounds have been laid out for baseball, football, cricket and the various sports of the cinder path.



Public Service Employees—Characters in the Comedy Sketch "Ye Olde Distrikt Skule"

Aside from the entertainments made possible through the facilities furnished by the company, the clubs also have outside entertainments, such as picnics, fishing parties and bowling. In order to encourage the growth of the last-named sport the company is planning to build one bowling alley at the Springfield club house and another at West Hoboken.

TRACKLESS TROLLEYS IN BRADFORD AND LEEDS, ENGLAND

On June 20 a trackless trolley line in Bradford and another in Leeds, England, were opened with appropriate ceremonies. These are the first trackless trolley lines in Great Britain. The line in Leeds extends from the center of the city to Farnley, a distance of about 4½ miles. It traverses a thinly populated territory which heretofore has had no transit facilities. The Bradford line is shorter, being a trifle less than 1½ miles long. Unlike the line in Leeds it traverses a thickly populated manufacturing district and connects with tramway lines at each end. The construction features of the Bradford and Leeds lines are very similar, as the work was carried out under the joint supervision of J. B. Hamilton, general manager of the Leeds tramways, and C. J. Spencer, general manager of the the Bradford tramways. The adoption of the trackless trolley system for these two lines followed a visit of the Leeds tramway committee to the Continent two years ago to inspect the trackless trolleys then in operation in Germany and Italy. The contract for both lines was given to the Railless Electric Traction Company, Ltd., London, which owns the patents on the apparatus employed.

The overhead construction consists of four No. 0000 ½ mile. The negative wires are not sectionalized and wherever possible they are bonded to the rails of intersecting or parallel tramway lines so as to decrease the drop in the return circuit.

The trolleys on the cars are of the double under-running



Bradford Trackless Trolleys—Car Passing Two Wagons

type and are mounted on the roof near the forward end. Both the trolley base and the trolley wheels are free to revolve about a vertical axis, and the length of the poles is such that the car can travel at a distance of 15 ft. outside the center line of the trolley wires. One of the



Bradford Trackless Trolleys—Overhead Construction at Terminal Loop

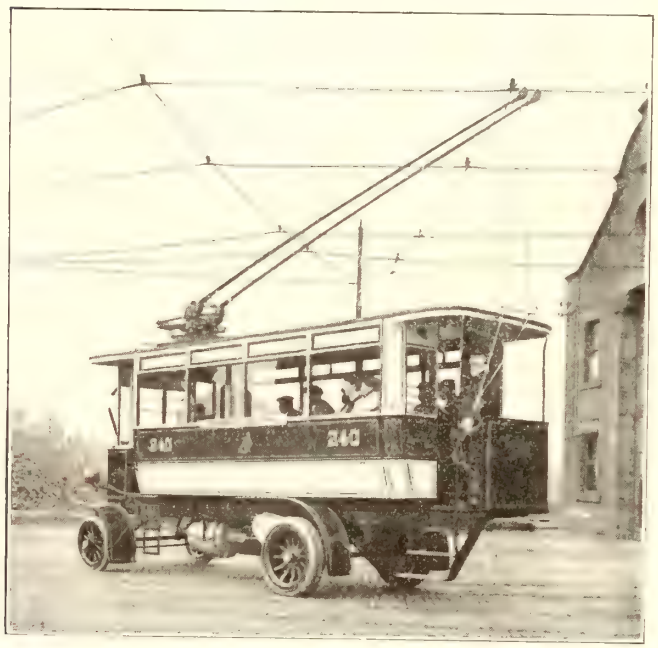
grooved copper trolley wires which are suspended in pairs from yoke hangers. Span wire construction using ornamental iron poles at the curb line is employed in Bradford, but in Leeds the trolley wires are carried by bracket arms 18 ft. long. The two positive wires carry current at 525 volts and they are sectionalized at distances of about

illustrations shows one of the Bradford cars passing two trucks which, together with the car, occupy the entire width of the street.

In Leeds the trackless trolley cars run for a distance of nearly a mile on a street in which an electric tramway is already in operation. In order to avoid the use of

two sets of overhead wires the trackless trolley cars use the positive wire of the tramway system and they are also fitted with a collector which runs on the tramway rail and makes the negative connection. This collector consists of a skate hinged at the rear end of the vehicle and arranged so that it may be raised and lowered. It permits a deviation of 5 ft. from the center line of the track.

The cars, of which two have been ordered for Bradford and four for Leeds, resemble a motor omnibus. The Bradford cars are entered from a rear platform and have a motorman and a conductor, but the Leeds cars are entered from the front platform and only a motorman is required. The bodies of both types of cars have cross seats upholstered in rattan and they have a total seating capacity for 28 passengers. The wheels are of the artillery type, with solid rubber tires. Single tires are used on the front wheels and double tires on the rear wheels. The wheel base is 13 ft. The cars are equipped with two Siemens interpole motors of 20 hp each. These motors have shunted fields and are suspended below the frame of the chassis. Each motor drives a countershaft through



Bradford Trackless Trolleys—Type of Rolling Stock

worm gearing immersed in oil and the drive from these countershafts to each of the rear wheels is by chains and sprockets which are inclosed in a metallic dust-proof case. A large part of the weight of the cars is carried on the rear wheels. This increases the tractive effort and facilitates steering by the front wheels. The motors have a maximum speed of 1050 r.p.m. on 525 volt current They are geared to give a maximum speed of 10 m.p.h. to the car. The controller is of the Siemens series-parallel type and is provided with special connections for cutting out either motor. The controller has nine positions, of which five are running positions, giving various rates of speed up to 10 m.p.h. The steering gear is designed to permit the car to be turned in a radius of 12 ft. measured from the rim of the inside rear wheel. The cars are lighted from incandescent lamps connected in the trolley circuit. Two sets of brakes are provided, one operated by a pedal and applied on the countershaft on each side and the other operated by a hand lever with a ratchet catch and applied on drums bolted on the rear wheels.

Regular operation of the Bradford line was begun on June 24 with a thirty-minute headway, the one-way fare for the journey of 1½ miles being 1 penny, equal to 2 cents in the United States.

DEPRECIATION ACCOUNT OF THE KOKOMO, MARION & WESTERN TRACTION COMPANY

After an inventory of the depreciable physical property of the Kokomo, Marion & Western Traction Company, Kokomo, Ind., Thomas C. McReynolds, the secretary and treasurer, established a depreciation account which is designed to provide for current replacements and future requirements on account of losses due to age and wear. The inventory was made at the beginning of the year 1909 and the account established to cover the operations of that year. It was then arranged to make an arbitrary charge

DISTRIBUTING LINES OF THE ELECTRIC LIGHT DEPARTMENT.

	Per Cent.		Per Cent.
Wire	2	Nernst lamps	10
Poles	7	Electric arches	20
Wire attachments	7	Signs	2
Guy wires and anchors	2	Lightning arresters	10
Street arc lamps and rigging	—	Meters	6
Commercial arc lamps and rigging	8	Transformers	6
Incandescent street light fixtures	8	High-tension transmission	3

CITY RAILWAY.

	Per Cent.		Per Cent.
Rails	3	Brick paving	5
Ties	10	Bridges	5
Spikes	5	Special work	13
Angle bars	3	Poles	7
Bolts	3	Feeder and trolley wire	2
Crossings	20	Span wires	5
Nut locks	5	Insulators, braces, etc.,	
Bonding	7	varying from	3 to 15
Excavations	3	Rolling stock	7
Track laying	3	Rolling stock equipment,	
Ballast	3	motors, trucks, etc.	7

INTERURBAN RAILWAY.

	Per Cent.		Per Cent.
Track rails	2	Tiling	3
Track laying	3	Bridges	3
Bonding	7	Paving	4
Railroad crossings	20	Rolling stock, car bodies	7
Special work	11	Rolling stock, trucks	7
Bolts and spikes	3 to 5	Rolling stock, motors and	
Ties	8	their equipment	6
Ballast	1		

SUBSTATIONS.

	Per Cent.		Per Cent.
Building	2	Rotary converter and booster	5
Lightning arresters	7	Storage battery (too low)	8
Cut-outs and transformers	5	Poles	7

DISTRIBUTION SYSTEM.

	Per Cent.		Per Cent.
Trolley wire	1-1½ to 2½	Brackets, cross-arms,	
Hangers, cross-arms,		etc., for transmission	7
etc.	5 to 10	Telephone line, cross-	
Transmission wire		arms, insulator wire	7 to 10
(aluminum)	2		

POWER PLANT.

	Per Cent.		Per Cent.
Building	2	Turbo-generators, rotary con-	
Battery buildings	2	verters, booster, etc	4 to 5
Coal trestle	6	Condensers	4
Boilers	5	Engine foundations	4
Steel smokestacks	12	Arc-lighting transformers	6
Piping, heaters	3	Lightning arresters	8
Water tanks	1½	High-tension cut-outs, etc.	10
Pumps	5	Storage batteries (too low)	8

REPAIR SHOP.

	Per Cent.
All machinery	8

CAR SHOPS.

	Per Cent.
Building	2 to 5

OFFICES.

	Per Cent.		Per Cent.
Furniture and fixtures	10	Adding machines, typewriters,	
Safe and vaults	2	addressographs and electrical	
		instruments	10

AMUSEMENT PARK.

	Per Cent.
Buildings	2

of a certain per cent against each class or division of the property. About the same percentages that are used by the Wisconsin Railroad Commission were adopted. At the end of each month there are set aside to the credit of the depreciation account for the various departments the amounts required by the percentages upon the appraisal of 1909. The annual percentages adopted by Mr. McReynolds are shown in the table published herewith.

Close account of the different departments is kept so as to demonstrate whether or not the amounts charged to each department will be sufficient to take care of the accruing depreciation. So far some accounts, such as ties and special work, have been overdrawn, while a great many other accounts have not been disturbed. That some accounts

have been overdrawn is due in part to the fact that the depreciation accounts were not started until about four years after operation of a portion of the property was started. It is believed by Mr. McReynolds, however, that the amounts now being set aside for maintenance and depreciation of ties and special work will have proved adequate at the end of ten years from the time the accounts were first established.

Mr. McReynolds says that to be really accurate the company should have taken into consideration the cost of the new construction and equipment for the year 1910, or the additions to the property, and charged off a certain percentage for depreciation. This, however, was not done, but at the beginning of the year 1912 all additions to the property since the last inventory will be taken into account and a certain additional per cent deducted for the depreciation which has taken place.

In the calculation the cost prices of apparatus were taken and the different elements were separated into electric light properties, city railway, interurban railway and other properties. In the determination of the percentage basis of annual depreciation the value of the salvage of the various articles and different materials inventoried was taken into consideration. Allowance was also made for an accumulated interest on the reserve, compounded when not used. This accounts for the low percentage on many of the items involved. During the two years and four months that have passed since the account was established the company has expended only about one-half of the amount set aside for depreciation.

Mr. McReynolds stated that the depreciation account was started as an experiment to determine the amounts that it was really necessary to set aside for the protection of each division of the property in order to maintain it properly and also to provide, where replacements could not be made from time to time, a reserve fund to take care of extraordinary replacements and future emergencies. So far the account had worked out satisfactorily and the amounts set aside, except in one or two instances, appeared to be adequate to take care of the depreciation.

Total charges for depreciation in 1909 were $20,253, of which $3,673 was spent for replacements, leaving a reserve balance of $16,580. In 1910 the total charge was the same and $13,199 was required for replacements, leaving a balance of $7,054 for the reserve fund, which amounted on Dec. 31, 1910, to $23,634.

The company received gross earnings in 1910 of $261,485, divided as follows: Interurban railway, $99,420; city railway, $62,146; light and power department, $99,919. Operating expenses were as follows: Interurban, $44,490; city railway, $30,531; light and power, $38,364; total, $113,385. Against the net income of $148,100 the following were charged: Bond interest, $50,000; preferred dividend, $6,000; taxes, $8,220; miscellaneous, $4,749; depreciation, $20,253; and common dividend, $30,000. The surplus was $28,878.

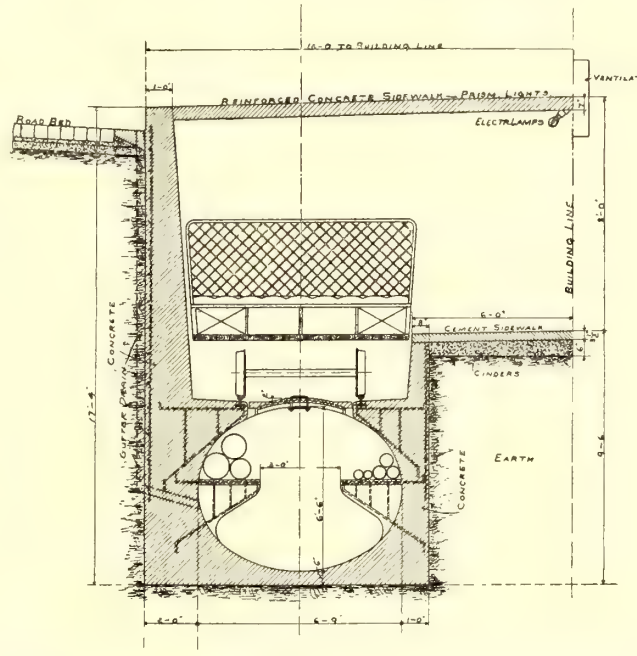
Total track mileage is 36½, of which 28 miles are in the interurban department and 8½ miles in the city department. Three passenger cars and one freight car are operated on the interurban line and six cars on the city road in Kokomo. The interurban departments ran 359,107 car miles last year and the city road 292,753 car miles. In the light and power department there were 2090 consumers.

H. Hall, vice-consul at Montevideo, Uruguay, reports that a local engineering firm, representing a syndicate of French capitalists, has been authorized by the Uruguayan Ministry of Public Works to make surveys for an electric railway from Montevideo along the coast to Maldonado and Punta del Este, a distance of 75 miles. The power is to be generated by means of low-grade coal and peat, of which there are large deposits in the neighborhood of Maldonado.

CURIOUS SUBWAY SUGGESTIONS

Following its policy of giving a hearing to all comers with suggestions relating to the proposed passenger subways in Chicago, the local transportation committee of the City Council of Chicago has given one or two hearings to proposals which seemed to be of an impracticable nature.

One of these was presented by J. H. Farrar, and was called by him a "sub-sidewalk railway rapid transit system." He said that he had been trying to bring his plan before the city authorities for thirty years, but without success. Mr. Farrar proposes to utilize only the space under the sidewalks for his combined subway and underground-utilities arrangement. The accompanying cross-section illustrates the inventor's proposal. The sewers are to be placed at each side of the street, under the sidewalks. They may be circular in shape, or, as illustrated, oval in section. The proposed sewer is about 7 ft. in diameter, and is much larger than really needed. Space is consequently afforded for brackets at the side which will support water and gas pipes and electric conduits, as well as other underground utilities. The top of this sewer is about 10 or 11 ft. below the surface of the sidewalk and,



Cross-Section of a Proposed Sub-Sidewalk Railway Rapid Transit System

as it is to be made of reinforced concrete, it is utilized for the tracks of the subway railway, which will run immediately under the sidewalk, the latter being made largely of glass, to admit light.

Mr. Farrar contends that his system would cost only $300,000 a mile for one side of the street, or $600,000 a mile for both sides, while the space occupied would only be from 10 to 20 per cent of that of the other systems proposed. The cars would have no roofs, and would be provided with cross benches seating 48 or 50 passengers. The total depth of the system, including the sewer, would be about 17 ft. or 18 ft. Mr. Farrar thinks there would be no objection to grade crossings in such a system, although if desired one line could be made to dip under another in the central part of the city. He insists that such a system would be pleasant to ride in, easily ventilated and very accessible, as well as economical. A speed of 30 m.p.h. could be attained by the cars. The entrance to the subway would be gained through rented stores in adjoining buildings, with basement connection. The inventor declared that the betterments to adjacent property would more than equal in value the total cost of

the proposed system. The committee did not seem to be greatly impressed with the idea, however, and only a few questions were asked.

J. W. Jenkins was another inventor who addressed the committee briefly. His idea, which is not particularly new, is to have a system of feeder cars running on auxiliary tracks, side by side with the express tracks. These feeder cars are to be brought from rest to the speed of the express trains, with arrangements for transferring passengers from one car or train to the other while both are going at full speed. This is to prevent the necessity of starting and stopping the express trains. During the operation of transfer the motorman of the express train is to control electrically both trains while they are running side by side. This idea also struck the committee as impracticable, and several objections were enumerated.

A suggestion of a more practical nature was that of Max E. Schmidt, of New York, who has urged the use of moving platforms or "sidewalks" as auxiliary means for handling heavy short-haul traffic in the new Chicago subways when built. Mr. Schmidt declared that his patented devices will permit practically noiseless platform operation at speeds up to 12 m.p.h., and cited engineers' opinions to show that for distances under 4 miles the continuous moving platform is actually quicker than a combination of express and local train travel, such as is employed in the New York subway. The continuous moving platform, he added, would avoid waiting for trains, would provide seats for a far greater number of passengers, would permit passengers to board and leave platforms at any point, and would obviate the heavy power demand necessary to accelerate ordinary trains. A platform operating at 12 m.p.h. would have boarding platforms traveling parallel to it at 9 m.p.h., 6 m.p.h. and 3 m.p.h. respectively. Mr. Schmidt offered no definite plan for the use of his continuous-transit system in connection with the proposed Chicago subways, but urged the device as an auxiliary to the regular train service in conveying large masses of people over short hauls, thus offsetting the heavy costs of the regular long-haul travel. In case the moving platforms were built pathways for pedestrians might be provided alongside, with merchants' windows opening onto these underground arcades.

MEETING OF THE COMMITTEE ON EXPRESS AND FREIGHT TRAFFIC

A meeting of the committee on express and freight traffic, American Electric Railway Transportation & Traffic Association, was held at the New York headquarters of the association on Tuesday, July 18. The committee members present were: Chairman H. E. Reynolds, assistant general manager Boston & Northern Street Railway; F. W. Watts, general freight agent Utica & Mohawk Valley Railway, and F. D. Norviel, general passenger and freight agent Indiana Union Traction Company. The committee discussed a draft of its proposed report to the 1911 convention. The final report will be based on replies made to the questions on data sheet No. 72 by 110 companies, of which ninety are doing an express or freight business. These replies relate to population, character of industries, class and limitations of franchises, solicitation and advertising, method of handling claims, transportation of newspapers, baggage, milk and cream service, accounting methods, contracts with express companies, etc.

Mr. Norviel proposed that the committee embody in its report some suggestions as to whether or not the express and freight department should receive credit for the transportation of departmental supplies. Advance copies of the report will be mailed by Chairman Reynolds to certain freight and express business managers, who will be asked to open the discussion on one or more of the subjects mentioned in the report. The meeting closed after a number of eliminations had been made in the committee's original synopsis and the tabulation of data upon which the ultimate report will be based.

AWARD OF ARBITRATORS IN THE RICHMOND CASE

An award has been made by the board of arbitration appointed to consider the value of operating rights over certain tracks of the Virginia Railway & Power Company, Richmond, Va., demanded by the Richmond & Henrico Railway, and the amount which each company should pay for the privilege of transferring passengers to the lines of the other company. The Richmond & Henrico Railway is an interurban line recently constructed to enter Richmond, while the Virginia Railway & Power Company owns the local system. The board of arbitration consisted of three members, of whom H. W. Fuller, general manager of the Washington Railway & Electric Company, was selected by the Virginia Railway & Power Company; William W. Cole, of Dodge, Day & Zimmerman, Philadelphia, was selected by the Richmond & Henrico Railway, and R. E. Danforth, general manager Public Service Railway, was selected by these two arbitrators.

The award of the arbitrators is dated July 6, 1911, and specifies the tracks of the Virginia Railway & Power Company which the cars of the Richmond & Henrico Railway will be allowed to use. It then states that for the use of these tracks the Richmond & Henrico Railway should pay 7½ cents per car mile. While on these tracks the cars and their employees are to be under the control of the Virginia Railway & Power Company and must comply with its rules and the orders of its officials. The equipment of the cars is to be at least as efficient as that on the cars of the local company, and in weight and dimensions of car body and wheels the cars should be able to be operated without injury to the tracks, except as regards ordinary wear and tear. The cars of the local company are to have the right-of-way at all crossings or connections. The Richmond & Henrico Railway is to be responsible for all damages caused by its cars or employees when operating over the local tracks, except where the Virginia Railway & Power Company or its employees are responsible.

The conditions laid down as to transfers provide that the Richmond & Henrico Railway is to redeem all of its transfers which are collected by the Virginia Railway & Power Company at 3 cents each, whereas the latter company is to redeem all of its transfers collected by the Richmond & Henrico Railway at 1 cent each.

The Richmond & Henrico Railway is to pay for the power used by its cars while on the tracks of the Virginia Railway & Power Company 4½ cents per car mile, unless the cars weigh over 42,000 lb. In that case the sum per car mile is to be increased by 0.225 cent per car mile for each 2000 lb. or part thereof in excess of 42,000 lb.

The contract provides for the maintenance of complete records by each company and other usual clauses in contracts of this kind, and also that all payments between the companies for the car miles run or transfers collected during each calendar month shall be made on or before the tenth of the following month.

In the argument before the arbitrators in the matter of transfers, attorneys for the existing lines represented that on the basis of mileage the Virginia Railway & Power Company had nineteen and one-half times the mileage of the new; on the basis of car mileage in operation it had ten times; on the basis of average distance to be traversed by passengers boarding at transfer points it would carry passengers four and one-half times as far. It was also represented that the new line would not originate traffic, but merely divert patronage from existing lines, since it goes into no new section of the city and serves to develop no new territory. The findings of the board of arbitration are understood to have been accepted by both companies.

COST OF MAINTAINING MOTOR CAR EQUIPMENTS ON THE BROOKLYN RAPID TRANSIT SYSTEM

The mechanical department of the Brooklyn Rapid Transit System maintains mileage card records and separate costs of the principal electrical elements of both the surface and elevated motor cars. This practice makes it easy to determine the mileage cost of any one or all of these items whenever such data are desired for comparison with earlier periods or with the costs of other companies. The electrical car maintenance costs of the Brooklyn Rapid Transit System are of particular interest because they show what can be done with old motors when every effort is made to maintain them in the best possible condition. As a matter of fact no new surface motors have been installed since 1907, the latest designs being the GE-80 and Westinghouse No. 101. The elevated motors, however, include the new Westinghouse No. 300 interpole design. Practically every motor on the system has a slotted commutator.

TABLE I.—SURFACE CAR MOTORS USED FOR THE 1910 SUMMER SCHEDULE OF THE BROOKLYN RAPID TRANSIT SYSTEM. (JULY-AUGUST-SEPTEMBER.)

No.	Type.	Motors per Car.
732	Westinghouse No. 68	{ 43-4 motor { 280-2 motor
1794	Westinghouse No. 81	2
424	Westinghouse No. 93	2
1136	Westinghouse No. 101	4
184	GE-64	2
500	GE-80	4
40	GE-57	2

4810 motors in all.

TABLE II.—SURFACE CAR MOTORS USED FOR THE 1910 WINTER SCHEDULE OF THE BROOKLYN RAPID TRANSIT SYSTEM. (OCTOBER, NOVEMBER, DECEMBER.)

No.	Type.	Motors per Car.
378	Westinghouse No. 68	{ 43-4 motor { 103-2 motor
1530	Westinghouse No. 81	2
424	Westinghouse No. 93	2
1136	Westinghouse No. 101	4
184	GE-64	2
500	GE-80	4
40	GE-57	2

4192 motors in all.

TABLE III.—MOTOR EQUIPMENT FOR THE ALL-YEAR SCHEDULE ON THE ELEVATED DIVISION OF THE BROOKLYN RAPID TRANSIT SYSTEM.

No.	Type.	Motors per Car.
874	Westinghouse No. 50-L	2
72	Westinghouse No. 50-B	2
172	Westinghouse No. 50-E	2
202	Westinghouse No. 300	2

1320 motors in all.

TABLE IV.—DETAILED COSTS OF MAINTAINING ELECTRIC CAR EQUIPMENT ON THE BROOKLYN RAPID TRANSIT SYSTEM FOR THE LAST SIX MONTHS OF THE YEAR 1910.

Total surface mileage			24,079,484
Total elevated mileage			17,055,340
		Total Cost.	Per Car Mile.
Armatures	Surface	$30,105.19	$0.00125
	Elevated	17,889.02	0.00105
Commutators	Surface	2,778.10	0.00011
	Elevated	1,384.32	0.00008
Fields	Surface	5,330.34	0.00022
	Elevated	742.84	0.00004
Car control	Surface	45,903.94	0.00190
	Elevated	45,300.71	0.00265
Gears, pinions and gear cases	Surface	27,151.11	0.00112
	Elevated	4,834.05	0.00028
Motor bearings	Surface	20,763.10	0.00086
	Elevated	831.36	0.00005
Brush holders	Surface	5,789.66	0.00024
	Elevated	4,725.22	0.00028
Motor miscellany	Surface	13,532.34	0.00056
	Elevated	4,374.27	0.00025
Cost per mile of all surface equipment parts listed			$0.00626
Cost per car mile of all elevated equipment parts listed			0.0047

The general character of the Brooklyn surface equipments is shown in Tables I and II, which present the lists of motors used for the summer and winter schedules respectively. Only one list of elevated motors is presented in Table III, as the elevated schedule does not differ materially throughout the year except that for three months no cars are in the shop for varnishing.

The detailed costs of maintaining the two classes of car equipment for the last six months of 1910 are given in Table IV. It will be noted that the total cost of the elevated equipment is only 0.47 cent per car mile as compared with 0.626 cent per car mile for the surface equipment. This is due to the fact that the maintenance cost of the individual elevated items is much less with the exception of control and brush holders. Furthermore, the control is the most costly item in both classes of equipment, the respective car-mile costs for surface and elevated (multiple-unit control) being 0.190 cent and 0.265 cent. In general, the term "maintenance" as applied in this table includes all labor and material charges for inspection and repairs.

The accompanying cost figures would not be complete without mentioning some of the items for which extraordinary amounts have been required to make comparatively old equipments approximate the reliability of new motors. Thus a great expenditure was required to slot all the commutators on the system in order to secure the operating advantages of high-grade brushes. In like manner, it has also been found advisable to begin reboring and relining all motor shells.

OPEN DOORS ON CLEVELAND PAY-WITHIN CARS

As stated in a recent issue, Street Railway Commissioner Dahl, of Cleveland, has issued an order that the doors on the rear platforms of the pay-within cars on the Cleveland Railway Company should be kept open during warm weather while the cars are in operation. In an interview with a representative of this paper Mr. Dahl stated that the primary reason for this order is to secure better ventilation, and he denied that the order was issued because of accidents caused by the closing of the doors on women's skirts, as reported.

EXHIBIT COMMITTEE OF THE MANUFACTURERS' ASSOCIATION

H. G. McConnaughy, of the Dearborn Drug & Chemical Works, has been appointed chairman of the exhibit committee of the Manufacturers' Association for the 1911 convention. Mr. McConnaughy has held this position for several years. He will assist E. H. Baker, of the Galena Signal Oil Company, who, as has already been announced, has been appointed vice-president of the Manufacturers' Association in charge of exhibits. The other members of the exhibit committee of the Manufacturers' Association, besides Messrs. Baker and McConnaughy, are:

L. R. Ashhurst, Jr., William Wharton, Jr., & Company, Philadelphia.

A. E. Carrier, National Carbon Company, New York.

E. F. Chaffee, O. M. Edwards Company, Syracuse, N. Y.

F. J. Drake, Lorain Steel Company, Philadelphia.

A. R. Foley, Home Rubber Company, Trenton, N. J.

F. H. Gale, General Electric Company, Schenectady, N. Y.

N. M. Hench, Carnegie Steel Company, Pittsburgh, Pa.

William M. Henderson, Pennsylvania Steel Company, Steelton, Pa.

J. A. Kucera, ELECTRIC RAILWAY JOURNAL, New York.

Frank Martin, Jenkins Brothers, New York.

J. C. McQuiston, Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.

F. W. Sargent, American Brake Shoe & Foundry Company, Mahwah, N. J.

Charles H. Thomas, Galena Signal Oil Company, Franklin, Pa.

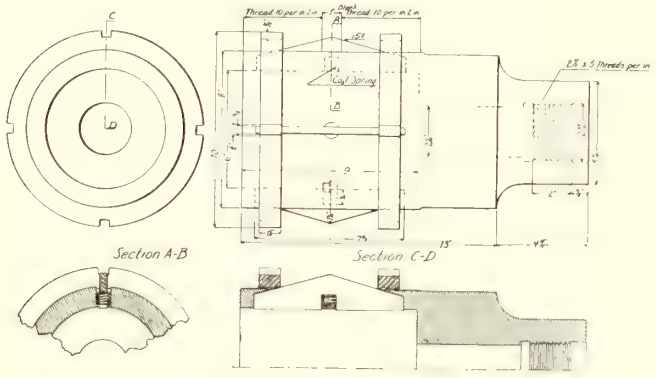
J. V. E. Titus, Electric Service Supplies Company, Philadelphia.

S. M. Wilson, The J. G. Brill Company, Philadelphia.

Among the exhibits at the American Land & Irrigation Exposition to be held in Madison Square Garden, New York, N. Y., next November, the Pennsylvania Railroad will exhibit models showing the evolution of its rolling stock from the Conestoga wagons to the electric trains.

CHUCK FOR BORING BEARINGS

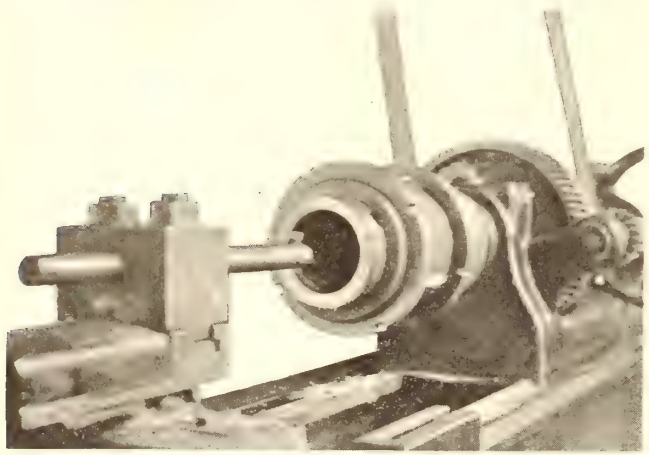
The accompanying drawing and half-tone show the details and application of a chuck which was designed principally for boring split bearings as built by F. J. Stevens, then master mechanic of the Lackawanna & Wyoming Valley Railroad, Scranton, Pa., and now master mechanic of the Ft. Wayne & Northern Indiana Traction Company. The old way of boring these bearings was to place a clamp on one end before putting the bearings in the lathe chuck.



Detail of Motor-Bearing Chuck

After the bearings were in the chuck some time was required to line them up properly before the cuts could be started. Now the bearings are placed in the chuck and tightened with two ring-nuts. The bearings are bored absolutely true both as to center and end or face, while the work itself is done in less than one-half the time required by the old method.

The chuck consists of a cast-iron cylinder, one end of which is of a size that can be threaded to fit the lathe spindle and the other large enough to admit the bearing. First the casting is put in the lathe and the threads are cut for the spindle, whereupon it is put on the spindle and the remaining machine work finished. In this way the



Chuck Applied to Motor Bearing

chuck is made absolutely true. After this four slots are cut 90 deg. apart for the jaws and then threaded from each end toward the center with right and left-hand threads for the two ring-nuts. The ring-nuts are also slotted on the quarter to permit the use of a spanner wrench for tightening. The inner side of each ring-nut is tapered to fit the taper of the jaw. A recess is cut in the jaw (section *A B*) and cylinder to admit a coil spring. This spring serves to hold the jaw in place as well as to release the grip on the bearings when the latter are finished and the ring-nuts are released.

This chuck can be used also on solid bearings of any size that can be put in it. The taper of the jaws can be made to fit the conditions. The range of the device for split bearings is limited by the size of the collar on the end of the bearing. To insure an absolutely true face on each half of a split bearing it is necessary to have something with which it can be lined up and placed in the same position in which it would be on the motor. The chuck is a great labor saver where there are many bearings to bore, since it saves time in truing up bearings and the grip is tight enough to admit the taking of deep cuts up to the finish cut. The work can be concluded with a light cut at a high speed, as there is no danger that the bearings will become loose o that the chuck will be thrown out. The dimensions of th chuck can be varied to suit conditions.

VALUATION OF MILWAUKEE PROPERTIES

The Railroad Commission of Wisconsin has made public its valuation of the property of the Milwaukee Electric Railway & Light Company, the Milwaukee Light, Heat & Traction Company and the Milwaukee Central Heating Company. The valuation was made by the commission in connection with the hearing of the case started by the city of Milwaukee to secure a lower rate of fare on the Milwaukee street railway lines. J. H. Roemer, chairman of the commission, announces that a final decision in the fare case will be rendered before fall. The figures announced by the commission put the cost of the properties of the three companies new at $23,877,906 and the present value at $18,850,937. These figures are divided by the commission as follows:

	Cost New.	Present Value.
Milwaukee Electric Railway & Light Co.	$16,310,947	$12,485,260
Milwaukee Light, Heat & Traction Co.	6,920,911	5,725,777
Milwaukee Central Heating Co.	646,948	639,900
Totals	$23,877,906	$18,850,937

The details of the values placed by the commission upon the property of the Milwaukee Electric Railway & Light Company are as follows:

	Cost New.	Present Value.
Land	$1,308,200	$1,308,200
Roadway	2,323,631	1,533,224
Transmission and distribution	3,252,592	2,733,703
Buildings, fixtures, and grounds	1,969,888	1,649,705
Power plant and equipment	2,163,454	1,450,795
Rolling stock and equipment	2,476,560	1,591,631
Paving	539,504	356,073
Totals	$14,033,829	$10,623,331
Overhead, 12 per cent	1,684,059	1,274,800
Totals	$15,717,888	$11,898,131
Materials and supplies	592,159	587,129
Grand totals	$16,310,047	$12,485,260

The values are further segregated by the commission as follows:

THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY.

	Cost New.	Present Value.
Railway	$10,147,745	$7,591,764
Light and commercial	4,367,418	3,494,310
Heat	103,059	88,799
Investment	431,760	424,704
Non-operating	1,260,065	885,683
Totals	$16,310,047	$12,485,260

MILWAUKEE LIGHT, HEAT & TRACTION COMPANY.

	Cost New.	Present Value.
Railway	$6,132,999	$5,110,211
Light and commercial	414,606	315,057
Investment	49,028	49,028
Non-operating	324,278	251,481
Totals	$6,920,911	$5,725,777

In the report of the commission the miles of single track of the railway companies are stated as follows: Milwaukee Electric Railway & Light Company, 147.002; Milwaukee Light, Heat & Traction Company, 229.173.

A summary of the brief in the fare case, filed for the company by Miller, Mack & Fairchild, attorneys, and Sullivan & Cromwell, counsel for the company, was published

in the ELECTRIC RAILWAY JOURNAL of June 10, 1911, page 1025. Full accounts of the various hearings before the commission in this case were published in the ELECTRIC RAILWAY JOURNAL of 1909.

COMMUNICATION

THE ARCH ROOF

CLEVELAND, OHIO, July 17, 1911.

To the Editors:

I note your editorial on the name of arch roof cars in the JOURNAL of July 15. The Niles name for this car, as used in all our literature and advertising, has been "single-arch roof," and we believe this is the best descriptive name for this type of car as the roof is a single arch in all directions in distinction from the monitor deck style, which consists of two or three sections of broken arches. We shall continue to refer to this style of car as single arch for the reason that it is the best descriptive name.

This merely as a matter of interest.

J. A. HANNA.

CREOSOTED WOOD PAVING IN THE CHICAGO BUSINESS DISTRICT

Charles K. Mohler, consulting engineer of the Loop Protective and Improvement Association, of Chicago, is distributing a sixty-two-page pamphlet containing a report and suggestions for improving the pavement in the congested business district of Chicago. This report considers methods for laying street substructures so that sinking of the pavement will be avoided, presents designs for manhole covers, criticises concrete pavement foundations and includes general observations and recommendations regarding paving, cross-walks, gutters, etc. That part of the report of particular interest to electric railway engineers includes the following regarding the junction of paving with the rails:

"To secure a satisfactory junction between the roadway paving and the rail is a problem which is seldom settled with entire satisfaction. On Madison Street west of Dearborn Street the new paving has been in only a little over a year and that adjoining the car track is already in very bad condition in many places. Failures of the kind developed on Madison Street seem to be the result of improper methods of laying rather than any inherent fault of wood block paving. In fact, granite block failures from the same apparent causes are very common.

"The causes of failures are probably as follows:

"First.—Open spaces or voids in the concrete. The vibration and jar produced from cars and traffic tend to work the sand of the bed on which the blocks are laid into these voids. The failures may be in part due to the above cause or any of the following:

"Second.—The spaces about and under the rails are not completely filled and the sand bed works in and allows the paving to settle.

"Third.—When the concrete bed has not had enough time to set before the paving is put in place and traffic resumed it may become more or less granular and loose, allowing the sand of the bed to work into it.

"Fourth.—Too great depth and too fine sand in the bedding of the blocks. With a deep bed of fine sand there is a tendency under a line of concentrated traffic for the sand to be forced out from under the more frequently loaded blocks and in under those less frequently loaded. That in time will result in depressions and ruts. Examples of this result are often very noticeable in brick pavements and to a less degree in granite. With a deep bed of fine sand there is nothing to keep a heavily loaded block from sinking but the friction of the confined sand and the force that prevents the adjoining blocks from rising. Under frequently repeated concentrated loads the blocks are eventually displaced."

Mr. Mohler has the following to say regarding the Chicago type rail with the beveled head:

"The rail used in Chicago has one feature that appears to be quite objectionable in connection with wood block paving. That is the beveled edge on the outside of the rail head. It is believed that better results would be obtained if the head were practically flat to the outer edge, so that the paving could be brought up flush with the side and even with the top, for the following reasons:

"First.—When a heavy load, carried on a narrow tire and drawn parallel to the rail, is just at the point of taking or leaving the rail, there is ¾ in. of its width that is without support. As a result a concentrated load is thrown on the edge of the pavement blocks.

"Second.—The edges of the blocks which stand out next to the beveled edge of the rail become broomed and worn.

"Third.—Water which finds its way into the groove formed by the bevel of the rail and the edge of the pavement cannot drain out. This keeps the broomed edge of the blocks constantly damp or wet, lowers their crushing resistance and thus contributes to the more rapid wear of the pavement.

"Fourth.—If the top of the paving is only brought up even with the beveled edge of the rail, then a bad condition results, producing at least three detrimental effects: (a) A wagon wheel passing over the rail will first rise and then drop, giving a rough road surface. (b) The drop from the rail to the pavement will tend to produce ruts and broom the surface of the blocks; this will be particularly liable to happen on lines of concentrated travel. (c) When the wheel crosses from the pavement to the rail at an acute angle it will tend to slide along the rail before mounting. The result will be that the fiber of the blocks will be torn, not only by the wheel next the rail but by the other one as well."

BLOCK SIGNALS TO BE TESTED IN INDIANA

At a recent meeting of the block signal committee appointed by the Indiana Railroad Commission M. H. Hovey, signal expert of the commission, was authorized to secure proposals on continuous-track circuit block signals using lights instead of semaphores to be installed on sections of three of the important interurban roads in the State. The proposals are to cover signal equipment for 18 miles of track of the Indiana Union Traction Company, 15 miles of the Terre Haute, Indianapolis & Eastern Traction Company and 10 miles of the Indianapolis, Columbus & Southern Traction Company. If the prices asked for signal equipment of this type are not prohibitive these trial installations will be made in order to determine the relative merits of the continuous-track circuit system and the short-track circuit system which is being tried by some of the Indiana companies.

SPECIAL COMMITTEE ON ASSOCIATE MEMBERSHIP OF THE AMERICAN ELECTRIC RAILWAY ASSOCIATION

President Arthur W. Brady, of the American Electric Railway Association, has appointed James F. Shaw, Thomas N. McCarter and Gen. George H. Harries a special committee to consider certain adjustments in the present plan of associate membership. This committee will meet with a committee of three, consisting of Henry C. Evans, James H. McGraw and Edwin H. Baker, who have been appointed by President Charles C. Castle, of the Manufacturers' Association.

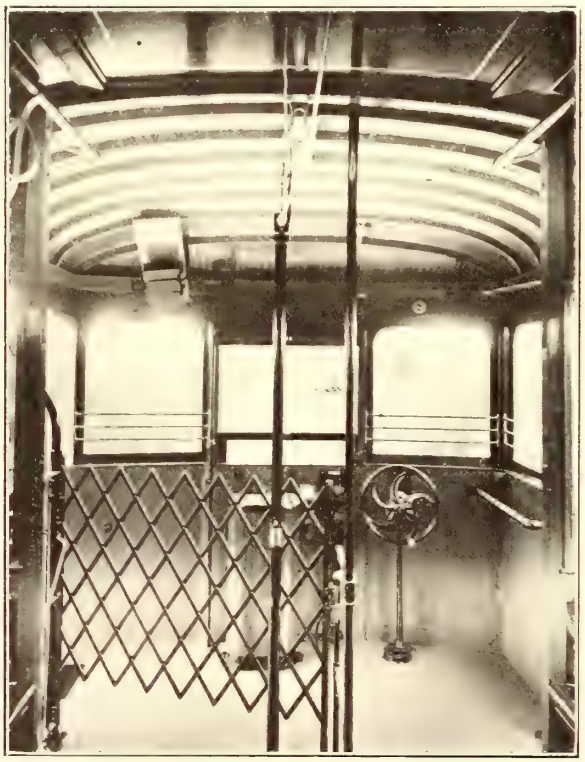
PREPAYMENT CARS FOR THE "KEY ROUTE," CALIFORNIA

The interesting car shown in the accompanying cuts is one of sixty now being completed by the St. Louis Car Company for the San Francisco, Oakland & San José Consolidated Railway known as the "Key Route." This design is for prepayment service, but gates instead of doors will be used on the vestibuled platforms. The body is divided into three compartments by two bulkhead partitions which have single sliding doors. The end sections have a 5-ft. 6-in. open entrance from the platforms and a 16-in. wide single sash placed opposite the ends of the longitudinal seats which are used throughout. The side sash are stationary. The use of composition steel and wood for the underframe and of an arch-type roof were important factors in obtaining low weight. Although the car body is 48 ft. over the crown pieces, it weighs only 15,000 lb. The longitudinal seats carry forty-eight passengers, while the inside standing capacity is seventy-two. The other principal dimensions follow: Length over the corner posts, 35 ft. 2 in.; length of the vestibules, 6 ft. ½ in.; width over the side sills, 8 ft. 6¾ in.; width over the side posts, 8 ft. 11¾ in.; height from the bottom of sill to top of roof, 8 ft. 7½ in.; distance between truck centers, 25 ft.



Side View of Prepayment Car for the "Key Route," California

All wooden members of the bottom framing are mortised and tenoned to each other with double tenons. The side sills are of composite steel and wood construction. They consist of 8-in. channels, extending in one length along the side of the car and bent around the ends. They meet in the center and are bolted together by means of a 6-in. x ½-in. splice plate. A yellow pine sill, 1⅝ in. x 2½ in., is bolted on the outside of this channel. The whole side sill is trussed with a 1⅛-in. rod upset to 1⅜ in. ends, resting on bolsters, extending through the end sills and having two cast-iron struts in the center of the car. The end sills are composite construction, comprising oak bolted against channel ends and having a sub-sill. The cross sills are of yellow pine, 2⅞ in. x 4 in., fitted with blocks into the side channel and bolted to the same by means of wrought-iron angles. The diagonal bracing consists of 1¾-in. x 6-in. yellow pine, notched over and bolted to all cross and side sills. The flooring is of yellow pine with maple strips.



View of Rear Platform



View of Front Platform

The bolsters are of wrought iron, 8 in. x 1 in. and 8 in. x ⅞ in. The top and bottom members are of the truss-plate type constructed with cast-iron filler. They have

malleable-iron side bearings. Wrought-iron rub plates are used to suit conditions of truck and center plates.

The body framing is arranged for twelve stationary sash on each side of car. One corner of each sash is rounded to a radius of 6 in. and the sash is arranged to give a double-window effect. End bulkheads are provided; also two intermediate bulkheads, which divide the car into three sections of approximately 11 ft. 5 in. each. The bulkheads of the center compartment are provided with single sliding doors, sliding toward the same side of the car to clear the register rod. The end bulkheads have open entrances. The corner posts are of white ash, 2½ in. by 3 1/16 in. in one piece. The side posts are of white ash, 1⅛ in. x 2 in., bolted directly to the side frame and extended straight to the vertical top plate. The opening between the side posts is 33¾ in. The sheathing is 1-in. x 6-in. tongued and grooved yellow pine and is placed on the inside of the body posts between the steel sill and window rail. It is continuous from end to end of car. The window rails are gained into the side posts and held with flat-head steel screws. The top corners of the body framing are provided with malleable-iron castings for guards. An inside truss rod, 2½ in. x ⅜ in., with a substantial malleable-iron stand is installed at the bolster on the inside of the car behind the seats. The side panels are of straight-side construction made of V-cut tongued and grooved poplar, ½ in. x 2 in., extending from the window rail to the top of the bottom steel plate on the side sill.

The roof is of the turtle-back pattern. It extends the entire length of the car body and is supported on one continuous steel carline over each pair of side posts securely fastened to top plate of car. There is a steel carline 1½ in. x ⅜ in. over each post, so placed and blocked with bolted wooden carlines as to prevent any sagging or vibration of roof due to trolley pole connections. The wooden carlines are of white ash, ¾ in. x 1⅛ in., spaced about 10 in. apart and extending from rail to rail. Two star ventilators are installed in the roof of the closed central compartment of the car.

The vestibules are of the curved-end type extending the full width of the platform. Each vestibule front above the dash consists of three sash, the center sash lowering inside of front framing of the vestibule. An illuminated sign is installed over the center sash. The outside of vestibule front, below the cash, is sheathed with tongued and grooved matched poplar like the side panels and is provided with a suitable water-tight molding at the bumper. The platform flooring is white maple ⅞ in. thick. The platforms are arranged for prepayment service with suitable railings and gates at the entrances and exits. The steps at the exits are operated simultaneously with the gates. The step at the entrance side is folded by hand. The motorman's side of vestibule is inclosed for a distance of 2 ft. 10 in. from end toward the car body. The entrance side of the vestibules are open 6 ft. 6 in. from the end of the car body. The exit side is open 2 ft. 8 in. from the end of the car body. The step from the platform to the floor of the car is 11 in. high. The gates are of two types; a vertical rod gate is used at the exits and a channel iron gate is used at the entrances and for forming the partition between the entrance and the exit on the rear platform.

The platforms are supported on the sides by a 7 in. 9.75 lb. channel extending under the side sill up to the bolster and securely hung from the inside end sill channel in a malleable-iron casting by ⅞ in. bolts and secured by a wrought-iron stirrup. The center platform knees are of oak 3¾ in. x 4¾ in., reinforced under the end sill by 4 in. x ½ in. plate bent to reach against the center sills and bolted to the knee and center sill. The bumpers are formed of 8 in. steel channels riveted to the platform knees and intermediate sills with angle clips.

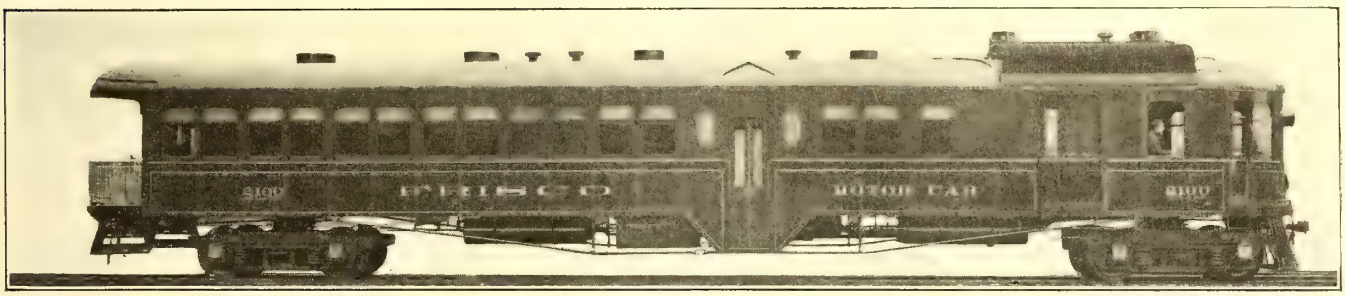
The side sash are single, made of mahogany, with one corner rounded. All bulkhead sash are stationary, except in the center bulkheads where door pockets require double sash, the inside one being hinged to give access to the door pocket. The doors in the center bulkheads are single, made of mahogany 1 1/16 in. thick. The interior finish of the car is plain mahogany. The headlinings are of mahogany, triple veneer, with plain strips of black-edged silver leaf, without any decoration. All trimmings are of bronze. The curtains are of pantasote.

The operating equipment includes the car builders vertical wheel brakes and illuminated signs. The weight of these cars without electrical equipment is approximately 25,800 lb., divided as follows:

Car body	15,000 lb.
Trucks	9,600 lb.
Air-brake equipment	1,200 lb

LARGE GAS-ELECTRIC MOTOR CARS

The accompanying illustration shows one of the six gas-electric motor cars built by the General Electric Company for the "Frisco Lines," and referred to by W. B. Potter, chief engineer railway and traction department General Electric Company, in the paper read by him at the annual meeting of the Street Railway Association of the State of New York, Cooperstown, June 28. These cars are 70 ft. long and 10 ft. 5 in. wide over all. The width, inside measurement, is 9 ft. 6 in. The seats are nearly 4 ft. long, and as they have no arms three people can comfortably occupy one seat. The aisle is narrower than is customary on steam railroad cars, but nevertheless is wider than on many electric cars. Aside from the passenger section, which seats ninety-eight passengers, the car has a 6-ft. baggage compartment. The gas-electric equipment consists of an eight-cylinder gasoline engine driving an electric generator. The motors are of standard railway type and the car is controlled by varying the voltage of the generator combined with series parallel connection of the motors. The engine control has a combination air valve and gas throttle by which the engine is started on compressed air and as soon as it begins running on gasoline the air is shut off. With this arrangement the engine need be run only when the car is being propelled. The auxiliary equipment includes a gasoline-electric set for lighting and means for securing compressed air. The car described has a maximum speed of about 50 m.p.h. on level track and a scheduled speed of 25 m.p.h. with stops 2½ miles apart.



Gas-Electric Motor Car for "Frisco Lines"

ORDERS FOR NEAR-SIDE CARS

The Philadelphia Rapid Transit Company announced this week that it had placed an order for fifty near-side cars with The J. G. Brill Company, and that the cars will be put in operation on the Twelfth and Sixteenth Street lines in Philadelphia within the next few months. The near-side car has been put in operation in Buffalo, as described in the Electric Railway Journal for July 8. As stated in that issue, this car was developed by Thomas E. Mitten. A "car full" sign will be used. In this connection the statement issued by the management says:

"The fifty new cars of the near-side type, now ordered, have a seating capacity of fifty-three persons, will comfortably accommodate a maximum load of eighty-three persons, seated and standing, and are provided with a 'car full' sign, which it is purposed to display when the car has become fully loaded, thus preventing the extreme overloading of the cars. The limiting of the number of persons carried, together with the extremely wide aisle possible in this type of car, will make it easy for passengers seated in the rear portion of the car to leave by way of the front platform, without experiencing difficulty in passing standing passengers."

The company also stated that illuminated destination signs in which the different routes will be indicated by a series of letters will be used.

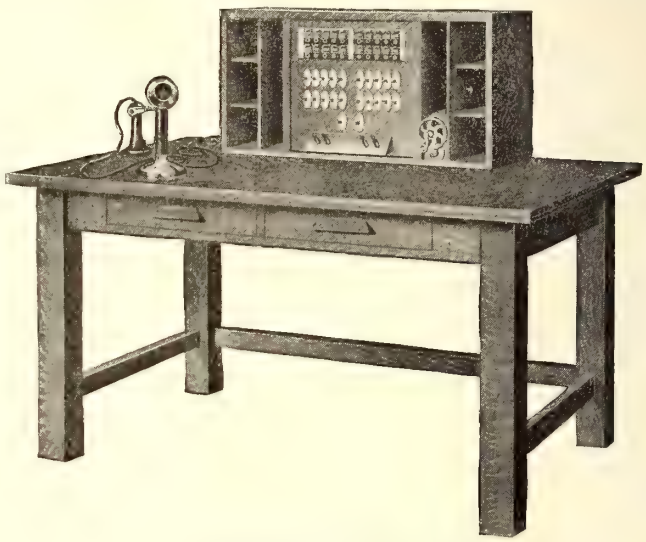
INTERURBAN CARS FOR THE BRITISH COLUMBIA ELECTRIC RAILWAY

The British Columbia Electric Railway, Vancouver, B. C., has purchased from the G. C. Kuhlman Car Company three interurban cars of the handsome design shown in the accompanying exterior view. The passenger and smoking compartments of these cars have a combined seating capacity of fifty-eight. Rattan cross-seats are used in both compartments. The principal car dimensions are as follows: Length of body, 42 ft. 9⅝ in.; length over the vestibules, 53 ft. 10⅜ in.; width over the sills, 8 ft. 3 in.; width over all, 8 ft. 4¾ in.; height from rail to sills, 3 ft. 4 15/16 in. The general construction is of steam coach style with monitor roof and Globe ventilators. The interior trim is African mahogany with sanitary finish and headlining in full Empire style. The trimmings are of bronze. There are seven arched double windows on each side with Pantasote curtains, Hartshorn rollers and Keeler eccentric fixtures. The bodies are mounted on Brill 27-M.C.B.-3 trucks carrying 34-in. diameter Midvale steel-tired wheels. Among the equipment specialties on these cars are Westinghouse A.M.M. air brakes, Tomlinson M.C.B. couplers, Hedley anti-climbers, Consolidated heaters, Crouse-Hinds headlights and Mason safety treads.

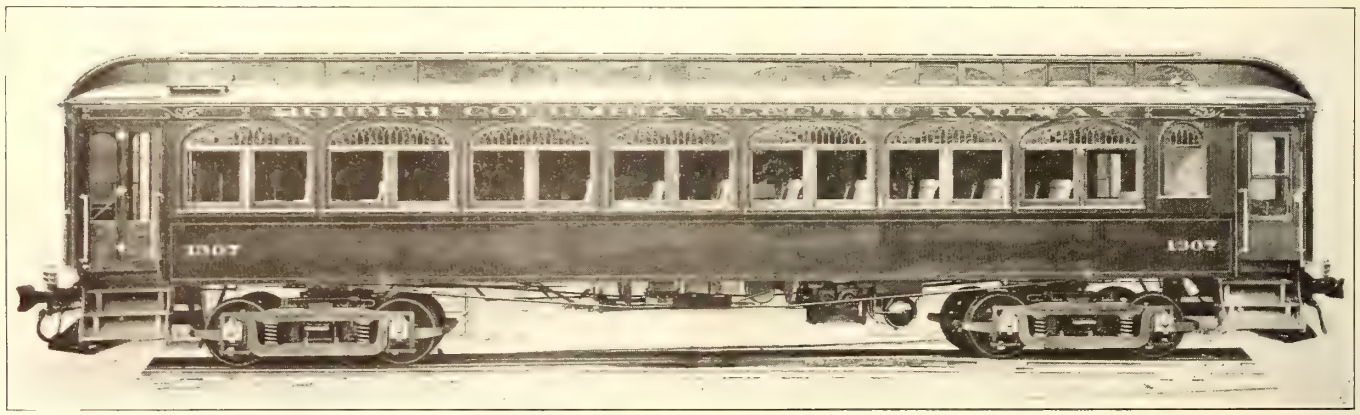
TELEPHONE APPARATUS FOR TRAIN DISPATCHING

The accompanying illustration shows the dispatcher's switchboard of the telephone train dispatching system made by the Lafayette Electric & Manufacturing Company, Lafayette, Ind. The turret or switching cabinet is built for twenty circuits. It is also provided with pigeonholes and book stalls. The turret and table are made of quarter-sawed oak with durable fittings.

A strong feature of this system is that instantaneous connection can be made without plugs or cords. The drops or signals are known as the Army type because they were originally designed by the United States Signal Corps for army service. A continuously ringing bell, which may be switched off or on at will, is connected with each drop. When the operator is away from the board the continuous ringing notifies him of a call, although he may not be in a position to see the drop. Each drop has a jack through which any signal may be connected one with another as the services and operator may require. The coils used in these signals are wound for 1000 ohms and the wire is silk-insulated.



Dispatcher's Switchboard



Latest Type of Interurban Car for the British Columbia Electric Railway

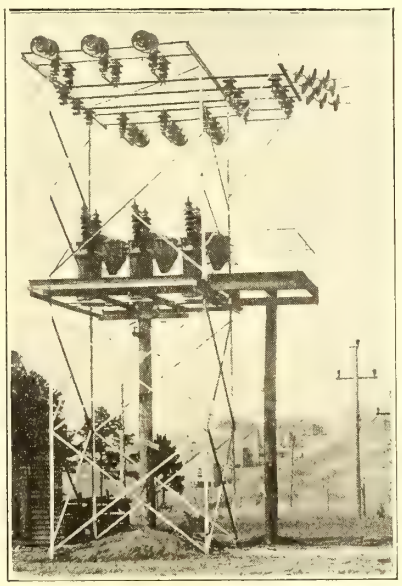
The board has an answering key for each circuit, so that it is not necessary to use plugs and cords to answer a call, but by depressing a key lever connection is made with the circuit over which the call has been made. These keys have long phosphor-bronze springs. Each contact-making spring has platinum points to insure perfect and clear service. The key plates are nickel-plated and the key levers are insulated with rubber handles. The board also has two cord circuits for interconnecting lines as service may require.

Each pair of plugs has ringing and listening keys to permit the dispatcher to ring on any line or circuit he may desire. A special desk telephone is used to communicate on any line or circuit at will. It is possible to furnish either an operator's telephone, as shown, or an arm and suspended transmitter. In either case there is included a double-pole receiver of the standard telephone receiver type or a head receiver with supporting band. The hand generator furnishes enough current to give loud, clear ringings at all telephones along the line if not more than thirty are in the circuit.

A call is displayed by the opening of the small shutter or drop. This denotes that some one is calling at a telephone connected with the signal mentioned. The dispatcher answers this call by depressing the corresponding key lever, which is located under the calling signal. The lever is restored to its normal position after the talk is over by touching it lightly underneath the spring mechanism. This action disconnects the line from the dispatcher's telephone. The dispatcher may talk on two or more circuits at one time or give two or more orders over circuits in different directions by depressing the proper key levers. Plugs and cords are furnished should he desire to connect one signal with another for any purpose. He does this by inserting the plug in the jack underneath the signal, turning the hand generator and depressing the key which corresponds to the plug connected to the line to be called. The operation of this system is extremely simple. The wear of the cords and plugs is negligible since they are not used except in the rare instances when the signals are to be interconnected.

OUTDOOR OIL CIRCUIT-BREAKERS

The Westinghouse Electric & Manufacturing Company has modified its type GA oil circuit-breaker for use as an outdoor high-tension switch at points on high-tension lines where it would not pay to have a substation. The breaker is like the indoor type, but has weatherproof protection for the operating mechanism and terminals. It is made for either hand or electrical operation, automatic or non-automatic, for circuits of from 44,000 volts to 110,000 volts, 300 amp capacity.



Outdoor Type Oil Breaker on Steel Tower

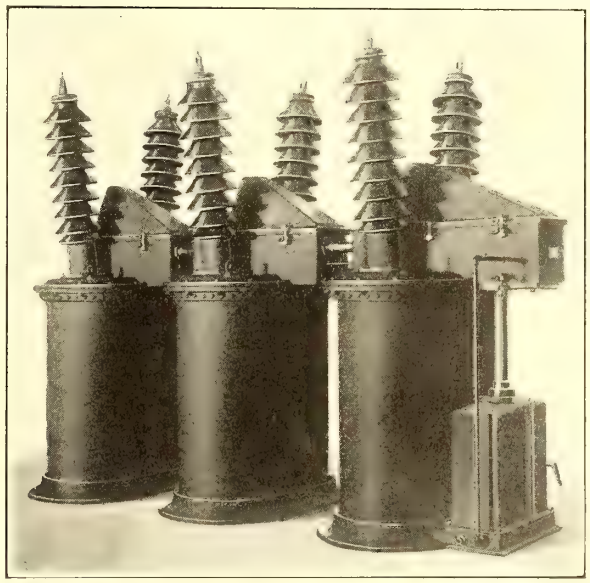
Each pole is a separate unit. A multipolar breaker consists of two or more units connected by pull-rods, which work the contacts and tripping mechanism. Each tank is made of welded boiler sheet iron with an insulating lining and is filled with insulating oil, the height of which may be determined by a sight gage. The pull-rod is surrounded by a stuffing box where it passes through the tank. This box wipes the oil from the rod and prevents its being thrown over the operating mechanism. The upper or fixed contacts are secured to the lower ends of the leads, which are of the condenser type. This upper contact consists of a circular piece of brass of greater area than the moving contact so that the entire surface of the latter will bear upon the stationary upper contact. This construction eliminates the necessity for accurately centering the contacts one upon the other. The lower or movable contacts are carried by a metallic cross-bar and consist of pieces of cylindrical brass backed by compression springs which insure alignment.

The electrically operated breakers have operating coils wound for direct current or standard voltages. They also have a tell-tale consisting of a double-throw knife switch and colored lamps which indicate the position of the contacts. The automatic breaker may be tripped by current from standard series transformers mounted at any convenient point or by special transformers built around the leads of the breaker. The latter method is considered standard and is usually furnished when the tripping current is 100 amp or over. Another method of tripping is furnished by a series relay which operates in connection with springs to trip the breaker.

These breakers are adapted to outdoor use by placing a two-part hinged cast-iron housing over the operating mechanism and rail shields over the condenser terminals. The housing forms an integral part of the breaker cover. In the electrically operated type of breaker the operating solenoid is also protected with a cast-iron housing and the operating leads are brought out through brass bushings, thus permitting the use of lead cables and wiped joints. There is also furnished a small knife switch mounted under the housing to control the incandescent lamps which may be placed at any convenient point to indicate the position of the circuit-breaker contacts.

The condenser type terminal with which these breakers are equipped has simplified the problem of successfully bringing the high-voltage leads through the tops of the iron tanks because this terminal lends itself readily to weatherproof protection by means of porcelain rain shields. These shields are porcelain petticoat insulators secured to the terminal on the inner side by a waterproof gum and on the outer side, where exposed to the weather, by a waterproof cement.

Many of these breakers have been installed by the South-



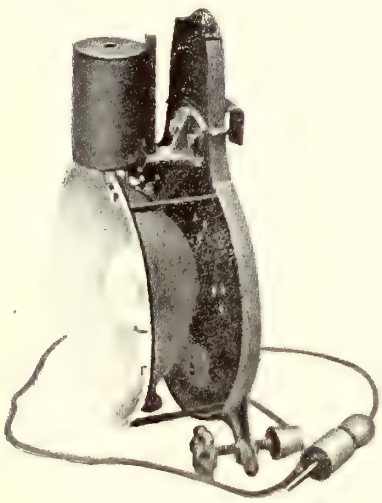
Three-Phase, 88,000-Volt Outdoor Type Oil Circuit Breaker

ern Power Company, which traverses over 1300 miles of the Piedmont section of North Carolina and South Carolina. In this region very great extremes of temperature and excessive moisture are experienced during short periods, and during the summer months there is an average of one rain and lightning storm every day. Nevertheless, the 44,000-volt and 88,000-volt breakers are said to behave very well. This company has used these breakers as sectionalizing switches in parallel lines of loops which have been built to insure continuity of service. By this means a defective section can be

cut out and a good line cut in without any interruption to the service. This would not be possible by the use of disconnecting switches alone. Some of these breakers are also used in testing the lines to locate trouble. On its 100,000-volt double-circuit steel tower trunk line the company desired to supply certain customers from either one of the two lines which might or might not be operated in parallel. This was accomplished by using two of these outdoor-type oil circuit-breakers and mechanically interlocking them so that but one breaker could be closed at a time, securing in effect a three-pole, double-throw breaker.

A SIMPLE HEADLIGHT

The Trolley Supply Company, Canton, Ohio, is now manufacturing a headlight known as the Peerless, Jr., which is notable for the small number of parts and several other points noted hereinafter. The lamp is 14 in. high to the top of the hood, 6¾ in. deep, and weighs only 22 lb. The clutch has a frictionless double lift which insures great durability. Another important feature is the use of one solid casting for the magnet bracket, carbon guide and top carbon holder. This casting is carefully machined to insure the permanent perfect alignment of the carbon. The top carbon is 9 in. x ⅜ in. in size. The bottom holder, which is made for a 4-in. x ⅜-in. carbon, is of brass and is machined to align with the upper carbon holder. The 3¾-in. x 2½-in. diameter magnet is made of double cotton-covered wire and weighs 3 lb. The carbon does not pass through the center of the magnet, but is placed at the rear to permit simple construction and a better focus point in the reflector. Instead of depending on a center screw the reflector is held by four brass posts, which are fastened to the back plate and to the rim of the reflector. The globe is 3¼ in. long and 3 in. in diameter. The resistance is 8 in. long and 7½ in. in diameter. Great care has been taken to obtain the best possible insulation from the binding posts and from the rod which holds the porcelain knobs. The covering is made of perforated steel with ample air space to keep the resistance cool. Only one hanger is used in the center of the lamp and two rubber bumpers are placed at the bottom with a screw and wheel to make certain that the light will be thrown directly in the center of the track at all times.



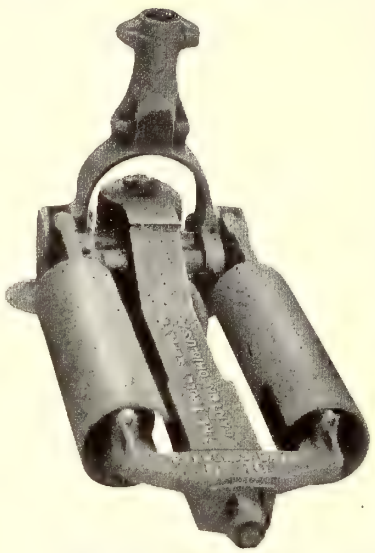
Side View of Headlight

CAR EQUIPMENT INSTRUCTION BOOK

The transportation department of the Metropolitan Street Railway, New York, has recently prepared a seventy-one-page, cloth-bound instruction book for the guidance of employees who wish to become starters, inspectors or instructors. The contents are therefore more elaborate than is usual in a book of this character. Several chapters are devoted to definitions of the principal electrical terms and to explanations of railway motor action in regular running and in emergencies. Detailed illustrated descriptions are presented of the standard air and electrical equipments of the cars; also of the contact and hand plows required for the conduit system and of the electric track switches. The list of "don'ts" offers a convenient summary of the causes which result in the greatest number of car troubles. Most of the data are in question and answer form for the convenience of the student. In preparing the text care was taken to avoid slipshod definitions and terms which would tend to confuse the learner who wants to widen his knowledge by studying standard electrical books.

ROLLER-BEARING TROLLEY BASE

The Trolley Supply Company, Canton, Ohio, is making for high-speed cars a roller-bearing trolley base known as the Peerless No. 10. One of its important features is that if perfectly balanced when set at any angle and at any pressure against the wire the base will come down on adding only ½ lb. weight. The base will not return to its previous position if the weight is removed, thus showing that the tension is stronger when the pole goes up than when it comes down. It is asserted that other bases require from 10 lb to 25 lb. to accomplish the same end. The frictionless features of this base have been obtained in part by taking the friction off the cross-pin which forms the up and down bearing of the trolley pole. This pin now carries the heavy pressure of the spring by means of a knife-edged bearing instead of the ordinary round bearing. A stronger upward tension of the pole has been obtained by changing the bearing point on the cross-pin. If the pole is pulled down on one side the cross-pin travels upward and if the pole is pulled down on the opposite side the cross-pin travels downward. The friction on the cylinder has been minimized by means of a ¾-in. ball at the rear end. Since there are two sets of bearings the pole can be used with equal ease for forward or backward running.



Roller-Bearing Trolley Base

The roller bearings are in a machined malleable housing which has a steel bushing and eight ⅞-in. x 5½-in. independent rollers. To prevent binding these rollers are supported by means of a malleable cage. The rollers work steel against steel. This is considered superior to other roller-bearing bases, which have thirty to forty ¼-in. or 5/16-in. diameter rollers whose bearing action is against a malleable casting. Such rollers tend to become embedded in the malleable iron and so prevent the base from working freely when going around curves. The springs and roller bearings are inclosed for protection from the weather. No oil is used on any part of the base. A simple adjustment of the trolley tension is secured by means of a screw nut, one turn of which increases the tension 4 lb.

The problem of repairing controller handles which have become loose from wear has been met by the Charlestown Interurban Railroad, Charlestown-Kanawha, W. Va., in the following manner: The hole into which the controller stem fits is drilled out to 1¼ in., then cross drilled three times with ¼-in. holes. The handle is set in a mold made from a controller stem and copper is poured in four holes and babbitt in two. An electric bonding machine melts the copper. Should these handles need repairs again, the babbitt and copper can be taken out and the handles refilled.

News of Electric Railways

Rapid Transit Contract Decision in New York

On July 20, 1911, the Board of Estimate, of New York, rejected by a vote of ten to six the proposed compromise embracing an annual preference payment to the Interborough Rapid Transit Company out of the earnings of the new subways ahead of the payment of interest on the city's bonds issued for construction of the extended lines, and by a vote of eleven to five declared in favor of an award of the entire new subway system to the Brooklyn Rapid Transit Company. The rules of the Board of Estimate require twelve affirmative votes to pass a resolution on its first presentation, and another meeting of the board was called for July 21, 1911, the members of the majority who voted in favor of the Brooklyn Rapid Transit Company on July 20 declaring their intention to repass the resolution. The six votes in favor of the preferential payment to the Interborough Rapid Transit Company were cast by President McAneny, of Manhattan; President Steers, of Brooklyn; President Miller, of the Bronx, and President Cromwell, of Richmond. Those against the proposal were cast by Mayor Gaynor, Comptroller Prendergast, President Mitchel, of the Aldermen, and President Gresser, of Queens. On the award to the Brooklyn Rapid Transit Company the eleven votes in favor were cast by Comptroller Prendergast, President Mitchel, of the Aldermen, and Borough Presidents McAneny, Steers and Cromwell, and the five against by the Mayor and Borough Presidents Miller and Gresser.

The subway plan which it was proposed finally to approve on July 21, 1911, involves a total expenditure by the city of approximately $123,000,000 in addition to $27,800,000 invested in lines now under construction. The Brooklyn Rapid Transit Company will spend approximately $75,000,000 in construction of new lines or reconstruction of existing lines and in the equipment of the system. There are added to the Brooklyn Rapid Transit System about 44 miles of double-track subway and various extensions to its existing elevated lines, bringing the total elevated mileage up to more than 80 miles of two-track or three-track road. More particularly the joint report of the committee of the Board of Estimate and the Public Service Commission, on which the award is to be based, proposed that the city should, under the division of territory between the Interborough Rapid Transit Company and the Brooklyn Rapid Transit Company, spend $58,400,000 in the construction of new lines in addition to the $27,800,000 investment in the Center Street loop and the Fourth Avenue subway, to which the company added $26,400,000 for construction and $24,000,000 for equipment. The addition to the Brooklyn Rapid Transit routes of most of the lines proposed for the Interborough Rapid Transit Company will bring the investment of the Brooklyn Rapid Transit Company up to $75,000,000 in round figures and will add to the city's investment for lines to be operated by that company the sum which the city previously proposed to spend for Interborough subways—$54,800,000 plus an additional sum of approximately $10,000,000.

A map showing the proposed division of territory between the Brooklyn Rapid Transit Company and the Interborough Rapid Transit Company was published in the ELECTRIC RAILWAY JOURNAL of June 17, 1911, page 1070. Under the plan of award in favor of the Brooklyn Rapid Transit Company which it was proposed to adopt on July 21, part of the lines which it was proposed to allot to the Interborough Rapid Transit Company will be awarded to the Brooklyn Rapid Transit Company, thus materially modifying the routes for the Brooklyn Rapid Transit Company which were shown on that map.

The Public Service Commission has adopted a resolution submitted by Commissioner Cram, instructing the commission's counsel to submit a form of certificate for the third tracking of the Second, Third and Ninth Avenue elevated lines of the Manhattan Elevated Railway, operated under lease by the Interborough Rapid Transit Company.

The City Club of New York has sent to the Board of Estimate and the Public Service Commission a report of its transit committee, with the suggestion of Walter Wellman that in the construction of future subways provision be made for trains of twenty cars or more, instead of eight and ten cars. The transit committee of the City Club consists of Homer Folks and Henry C. Wright. The Board of Estimate and Public Service Commission are asked to consider the suggestion, particularly in connection with the proposed Broadway subway in Manhattan.

The formal order from Judge Lacombe authorizing Adrian H. Joline and Douglas Robinson, as receivers for the Metropolitan Street Railway, to consent to the entry of an order brought by the State of New York to compel the forfeiture of certain licenses held by the Broadway & Seventh Avenue Railroad for surface tracks which have not been operated for many years has been filed in the clerk's office of the United States Circuit Court. The order will permit the tearing up of these tracks, which are considered an impediment to ordinary street traffic.

Decision in Rental Suit in Detroit

In a decision handed down recently by the Wayne County Circuit Court, Corporation Counsel Hally, of Detroit, is upheld in his contention that the city has a right to fix such rental as it sees fit for the occupany of the streets by the Detroit United Railway where franchises have expired, and that the reasonableness of the rental does not enter into the question. If the company does not choose to pay the rental fixed by the city, the court says it must vacate the streets. The case was brought against the company by Corporation Counsel Hally to compel the company to pay a rental of $200 a day in addition to what it was already paying for the use of the streets occupied by the Fort Wayne lines. The city, however, is refused judgment for the back rental since the date of the action of the City Council in increasing the rental. Ten days are given to the company in which to settle this point with the city. After the expiration of this time, if the company has not paid, the Council may take such action as it deems best.

The decision reads in part:

"The city is at all times in possession of its streets, in order to secure their proper use and enjoyment by and for the public. Its own title may be only an equitable one, but it is a paramount one for the objects stated. The rights conferred by the grant constituted an easement. A right to the use of the streets, superior in character to that possessed by any other individual or portion of the general public, was conveyed, and to that extent an interest in realty in the nature of an incorporeal hereditament passed to the defendant.

"The exercise of such an easement, in the absence of authority permitting it, is, in legal contemplation, an obstruction in the streets in the nature of a nuisance, to abate which equity has jurisdiction. There is distinct authority for this holding in our own State, and ample adjudications to the same effect in other jurisdictions.

"But it is urged that assent to continued operation is to be implied from the failure of the city to take action directing stoppage of operation, and that, therefore, the continuance of operation has been with the municipality's tacit approval. Whatever force, if any, this claim may have had, has been destroyed by the resolution of the Council of date June 13, 1911, when that is taken in conjunction with other allied facts.

"We come now to the claim that there can be no termination of a street railway franchise except by the mutual consent of grantor and grantee. Fairly stated, this position is grounded upon these propositions: The State, in giving to the street railway its charter, by which it obtained corporate capacity to accept a grant from the city (Sec. 6446 Comp. Laws), intended that the corporation should enjoy any grant received during its corporate life. Likewise, the

city contemplated a continuance of operation, subject only to the right to fix terms by mutual agreement, as required in the statute for the organization of railway companies, just cited. The whole public is said to have a right to transportation facilities of which neither the city nor the company may deprive them.

"It is difficult to deal in seriousness with a position so manifestly untenable, and so at variance at once with right reason and all established authority. Here are grants definite in their time limit. Their import is so clear that it cannot be made clearer by argument. To state them is to repel all inference of indefiniteness, and to negative all implication of extension beyond the plain letter of the grant. Moreover, the subversion of the public interest which would accompany such a denial of the city's power to control its streets under the authority conferred by its charter and by the constitution, and which would give to a limited easement an indefinite, if not a perpetual, tenure needs only to be stated to carry its own refutation.

"Guided by the evidence herein, and planting our position upon legal principles which receive universal recognition, the conclusion must be reached that the franchises have severally expired as claimed.

"The defendant insists that the fee for continued operation must be subjected to the test of reasonableness. If it deprive the company of a fair net revenue it is said to be invalid as confiscatory. The language of the city charter gives the city a very free hand in the regulation of its streets. The Common Council determined the manner in which the company could continue use of the streets beyond the grants, by the terms of the resolutions passed before the franchises had expired. Being revocable at will, the authority granted was not subject to the constitutional requirements of a referendum. The resolutions permitted a temporary use of the streets to one whose occupancy otherwise was without right. In the absence of any right to be in them, the company is in no position to question the city's terms.

"By virtue of its conferred powers of regulation we can find no limitation upon the municipality in prescribing the conditions upon which one without right of user may be given temporary, revocable use. The authority to determine the character of the conditions rested in the Common Council, and its legislative discretion, upon the facts here presented, is not subject to judicial review."

Report of Cleveland Railway for June

The report of the Cleveland (Ohio) Railway for June, 1911, shows a deficit of $63,064.74 and the surplus in the interest fund, which amounted to more than $200,000, has been reduced by $67,780.58. The deficit was caused by the heavy traffic and the fact that the lines are now operated at a straight fare of 3 cents. The franchise provides for the expenditure of 12½ cents per car mile for operation in June and 6 cents for maintenance. The actual expenditure for operation was 11.81 cents per car mile and 6.49 cents for maintenance. The car mileage for the month was 2,419,909. The statement follows:

		Cents per car mile.
Maintenance of property	$157,160	6.49
Operating expenses	285,807	11.81
Taxes	32,168	1.29
Interest	117,514	4.86
Total cost of operation	$591,649	24.45
Earnings from operation	524,896	21.69
Miscellaneous income	3,687	.15
Total earnings	$528,584	21.84
Deficit	$63,064	2.61

Councilman French has announced that at the meeting of the City Council on Aug. 28 he will offer a resolution asking Street Railway Commissioner Dahl to report on the cost of constructing a crosstown line on East Seventy-ninth Street. This is about midway between the Fifty-fifth Street and the 105th Street lines. At the last meeting of Council Messrs. Shimmon and Townes offered resolutions calling for a report on the cost of an extension of the 105th Street line to Denison Avenue across the Denison-Harvard bridge. These matters are coming up because of the agreement of the company to expend $2,500,000 in extensions and betterments at once.

Strike in Trenton

On July 17, 1911, twenty-two of the forty employees of the New Jersey & Pennsylvania Traction Company, Trenton, N. J., went on strike to enforce their demands for a flat rate of pay of 25 cents an hour and a closed shop. The company has always paid a graduated scale of wages. When the strike was declared this scale was as follows: First year, 21 cents; second year, 23 cents; third year, 25 cents. A few weeks ago some of the men who received 21 cents an hour formed a union and by intimidation, coercion and misstatement they succeeded in getting about twenty-two men out of the total of forty men to join them in demanding that C. M. Bates, president and general manager of the company, sign an agreement for two years giving a flat 25-cent rate and a closed shop.

On July 17 the men demanded that one of the organizers who had been brought to Trenton should be received in conjunction with the committee of employees to discuss the agreement. Mr. Bates refused to receive the men under such conditions, but told them he would discuss any alleged grievances with the employees. Four hours later, without any notice or warning, the men turned in their cars. The company arranged to run its full schedule with men who had remained loyal to the company, but during the night the strikers and their sympathizers cut the signal and telephone wires, spiked the switches and greased the rails on grades. This made it impossible for the company to run cars except on the Lambertville division, where repairs were made at once. On July 18 Mr. Bates received a committee of three employees and it was agreed to submit the differences to arbitration, as required by Section 30 of the ordinance of the city of Trenton. At none of the conferences was anybody present but Mr. Bates, representing the company, and employees of the company.

The Toledo Valuation

On the evening of July 10, 1911, the committee of the whole of the City Council of Toledo, Ohio, authorized Mayor Whitlock to inform the Toledo Railways & Light Company by written communication that the city is unwilling to consider the appointment of any one but Judge John M. Killits, of the Federal Court, as arbitrator in the valuation of the company's property. The company had suggested that an engineer would be better fitted to perform the duties of arbitrator.

The letter from the company regarding the appointment of Judge Killits was read to Council by Mayor Whitlock. He said he believed the city had been fair to the company in selecting Judge Killits and that as a rule experts leaned toward the companies. The vote to reject the suggestion for appointing an expert stood 15 to 1.

Mayor Whitlock's letter follows in part:

"Inasmuch as the gentleman to be selected to represent your company will, as you say, undoubtedly be as skilled and experienced in this service as is Professor Bemis, we are confidently of the opinion that they together would encounter only negligible differences in agreeing on the value of the physical property, and that therefore the chief points of variance necessarily would arise in ascertaining the extent of those intangible values to which the company lays claim. The principles applicable to the evaluation of the intangible elements of the property are largely, if not wholly, of a legal or abstract nature, and have been discussed and applied by the judges of the courts and announced in their reported decisions.

"We incline the more strongly, therefore, on this account to the conviction that in Judge Killits we would be fortunate in having to our aid not only a distinguished citizen of our own city, in whom the people have confidence, but a jurist abundantly qualified to pass on these recondite questions, and the city is ready now to proceed in a joint evaluation with him as the determining arbiter. While he would not, of course, as you say, possess in that capacity the legal power to issue subpœnas, he no doubt would be ready to be enlightened by the opinions of the professional gentlemen of whom you speak, and we are sure that on further reflection the reasonableness of this view will more seriously impress you and that thereby will be removed the

only immediate obstacle to that satisfactory, creditable and just solution of the transportation problem which we all so much desire."

City Solicitor Schreiber has been instructed by the committee to investigate the franchises under which the company operates with particular reference to their forfeiture. In an interview Mr. Schreiber was reported to have stated that he thought the Robison line franchises could be forfeited because the company has not paid the 1 per cent of the net earnings which it is claimed is due under the contract. These lines include the Huron Street, South Street and Bancroft Belt routes.

Valuation of Washington Water Power Company's Property.—Prof. C. L. Cory has been retained by D. L. Huntington, president and general manager of the Washington Water Power Company, Spokane, Wash., to make an independent valuation of the company's holdings.

Municipal Railway Considered in Los Angeles.—The construction of a municipal railway from the business center of Los Angeles to the harbor district was discussed at an executive conference held by Mayor Alexander and members of the City Council recently. Those who favor the construction of the line urge that at least $200,000 or $250,000 of the city's reserve fund could be spared to start the work.

List of Members of Central Electric Railway Association.—A. L. Neereamer, secretary of the Central Electric Railway Association, Indianapolis, Ind., has issued "Yellow Book No. 2," dated Indianapolis, July 15, 1911, which presents a list of the officials of each of the roads which is a member of the Central Electric Railway Association and a list of the members of the association who are connected with the supply trade.

Three Reports Required of Electric Railways in Ohio Each Year.—Under laws recently enacted in Ohio electric railways are required to make three annual reports. One of these goes to the new Public Utilities Commission and the other two go to the State Tax Commission. One of the reports to the State Tax Commission requires a statement of the gross earnings of the companies on which a tax of 1.2 per cent is to be collected. The other one requires a full exposition of the business.

Need for Comprehensive Subway System in Chicago.—William Schuyler Jackson, who represents the Chicago Municipal Subway Company, in presenting the plan of that company to the committee on local transportation of the City Council of Chicago on July 13, 1911, said: "To attempt to build a small subway loop in the downtown district would be a makeshift policy, would tend to add to congestion and would not provide any additional transportation facilities for the straphanger. A comprehensive system which can be expanded with the city's growth can be had without delay. Such a system alone is practicable and worthy of the dignity of the present and future Chicago."

Hearing on Power Brake Ordinance in Pittsburgh.—The committee on public service and surveys of the City Council of Pittsburgh, Pa., met on July 13, 1911, to consider the ordinance to compel the Pittsburgh Railways to equip all its cars with power brakes. S. L. Tone, second vice-president, represented the company. Mr. Tone asked that the committee amend the ordinance so as not to require power brakes on trail cars, and to permit hand-brake motor cars to be run on routes like the Carson Street line, where there are no severe grades. Mr. Tone said that only fifty cars out of nearly 1800 motor cars were not equipped with power brakes. These fifty were of a type that the company hoped eventually to replace with new cars. When the Smithfield Street bridge was widened the company would be willing to run cars equipped with power brakes on the Carson Street line. Mr. Tone suggested that the company be allowed a year to equip or replace the fifty cars to which he referred. It was finally decided to recommend to the Council that the company should be required to equip all motor cars with power brakes by Jan. 1, 1912, and to equip all new double-truck trailers with power brakes. The company will, however, be permitted to continue to use hand brakes on its single-truck trail cars.

Hoosac Tunnel Inspected.—A party of 200 Boston and other Massachusetts newspaper men inspected the newly electrified Hoosac tunnel on July 11, 1911, under the guidance of Vice-president Byrnes, of the New York, New Haven & Hartford Railroad. A special train took the party to North Adams. Mr. Byrnes stated that the capacity of the tunnel has been doubled since electrification. The return trip through the tunnel was made aboard two open freight cars attached to the special train. This gave the newspaper men an excellent opportunity fully to note the improved atmospheric conditions. Other railway officials besides Mr. Byrnes who made the trip were Vice-president Frank Barr, of the Boston & Maine Railroad; Assistant General Superintendent G. H. Folger, Superintendent A. S. Cheever, of the Fitchburg division; Superintendent G. L. R. French, of the terminal division, Boston; H. H. Fabian, manager of purchases and supplies; Assistant Superintendent J. D. Tyler, of the Fitchburg division; C. M. Burt, general passenger agent; W. L. Pratt, Western passenger agent; B. T. Wheeler, engineer of construction; W. S. Murray, electrical engineer; E. H. Ryder, secretary to the president; E. P. Lyon, of the press department of the New York, New Haven & Hartford Railroad, and H. A. Moulton, press representative of the company in Boston.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

CONNECTICUT

Governor Baldwin, of Connecticut, has signed the public utilities bill passed recently by the General Assembly. The bill provides for a commission of three members to succeed the Railroad Commission and have supervision over all public service corporations. The Governor has named the members of the present Railroad Commission to be members of the new commission. The appointees and their respective terms follow: Richard J. Higgins, Winchester, until July 1, 1917; Theodore V. Ford, Bridgeport, until July 1, 1915; John H. Hale, Glastonbury, until July 1, 1913.

NEW YORK

Senator Pollock has introduced a bill to give the Public Service Commissions the right to supervise the issuance of securities when public service corporations are reorganized. The bill was introduced primarily on account of the appeal by the Third Avenue Railroad to the Appellate Division of the Supreme Court in the case of the reorganization of the Third Avenue Railroad, the claim being made by the attorneys for that company that the commissions are empowered at present only to regulate the issuance of securities of new or going concerns and have no control over reorganization issues. The cities committee of the Senate has reported favorably the bill introduced by Assemblyman Goldberg to compel the restoration of free transfers in Manhattan Borough, New York, without waiting for action by the commission to compel the companies to re-establish the transfers which were discontinued following the segregation of the street railways in New York. The motion of Senator MacManus to have the Senate pass the MacManus-Boylan bill over the veto of Mayor Gaynor of New York was defeated on July 17. The MacManus-Boylan bill sought to compel the New York Central & Hudson River Railroad to remove its tracks from Eleventh Avenue, New York, and was vetoed by Mayor Gaynor on the ground that the act was unconstitutional in that it did not outline a route for other tracks to take the place of those which is sought to remove.

The Assembly has passed the Jackson resolution proposing an amendment to the Constitution so that the Legislature may pass an employers' liability act. The amendment would give the Legislature authority to make provision for the security and protection of the lives, health, and safety of workmen; for compensation for injuries to workmen caused by accidents arising out of their employment, and for insurance against accidents, sickness, or old age. There was considerable objection to the resolution on the ground that it was too broad in scope, but on Mr. Jackson undertaking to have it modified in the Senate, the Assembly approved the resolution. After a public hearing on July 18, 1911, on the McClelland-Walker bill, which provides for the removal of the tracks of the New York Central & Hudson River Railroad from Eleventh and Twelfth Avenues, New York, under an agreement to be made between the railroad and the city, Mayor Gaynor signed the measure and returned it to Albany.

Financial and Corporate

New York Stock and Money Markets

July 19, 1911.

News of approaching settlement of subway matters on Tuesday caused an advance of 3 points in Interborough-Metropolitan shares, followed by gains throughout the list. Although some hesitation was shown at the opening on Wednesday, trading became active and further advances were made. Prices closed, however, at the level of the preceding day. The influence of the crop situation is a strong factor in the market. Time money is slightly firmer, but the demand is not especially heavy. Quotations to-day were: Call, 2¼@2⅜ per cent; ninety days, 2¾@3 per cent.

Other Markets

Local tractions have been the features of the Philadelphia market and new records have been reached in Philadelphia Rapid Transit and Union Traction. The latter was in good demand in to-day's market and trading in general was brisk.

Trading in Boston has been on a narrow scale. There have been but few price changes of importance. Massachusetts Electric preferred at 95½ made a new record last Saturday.

Chicago Elevated Railways preferred was traded in to-day for the first time on the Exchange. Sales were made from 85 on opening to 88 at the close. The common stock rose to 26 in the course of the day's transactions.

Nothing of moment as concerns traction issues has been shown in the Baltimore market of the week.

Quotations of traction and manufacturing securities as compared with last week follow:

	July 12.	July 19.
American Light & Traction Company (common)	a310	a305
American Light & Traction Company (preferred)	a108	a108
American Railways Company	44	a44
Aurora, Elgin & Chicago Railroad (common)	a45	a44⅛
Aurora, Elgin & Chicago Railroad (preferred)	a87	a87
Boston Elevated Railway	a129	a129
Boston Suburban Electric Companies (common)	a15	a15
Boston Suburban Electric Companies (preferred)	75	75
Boston & Worcester Electric Companies (common)	a13	a12½
Boston & Worcester Electric Companies (preferred)	a57½	a58
Brooklyn Rapid Transit Company	83⅝	83½
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	87⅞	87¾
Capital Traction Company, Washington	a127	a130
Chicago City Railway	a190	a190
Chicago & Oak Park Elevated Railroad (common)	*3	3
Chicago & Oak Park Elevated Railroad (preferred)	*5	5
Chicago Railway, ptcptg., ctf. 1	a90	a90
Chicago Railways, ptcptg., ctf. 2	a26½	a28
Chicago Railways, ptcptg., ctf. 3	a10	a9½
Chicago Railways, ptcptg., ctf. 4	5½	5½
Cincinnati Street Railway	a130½	*130½
Cleveland Railway	a27½	a99⅛
Columbus Railway (common)	81½	*81½
Columbus Railway (preferred)	92	*92
Consolidated Traction of New Jersey	a76	a75½
Consolidated Traction of N. J. 5 per cent bonds	a105	a105
Dayton Street Railway (common)	a25	a25
Dayton Street Railway (preferred)	a100	a100
Detroit United Railway	79	74
General Electric Company	162½	162
Georgia Railway & Electric Company (common)	a163	a155
Georgia Railway & Electric Company (preferred)	93	93
Interborough Metropolitan Company (common)	18	19⅝
Interborough Metropolitan Company (preferred)	50⅝	55¾
Interborough Metropolitan Company (4½s)	78¼	81⅞
Kansas City Railway & Light Company (common)	a19	a19
Kansas City Railway & Light Company (preferred)	44	a41
Manhattan Railway	137½	141½
Massachusetts Electric Companies (common)	a23⅛	a23⅜
Massachusetts Electric Companies (preferred)	a94¾	94½
Metropolitan West Side, Chicago (common)	27½	a27½
Metropolitan West Side, Chicago (preferred)	a75	a75
Metropolitan Street Railway, New York	15	15
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	a74½	a73½
Northern Ohio Light & Traction Company	a49¾	*49¾
Northwestern Elevated Railroad (common)	a30	a30
Northwestern Elevated Railroad (preferred)	70	a70
Philadelphia Company, Pittsburgh (common)	56	a55½
Philadelphia Company, Pittsburgh (preferred)	a43½	a44
Philadelphia Rapid Transit Company	a20¾	a22⅜
Philadelphia Traction Company	a86¾	a86½
Public Service Corporation, 5% col. notes (1913)	101	*101
Public Service Corporation, ctfs.	a107	a107
Seattle Electric Company (common)	a111	a110½
Seattle Electric Company (preferred)	102½	102¾
South Side Elevated Railroad (Chicago)	a80¼	a76
Third Avenue Railroad, New York	a10½	11¼
Toledo Railways & Light Company	a7¾	a7½
Twin City Rapid Transit, Minneapolis (common)	a108½	a110¼
Union Traction Company, Philadelphia	a50⅛	a52⅜
United Rys. & Electric Company, Baltimore	*19½	*19½
United Rys. Inv. Co. (common)	a39	a37½
United Rys. Inv. Co. (common)	a39	a37½
United Rys. Inv. Co. (preferred)	70	a70
Washington Ry. & Electric Company (common)	a42¾	a42⅞
Washington Ry. & Electric Company (preferred)	a89	a89½
West End Street Railway, Boston (common)	a89½	a88½
West End Street Railway, Boston (preferred)	a103	a102½
Westinghouse Elec. & Mfg. Co.	75½	75⅞
Westinghouse Elec. & Mfg. Co. (1st pref.)	a120	a120

a Asked. *Last sale.

ANNUAL REPORT

Philadelphia Rapid Transit Company

The income account of the Philadelphia Rapid Transit Company for the years ended June 30, 1911 and 1910, compares as follows:

Year ended June 30	1911	Per Cent Increase.	1910
EARNINGS.			
Gross passenger earnings	$20,612,687	14.57	$17,991,100
Receipts from other sources	916,781	19.05	770,047
	$21,529,468	14.76	$18,761,147
EXPENSES.		Per Cent Earnings.	
Maintenance and renewals:			
Amount expended	$2,624,692	12.19	
Unexpended balance	604,728	2.81	
Total appropriation	$3,229,420	15.00	$2,420,220
Operation of power plants	1,427,022	6.63	1,460,677
Operation of cars	5,348,479	24.83	4,527,961
General	1,988,648	9.24	1,853,123
Taxes	1,155,491	5.37	1,194,635
	$13,149,060	61.07	$11,456,616
Net earnings from operation	$8,380,408	38.93	$7,304,531
FIXED CHARGES			
Interest	$1,469,748	6.83	$1,337,468
Rentals	7,326,220	34.03	7,296,785
	$8,795,968	40.86	$8,634,253
Deficit	$415,560	1.93	$1,329,722

Following is a statement showing the operation of the reserve fund for renewals for the year ended June 30, 1911:

Special appropriation in accordance with the Stotesbury requirement	$1,500,000
Unexpended balance of appropriation of 15 per cent of the gross earnings for the year ended June 30, 1911	604,728
	$2,104,728
From which deduct the deficit for the year; this amount representing that proportion of the total appropriation of 15 per cent of the gross earnings which is to be obtained from this renewal reserve fund	415,560
Balance of fund, June 30, 1911	$1,689,168

Charles O. Kruger, the president, says in part:

"Prior to Mr. Stotesbury's assuming financial control of the company a most exhaustive audit of the books and accounts was made, and upon the recommendation of the certified public accountants representing the city and the formal approval of Councils, an entirely new method of accounting was adopted.

"To meet the known capital requirements of the company during the five years next ensuing, a bond issue of $10,000,000, to bear 5 per cent interest annually, was arranged for. In consideration of the remaining equity in the Market Street Elevated being conveyed to it, the Union Traction Company agreed to guarantee the principal and interest of these bonds, and to pledge as security for the payment of the principal and interest of the said bond issue the entire issue of capital stock of the Market Street Elevated Railway, which represents the equity in property, over and above the first mortgage of $10,000,000.

"To insure the proper maintenance and renewal of the property, an annual expenditure of an amount equaling 15 per cent of the gross earnings was set forth as being necessary under Mr. Stotesbury's plan. Owing to the financial straits of the company the expenditure in this regard had not heretofore been in excess of an amount equaling 12 per cent of the gross earnings.

"The earnings of the company are not as yet sufficient to bear the cost of operation, including this 15 per cent, in addition to the payment of its fixed charges, which now represent an amount approximating 41 per cent of the gross earnings. The fund of $1,500,000 in current assets was required by Mr. Stotesbury to meet a deficit of $415,560 occurring this year, and to provide a sufficient reserve against the anticipated shortage of the succeeding years.

"Mr. Stotesbury's conditions having been met, and the necessary consent of the city obtained, the following new members were duly elected at the regular meeting of the board held June 5: E. T. Stotesbury, chairman; C. E. Ingersoll, H. G. Lloyd, C. S. W. Packard, T. E. Mitten. These gentlemen now constitute the members of the new executive committee, of which Mr. Mitten has been selected to act as chairman, he also acting as chairman of the board of directors during the absence of Mr. Stotesbury, who, relying upon Mr. Mitten's estimates and continued assist-

ance, is now directly represented by him in all matters pertaining to the operation and development of the property.

"The gross earnings for the current year show an increase of 14.76 per cent over the previous year. This abnormal increase is occasioned by the reduced gross earnings of the fiscal year ended June 30, 1910, due to the strike conditions which then prevailed. The normal increase in gross earnings is estimated to be slightly in excess of 4 per cent per annum, this based upon the actual average increase of 4.2 per cent per annum for the years 1902 to 1909, during which period the population increase approximated 2 per cent per annum.

"The division of the 15 per cent between the amount from earnings and that from the reserve fund follows:

		Per Cent Earnings
From earnings:		
Expended	$2,624,692	12.19
Unexpended	189,168	.88
	$2,813,860	13.07
From reserve fund:		
Unexpended	415,560	1.93
Total	$3,229,420	15.00

"The reserve fund for renewals as at June 30, 1911, contains the sum of $1,689,168, made up as follows: Securities from fire insurance fund, $1,200,000; cash appropriated from current funds of the company as at Dec. 31, 1910, to make the total reserve of $1,500,000 required by the Stotesbury management, $300,000; unexpended balance of appropriation from earnings for maintenance and renewals for year to June 30, 1911, $189,168; total, $1,689,168.

"The last two items in the above summary, aggregating $489,168, have been advanced temporarily from the reserve fund for renewals, to meet construction expenditures and the refunding of capital obligations. When renewal expenditures make it necessary the reserve fund for renewals will be reimbursed the amount of these advances for capital requirements from the proceeds of the new $10,000,000 bond issue.

"The capital expenditures to June 30, 1911, aggregated $665,026, as follows: Construction expenditures, $474,026; refunding of capital obligations, $191,000; total, $665,026. Of this total, $489,168 has, as stated, been advanced from the reserve fund for renewals, the remaining $175,858 having been taken from the current working capital of the company. Bonds of the new $10,000,000 issue will later be used to finance these capital expenditures.

"Summarized, the transactions in the surplus account for the six months ended June 30, 1911, are as follows: Surplus as at Dec. 31, 1910, $607,099; operating loss for the six months to June 30, 1911, occasioned by charging against earnings a sum sufficient to make the appropriation for maintenance and renewals 15 per cent of the gross for the twelve months to June 30, 1911, $200,745; miscellaneous charges to surplus, $48,103; balance at June 30, 1911, $358,251.

"The expense classification 'operation of cars' includes the amount paid to the trainmen, which represents 21.81 per cent of the gross passenger earnings, as follows:

Wages:		Per cent
Timetable cost	$4,414,987	21.42
Unearned wages at the rate of $2.00 per day paid to returning strikers under agreement of April 5, 1910	60,273	.29
Pension and death benefits	20,830	.10
	$4,496,090	21.81

"The fixed assets as at Dec. 31, 1910, included an amount of $934,346, which represented the unabsorbed portion of the costs of the 1910 strike. Following the recommendation of Vollum, Fernley, Vollum & Rorer, the certified public accountants auditing the books of the company, this amount will be written off to surplus at the rate of 10 per cent per annum.

"Fire insurance to the amount of $18,500,000 has been placed with companies authorized to do business in this State. This amount is considered to be sufficient fully to protect the company against loss by fire.

"Mr. Stotesbury's expressed desire and intention is to rehabilitate the physical property of the company and to improve its operating methods to the end of developing the best street car service which it is within the financial ability of the Philadelphia Rapid Transit Company to produce.

"The new capital represented by the $10,000,000 bond issue now authorized is recognized as being a very small amount with which to attempt to accomplish such a material change in conditions, and it can only by the exercise of the utmost care be made sufficient to complete the rehabilitation of the present property.

"The authorized $10,000,000 bond issue would, if marketed at an average price of 96, produce $9,600,000, of which approximately $1,600,000 will be required to pay present outstanding capital obligations which mature during the next five years, leaving an amount approximating $8,000,000 available for the capital requirements of the company.

"It is estimated that the expense, including the maintenance and renewals, will be approximately $1,500,000 in excess of earnings during the three years ensuing, to meet which deficit the company now has set aside in a special fund cash assets which will be marketed as may be found necessary. The remaining two years of the five-year period, it is thought, will result in a small earned surplus which should continue to grow larger each year thereafter.

"The estimates for the immediate future are not based upon a reduced cost of operation, as all of the economies effected, it is thought, will be offset by the larger number of seats necessary to be supplied to the public during the rush hours and the increased wage of ½ cent per hour, now approximating $100,000 per annum, which the company is under published promise to pay to its motormen and conductors on July 1 of each year. The company is also by its previous action obligated to pay a pension of $20 per month to those employees who are over sixty-five years of age and who have been in the service twenty-five years, and to pay an amount of $500 to surviving relatives at the death of any motorman or conductor who has been over two years in the service of the company.

"It is now understood that the Stotesbury management will, commencing as of July 1, 1911, pay to its trainmen that amount which in total will represent 22 cents out of every dollar collected in payment of fares. During the year ended June 30, 1911, the amount expended by the company to its trainmen represented 21.81 cents out of every dollar collected in payment of fares.

"The introduction of larger cars and better operating methods, together with proper co-operation between the men and the management, should very materially improve the operating efficiency of the company, thereby making possible such an increased scale of wages during the intervening years as should result in a maximum wage of 28 cents per hour in the year commencing July 1, 1915, or the fifth year of the Stotesbury management.

"This added increase in wages of motormen and conductors over that promised in the company's published notice of April 5, 1910, must of necessity depend upon the degree of co-operation displayed by the men in assisting the management in its efforts to improve the methods of operation. Such an increase of wages would necessarily be deferred and perhaps be made impossible should the company be put to expense on account of labor trouble with its motormen and conductors, as in that event the costs incident thereto would have to be spread over the remainder of the five-year period.

"Summarizing, the Stotesbury management will now attempt with the limited resources at the company's command, and with its very heavy expenses as compared with its earnings, to build up a perfect system of transportation and at the same time satisfy the three parties at interest.

"To the public it promises an adequate system of transportation within a five-year period, but counsels patience during the accomplishment of this object; to the motormen and conductors it promises recognition of their efforts in the way of co-operation by such wages as the resulting increased efficiency makes possible; but to the stockholders of the Philadelphia Rapid Transit Company it can only promise the building up of their property to the end that it may be a credit to its owners and productive of return upon the $30,000,000 of capital actually paid in. There can be no hope of dividend upon this stock, however, until good service to the public has become an established fact and the wages of the motormen and conductors placed upon a satisfactory basis."

American Railways, Philadelphia, Pa.—It is stated that a syndicate composed of Bioren & Company, Philadelphia, Pa., and Newburger, Henderson & Loeb, New York, N. Y., has been formed to underwrite $2,500,000 of the twenty-year, 5 per cent gold bonds of the American Railways which are to be issued to refund $2,500,000 of bonds of the company which mature on Dec. 1, 1911. The instrument which secures the bonds is a closed mortgage for $3,000,000 and the syndicate is said to have an option to purchase the $500,000 of bonds which will remain after the issue of the $2,500,000 of bonds previously mentioned.

Boston (Mass.) Elevated Railway.—The so-called Tinkham bill, which provides for the consolidation of the West End Street Railway and the Boston Elevated Railway at the termination of the lease of the West End Street Railway to the Boston Elevated Railway in 1922, has passed both branches of the Massachusetts Legislature. The terms of the consolidation provide that the Boston Elevated Railway shall issue additional capital stock to cover the stock of the West End Street Railway, of two kinds: First preferred stock, which shall be exchanged for the preferred stock of the West End Street Railway, share for share, and which shall be entitled to a preferential dividend of 8 per cent; and second preferred stock, which shall be exchanged, share for share, for the common stock of the West End Street Railway, and which shall be entitled to a 7 per cent dividend. The bill authorizing the construction of additional tunnels and subways in the city of Boston has been ordered to a third reading in the House. Two amendments proposed to the transit bills were rejected by large majorities: An amendment providing that the hours of labor on the Boston Elevated Railway be limited to nine in eleven, and one which provided for the abolition of the 1-cent toll charge through the East Boston tunnel.

Cincinnati, Georgetown & Portsmouth Railroad, Cincinnati, Ohio.—It is reported that negotiations have been closed by which the Comstock estate of Detroit, Mich., has disposed of a controlling interest in the Cincinnati, Georgetown & Portsmouth Railroad to a syndicate of Cincinnati capitalists in which E. E. Galbreath, president of the Second National Bank, Cincinnati, is interested. Mr. Galbreath and his brother are interested in the Ohio River & Columbus Railway, which intersects the Cincinnati, Georgetown & Portsmouth Railroad at Georgetown.

Chicago & Milwaukee Electric Railroad, Chicago, Ill.—Federal Judge Grosscup concluded, on July 11, 1911, a hearing on the validity of the $10,000,000 bond issue of the Chicago & Milwaukee Electric Railroad. He took the matter under advisement to be definitely decided later. It developed that virtually all the bonds issued to build the Wisconsin end of the road were sold at a discount ranging from 10 per cent to 25 per cent, whereas the bonds issued to provide funds to construct the line in Illinois were sold at par. Judge Grosscup is reported to have said at the close of the hearing: "Now, this is my present impression: With respect to the bondholders, if I can find a way in which they are entitled to participate in the proportion they paid for their bonds, I will follow such a way, because that is only fair and just. If I cannot find such a way, my present impression is that I will hold the bonded issue as an entirety without preference to anybody."

Columbus, Delaware & Marion Railway, Columbus, Ohio.—Judge Babst, in the Marion County Court, on July 11, 1911, appointed George Whysall receiver of the Columbus, Delaware & Marion Railway, on application of John B. Webb, president of the company. Mr. Whysall was removed as co-receiver with Mr. Ely West about two years ago, by order of the Franklin County Court. Mr. Whysall is also one of the receivers of the Columbus, Marion & Bucyrus Railroad.

Massachusetts Electric Companies, Boston, Mass.—By special legislation enacted early in 1911 and with the approval of the Massachusetts Railroad Commission, the Boston & Northern Street Railway on July 1, 1911, absorbed the Old Colony Street Railway. Both roads are owned by the Massachusetts Electric Companies, a voluntary holding company. The order of the Railroad Commission approved an increase in the capital stock of the Boston & Northern Street Railway of $776,700 in preferred stock and $8,004,100 in common stock.

Republic Railway & Light Company, New York, N. Y.—The Republic Railway & Light Company, the incorporation of which was noted in the Electric Railway Journal of July 8, 1911, page 94, has organized as follows: James Parmalee, president; De Forest Candee, vice-president; George A. Galliver, vice-president and treasurer; G. F. Ravenell, secretary; Henry H. Wehrhane, chairman; Anson W. Burchard, Samuel McRoberts, George A. Gallier and Harrison Williams, executive committee; J. J. Bodell, of Bodell & Company, bankers, Providence, R. I., and director American Textile Company; R. R. Breed, president of the American Gas & Electric Company; Anson W. Burchard, assistant to the president of the General Electric Company; De Forest Candee, president of the Federal Utilities, Inc.; Norman McD. Crawford, president Mahoning & Shenango Railway & Light Company; George A. Galliver, director of the Federal Utilities, Inc.; Myron T. Herrick, president of the Society for Savings, Cleveland, Ohio; Parmeley W. Herrick, director of the Cleveland Electric Illuminating Company; Samuel McRoberts, vice-president of the National City Bank of New York; James Parmelee, president of the Cleveland Electric Illuminating Company; Thomas A. Reynolds, assistant cashier of the National City Bank of New York; Henry W. Wehrhane, of Hallgarten & Company, bankers, and a member of the executive committee of the American Gas & Electric Company; Harrison Williams, of the American Gas & Electric Company, Federal Light & Traction Company, Federal Utilities, Inc., and president Springfield Railway & Light Company, Springfield, Mo., directors.

South Side Elevated Railroad, Chicago, Ill.—The directors of the South Side Elevated Railroad have declared an extra dividend of 5.9 per cent, or $5.90 a share, to be paid July 26, 1911, to the stockholders of record on July 15, 1910, out of the accumulated surplus.

Toronto (Ont.) Street Railway.—The directors of the Toronto Street Railway have called a meeting of the stockholders of the company for Aug. 14, 1911, to authorize an increase in the capital stock of the company from $8,000,000 to $12,000,000. It is intended to issue $2,000,000 of the new stock at par to stockholders in the proportion of one share per every four shares now held. In addition it is proposed to give the stockholders a stock bonus of $1,000,000, or one share for every eight shares now held. The balance of the $4,000,000 of common stock, or $1,000,000, will be retained in the treasury.

Tri-State Railway & Electric Company, East Liverpool, Ohio.—Subscription books were open at the Municipal & General Securities Company, Ltd., London, Eng., from July 3, 1911, to July 6, 1911, for the sale of $668,000 of 6 per cent first mortgage and collateral trust sinking fund gold bonds of the Tri-State Railway & Electric Company, at 95 per cent, with a bonus of 20 per cent in common stock. The bonds are part of an authorized issue of $2,500,000.

United Railways & Electric Company, Baltimore, Md.—Alexander Brown & Sons, Baltimore, Md., announce that the subscriptions to the $3,125,000 of three-year, 5 per cent notes of the United Railways & Electric Company aggregated more than $10,600,000, although the subscription list was closed a week ahead of the day originally announced. The stockholders, who were given precedence in the allotment, will receive more than 90 per cent of the notes. The remaining notes will be allotted to subscribers who are not stockholders. The subscriptions of the latter aggregated about twenty times the amount of the notes available for allotment.

Waco (Tex.) Street Railway.—The Waco Street Railway, which was incorporated recently with a capital stock of $1,000,000, has taken over the property of the Citizens' Railway Company, which was purchased recently under option by H. S. Shear, Waco, representing J. F. Strickland and his associates. It is proposed to transfer the property of the Waco Street Railway to the Southern Traction Company when it is incorporated. The officers of the Waco Street Railway Company are: J. F. Strickland, president; Osce Goodwin, treasurer; James P. Griffin, secretary; J. F. Strickland, Osce Goodwin, M. B. Templeton, Dallas, Tex.; Judson H. Boughton, Thomas H. West, J. G. Holliday and George L. Edwards, St. Louis, Mo., directors.

Dividends Declared

Albany Southern Railroad, Hudson, N. Y., ½ of 1 per cent, preferred.

Columbus (Ohio) Railway, quarterly, 1¼ per cent, preferred.

Commonwealth Power Railway & Light Company, Grand Rapids, Mich., quarterly, 1½ per cent, preferred.

Georgia Railway & Electric Company, Atlanta, Ga., quarterly, 1¼ per cent, preferred.

Grand Rapids (Mich.) Railway, quarterly, 1¼ per cent, preferred.

Havana Electric Railway, Havana, Cuba, quarterly, 1½ per cent, preferred and common.

Jacksonville (Fla.) Traction Company, quarterly, 1¾ per cent, preferred; quarterly, 1½ per cent, common.

Railways Company General, Philadelphia, Pa., quarterly, 1 per cent.

South Side Elevated, Chicago, Ill., special, $5.90.

United Traction Company, Pittsburgh, Pa., 2½ per cent, preferred.

MONTHLY ELECTRIC RAILWAY EARNINGS

AURORA, ELGIN & CHICAGO RAILROAD.

Period	Gross Revenue	Operating Expenses	Net Revenue	Fixed Charges	Net Income
1m., May, '11	$152,751	$89,935	$62,816	$35,843	$26,974
1 " " '10	142,644	82,338	60,306	33,662	26,644
11 " " '11	1,574,293	912,121	662,171	380,107	282,064
11 " " '10	1,444,926	809,098	635,829	340,928	294,901
BATON ROUGE ELECTRIC COMPANY.					
1m., May, '11	$10,110	$5,853	$4,257	$2,034	$2,223
1 " " '10	8,937	6,127	2,810	1,938	871
12 " " '11	113,339	69,965	43,374	23,611	19,763
12 " " '11	105,176	69,302	35,875	22,890	12,985
BROCKTON & PLYMOUTH STREET RAILWAY.					
1m., May, '11	$10,070	$7,621	$2,449	$1,565	$884
1 " " '10	9,524	7,526	1,998	1,765	234
12 " " '11	120,146	83,543	36,603	19,044	17,559
12 " " '10	127,228	93,281	33,947	20,920	13,027
CAPE BRETON ELECTRIC COMPANY.					
1m., May., '11	$27,651	$14,969	$12,682	$6,157	$6,525
1 " " '10	26,030	14,557	11,472	6,155	5,318
12 " " '11	328,924	170,268	158,556	73,731	84,926
12 " " '10	305,453	170,428	135,225	74,083	60,942
DALLAS ELECTRIC CORPORATION.					
1m., May, '11	$132,585	$88,079	$44,506	$27,941	$16,564
1 " " '10	115,593	81,398	34,194	26,621	7,573
12 " " '11	1,554,194	975,209	568,985	314,477	254,508
12 " " '10	1,383,893	892,743	491,151	326,007	165,143
EAST ST. LOUIS & SUBURBAN COMPANY.					
1m., May, '11	$193,181	$99,286	$93,896	....	....
1 " " '10	183,478	102,739	80,740	....	....
5 " " '11	905,984	487,222	418,763	....	....
5 " " '10	918,799	493.189	425,611	....	....
EL PASO ELECTRIC COMPANY.					
1m., May, '11	$54,161	$30,972	$23,189	$8,295	$14,894
1 " " '10	51,148	30,918	20,230	8,218	12,013
12 " " '11	658,208	381,959	276,249	98,144	178,104
12 " " '10	628,482	361,564	266,918	100,917	166,001
GALVESTON ELECTRIC COMPANY.					
1m., May, '11	$37,626	$19,594	$18,033	$8,557	$9,486
1 " " '10	27,954	17,939	10,015	6,462	3,552
12 " " '11	395,577	218,587	176,990	97,644	79,346
12 " " '10	364,664	228,979	135,686	77,265	58,421
NORTHERN OHIO TRACTION & LIGHT COMPANY					
1m., May, '11	$228,693	$124,657	$104,037	$44,329	$59,708
1 " " '10	207,323	111,250	96,074	43,375	52,699
5 " " '11	977,579	562,041	415,538	221,774	193,764
5 " " '10	865,662	501,105	364,557	216,542	148,015
SEATTLE ELECTRIC COMPANY.					
1m., May, '11	$447,989	$256,821	$191,168	$114,889	$76,279
1 " " '10	467,961	273,933	194,028	105,737	88,291
12 " " '11	5,565,586	3,122,359	2,443,027	1,329,043	1,113,984
12 " " '10	6,060,384	3,515,256	2,545,128	1,281,233	1,263,895
TAMPA ELECTRIC COMPANY.					
1m., May, '11	$55,302	$30,749	$24,553	$6,914	$17,639
1 " " '10	50,421	30,724	19,697	4,533	15,164
12 " " '11	608,447	325,455	238,293	74,247	209,046
12 " " '10	611,925	350,384	261,541	55,474	206,067
TWIN CITY RAPID TRANSIT COMPANY.					
1m., May, '11	$658,739	$311,974	$346,765	$140,079	$206,685
1 " " '10	627,946	289,382	338,564	140,113	198,452
5 " " '11	3,100,450	1,602,445	1,498,005	700,396	797,609
5 " " '10	2,931,643	1,446,451	1,485,192	701,029	784,163
UNION RAILWAY GAS & ELECTRIC COMPANY.					
1m., May, '11	$256,574	*$152,456	$104,118	$62,621	$41,497
1 " " '10	228,955	*139,074	89,881	57,837	32,044
5 " " '11	1,281,049	*756,639	524,410	301,907	222,503
5 " " '10	1,211,883	*730,444	481,439	290,018	191,421
UNION RAILWAY.					
1m., Mar., '11	$168,446	*$141,069	$27,377	.....	.....
WHATCOM COUNTY RAILWAY & LIGHT COMPANY.					
1m., May, '11	$32,651	$16,136	$16,515	$10,929	$5,586
1 " " '10	35,404	19,143	16,261	8,370	7,891
12 " " '11	428,510	218,738	209,772	120,053	89,719
12 " " '10	418,364	237,584	180,779	101,178	79,602

*Including taxes.

Traffic and Transportation

Fare Reduction Ordered on Syracuse & South Bay Railroad

The Public Service Commission of the Second District of New York has ordered the Syracuse & South Bay Railroad to cease, after Aug. 1, 1911, charging its present 10-cent fare between Stop No. 5 and the city line of Syracuse, and to establish a one-way fare not exceeding 6 cents. Complaints on the 10-cent fare were filed with the commission some time ago. In its order the commission points out that the distance from Stop 5 to the city line is 2.46 miles, making a rate of 4 cents a mile by charging the 10-cent fare. The same fare applies from North Syracuse to the city line, although the distance is 4.27 miles, making the rate per mile about 2.3 cents.

It is further declared that the company sells round trip tickets between Syracuse and North Syracuse for 25 cents, but that these tickets are sold only in Syracuse and in North Syracuse. They are also good from Stop No. 5 into Syracuse and return, but no ticket office is provided at Stop No. 5 or at intermediate points, and the conductors are not allowed to sell tickets on the cars.

The commission relates that the regular one-way fare into Syracuse from Stop No. 5 is 15 cents, 10 cents to the city line and 5 cents from the city line into the city; that the round trip fare is 30 cents; that Stop No. 4 is only .57 of a mile nearer the city line, but that the fare from Stop No. 4 to the city line is only 5 cents and only 10 cents into the city. The commission declines to fix a 5-cent fare, but finds that the fare of 10 cents from Stop No. 5 to the city line and 15 cents into Syracuse is unreasonably high for the service rendered. The company is, however, given the option of putting in ecect a 6-cent fare or of keeping to the multiple of five basis, and thereby reducing the fare to 5 cents.

Side-Rod Prepayment Car in Cincinnati.—The Cincinnati Traction Company, Cincinnati, Ohio, has put into service a double-truck prepayment car, equipped with trucks with side rods. The car was designed by Thomas Elliott, chief engineer of the company, and was built by the Cincinnati Car Company.

Coney Island Express Service Satisfactory.—The Public Service Commission of the First District of New York has served upon the Brooklyn Union Elevated Railroad, the Nassau Electric Railway, the Sea Beach Railway and the South Brooklyn Railway an order dismissing the complaint of the Luna Park Company et al with reference to the summer express service to Coney Island.

Abusing the Baggage Privilege.—At the monthly meeting of the Western Passenger Association at Mackinac Island, Mich., on July 12, 1911, the advisability was considered of amending the rules of the association so as to prevent the growth of the practice among patrons of the steam railroads of using their mileage books to check baggage by the steam railroads and then patronizing the electric railways.

Small Children Must Be Accompanied.—Alexander Shane, general manager of the Indianapolis, Columbus & Southern Traction Company, Columbus, Ind., has issued an order that all small children who travel on the company's cars must be accompanied by some person old enough to care for them properly. Trouble experienced recently by the crew of a car in determining the destination of an unaccompanied child prompted the order.

Transfer Modifications in Louisville.—As a result of the announcement of the Louisville (Ky.) Railway that it will establish a number of additional transfer points, the ordinance now pending in the General Council of Louisville, to compel the company to institute a so-called universal system of transfers, will probably not be acted upon. Several years ago the company substituted transfers to be given by the conductor for the car-to-car transfer station arrangement.

Record Traffic in Rochester.—Traffic figures compiled by the New York State Railways, Rochester Lines, for Carnival Day, July 12, 1911, indicate that the patrol drill of the Shriners and the Water Carnical at Genesee Valley Park combined to make a new record for the company. During

the day 283,165 revenue passengers and 104,423 transfer passengers were handled, making the total 387,588, or a gain of 23,558 over the previous high record of 354,030 passengers carried on July 4, 1910.

Coney Island Fare Case Reopened.—The Public Service Commission of the First District of New York has adopted on the motion of J. Sergeant Cram an order setting a hearing for July 24 to determine whether all the companes operating from New York to Coney Island shall not be obliged to reduce their fare to 5 cents except in the rush hours. The order just adopted affects all the companies, elevated and surface, in the Brooklyn Rapid Transit System operating to Coney Island, and the Coney Island & Brooklyn Railroad.

Decrease in New York Subway Traffic in Summer.—A comparison of traffic on the subway division of the Interborough Rapid Transit Company, New York, N. Y., for the period from July 5, 1911, to July 12, 1911, with the period from Dec. 5, 1910, to Dec. 12, 1910, shows that a total of 4,047,418 tickets were sold for the eight days from July 5 to July 12, 1911, while for the eight days from Dec. 5 to Dec. 12, 1910, 6,985,748 tickets were sold. The daily average for the eight days in July was 505,927, whereas the daily average for the eight days in December was 873,223.

Record Traffic in Portland, Ore.—Figures compiled by the Portland Railway, Light & Power Company, Portland, Ore., with regard to its passenger traffic on July 4, 1911, show that in point of numbers more passengers were carried that day than on any other day in the history of the company, not excluding the Rose Festival. The company reports as follows: Rose Festival, June 9, 1910, 372,017; June 10, 1911, 372,171; July 4, 1910, 371,979; July 4 1911, 439,154. In the compilation transfers are included, and these are estimated to total 25 per cent of the whole number. The increase on July 4, 1911, over July 4, 1910, was 67,175.

Pacific Electric Railway Uniforms.—On Aug. 1, 1911, the Pacific Electric Railway, Los Angeles, Cal., will adopt a single-breasted blue suit as standard for all its trainmen. The white caps will be replaced by black silk ones, and men who have been in the service of the company more than three years will be distinguished through a gold braid stripe on the left sleeve. For each three years' service a stripe will be attached to the wearer's uniform until the ninth year, when a star of gold braid will form the distinguishing mark. Depot masters and other employees not connected with the passenger service will wear silver trimmings in place of the gold. Stripes to designate length of service will be added in the same manner.

Increase in Wages for Chicago & Joliet Electric Railway Employees.—The board of arbitration which has been considering the question of increasing the wages of the employees of the Chicago & Joliet Electric Railway, Chicago, Ill., has decided that the men are entitled to an increase of 1 cent an hour. The award will date from July 1, 1910, and each employee will receive a bonus of about $40 in back pay. J. S. LeBosky represented the men of the board of arbitration, Clayton E. Crafts represented the company, and Chief Justice Harry Olson, of the Municipal Court at Chicago, was chosen by Mr. LeBosky and Mr. Crafts as the third member of the board. Mr. Crafts filed an opinion dissenting from the findings of Justice Olson and Mr. LeBosky.

New Destination Signs in Hartford.—The Connecticut Company has placed in service on its Asylum Avenue line, in Hartford, three cars equipped with new illuminated front, rear and side destination signs, which it is proposed to adopt as standard for use in Hartford. W. T. Bristol, manager of the company in Hartford, in referring to the signs, said: "As a whole they seem to be more satisfactory than any others we have adopted. The only car line other than the Asylum Avenue to have the illuminated sign is the one to Glastonbury. Glastonbury cars are closed. The side signs are the same as on the Asylum Avenue line. The front and rear signs differ, inasmuch as the Glastonbury cars are provided with a Pullman hood, and the sign is attached to the roof, while on the Asylum Avenue cars the front and rear signs are fastened into the window casing under the main roof of the car."

Boston & Northern Street Railway Literature.—A variety of literature has been issued this year by the Boston & Northern Street Railway, Boston, Mass. One booklet, "Trolley Facts," is devoted entirely to detailed information as to rates, fares, distances, where to take cars and where to make changes to hundreds of points on the lines of the company and connecting roads. This also has a detailed map of the section of Massachusetts east of Worcester, the southern part of New Hampshire and Rhode Island. Another folder, "Trolley Trips," is devoted to descriptions of the principal trips. In the center is an "Aero-View Map," while through the book individual route maps are used to depict more plainly the special trips referred to in the text. Besides these folders another is devoted to the special Boston and Providence summer service operated by the company, another to the Blue Hills reservation, ten smaller ones suggest trips and how to take them from the principal cities on the company's lines, and others are equally interesting. "Get the trolley habit" is the slogan adopted by the company.

Hearing on Fares and Transfers Before New Jersey Commission.—Argument was heard by the Board of Public Utility Commissioners of New Jersey at Newark on June 30, 1911, in the case of Commissioner William Mungle, of the Board of Works of Newark, against the Public Service Railway on the subject of the extension of transfers and of round-trip fares to New York. L. D. Howard Gilmour appeared for the company and Joseph G. Wolber represented Mr. Mungle. Mr. Mungle contended that the company should allow a passenger to board any car going in the direction of his destination and permit him to transfer rather than compel the passenger to wait for the car which is routed direct to where the passenger desires to go. In regard to the excursion fare to New York Mr. Mungle petitioned for an order to compel the company to meet terms of city ordinances which he contended require that the round-trip fare to New York to passengers on the South Orange line should be 20 cents and to passengers transferring to the South Orange line 24 cents. The company contended that the board had recently handed down a decision adverse to the petitioner in a similar case in Jersey City. Mr. Gilmour said that at a previous hearing no one testified that there was any demand for the 25-cent rate, and that there had been no complaints on the subject since Jan. 1, 1910. He said that the excursion rate is only 25 cents if the passenger buys ten ferry tickets at once and is only 26 cents if ferry tickets are bought one at a time.

Service Changes in Oneida.—An agreement has been reached by the Oneida (N. Y.) Railway with the city whereby a connection will be built from Madison Square through Madison and Sconondoa Streets to the New York, Ontario & Western Railway's tracks before Oct. 31, 1911. The company also is to cause local cars operated on its main line to leave the West Shore tracks at or near their intersections with Main Street and Lenox Avenue and proceed through Main Street and Lenox avenue or Central Avenue, connecting again with the West Shore R. R. at Oneida Castle, at or near the Lenox Avenue bridge, effective Oct. 31. Two additional cars are to be put on by Oct. 31, during the rush hours, between Sherrill and Oneida. The company has also agreed that on or before Oct. 31, 1911, it will sell for 10 cents a round-trip workingman's ticket between any point in Oneida on Main Street, Lenox Avenue, West Street, Central Avenue, Madison Street and Sconondoa Street and Kenwood; the tickets to be good for passage from the West Shore between Main Street and Lenox Avenue and between Sherrill and Oneida in the rush hour. The tickets in question are to be good only for continuous passage between 6.30 a. m. and 8.30 a. m. and 5 p. m. and 7 p. m. on each week day. The city of Oneida has agreed to grant the company permission to construct the extension referred to and to repeal or modify the provision in the railway company's franchise relating to the speed limit for cars in Oneida. The city has also agreed to certain other amendments to contracts and franchises now held by the company. The agreement made between the city and the company has been approved by the Public Service Commission of the Second District, with the full understanding that the commission does not relinquish any of the powers vested in it.

Personal Mention

Mr. Theodore P. Shonts, president of the Interborough-Metropolitan Company and the Interborough Rapid Transit Company, New York, N. Y., and president of the Chicago & Alton Railroad, has been elected a member of the board of directors of the Kansas City, Mexico & Orient Railway.

W. I. Barley has been appointed chief engineer of steam plants of the Portland Railway, Light & Power Company, Portland, Ore., to succeed Mr. B. W. Slocum, resigned, who has been appointed general manager of the Oregon Dry Dock Company, Portland, Ore., as mentioned in the ELECTRIC RAILWAY JOURNAL of July 15, 1911.

Mr. Frank W. Frost, assistant secretary of the Oakland Traction Company and the San Francisco, Oakland & San Jose Consolidated Railway, Oakland, Cal., has been elected secretary of the companies to succeed Mr. Samuel J. Taylor, resigned, who has been elected secretary of the People's Water Company, San Francisco, Cal.

Mr. Clarence P. King, who is president of the Washington-Virginia Railway, has been elected president of the Washington Railway & Electric Company and the Potomac Electric Company to succeed Mr. Clarence F. Norment, who resigned on account of the pressure of private matters. Mr. Norment will continue with both companies as a director.

Mr. W. T. Buchanan, who has been connected with the staff of *The Oregonian*, has been appointed publicity agent of the Portland Railway, Light & Power Company, Portland, Ore. Mr. Buchanan will have charge of the advertising of the company and the relations of the company with the press and will assist in editing the official journal of the company, *The Portland Carman.*

Mr. R. B. Grimmet will be appointed assistant superintendent of the railway department of the Little Rock Railway & Electric Company, Little Rock, Ark., the office of superintendent of transportation being abolished. Mr. Grimmet has been in the employ of the company for the last ten years. He was first employed as a conductor. He was promoted from that postion to dispatcher and has since continued as dispatcher.

Mr. Dow S. Smith has been appointed general manager of the Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn. For some time past Mr. Smith has been connected with power development work in the West. From June, 1902, until July, 1907, he was general superintendent of the Brooklyn (N. Y.) Rapid Transit Company. Before that Mr. Smith was connected with the Twin City Rapid Transit Company, Minneapolis, Minn., for eight years.

Mr. Hugh Patterson, who recently resigned from the Pennsylvania Tunnel & Terminal Company, New York, N. Y., to act as electrical engineer for the Chicago Electrification Commission, to study the electrification of the steam railroad terminals in Chicago, was tendered a farewell dinner at the New York Athletic Club on July 19. There were fourteen in the party which consisted for the most part of Mr. Patterson's old associates in electric railway work. Mr. Patterson will assume his new duties on Aug. 1.

Mr. Richard Eick will be appointed superintendent of the railway department of the Little Rock Railway & Electric Company, Little Rock, Ark., vice Mr. C. J. Griffith, promoted. Mr. Eick has been superintendent of the transportation department of the company since 1904. He was formerly division superintendent of the North Jersey Traction Company, from which company he went to the United Railroads, San Francisco, Cal., as division superintendent. He resigned from the United Railroads to become superintendent of transportation of the Little Rock Railway & Electric Company, which position he has filled up to the present time.

Mr. J. V. H. Torner has been appointed foreman of shops and carhouses of the Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis. Mr. Torner was born in Newport, Ohio, and was educated at the Ohio Northern University, Ada, Ohio, and at the Ohio State University at Columbus, Ohio. He began his railway career with the Chicago City Railway, and after a year of service with this company was appointed night foreman of one of its car houses, and was later transferred to the company's new carhouse at Thirty-eighth Street and Cottage Grove Avenue as night foreman. He was subsequently appointed assistant day foreman of the carhouse and shops of the Calumet & South Chicago Railway. He resigned from this company to become division shop foreman of the Rockford & Interurban Railway at Beloit, Wis.

Mr. Charles J. Griffith will be appointed general superintendent and treasurer of the Little Rock Railway & Electric Company, Little Rock, Ark., to succeed Mr. D. A. Hegarty in charge of operation. Mr. Griffith has been superintendent of the railway department of the company since 1905. He entered the employ of the Little Rock Traction & Electric Company in 1892 as master mechanic, and remained in that position until 1897, when he became general superintendent of the Southern Engineering Company, installing electric light plants and water works. He re-entered the service of the Little Rock Railway & Electric Company in 1901 as master mechanic and continued in that position until he was promoted to superintendent of the railway department, which position he has held up to the present time.

Mr. M. J. Hill has been appointed general superintendent of the Trenton, Bristol & Philadelphia Street Railway, Bristol, Pa. After completing the course in electrical engineering at the University of Wisconsin Mr. Hill entered the mechanical department of the Grand Rapids, Grand Haven & Muskegon Electric Railway, and about a year later became connected with the engineering department of the Westinghouse Electric & Manufacturing Company at East Pittsburgh, Pa. He resigned from the Westinghouse company, however, to become master mechanic and chief engineer of the Winnebago Traction Company, Oshkosh, Wis. About two years later he accepted the position of chief engineer of the Philadelphia & Western Railway. Subsequently he purchased an interest in a gas and electric company in the South and acted as president and manager of the company for several months. Mr. Hill became electrical and mechanical engineer of the Trenton, Bristol & Philadelphia Street Railway on April 1, 1910, and continued in that capacity until July 1, 1911, when he was appointed general superintendent of the Trenton, Bristol & Philadelphia Street Railway.

Mr. J. J. Doyle, who has been acting manager of the Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md., was appointed general manager of the company on July 1, 1911, to succeed Mr. J. N. Shannahan, resigned, who has become connected with J. G. White & Company, Inc., New York, N. Y. Mr. Doyle has long been connected with steam railroad and electric railway work. He was employed in the maintenance of way department of the Pennsylvania Lines, West, from 1888 to 1893 in various capacities. In 1893 he accepted a position with the freight department of the Wheeling & Lake Erie Railroad at Cleveland, Ohio, and served that company until 1895, when he entered the service of the L. P. & J. A. Smith Contracting Company. After a connection of two years with this company Mr. Doyle accepted a position with the Cleveland & Eastern Railway, Cleveland, Ohio, which he served as train dispatcher, division superintendent and general superintendent, continuing with the company until Jan. 1, 1908, at which time he entered the service of the Washington, Baltimore & Annapolis Electric Railway as engineer of track and overhead lines. On Nov. 18, 1909, he was made general superintendent of the Washington, Baltimore & Annapolis Electric Railway and continued in that capacity until July 1, 1911.



J. J. Doyle

Mr. Jay P. Graves, who recently disposed of his interest in the Spokane & Inland Empire Railroad, Spokane, Wash., and was succeeded on July 1, 1911, as president of the company by Mr. Carl Raymond Gray, as noted in the Electric Railway Journal of July 8, 1911, has been president of the company since its incorporation on Jan. 1, 1906. Mr. Graves went to Spokane from Illinois in 1887, when the estimated population of Spokane was 7000 persons. He was one of the incorporators and the first president of the Spokane Traction Company, which was organized on Feb. 18, 1903, when the estimated population of the city was 40,000. The Spokane & Inland Railway, now the Palouse & Moscow branch of the Spokane & Inland Empire Railroad, was incorporated on Dec. 13, 1904. Mr. Graves was also first president and one of the incorporators of this road, as well as of the Spokane Terminal Company, which was organized on March 5, 1905. He was one of the incorporators of the Cœur d'Alene Railway, of which Mr. F. A. Blackwell was the first president. The Cœur d'Alene Railway was purchased and consolidated with the other companies when the Spokane Terminal Company was organized.

Mr. D. A. Hegarty has resigned as vice-president, general manager, treasurer and director of the Little Rock Railway & Electric Company, Little Rock, Ark., to become general manager of the railway and lighting departments of the New Orleans Railway & Light Company, New Orleans, La., to take effect on Aug. 1, 1911. Mr. Hegarty was one of the pioneer operators in the electric field and the railway, lighting and gas business. He was educated at the University of Pennsylvania. On leaving the university he became connected with the engineering department of the Pennsylvania Railroad as rodman. He was assistant engineer of construction and maintenance of way of the Pennsylvania Railroad when he resigned from that company to become associated with Mr. A. Langstaff Johnston, pioneer electrical engineer in the railway field. When Mr. Johnston took charge of the work of electrifying the railways in Philadelphia Mr. Hegarty was engineer-in-charge of construction. On completion of the construction work he became general manager and chief engineer of the Hestonville, Mantua & Fairmount Passenger Railway. When the companies in Philadelphia were merged Mr. Hegarty resigned to accept the position of general manager and chief engineer of the Norfolk (Va.) Railway. Subsequently he became manager of the Railways Company General, an operating and construction company having railways and electric light and gas plants in Michigan, New York, Pennsylvania, Ohio and Cuba. This company also made a large number of reports and carried on construction work with properties all over the United States and in South America. Resigning this position, Mr. Hegarty became vice-president, treasurer and general manager of the Little Rock Railway & Electric Company, and has been in charge of that property for the last five years. The Little Rock Railway & Electric Company is one of the properties operated by Ford, Bacon & Davis, New York, N. Y., and is admitted to be one of the best constructed and operated public service properties in the country for a city the size of Little Rock. Mr. Hegarty has been closely identified with the progress of Little Rock, and is one of the directors of the Board of Trade and a member of the board of governors of the Chamber of Commerce. He is a member of the committee on city rules of the American Electric Railway Association and was one of the organizers of the Arkansas Association of Public Utility Operators, and was formerly president of that association. The Arkansas *Gazette* said editorially: "The Little Rock Company has always given good service and Little Rock has every reason to regret losing Mr. Hegarty, both as a street railway manager and as a citizen."



D. A. Hegarty

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Benton Traction Company, Benton, Ark.**—Incorporated in Arkansas to build a street railway. Capital stock, $100,000. Incorporators: M. H. Holleman, L. L. Lansing and L. B. White.

***West Peak Railroad, Meriden, Conn.**—Incorporated in Connecticut to build an electric railway from the summit of West Peak, in Meriden, to connect with the lines of the Connecticut company at Southington. C. J. Danaher, Meriden, is interested.

***Albany Transit Company, Albany, Ga.**—Application for a charter has been made in Georgia by this company to build an electric railway in Albany. Capital stock, $75,000. Incorporators: C. W. Rawson, S. B. Brown, F. F. Putney, W. W. Pace, and others.

***St. Louis, Cedar Rapids & Minneapolis Railroad, St. Louis, Mo.**—Application for a charter will be made by this company in Missouri to build an electric railway to connect St. Louis, Mo., and Minneapolis, Minn. Capital stock, $20,000,000. The Missouri, Iowa & Minnesota Construction Company is promoting this proposed line.

Columbia Falls & Southern Railroad, Columbia Falls, Mont.—Incorporated in Montana to build a 26-mile electric railway between Columbia Falls, Jessup and Big Fork. Capital stock authorized, $100,000. Officers: A. L. Jordan, Columbia, president; H. F. Snow, Jessup, vice-president; W. P. Snow, Big Fork, secretary; John T. Robinson, Columbia Falls, treasurer, and H. E. Waggener, Columbia Falls, chief engineer. [E. R. J., May 13, '11.]

Cheat River Development Company, Pittsburgh, Pa.—Incorporated in West Virginia to build electric lines in Preston County. Capital stock, $50,000. Incorporators: Charles W. Held, William L. Hyatt, John M. Gleason, Frank P. Weaver and Glenn Hunter, all of Morgantown.

***Hancock County Electric Company, New Cumberland, W. Va.**—Incorporated in West Virginia to build an electric railway in Hancock County. Capital stock, $12,000. Incorporators: Nelson D. Miller, John F. Flood, Harry E. Armstrong, Samuel E. McCoy and Samuel G. Stewart, all of Steubenville, Ohio.

FRANCHISES

Fort Smith, Ark.—The Fort Smith Light & Traction Company has asked the Council for two franchises in Fort Smith.

Chico, Cal.—The Northern Electric Railway has asked the Board of City Trustees for a franchise to build over the entire length of Ninth Street, and on Oak Street from Fifth Street to Ninth Street.

Sacramento, Cal.—The Sacramento Electric, Gas & Railway Company has asked the Board of Supervisors for a franchise to extend its tracks through the suburbs to the east and southeast sections of Sacramento, making several loops. This application covers three sections of single or double tracks, as the company may hereafter decide.

***San Luis Obispo, Cal.**—W. G. Lincoln, San Luis Obispo, has asked the Board of Supervisors for a franchise to build an electric railway in the city and county of San Luis Obispo. He has also asked the City Council of Paso Robles for a franchise to build an electric railway in Paso Robles.

***Watts, Cal.**—The city clerk will receive sealed bids up to Aug. 8, 1911, for a fifty-year franchise to maintain and operate a railroad, with two or more tracks, along certain streets of Watts; to be operated with electricity.

Canaan, Conn.—The Berkshire Street Railway has had transferred to it, from Henry J. Loraback and S. F. Eddy, a franchise to build an electric railway from Canaan to the Massachusetts State line, to connect there with a line now being built from Ashby Falls, Mass.

New Haven, Conn.—The Shore Line Electric Railway has asked the Railroad Commission to approve two petitions for constructing its tracks in New Haven, East Haven, North Branford, Branford, Clinton, Westbrook, Old Saybrook and Essex.

Attleboro, Mass.—The Interstate Consolidated Street Railway has received permission from the Board of Railroad Commissioners to rebuild its tracks over South Main Street, in Attleboro.

***Bay City, Mich.**—Alex J. Grosbeck has asked the Common Council for a franchise to build an interurban railway over certain streets in Bay City.

Marquette, Mich.—The Houghton County Traction Company, Houghton, has received a franchise from the Village Council to build an extension on Ingot Street, in Marquette, to the railroad crossing.

***Little Falls, Minn.**—The American Engineering & Construction Company has asked the Council for a franchise to build an electric railway and power plant in Little Falls.

St. Louis, Mo.—The St. Louis & Jennings Railway has received a franchise from the Municipal Assembly to build a 1-mile electric railway from the end of the Union-Florissant line to West Walnut Manor in St. Louis. [E. R. J., July 15, '11.]

Geneva, Ohio.—The Cleveland, Painesville & Eastern Railroad, Willoughby, has received a 25-year extension on its franchise in Geneva.

Hamilton, Ohio.—The Ohio Electric Railway has asked the City Council for a franchise in Hamilton.

Beaver Falls, Pa.—The Beaver Falls, Koppel & New Castle Street Railway has asked the City Council for a franchise in Beaver Falls. This is part of a plan to build an electric railway to connect Beaver Falls, Koppel, Wampum, Mahoningtown and New Castle. It will connect with the Pittsburgh, Butler, Harmony & New Castle Railway. [E. R. J., June 24, '11.]

Butler, Pa.—The Butler Passenger Railway has received a franchise from the City Council to build a 750-ft. viaduct in Center Avenue, Butler, to span the Bessemer & Lake Erie Railroad and the Baltimore & Ohio Railroad tracks.

Greensburg, Pa.—The West Penn Traction Company has asked the Borough Council for a franchise for the Greensburg Terminal Company. This company proposes to lease the tracks of the Pittsburgh, McKeesport & Greensburg Company and the Greensburg & Southern, Greensburg, and to build extensions within the borough limits.

Lebanon, Pa.—The Ephrata & Lebanon Street Railway has received an extension of time on its franchise from the City Council in Lebanon.

Northumberland, Pa.—The Sunbury, Lewisburg & Milton Railroad, Sunbury, Pa., has asked the City Council for a franchise to build its tracks over the principal streets in Northumberland to the borough limits. W. H. Lyons, Sunbury, president. [E. R. J., Nov. 5, '10.]

Philadelphia, Pa.—The Philadelphia Rapid Transit Company has asked Councils for a franchise to extend its Chester Avenue line in Philadelphia.

Houston, Tex.—The Houston Electric Company has received a franchise from the City Council to relay its tracks over certain streets in Houston. Another franchise was granted to this company and to the Galveston-Houston Electric Company to enter into supplemental contracts with each other for the joint use of track in and around Houston.

Wenatchee, Wash.—E. J. Felt, Tacoma, representing the Wenatchee Valley Railway & Power Company, will ask the Council for a franchise to extend this line in Wenatchee to Leavenworth. [E. R. J., April 15, '11.]

TRACK AND ROADWAY

Pacific Electric Railway, Los Angeles, Cal.—Plans are being made by this company for the immediate construction of an extension on Colton Avenue, from Urbita Springs, south of San Bernardino, to Colton.

San Joaquin Valley Electric Railway, Modesto, Cal.—T. K. Beard has been awarded the contract by this company to construct an extension in Modesto from the city limit at Elm Street, to Eighth Street and F Street. As soon as this line is completed the company will build north to the Stanislaus River.

***Stockton and Bay City Short Line, Stockton, Cal.**—This company proposes to build an electric railway between Stockton and Byron, and ultimately to Antioch and Oakland. Application for a charter will be made soon.

Florence, Col.—D. F. Foor, Florence, advises that he has secured all right-of-way and franchises and that construction will be begun as soon as he has secured the necessary capital to build a 6-mile electric railway to connect Florence, Williamsburg, Rockvale and Coal Creek. [E. R. J., June 10, '11.]

***Tampa, Fla.**—James R. Reid, Augusta, Ga., it is said, plans to build an electric railway to connect Miami and Tampa, via the Everglades.

***Albany, Ga.**—Jesse & Earnest, general agents of the Dixie Pecan Orchards Company, 206 S. La Salle Street, Chicago, Ill., and Albany, Ga., are reported to be considering the construction of a 30-mile electric railway out of Albany.

Atlanta & Carolina Railway, Atlanta, Ga.—Work has been begun by this company laying its tracks from Atlanta to Oxford.

City & Suburban Railway, Brunswick, Ga.—This company will build a 1-mile extension.

***Jackson, Ga.**—It is reported that W. F. Smith, Jackson, is interested in a plan to build an electric railway from Indian Springs to Jackson, with a branch line to Griffin.

Illinois Traction System, Champaign, Ill.—This company has appropriated $100,000 for improvements on its lines in Peoria this year. Among other improvements this company will reconstruct its tracks in Averyville.

***Quincy & Western Illinois Electric Railway, Quincy, Ill.**—This company has been formed to build a 75-mile electric railway between Quincy and Niota, with branches to Keokuk, Warsaw, Nauvoo and Carthage. Construction will be begun in about three months. Henry Dayton, Quincy, president and general manager.

St. Joseph Valley Traction Company, Elkhart, Ind.—This company completed on July 15 its line between Elkhart, Middlebury, Lagrange and Angolia. A portion of the line has been operated for about five years by gasoline-electric motor cars. Electric cars are being used on the western end of the line.

***Keokuk, Ia.**—Right-of-way has been obtained to build an interurban railway from Rock Island to St. Louis via Adams, Pike and Calhoun Counties. It is reported that Stone & Webster, who are financing the Keokuk & Hamilton Water Power Company, Keokuk, are interested in the project and that power to operate the line will be obtained from this company.

***Excelsior Springs, Kan.**—D. A. McKibben and W. B. Walker, Excelsior Springs, and associates plan to build an electric railway from Leavenworth to Excelsior Springs via Bveerly and Platte City.

Kentucky Traction & Terminal Company, Lexington, Ky.—Work has been begun by this company relaying 80-pound rails in concrete in place of the lighter ones now in service.

Aroostook Valley Railroad, Presque Isle, Me.—It is stated at Presque Isle, Me., that the St. John & Quebec Railway, of which A. R. Gould is general manager, has arranged with the Canadian and the New Brunswick authorities for a subsidy for a new railroad from St. John, N. B., to Grand Falls, N. B., with a connection at or near Aroostook Junction, N. B., with the Canadian Pacific Railway branch to Presque Isle, Me. Mr. Gould obtained permission from the Legislature last winter for the Aroostook Valley Railroad (electric) to build three extensions—one to New Sweden, one to Caribou, and one westerly across northern Maine to the Canadian boundary in L'Islet County, Que., where connections might be made with a railroad from Quebec, and also obtained charter rights to acquire and electrify the Presque Isle branch of the Canadian Pacific Railroad so as to form links in a new route from Quebec to the Atlantic seaboard at St. John, N. B. In the recent announcement from Presque Isle it is not stated whether the St. John & Quebec Railway is to be operated by steam or electricity.

Boston & Eastern Electric Railroad, Boston, Mass.—This company has filed with the State Treasurer of Massachusetts a bond for $1,000,000, approved by the Attorney General of the State, to assure the construction of the road. This line will connect Boston, Beverly and Danvers. John H. Bickford, 110 State Street, Boston, chief engineer. [E. R. J., July 1, '11.]

Boston (Mass.) Elevated Railway.—Work has been begun by this company retracking Pleasant Street, in Malden.

Springfield (Mass.) Street Railway.—Work has been begun by the Fred T. Ley Company on the construction of the extension of this company's Brightwood line through East Street in Chicopee.

Detroit (Mich.) United Railway.—This company has placed in operation its extension on Detroit Street to the intersection of Court Street and Saginaw Street, in Detroit. The company will begin rebuilding its Griswold Street line between Grand River and Jefferson Avenue, in Detroit, at once.

Michigan United Railway, Jackson, Mich.—This company placed in operation on July 8 its third-rail line between Lansing and Owosso. The line is 33 miles in length and will, it is said, eventually be extended to Saginaw.

Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn.—Shepard & Morse, St. Paul, have been awarded the contract by this company to grade its extension from Northfield to Faribault, ultimately to extend to Owatonna.

Cape Girardeau-Jackson Interurban Railway, Cape Girardeau, Mo.—During the next six months this company will place contracts to build 9 miles of interurban railway.

Missouri Interurban Railway, Jefferson City, Mo.—This company is constructing an extension to connect the eastern and western part of Jefferson City.

St. Louis & Jennings Railway, St. Louis, Mo.—Contracts will be awarded at once by this company to construct its 1-mile electric railway from the end of the Union-Florissant line to West Walnut Manor in St. Louis; to be operated as an extension of the Bellefontaine and the Union Avenue lines between Walnut Park and West Walnut Manor. Richard J. Baldwin is interested. [E. R. J., July 15, '11.]

Public Service Corporation, Newark, N. J.—This company is said to be planning extensive improvements in the service of its Montclair line. Plans are also being perfected for the construction of a loop on the plaza in front of the proposed Lackawanna terminal, in Montclair. A third new line for which right-of-way has been offered is to extend through Essex Falls to Roseland.

Trenton-Mercer County Traction Company, Trenton, N. J.—Richard Newton has been awarded the contract by this company to reconstruct this company's tracks over State Street, from the canal bridge to Broad Street in Trenton. [E. R. J., Oct. 15, '10.]

Suffolk Traction Company, Patchogue, N. Y.—The Public Service Commission, Second District, has determined that the crossing of the right-of-way and tracks of the Long Island Railroad on Ocean Avenue, in Patchogue, by the tracks of the Suffolk Traction Company shall be at grade. The crossing is to be protected by interlocking and derailing devices to be approved by the commission, and the expense of installing the crossing and necessary interlocking and derailing devices is to be paid entirely by the Suffolk Traction Company, and the expense of maintenance and operation of the safety devices is also to be borne by the Suffolk Traction Company.

Syracuse, Lake Shore & Northern Railroad, Syracuse, N. Y.—The extension between Fulton and Oswego has been completed by this company and will be placed in operation as soon as the work on the Fulton Bridge is finished.

Syracuse, Watertown & St. Lawrence River Railroad, Syracuse, N. Y.—It is reported that this company will soon award the contract to construct its 6-mile line from Stop 9 on the South Bay road to Brewerton. [E. R. J., July 1, '11.]

Akron, Canton & Youngstown Electric Railway, Canton, Ohio.—The filing of a mortgage for $15,000,000 by this company is said to mean that the construction of this railway to connect Akron, Canton and Youngstown will be begun this summer. [E. R. J., May 21, '11.]

***Cleveland Underground Rapid Transit Company, Cleveland, Ohio.**—The capital stock of this company has been increased from $10,000 to $3,500,000, of which $2,000,000 is common stock and $1,500,000 is 6 per cent preferred.

Hills & Dale Railway, Van Buren, Ohio.—This company has placed in operation its 1-mile electric railway between the Dayton Automobile Club and the Country Club. Eventually this line will be extended throughout Hills and Dale, a distance of about 4 miles. Edwin P. Matthews, Clayton, is interested. [E. R. J., April 8, '11.]

West Penn Railways, Pittsburgh, Pa.—Plans are being made by this company to build an extension across the Pennsylvania State line to Morgantown, W. Va. The company is also building several extensions from its main line toward the Monongahela River.

Jefferson Traction Company, Punxsutawney, Pa.—This company has completed the extension of the Mahoning Valley Street line through Big Run. It connects with the United Traction Company of Dubois, which makes a through line from Punxsutawney to Dubois.

Waynesburg & Blacksville Street Railway, Waynesburg, Pa.—The Bardella Construction Company, Fairmont, W. Va., has been awarded the contract by this company to grade and construct 5 miles of its electric railway between Waynesburg and Blacksville. The American Bridge Company received the contract to build a 140-ft., double-track steel bridge over Tenmile Creek, and the H. F. Stark Company has been awarded the contract to grade the remaining 8 miles of track on the south end of the line, leaving Blacksville and connecting with the Bardella contract 5 miles south of Waynesburg. Samuel Eakin, Wadestown, W. Va., president. [E. R. J., June 17, '11.]

Nashville-Gallatin Interurban Railway, Gallatin, Tenn.—The Fidelity Securities Corporation, which is building this 30-mile electric railway from Nashville to Gallatin, is making arrangements to extend this line northward to Franklin and Bowling Green. H. H. Mayberry, Nashville, president. [E. R. J., June 24, '11.]

Kittitas Railway & Power Company, Cle Elum, Wash.—This company has filed a deed of trust for $500,000 in the County Auditor's office at Ellensburg, as a step toward raising funds for building an electric railway between Roslyn and Cle Elum, via Ronald and Janesville. Paul L. Richards, Tacoma, president. [E. R. J., June 17, '11.]

***Clarksburg (W. Va.) Northern Railway.**—A contract has been awarded by this company to Contractor Fucci, Clarksburg, to build this electric railway between Clarksburg, New Martinsville and Middlebourne. T. Moore Jackson and I. M. Underwood are interested.

Ohio Valley Electric Railway, Huntington, W. Va.—This company plans to double-track about 8 miles of its road from Guyandotte to Camden Park, via Huntington.

SHOPS AND BUILDINGS

Northern Electric Railway, Chico, Cal.—This company will build repair shops, a carhouse and depot in Marysville.

Pacific Electric Railway, Los Angeles, Cal.—This company will build a passenger station at Azusa, Cal.

Southern Pacific Railroad, Los Angeles, Cal.—The construction of a new passenger station has been begun by this company at Sixteenth Street in Oakland. The structure will be of steel and concrete construction throughout, the exterior faced with a granite base and terra cotta glazed tile.

Oakland (Cal.) Traction Company.—Plans are being made by this company and the Oakland, Antioch & Eastern Railway and the Key Route to establish a depot and distributing station between Twelfth, Eleventh, Webster and Harrison Streets, in Oakland.

Denver (Col.) City Tramway.—This company has decided to proceed at once with the construction of an interurban electric railway station on Curtis Street, between Fourteenth and Fifteenth Streets, in Denver, following its policy of centralizing the administration and terminals.

Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.—This company has plans and specifications ready for contractors for the erection of modern passenger stations in Connersville and Shelbyville and for the remodeling of the station at Greensburg. C. L. Henry, president.

Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind.—Work will be begun at once by this company on its new carhouse in Ft. Wayne. The estimated cost of the structure is $175,000.

Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn.—Plans have been made and work will soon be begun by this company on its passenger station, at Third Street and Linden Street, Northfield, Minn.

Great Falls Street Railway, Great Falls, Mont.—This company is now building a new carhouse and repair shops in Great Falls. The structure is 80 ft. x 170 ft., and of reinforced concrete, steel and corrugated iron construction.

Public Service Corporation, Newark, N. J.—This company is considering plans to build a new carhouse at Bell Street and Bloomfield Avenue, in Montclair.

Northern Ohio Traction & Light Company, Akron, Ohio.—This company plans to construct a carhouse at Kenmore.

POWER HOUSES AND SUBSTATIONS

San Francisco, Vallejo & Napa Valley Railroad, Napa, Cal.—This company has recently ordered the following material for use in its shops at Napa: One 300-ton Caldwell hydraulic wheel press with direct motor drive, one McCabe 36 x 54-in. double-spindle lathe, driven direct by General Electric multispeed induction motor. The 54-in. swing on the lathe will be used for turning steel wheels and tires.

Bangor Railway & Electric Company, Bangor, Me.—Plans have been made and work will soon be begun on this company's new substation near Center Street and Park Street, in Bangor. This building is to be 86 ft. x 43 ft., and of reinforced concrete construction. E. M. Waterhouse is in charge.

Waterville & Fairfield Railway & Light Company, Waterville, Me.—This company is in the market for one second-hand, 500-kw turbine for its power house in Waterville.

Marquette County Gas & Electric Company, Ishpeming, Mich.—This company expects to purchase a 200-kw rotary converter.

Cape Girardeau-Jackson Interurban Railway, Cape Girardeau, Mo.—During the next six months this company will place contracts to build a new substation in Cape Girardeau.

Trenton-Mercer County Traction Company, Trenton, N. J.—This company will make an addition of 750 kw to its power plant at Trenton.

Elmira Water, Light & Railroad Company, Elmira, N. Y.—This company has purchased a 600-hp Babcock & Wilcox boiler.

Syracuse (N. Y.) Rapid Transit Company.—This company will start work immediately on a 2000-kw substation to be located at 208 Townsend Street, in Syracuse. This station will supply energy to the Butternut, Oak, East Syracuse, Hawley and the east end of East Genesee Street lines.

Wilkes-Barre (Pa.) Railway.—This company has added to its power plant a 1500-kw Rice & Sargent compound engine direct-circuited to a General Electric generator, and has also added a battery of six Babcock & Wilcox boilers rated at 2100 hp. The boiler room has been enlarged and a new 178-ft. stack built. William H. Wheator, chief engineer.

Grays Harbor Railway, Light & Power Company, Aberdeen, Wash.—This company has placed in operation its new power house No. 2, located on the Anderson & Middleton Lumber Company's property, on Broadway Street, in Aberdeen. A 1000-kw turbo-generator and a 300-kw turbo-generator have been installed.

Washington-Oregon Corporation, Vancouver, Wash.—This company is building a new power house on the Kalamon River. A. Welch, 502 Fenton Building, Portland, Ore., general manager.

Manufactures & Supplies

ROLLING STOCK

United Traction Company, Albany, N. Y., is rebuilding twenty cars in its own shops.

Savannah (Ga.) Electric Railway has ordered three 26-ft. 6-in. car bodies from the St. Louis Car Company.

Binghamton (N. Y.) Railway expects to be in the market shortly for four or six closed single-truck car bodies.

Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., has ordered two single-truck closed cars from the J. M. Jones' Sons Company.

Birmingham (Ala.) Railway, Light & Power Company has ordered twenty-four Brill 53-B trailer trucks from The J. G. Brill Company.

Ocean City Electric Railroad, Ocean City, N. J., has ordered two 28-ft. 8⅜-in., 10-bench open cars from The J. G. Brill Company.

Columbus Railway & Light Company, Columbus, Ohio, has purchased twenty-four Brill-22 special trucks from the G. C. Kuhlman Car Company.

Texas Traction Company, Dallas, Tex., has ordered two 28-ft. 8-in. closed trailer car bodies, mounted on Brill-57 trucks, from the Danville Car Company.

Aurora, Elgin & Chicago Railroad, Chicago, Ill., is in the market for ten heavy all-steel four-motor interurban cars. F. C. Faber, Wheaton, general manager.

Lehigh Valley Transit Company, Allentown, Pa., has ordered ten 30-ft. 1-in. pay-within convertible cars, mounted on Brill-27 MCB-1 trucks, from The J. G. Brill Company.

Warren (Pa.) Street Railway has ordered five 28-ft. 8-in. semi-convertible, pay-as-you-enter motor car bodies, on Brill 21E trucks, from the G. C. Kuhlman Car Company.

Montreal (Que.) Street Railway, noted in the ELECTRIC RAILWAY JOURNAL of July 1, 1911, as having issued specifications for twenty-five cars, has ordered twenty-five steel pay-as-you-enter car bodies from the Ottawa Car Company.

International Railway, Buffalo, N. Y., has ordered sixty motor equipments which consist of two 60-hp motors with K-36 control, from the General Electric Company. These equipments will be installed on the sixty semi-convertible, near-side cars being built by The J. G. Brill Company.

Philadelphia (Pa.) Rapid Transit Company has ordered thirty two-motor car equipments for use on its elevated division and fifty two-motor equipments for use on its surface division from the General Electric Company. The equipments for the elevated division consist of two 125-hp motors with Sprague-General Electric type M control, and will be installed on the thirty steel cars being built by The J. G. Brill Company. The equipments for the surface lines consist of two 60-hp, 500-volt motors with K-36 control, and will be installed on the fifty near-side cars which are also being built by The J. G. Brill Company.

Houston (Tex.) Electric Company has specified the following details for the ten single-end closed trailer cars being built by the St. Louis Car Company:

Seating capacity	40	Air brakes	West.
Length of body	26 ft. 6 in.	Couplers	Tomlinson
Over vestibule	38 ft. 6 in.	Curtain material	Pantasote
Width over sills	8 ft. 4 in.	Destination signs	Hunter
Height, rail to sills	2 ft. 4 in.	Wheelguards	H-B
Sill to trolley base	8 ft.	Seats	Heywood
Body	semi-steel	Trucks	Brill 39-E
Interior trim	mahogany	Wheels	chilled iron
Roof	arched	Drivers	33 in.
Underframe	composite	Pony	21 in.

Springfield (Mo.) Traction Company, noted in the ELECTRIC RAILWAY JOURNAL of July 1, 1911, as having ordered six closed motor cars from the Danville Car Company, has included the following details for this equipment:

Seating capacity	32	Fenders	Phila. rope type
Weight (car body)	12,000 lbs.	Gongs	Dedenda
Length of body	20 ft. 8 in.	Hand brakes	Brill
Over vestibule	30 ft. 8 in.	Heating system	Consol.
Width over sills	7 ft. 11½ in.	Headlights	Crouse-Hinds
Over posts at belt	8 ft. 4 in.	Journal boxes	Brill

Sill to trolley base. 8 ft. 7⅛ in.	Motors. 2 West. 323 interpole
Height, rails to sills. . 26⅝ in.	Push button signal. Brill Std.
Body ..... wood	Registers ..... Inter.
Interior trim ..... cherry	Roofs ..... plain arch
Underframe ..... wood	Sanders ..... Dumpit
Bumpers. Brill pat. angle iron	Sash fixtures ..... Brill Std.
Car trimmings ..... bronze	Seats ..... Winner
Control system.... G.E.-K-10	Seating material ..... rattan
Couplers ..... Brill Hovey	Springs ..... Brill
Curtain fixtures.. F.88 ring fit	Step treads ..... wood
Curtain material. painted duck	Trucks ..... Brill 21-E
Destination signs .... Hunter	Wheels ..... 33 in.

TRADE NOTES

American Car & Foundry Company will build a one-story steel hammer and forge shop at 2513 South Wood Street, Chicago, Ill.

Hayes Track Appliance Company, Richmond, Ind., received an order for 100 model AP derails from the Havana Central Railroad, for shipment to the United Railways of Havana, at Havana, Cuba, and shipped them on the same day the order reached it. Shipments of derails have also recently been made to Karachi and Howrah, India.

W. T. Brown, Seattle, Wash., who was formerly connected with the Washington Water Power Company at Spokane, in conjunction with W. L. Hoffman and F. H. Godfrey, has opened offices as consulting electrical and mechanical engineer at Seattle, Tacoma and Vancouver, the Seattle office being in the Bailey Building and the Tacoma office in the Bank of California Building.

Ackley Brake Company, New York, N. Y., reports the receipt of the first orders for Ackley no-staff brakes for Japan, Australia and New Zealand. Shipments of these brakes are now being prepared for England, Germany, France and Switzerland. The company also advises that inquiries concerning the new brake are being received from users of vertical wheels and screw brakes in foreign countries throughout the world.

Q M S Company, Plainfield, N. J., reports the receipt of orders for Stanwood car steps from the following companies: Wason Manufacturing Company, for the cars of the Springfield Street Railway and the Connecticut Company; The J. G. Brill Company, for the York Railways; Osgood-Bradley Car Company, for the new cars which it is building for the Connecticut Company and the Worcester Consolidated Street Railway.

Knickerbocker Construction Company, New York, N. Y., has opened a Chicago office at 912-913 Medinah Building, in charge of Russel N. Edwards, as Western manager and chief engineer. Mr. Edwards was graduated from Purdue in 1903 and served four years with the Arnold Company, following which he was associated with R. S. Feurtado, also of Chicago. The Knickerbocker Construction Company acts as engineer, constructor and operator of electric railways, electric lighting plants, transmission systems and other public utilities.

J. A. & W. Bird & Company, Boston, Mass., announce that in order to centralize the manufacture and sale of Rex Flintkote roofing and other waterproofing and insulating specialties, heretofore handled by them, and to further develop this growing business, they have disposed of and transferred their interests in these products to the Flintkote Manufacturing Company, Boston, Mass. This will permit Bird & Company to give their undivided attention to the other branches of their business. The Flintkote Manufacturing Company, a corporation whose directors and stockholders have been identified for years with Bird & Company, has taken over the roofing, waterproofing and insulating business in its entirety and will continue it upon the same general lines as heretofore.

The J. G. Brill Company, Philadelphia, Pa., reports the receipt of the following orders for export: American Railroad of Porto Rico, five 35-ft. first-class coaches, five 35-ft. steel underframes and ten all-steel first-class passenger car trucks; Cia. Limitada Ferrocarriles Vapores Nacional, Nicaragua, sixteen Brill 59-D first-class trucks and forty Brill 53-H freight trucks: M. E. Curwen for United Electric Company, Preston, Eng., 500 Brill 21-E side bars; E. G. Long Company for Hankai Electric Railway, Japan, twenty-two Brill 27-GE-1 trucks without wheels and axles; Byington & Company for eight special single-truck passenger cars. The company has also received an order from the government for a 20-ft. closed motor car mounted on a Brill 21-E truck, for use in the League Island Navy Yard.

Allis-Chalmers Company, Milwaukee, Wis., has appointed Fred L. Webster Pacific Coast manager, with headquarters at San Francisco, to succeed W. S. Heger, resigned. Mr. Webster joined the E. P. Allis Company in the erecting department, in 1892. Subsequently he did a great deal of foreign work for its factory, spending four years in South Africa. On his return from Africa, in 1891, he became chief engineer of the St. Louis Transit Company, holding that position until 1893. Then he went with the Fulton Iron Works, St. Louis, as sales manager, handling Corliss engines principally. In 1895 he returned to the Allis-Chalmers Company and was for two years head salesman of its Chicago office. Then he came to the Coast as manager of the Seattle office, which position he has held for the past three and a half years, his territory covering Washington, Oregon and British Columbia.

ADVERTISING LITERATURE

Ackley Brake Company, New York, N. Y., has issued a folder which is devoted to the new Ackley no-staff brake.

Bridgeport Brass Company, Bridgeport, Conn., is mailing a circular which discusses the merits of phono-electric trolley wire.

Kelman Electric & Manufacturing Company, Los Angeles, Cal., has issued Bulletin No. 7, which describes and illustrate high-voltage oil switches and oil circuit breakers.

Frank Ridlon Company, Boston, Mass., has issued a circular calling attention to the list of new Western Electric motors and generators which it is offering at low prices.

Niles-Bement-Pond Company, New York, N. Y., is mailing a 28-page catalog which describes and illustrates a variety of standard planers equipped with reversing motors.

Sanitary Rag Company, Kalamazoo, Mich., is mailing a card which calls attention to quality of the washed wiping cloths manufactured by the company, and to the low price at which they are sold.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has issued folder No. 4206 on the Westinghouse automatic section insulator. The folder gives the applications with style numbers, sizes of wire and cross-section views.

Norton Company, Worcester, Mass., has issued a booklet entitled "Safety as Applied to Grinding Wheels," which describes and illustrates modern safety devices that can be practically applied in the use of grinding wheels and machines.

Allgemeine Elektricitäts-Gesellschaft, Berlin, Germany, has issued the first English edition of the A. E. G. Journal, dated July, 1911. The principal articles in this number are entitled: "A Tour Through the A. E. G. Turbine Works," "The Dessau-Bitterfeld Electric Railway," "The A. E. G. at Munich Electrical Exhibition," and "The Hamburg Elevated Railway."

Goldschmidt Thermit Company, New York, N. Y., in its publication *Reactions* for the second quarter of 1911, prints among others illustrated articles on "Annealing," "Repair to S. S. *Monroe C. Smith,*" "The Melting Pot and Its Relation to Alloying Capacity," "Copper-Zinc Alloys," "Thermit Welding at Norfolk Navy Yard" and "Around the Railroad Shops."

Hess-Bright Manufacturing Company, Philadelphia, Pa., has issued sheets 68, 69, 70 and 71 of series 336, describing respectively "Application of Floating Bushes to Grinding Machine Spindle," "Method of Assembling an Adapter with Mountings," "D W F Adapter and the Method of Assembling It with Bearings on a Straight Shaft" and "Ball Bearings in Horizontal Molding Machines."

Delta-Star Electric Company, Chicago, Ill., has printed a sectional catalog which is devoted to an exposition of the Pittsburgh weatherproof transformers for use in securing new business along transmission lines. Recommendations are made as to the best method of installation, lightning protection and grounding of the secondary system. The catalog also describes Delta-Star high-tension specialties, for both indoor and weatherproof mounting.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVIII NEW YORK, SATURDAY, JULY 29, 1911 No. 5

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.
HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.
CURTIS E. WHITTLESEY, Secretary and Treasurer.
TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

HENRY W. BLAKE, Editor.
L. E. GOULD, Western Editor.
Associate Editors:
RODNEY HITT, FREDERIC NICHOLAS, WALTER JACKSON.
News Editors:
G. J. MACMURRAY, FRANK J. ARMEIT.

CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1021 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Thursday, 9 A. M., of the week of issue.

Copyright, 1911, by MCGRAW PUBLISHING COMPANY.

Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, JULY 29, 1911.

CONTENTS.

A British Convention..... 181
Test of a 5-Cent Coney Island Fare..... 181
Campaign Against Team Interference in Chicago..... 182
Problems in High-Tension Transmission..... 182
Co-operative Timber Treatment Plants..... 183
Accounting Methods of Illinois Traction System..... 184
Single-Phase Locomotive for the Loetschberg Line in Switzerland... 190
Existing Fares of Wisconsin Road Upheld by Commission, After Valuation..... 193
Hearing on Power Brakes and Height of Car Steps in New York... 196
Changes in Cleveland Ordinance..... 197
A Hearing on Coney Island Fares..... 198
New Concrete Tie..... 198
Convention of the Tramways and Light Railways Association..... 199
Fast Trains in Indiana..... 200
Test of Couplers at Indianapolis..... 200
The Halsey Radial Truck..... 201
Report of Interstate Commerce Commission..... 202
News of Electric Railways..... 203
Financial and Corporate..... 205
Traffic and Transportation..... 207
Personal Mention..... 209
Construction News..... 210
Manufactures and Supplies..... 213

A British Convention

An abstract is published elsewhere in this issue of the papers read at the convention of the (British) Tramways & Light Railways Association at Edinburgh July 13-14. Probably the most striking feature of these papers to the American reader is the fact that our British cousins are wrestling with the two subjects which from an engineering and operating standpoint are perhaps most prominent in city transportation on this side of the Atlantic, namely, the reduction of the weight of cars and the transfer problem. The latter has never reached the importance abroad which it has in this country, because of the general adoption there of the zone system of fare collection. A transfer ticket on nearly all of the European lines does not entitle the holder as in America to a long ride on any car for no additional expenditure. Instead, the fares are based, as a rule, upon the distance traveled, irrespective of how many cars are used, and when free transfers are given they are entirely within a zone and entitle the holder to a very short ride only—perhaps a half mile or less. Hence, there is little temptation for anyone to use them fraudulently, and they are much simpler in design than those employed in this country. Nevertheless, there seem to be abuses which as yet it has been impossible entirely to correct. The problem of the lighter car in England centers largely about the double-deck car, which is almost exclusively a British institution. One of the convention papers, published elsewhere, indicates a sentiment in favor of the single-deck car, but a decided step in this direction is probably a long way off. But throughout Europe, as well as in America, there is a general desire to find the lightest car consistent with structural strength.

Test of a 5-Cent Coney Island Fare

In some respects the offer just made by the Brooklyn Rapid Transit Company to reduce the round-trip fare to Coney Island during certain hours of every day except Saturdays and Sundays is following a precedent because, on a number of railways, "workingmen's tickets," good only during certain hours of the day, are sold at lower than the ordinary rate. But in at least one respect the offer is probably of a unique character, because we do not now recall a fare reduction of this kind which is made for at least five days of the week during certain hours to a pleasure resort. President Williams takes pains to explain clearly that the arrangement is purely experimental, and that it will not be renewed next season if the company should encounter serious difficulties in its enforcement or, presumably, if the plan should involve considerable loss. At several hearings last year the expense of conducting Coney Island traffic by the Brooklyn lines was carefully considered and the average cost per passenger was shown to be

more than 5 cents. Hence the company can undertake this low-fare business only during those periods when the normal traffic to Coney Island is light, and if the concession is used as the basis for a demand by the public for a material extension of the low-fare hours the purpose of the whole plan will be defeated. This, in fact, is one serious objection to special rates of fare of all kinds. Many people in the community do not seem to be able to understand why reduced prices made at certain hours or to certain classes of people should not be extended to include all lines, at all times of the day and for other classes or for all classes of people. But there is no particular difficulty, from an operating standpoint, in enforcing hour-limits such as those proposed. They have been in use even on the elevated lines in New York, and since the Brooklyn company is willing to give the plan a trial we hope that it will prove successful.

Campaign Against Team Interference in Chicago

A strong effort is being made by the Chicago Railways Company to secure the co-operation of the owners of teams in reducing the number of car blockades. Although there is a penalty under the municipal code of that city which is enforcible against the drivers of wagons who refuse to get off the tracks promptly after they have been notified of the approach of a car, team interference constitutes a serious delay to surface railway transportation there, as it does in other cities. Ever since the days of Jehu, the drivers of teams have been noted for their disregard of the rights of other occupants of the highway, and the inability of a surface car to leave its tracks and reach its destination in some other way makes it particularly subject to annoyances of this kind. If the reform should have to come from the drivers themselves there would be little hope for improvement. Pleas for fair treatment or threats of the law would simply be incitement to further exhibitions of obstinacy and malice and to worse treatment, although possibly under such guise as to make prosecution difficult. But by addressing the owners of the teams directly the company is reaching people who have a sense of responsibility. It is satisfactory to learn that the results of this educational campaign so far have been good, and in this respect correspond to a similar action taken in Seattle, and described in these columns in our issue of June 17. The claim is sometimes made that the streets are public property and that the drivers of teams have as much right to use them as the railway company. This is true in only a very narrow sense. Certain vehicles now, such as mail wagons, ambulances and the equipment of the fire department, have rights superior to ordinary vehicles, and it is proper that they should because the interests of the people as a whole deserve consideration before those of individuals. There is equally no question as to the relative importance to the community, as regards time of transit, between a street car and the average load of freight in charge of a single driver. The car may be owned and operated by a private company, but its uses and purposes are of exactly as public a character as those of the mail wagon, ambulance or fire engine, and it should not be unduly hindered or obstructed in its use of the streets for the rapid transportation of passengers.

PROBLEMS IN HIGH-TENSION TRANSMISSION

The group of papers upon high-voltage power transmission read at the recent convention of the American Institute of Electrical Engineers not only were immensely instructive in themselves, but provoked a particularly valuable discussion. Aside from the reports on plants operated at extreme voltage, upon which we have already had occasion to comment, the most important topic from the standpoint of the engineer was the discussion of those extraordinary variations of potential due to electrical oscillations impressed upon the transmission system from one source or another. In the earlier days of power transmission these phenomena of temporary rise of voltage were commonly lumped together under the general title of "static." It has been long known, of course, that this is a misnomer, since the great mass of such phenomena are due strictly to electrodynamic conditions. That is to say, they are occasioned by oscillatory electric forces impressed upon the line by harmonics of a fundamental electromotive force or by surges induced in the system, or portions of it, by variations in the electrodynamic conditions, thus causing the storage and discharge of electromagnetic energy, or else they have their origin in disturbances caused in switching, or by short-circuits, or by rupture of the line. The two classes of phenomena, resonance and surging, are closely allied in their fundamental characteristics, although generally separated in cause.

During the discussion of the transmission papers one instance was cited of the actual observation of the seventeenth harmonic having a magnitude as great as 5 per cent of fundamental electromotive force. In the instance discussed no serious results followed, simply because the resulting frequency of 25 cycles per second did not happen to fall in with any portion of the system having the same natural period. It is perfectly possible, however, for such harmonics to fall into resonance and to produce somewhat startling results which would probably be attributed to everything and anything except the actual cause, unless the line were carefully investigated. It is not at all uncommon to find strong seventh and ninth harmonics of considerable magnitude, although the seventeenth and such higher harmonics are not commonly of amplitude enough to be conspicuous.

The fact is, however, that very many of the minor rises in voltage charged to "static" are really cases of minor resonance, resonance of fairly high harmonics with some portion of the connected system. Wherever there is an abrupt change in the constants of the system there is an opportunity for the occurrence of extraordinary voltage due primarily to resonance with harmonics, the fundamental frequency being generally so low compared with the period of any of the possible resonating points that it rarely appears, on lines of any length yet in use, to a degree which causes any material disturbance of operative condition. It is quite possible, however, for any of the harmonics to produce considerable trouble if by chance the periodicity happens to be just right. But such phenomena are not particularly likely to increase with an increase of the working voltage, and, in fact, in the case of high-voltage lines the factor of safety is usually high enough very readily to

take care of any resonance disturbance of the ordinary kind.

The question of surging is practically of much greater importance. There is constant opportunity for starting the surges when the main circuit is made or broken, or branch lines are switched on or off, or when even any violent change of load occurs which disturbs the normal electromagnetic characteristics of the system. The voltages due to surging are sometimes of most formidable character, and there have been repeated cases of breakdowns of lines and apparatus chargeable directly to the rise in voltage produced by heavy surge. The effect of surges is felt particularly at the apparatus where there is a violent change in the electromagnetic conditions, and time and again insulator bushings and transformers and protective apparatus in the stations have been attacked with disastrous results by the sudden development of a surge. The increasing use of oil switches, now become very general, tends to decrease the amount of trouble from surging, inasmuch as the character of the break is such as to diminish the danger of starting dangerous phenomena of this sort. Open air switches and apparatus in which air breaks occur are particularly likely to start surges, and the result is often shown in arcs of enormous extent compared to anything which could properly be due to the working voltage. Starting a long arc in one part of the system not infrequently produces surges which break through elsewhere, apparently without adequate reason and perhaps miles away from the disturbing source. Even circuits of relatively low voltage sometimes show terrific phenomena of this class, the magnitude of the effect varying with the magnitude of the current variation, whether this amounts to a complete make or break or merely to a very violent change in magnitude. In fact, some of the most formidable and disastrous surges recorded have been on circuits of only a few thousand volts, but carrying very large current. The comparatively small currents generally carried by lines at extreme voltage secure to them a certain degree of immunity, so that in a sense the long-distance and high-voltage systems are less liable to break down from this source than some of those at lower pressure. An extended system, however, gives an opportunity for more sources of surging than would be found in a smaller and simpler system, inasmuch as there are more switching points, more apparatus connected and many more opportunities for violent changes in inductance and capacity.

The moral of the whole discussion seems to be that some care should be exercised to select apparatus which is likely to put upon the system no harmonics of high degree and of considerable amplitude. Furthermore, the switching apparatus should preferably be comparatively simple and should be installed with the possibility of surges fully in mind. It is entirely practicable to operate a long system almost continuously and under load conditions that render violent changes infrequent. The steadier the load and the less the shocks administered by injudicious switching the less likelihood of troubles due to resonance. Fortunately, the long transmission lines which are increasing and common in railway practice can generally be operated with due regard to this danger, and with a large system having considerable resistance as well as capacity and inductance there is a certain softening effect which tends to decrease the violence of the larger surges and confine danger to a comparatively limited region. The more extensive the system the less likelihood of widespread trouble from any of the sources here indicated.

CO-OPERATIVE TIMBER TREATMENT PLANTS

A feature of electric railway conventions during the past three or four years has been the presentation of papers upon timber preservation by representatives of the Forestry Division. These papers have not been solicited for their theoretical interest only, but because electric railway companies realize the rapidly increasing price of timber and the necessity of prolonging its life in those places where it is used in railway work. There are evidences that advantage has been taken in many directions of the lessons taught by these papers.

Partly as the result of one presented before the Central Electric Railway Association nearly four years ago the Indianapolis, Columbus & Southern Traction Company installed a pressure and vacuum treating plant at which it has treated all of its ties, poles, cross-arms and fence posts for the past three years. This plant has been in operation long enough to demonstrate its value to the railway company, and its successful operation has done much to promote the use of treated timber by other electric railways in the Central West. At the St. Joseph meeting of the Central Electric Railway Association another paper on wood preservation was read and was followed by an interesting discussion which brought out expressions of opinion from several members in favor of a co-operative treating plant. As the result of this discussion the executive committee was instructed to consider practical means for encouraging the use of treated timber by member companies and undoubtedly it will investigate the co-operative plan. Many of the steam railroads are operating their own treating plants, but their annual consumption of timber, of course, is on a much larger scale than that of the average electric railway. The problem is really the same as that presented in a manufacturing business. A plant of any size can be operated, but the greatest economy can be secured only if the output is large and continuous. There are perhaps few directions in which co-operation between electric railway companies would result in as high direct returns as in this way. Such a plan would not only reduce the cost for each participating company; it would encourage the general use of treated timber for a wide variety of purposes, many of which are not now usually considered in connection with timber preservation.

If the plan of the Central Electric Railway Association should be carried out, its progress will be watched with interest, because if it should prove successful, other plants would probably be started by other groups of companies which are close together geographically or which purchase their supplies of ties and timber from the same territory. The parties to such an undertaking need by no means be confined to electric railway companies, but might well include with mutual advantage other electrical interests such as electric lighting, telegraph and telephone companies.

Accounting Methods of Illinois Traction System

A Description of the Practices by Which the Departments of the General Auditor and the Auditors of Receipts and Disbursements Account for the Operations of the Company.

With the rapid increase in mileage of the Illinois Traction System there has been a corresponding development in the accounting department and in the methods employed therein until the practices and form of organization follow in many respects practically those which are standard on steam railroads. The accounting department is under the direct supervision of George M. Mattis, vice-president and treasurer, and B. E. Bramble, general auditor. George R. McComb is assistant auditor, J. D. Maynes auditor of receipts and L. Campbell auditor of disbursements.

The offices of the accounting department are at Champaign, where the construction accounts are handled under the direct supervision of the general auditor and the treasurer. At each city where local systems are controlled a local auditor is in charge, who reports for the operation of the city properties directly to the general auditor. In accordance with this system local auditors are located at Danville, Urbana, Champaign, Decatur, Bloomington, Peoria, Jacksonville, Edwardsville and Granite City, Ill. Two local auditors are located at Topeka, Kan., and one at Des Moines, Ia., in charge of the accounts of properties in those cities which are controlled by the McKinley interests. One auditor is located at each of three coal companies controlled by the Illinois Traction System—the Consumers' Coal Company, of Danville, the Kerens-Donnewald Coal Company and the Consumers' Coal Company, of St. Louis. One traveling auditor is engaged solely in the work of visiting the various city properties.

AUDITOR OF RECEIPTS

Mr. Maynes, the auditor of receipts, adopted in September, 1909, the system of monthly reports and settlement of accounts from agents, based on steam railroad practice. Since the adoption of this change there has never been any reason to regret it. Permanent station records in book form were furnished.

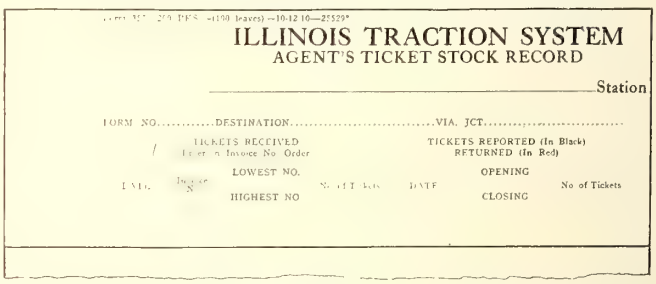
For the use of the freight agent three books are furnished, a cash book, a freight-received register and an "advances and prepaid on freight forwarded" register. At the head of the debit side of the cash book this notice is printed: "It is the duty of agents to collect and remit daily the revenues of the company. Agents will be held responsible for any loss by theft or otherwise resulting from their failure to remit promptly, or for losses occasioned by the violation of instructions." The headings of the columns on the debit side are as follows: Pro number, current month, previous month, prepaid forwarded collections, sleeper and local ticket sales, interline ticket sales, baggage revenues, switching revenues, extra revenue collections, auditor's special debits and total. On the credit side of the cash book the headings of the columns are: Account, date and number of way bill, number of pro, advance charges paid, prepaid beyond, auditor's special credits, remittances to bank or treasurer, relief claims remitted to auditor of receipts for credit, and total. By the adoption of the freight-received register it was made possible for agents to have a permanent detailed record of all received way bills, permitting them, after making their record, to forward the received way bills to the auditor of receipts to be audited and filed.

For the use of ticket agents there are three permanent book records, the cash book described, a daily record of ticket sales and a permanent record of ticket stock. The latter is used to show the tickets received from the traffic department and has columns in which the sales and cancellations and return of stock may be shown. Tickets reported sold are shown in black ink and tickets returned in red ink. This book, the heading of which is indicated herewith, provides a record of value in connection with the audit of agents' accounts by traveling auditors, who are enabled to determine the exact condition of the ticket stock quickly, saving time in the inventory of tickets on hand required in support of their report.

The forms for abstracts of local freight-forwarded way bills and local freight-received way bills provide that only one station shall be reported on each blank. These reports must be forwarded to the auditor of receipts on the third day of each month and must include all way bills dated in the month for which the report is made. Separate columns are provided for report of the weight of carload and of less than carload tonnage. One column calls for the exact description of carload shipments. It has been found convenient and economical to divide the system into four accounting divisions in the audit of agents' freight abstracts. Agents are required to recapitulate each accounting division separately and to make a general summary covering the accounting division as a whole. This permits a clerk to verify, check and balance the forwarded and received abstracts of an accounting division without the necessity of referring to reports which are being handled by other clerks. Each accounting division is balanced first and then the general balance, by this method, is obtained without unnecessary labor or confusion.

INTERLINE FREIGHT ACCOUNTS

Interline freight accounts are handled in accordance with the rules of the Association of American Railway Account-


ILLINOIS TRACTION SYSTEM
AGENT'S TICKET STOCK RECORD
Station
FORM NO. DESTINATION VIA. JCT.
TICKETS RECEIVED
Letter or Invoice No. Order
TICKETS REPORTED (In Black)
RETURNED (In Red)
LOWEST NO.
OPENING
DATE
No. of Tickets
HIGHEST NO
CLOSING

Illinois Traction System—Heading of Agent's Ticket Stock Record

ing Officers, which represents the steam railroads of the country. Four forms are used to cover respectively the abstracts and the recapitulations of interline way bills received and forwarded. The forms are on different colors of paper. Separate sheets are used for the business of each road. The Illinois Traction System has through route and joint rate arrangements with several steam railroads. Four forms are used for reports of revenues on interline freight business to the accounting departments of the steam roads and the adjustment thereof. The headings of two of these forms are illustrated on page 185.

A form is used for advice to agents by the auditor of receipts of corrections and differences in their monthly freight reports. Agents are instructed on receipt of this notice to correct their records accordingly. The lines on the abstract correction sheet are numbered and if further correspondence between the agent and the auditor of receipts is necessary after the agent receives the advice of correction reference is made to the number. At the bottom space is provided for a recapitulation of the items as reported by the agent and as corrected by the auditor.

A monthly report of uncollected bills is made by agents in original and duplicate. The former is sent to the auditor of receipts, while the duplicate is retained in the file of the

agent. The report is designed to show a complete list of all uncollected bills and a list of unadjusted relief claims if any exist. Instructions to agents which accompany this form state that the report should be divided into eight sections with headings as follows: (1) Uncollected demurrage charges; (2) uncollected storage charges; (3) uncollected switching charges; (4) uncollected prepaid forwarded; (5) uncollected account, freight, short, damaged and refused; (6) unadjusted relief claims; (7) uncollected freight on hand more than thirty days; (8) uncollected freight received during month for which this report is made.

After the uncollected freight bills are listed in the order named a recapitulation is made showing the total uncollected freight bills on hand. Agents are also directed to state what efforts have been made to have the station record relieved of the uncollected charges. To avoid carrying charges for an unnecessary length of time for short, unclaimed, refused and damaged freight, company freight, etc., agents are directed to be particular to notify the proper officers each month of all such items and to follow the matter up energetically until the station is relieved of such charges. By means of this report the accounting department has a complete detailed statement of all outstanding items in the accounts of agents and is able to exercise careful scrutiny of the business each month so as to determine whether agents are giving credit to unauthorized shippers, are lax in the collection of charges or carry items that should properly be dropped from the account and for which the cash should be remitted.

A "monthly extra freight revenue report" is used by agents for report of freight items not reported otherwise. This report is to be forwarded not later than the fifth day of the succeeding month. If no revenue has been collected the agent must send in a blank report.

SWITCHING CHARGES

A separate report is used for advice of switching performed and charges collected at each station, and is forwarded to the auditor of receipts not later than the third day of the succeeding month. Revenue from switching service is an important item with this company, and it has been found that the use of this report and a switching ticket in accordance with this plan has increased the revenue of the company from this source. The switching ticket is in three parts, of which the original is sent to the switching foreman, the second copy to the auditor and the third is retained by the agent. The original is reproduced herewith.

The way bills are in regular steam railroad standard form, in quarter, half and full sheets. A form of way bill for astray freight is also used. This has enabled the company to obtain revenues and better delivery of astray freight than was secured before the adoption of this form. Expense bills in two parts are used in connection with the delivery of freight and a special form is used for the collection of prepaid forwarded charges. After the agent's balance sheets have been checked and verified a debit and credit letter system is used for the adjustment of agents' accounts. The use of this system reduces relief claims of agents to a minimum, as it permits the accounting department to give agents, without undue delay, authority for credit or, when necessary, to charge agents. For debit and credit letters two forms are used, covering respectively passenger and freight entries.

New Form 308. 12-6-09. 1631. 13568.

ILLINOIS TRACTION COMPANY No. 14002

SWITCHING TICKET

.....date..... 191..

Car No. .....
Initial .....
Contents .....
Weight .....
Rate .....
Amount .....

Switched from.....to.....

Acct. of .....

Moved by Switch Foreman.....date.....Time.....

NOTICE

Switch Foreman will positively refuse to move a loaded car in switch movement without this order and will mail this order to Auditor Receipts, Champaign, Ill., when completed.

NOTE—Original to Switching Foreman; Duplicate to Auditor; Triplicate to be retained by Agent

Illinois Traction System—Switching Ticket

In accordance with the policy of the company agents are authorized to file relief claims each month and to forward them with the monthly balance sheet. This permits the agents to take the accounts from their books without loss of time. If subsequent investigation by the accounting department shows that credit was claimed improperly the station is then charged the amount involved and advised by a debit letter. This practice concentrates all items of this nature in the office of the auditor of receipts and keeps the agents' uncollected accounts free from uncollectible items. This plan has been found to afford excellent results in the accounts of agents and also advantageous because it enables the accounting department to keep a close watch upon such items as are usually the subject of relief claims.

Instructions to agents direct that the reason why relief claims are filed must be stated clearly in every instance and evidence submitted to show what efforts have been made to secure payment of the charges. The agent's monthly balance sheet is published on page 186.

ILLINOIS TRACTION COMPANY

ACCOUNTING DEPARTMENT Champaign, Ill. 190 . .

CORRECTION ACCOUNT to be included in Settlement for Month of 190 on Interline Way-Bills

Received from.....R.....Co. Via.....R.....Co. No.....

WAY-BILL DATE	PREFIX AND NO.	FROM	TO	WEIGHT AND CHARGES AS SETTLED: WEIGHT	FREIGHT	ADVANCES	PREPAID	PROPORTIONS AS SETTLED: Pa. Cr.	I. T. Co.	Pa. Cr.	Pa. Cr.	Pa. Cr.	WEIGHT AND CHARGES SHOULD BE: WEIGHT	FREIGHT	ADVANCES	PREPAID	PROPORTIONS SHOULD BE: Pa. Cr.	I. T. Co.	Pa. Cr.	Pa. Cr.	Pa. Cr.

Illinois Traction System—Heading of Correction Account for Interline Way Bills

Form 280- 6-10-09-2M -1966

ILLINOIS TRACTION COMPANY

Accounting Department

DIVISION OF FREIGHT REVENUE on Interline Way-Bills from Stations on the.....R. Co.

Via Via Via Via Month of 190

FROM	TO	ROUTE	COMMODITY	WEIGHT	FREIGHT	ADVANCES	PREPAID	ARBITRARIES: RATE	AMOUNT	PROPORTIONS: %	I. T. CO.	%	%	%	%

Illinois Traction System—Heading of Statement for Division of Revenue on Interline Way Bills

PASSENGER ACCOUNTS

The passenger accounts are simple, and few complications are met. It has been found that simple blanks enable agents to make correct reports of ticket sales and other revenues in connection with passenger service. Separate forms are provided for monthly reports of ticket sales, baggage check sales, C.O.D. baggage received, C.O.D. baggage forwarded and government orders exchanged for revenue transportation. The latter blank has been found to be of great value. It provides for a complete identification of the order and the ticket issued in exchange and gives the accounting department a permanent record for reference in case any question arises as to an order or ticket. The form provides for the following data regarding the order: Form, number, date and place of issue. Concerning the ticket exchanged the agent is required to give the form, number, starting point of trip and destination and amount involved. This statement is made out in duplicate, and the original, together with all orders, is attached to the monthly balance checks and drafts are listed singly. The agent is required to certify that the cash listed was counted by him in the presence of the traveling auditor, that the amount was correct and was the total due the companies which he represented. A number of other important details are covered in the report which includes the balance sheet, as, for instance, the names and occupations of all station employees, their rates of pay and the length of time they have been in the position occupied and in the service of the company. A special space is provided for notation of the name and occupation of all employees who handle funds of the company and are not bonded.

When a change of agents occurs the traveling auditor is required to state the following: Why the retiring agent left and where he went, the length of time of absence and whether any reason was known why pay should be withheld. The traveling auditor is asked to state where the incoming employee was last employed and in what capacity, and whether, in his opinion, the new man was competent

New Form 329—5-1-11-5M—39418

ILLINOIS TRACTION SYSTEM

STATION AGENT'S MONTHLY BALANCE SHEET

This Balance Sheet must be made in accordance with note 7, printed on back and forwarded to Auditor of Receipts with list of uncollected bills form 292 not later than the tenth of the month. (SEE INSTRUCTIONS ON BACK)

Balance Sheet from ..... Station, for the month of ..... 19....

Explaining in detail the various amounts to Debit and Credit of the Agent whose signature as attached hereto. I hereby certify this account to be correct.

..... AGENT

Personal Signature

Dr.				Cr.		
1 To Balance due Company, as per last month's corrected duplicate balance sheet				2 By Differences to my credit last month, as per corrected duplicate balance sheet		
3 " Local charges on freight received, Form No. 104				4 " Remittances to Treasurer, as per statement on back		
5 " Advances on freight received, Local Form No. 104				6 " Advances on freight forwarded, Local Form No. 105		
7 " Local Prepaid on freight forwarded, Form No. 105				8 " Local Prepaid on freight received, Form No. 104		
9 " Freight charges on freight received interline Form No. 284				10 " Advances on freight forwarded interline Form No. 282		
11 " Advances on freight received interline, Form No. 284				12 " Prepaid on freight received interline Form No. 284		
13 " Prepaid on freight forwarded interline, Form No. 282				14 " Special credits Auditor Receipts (freight) Form No. 294		
15 " Special debits from Auditor Receipts (freight) Form No. 294				16 " Unadjusted Relief Claims for which credit is claimed, Form No. 262		
17 " Switching charges, Form No. 247				18 " Special credits Auditor Receipts (passenger) Form No. 295		
19 " Extra Freight Revenue, Form No. 314				20 " Orders for transportation remitted, Form No. 296		
21 " Treasurer's Drafts as per statement on back				22 " Prepaid orders exchanged, Form No. P. D. 54		
23 " Local Ticket Sales, Form No. 32				24 " ‡		
25 " Sleeper and Parlor Car Ticket Sales, Form No. 383				26 " ‡		
27 " Interline Ticket Sales, Form No.				" Balance to my debit carried to next month's account, made up as follows, viz:		
29 " Baggage Check Sales, Form No. 237				28 " Uncollected bills for freight, Form No. 292		
31 " C. O. D. Baggage Collections, Form No. 195				30 " Authorized working fund. See Note No. 3		
33 " Special debits Auditor Receipts (passenger) Form No. 295				32 " Cash on hand See Notes Nos. 4, 9 and 10		
35 " Extra Passenger Revenue, Form No. 313				34 "		
37 " Prepaid orders issued, Form No. P. D. 54				36 "		
39 " ‡				BALANCE TO BE TAKEN UP BY AGENT NEXT MONTH		
41 " Advances forwarded, not paid out				Item No. 1 - - $		
43 " Prepay due connecting line, not paid out				Item No. 2 - - $ Auditor of Receipts		
45 " ‡						
Total				Total		

Illinois Traction System—Form of Station Agent's Monthly Balance Sheet

sheet, while the carbon copy is retained and placed in the files.

Monthly reports of extra passenger revenues are made. The form used for this purpose has the following headings: Newspaper revenue, destination, weight, rate, amount and shipper; automatic machine collection; accident insurance tickets; parcels receipts, open and closing numbers and amount; milk revenue, opening and closing numbers, starting point and destination, rate and amount; and other extra revenue. A special form is used for advices to agents of corrections, additions or errors in their monthly ticket, baggage or extra passenger revenue reports.

For the work of the traveling auditors a balance sheet and confidential report are used at each station. The balance may be taken in transferring, checking, opening or closing the accounts. In case of a change in agents both the retiring and the incoming employee certify to the correctness of the account drawn up by the traveling auditor. All cash on hand is counted and reported in detail as to the number of pieces, denomination and amount of paper currency, gold coin and other coin, respectively, while to fill the position. The incoming agent signs this agreement, embodied in the balance sheet of the traveling auditor:

"The subscriber hereto agrees that he will make himself liable for all shortage of money collected at this station which may occur in excess of the bond of the cashier at this station, and in case he shall quit the service of the company, or be discharged therefrom, the company shall have the right to withhold any sum which may be due him until after the regular time for examination of his accounts as such employee has elapsed, and until the regular pay day of the company."

In addition to all that has been stated the balance sheet contains the following general questions for the traveling auditor to answer:

"General condition of station and accounts.....
"Did cash book show proper balance?.....
"When did agent balance his cash last?.....
"Cash over $.....Cash short $.....
"Was shortage made good?.....If so, how.....
"Does agent or do any of his employees drink?.....

"Does agent make a good personal appearance?.....
"What explanation did agent give for cash being over or short?.....

CONFIDENTIAL REPORT OF TRAVELING AUDITORS

The confidential report of traveling auditors contains the following:

"This report is not only intended as a record of the examination or transfer, but it is also intended as a reminder to traveling auditors of the salient points to be investigated by them at each station.

"Traveling auditor is not required to answer questions marked X except in cases where he finds the agent delinquent. All other questions should be answered in every instance where a report is made.

"Where traveling auditor has not answered questions marked X it is understood that he has investigated and found the practice O. K.

"1. Are all station records kept in proper form?..... Are they written up daily?..... If not, give list of records improperly kept and not written up promptly, and explain errors in each.....

"2. Is cash book balanced daily?..... Did it show same balance as your report?.....

"3. Did you compare cash book with freight received book, corrected monthly balance sheets and other records? ..... How far back did you go with this comparison?..... Any intentional errors or omissions in cash book?..... Does agent keep cash of this company separate from all other funds?.....

"Did you charge agent with all advertising and vending machine collections?.....

"4. Were any unauthorized credits claimed or proper charges suppressed?..... If so, list in detail.....

"Are proper precautions taken to prevent loss of money? .....

"x5. Did you instruct agent that overcollections must be reported at close of month and that refunds must not be made except upon presentation and indorsement of expense bills, and upon authority from auditor of receipts? .....

"x6. Does agent take receipts for advances to consignors and foreign prepaid charges paid out?.....

"x7. Does he take and file express company's receipt for all cash remitted?..... Do remittances on cash book agree with express receipts?..... Does agent close cash account and remit balance promptly at last of month? .....

"x8. Has agent a bank account for keeping company funds?..... If so, give name of bank and exact title under which account is kept.....

"9. Does agent collect and remit daily, including first of each month, while he is compiling his monthly reports? .....

"10. Are receipts of current month ever remitted to balance previous month's report?.....

"11. Were the uncollected charges on delivered freight collected while you were at the station?..... If not, did you obtain acknowledgment from consignees that amounts were due as claimed?.....

"x12. Does uncollected list contain charges for which relief should be asked?..... If so, did you have agent make out relief claims and send in while you were at station?.....

"13. Does agent take receipt for all freight delivered? ..... Is receipt taken at time of delivery of freight? .....

"If not, when does agent take receipt?.....

"x14. Is station supplied with scales?..... If so, is all freight weighed?.....

"x15. Is there a drayman there?..... If so, does the agent hold proper orders from consignees to deliver their freight to drayman?.....

"Does drayman collect our charges from consignees? ..... If so, does he settle with agent daily?.....

"16. Is freight received book-footed and does it agree with report to auditor of receipts and monthly balance sheet?.....

"17. Is this a competitive point?..... If so, what is the competition?.....

"18. Is the agent in the habit of giving credit for more than twenty-four hours?..... If so, to whom, and by whose order or authority? (Give name of official authorizing such credit, and date of each letter of authority).....

"19. If agent has no authority, does he acknowledge his responsibility in case he fails to make collection? (Agent will answer and sign.).....

"x20. Is agent vigilant and prompt in inquiring into and making returns of stolen, short, over, unclaimed and damaged property?.....

"x21. Did you investigate and see that all miscellaneous collections were properly charged in record for that purpose?.....

"x22. Did you carefully instruct agent how to make adjustment on his books each month, account of corrections, shown on duplicate balance sheet returned from auditor of receipts? (Agent will answer and sign).....

"23. Did you check all accounting department corrections back to date of last examination and see that agent had properly taken up in his accounts all debit and credit corrections?.....

"24. Did you check agent's car reports and the cars in the yard and compare with cash and pro books to see if all carloads received with charges had been properly accounted for and charged to station?.....

"25. Did you personally check freight house?..... Did you examine last uncollected report to see that all over and on hand freight was included?..... Give list of articles omitted..... Does agent carry any items unauthorized?.....

SUGGESTED CHANGES

"26. Can you suggest any changes in the organization of the station force or work that would effect a saving of labor?.....

"27. Does agent keep cash account and make up the balance sheet personally?..... If not, give name of cashier who does.....

"28. Did you locate and correct all errors and omissions from the time of last audited balance sheet and leave the records balanced?.....

"29. Did you count the tickets on hand and compare same with list of stock on hand, or prepare inventory of stock, and did you explain the necessary action to be taken in the event of tickets being lost or stolen?.....

"x30. Is agent keeping any unnecessary records or making any unnecessary reports?.....

"31. Is stationery kept reduced to a minimum?..... Is it clean and in order?.....

"x32. Did you send to stationer any supplies found in excess of amount needed?..... If so, attach list of same.....

"x33. Are old station records carefully preserved?..... Is rule relative to shipper's order bills of lading observed? .....

"34. Are there any unadjusted differences between the agent and accounting or any other department?..... If so, attach list of same.....

"x35. Are all special rates, circulars and letters filed where they can be easily referred to?.....

"x36. Is agent supplied with full sets of passenger and freight tariffs, and are they properly kept for ready reference?.....

"37. Are the office, passenger waiting rooms and freight warehouses kept clean and orderly?.....

"x38. Does agent invariably write his expense bills with ink or indelible pencil?.....

"x39. Are duplicate expense bill receipts filed carefully so they can be readily located?..... How far back did you check them?.....

"40. Date of last examination..... Condition of station then.....

"41. Time engaged checking and transferring railway accounts.....

"42. Time engaged checking and transferring express accounts.....

"43. Time engaged checking railway accounts.....

"44. Time engaged checking express accounts.....

"45. Arrived at this station .....M. .....19.. Train No.....

"46. Left this station.....M. .....19.. Train No.....

"Important Note.—In those cases where, for any reason, answers in this report are unfavorable to the agent or employee, or to the practices indulged in at the station, the replies *must* be noted in *red ink or red or blue pencil.* This also to apply to all entries covering shortages or special debits and credits."

This enables the auditing department to know exactly the condition of affairs at a station, the ability of the agent to do his work and other general information of the character that should be in possession of the general officials. The two reports are numbered consecutively, indexed and filed for future reference. Frequently agents have made complaint that their accounts were not audited properly or that some fictitious credit which they claimed had not been allowed. The production of this record settles the dispute at once beyond all question.

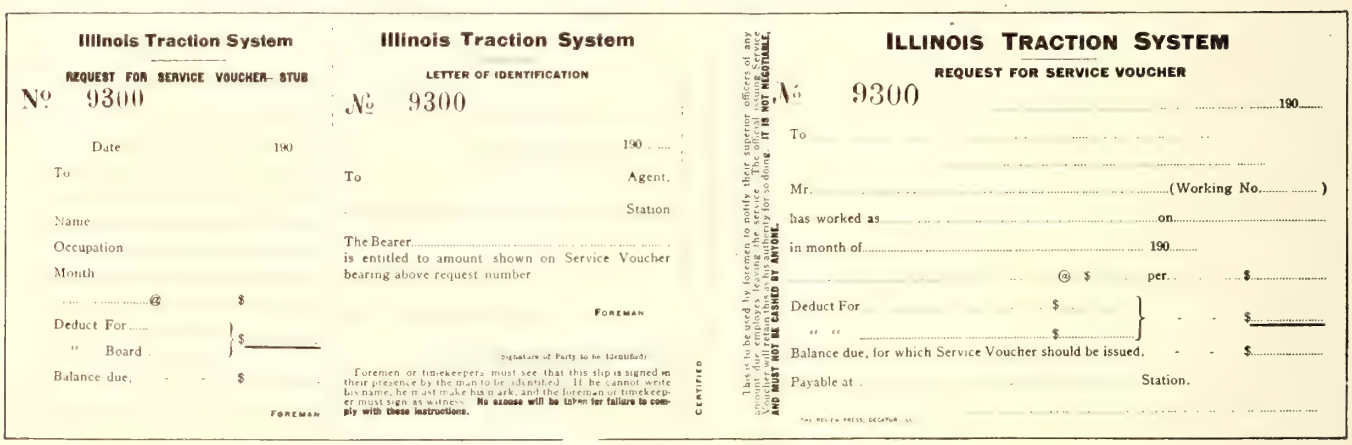
FORMS USED BY THE AUDITOR OF DISBURSEMENTS

Some of the forms used in connection with the work of Mr. Campbell, the auditor of disbursements, are described and illustrated herewith.

The summaries of cash receipts are made out by the cashier for the treasurer. One is used for conductors' deposits and another for agents' deposits each day. Spaces are provided for the names of the persons who remitted the fund and for the amount. These statements are certified as correct by the cashier. They give the information from which the conductors' and agents' books are kept. The totals of the summary sheets are entered under conductors' account and agents' account on the daily cash report. Under these there is a column for a summary of accounts receivable. As the company sells power and has a number of outside interests, receipts from these sources are entered in this column. On the other side of the report fourteen banks are listed. They are the banks where conductors and agents deposit. The cash book is posted from this report.

Payroll checks are issued twice each month, when vouchers are drawn to cover the amount of the payrolls and are forwarded to the banks on which the checks are drawn. Payrolls are drawn on five banks and the checks are printed on the same number of different colors of paper. The checks are payable in New York or Chicago exchange at par, and are drawn on banks located at the points nearest the places where the men work in order to avoid the possibility that the employees might have to pay exchange. On the face of the check is printed: "In full for wages to date"; on the reverse side of the check at the top the following is printed: "For all wages due me up to and including date on face of this check. Amount, $..... Less deductions, $..... Balance, $..... Signed, ..." Employees therefore are obliged to receipt in this manner when they indorse the check. The payroll sheets are numbered alphabetically with one letter for each sheet. After all the letters of the alphabet have been used once, double letters and then triple are used. Each check is lettered according to the sheet on which it is shown, and is numbered in accordance with the line on which it appears on the sheet. This system of numbering saves a great deal of time when the checks are sorted after they are returned from the banks.

For the purpose of meeting the amounts required for service vouchers a fund of $900 is carried in the Millikin National Bank, Decatur, Ill. With the payment of every payroll this fund is reimbursed in the amount of the discharge checks issued for that payroll. A request for service voucher, which is illustrated herewith, is filled out and signed by the foreman in charge of the work. These requests are made out in three parts, one of which is retained as the stub in the book, while the second part is the letter of identification and the third is the request for issue of the voucher. The middle portion is given to the laborer to identify him as the proper one to receive the check. The request portion is given to the head of the department concerned, who makes out the discharge check. Only heads of departments have authority to sign these discharge checks, which are bound in book form, permitting a record on the stub of the details desired.


Illinois Traction System

REQUEST FOR SERVICE VOUCHER—STUB

No. 9300

Date 190

To

Name

Occupation

Month

.....@ $

Deduct For..... } $

" Board . }

Balance due, - - $

FOREMAN

Illinois Traction System

LETTER OF IDENTIFICATION

No. 9300

190 .....

To Agent,

Station

The Bearer.....

is entitled to amount shown on Service Voucher bearing above request number

FOREMAN

(Signature of Party to be Identified)

Foremen or timekeepers must see that this slip is signed in their presence by the man to be identified. If he cannot write his name, he must make his mark, and the foreman or timekeeper must sign as witness. No excuse will be taken for failure to comply with these instructions.

CERTIFIED

This is to be used by foremen to notify their superior officers of any amount due employes leaving the service. The official issuing Service Voucher will remember his authority for so doing. IT IS NOT NEGOTIABLE, AND MUST NOT BE CASHED BY ANYONE.

ILLINOIS TRACTION SYSTEM

REQUEST FOR SERVICE VOUCHER

No. 9300 .....190.....

To .....

Mr. .....(Working No.....)

has worked as .....on.....

in month of.....190.....

@ $ per. $.....

Deduct For $ } - - $.....

" " $.....

Balance due, for which Service Voucher should be issued. - - $.....

Payable at Station.

THE REGISTER PRINTS, DECATUR, ILL.

Illinois Traction System—Request for Service Voucher

The laborer surrenders his identifica-

tion card to the agent and receives his check. This card is then sent to the head of the department who signed the check and is filed according to number.

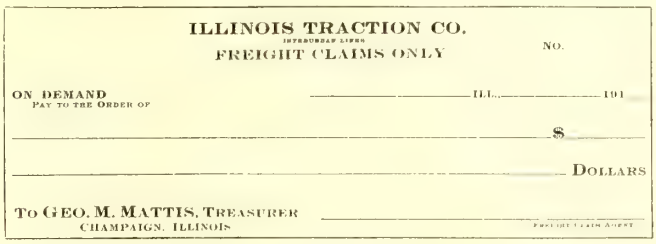
A fund of $500 is carried in one bank with which petty cash checks are met. This fund is reimbursed at the end of each month. These checks are used for the payment of bills not larger than $10. They are advantageous in that they save time and do not require for payment the signatures of heads of departments. These checks have printed on the faces in red ink "$10 NOT OVER TEN DOLLARS $10," and also "Petty Cash Account." They state on the face: "By the indorsement of this check the payee acknowledges full settlement for items described on the back hereof." On the back of the check space is provided on which the date, description and the amount are entered. There is also a line reading "In full settlement for the following items," while another line, "Make indorsement here," is followed by a space for indorsement.

PAYMENT OF FREIGHT CLAIMS

For the purpose of meeting checks and drafts issued on account of freight claims a fund of $500 is kept in the bank. This fund is reimbursed at the end of each month in the amount of the checks drawn against it each month. Two forms are used in the payment of claims. A check is used in the payment of ordinary claims. This check is provided with a stub on which the name and address of the payee are entered, while there is provision also for checking the name of the subsidiary company which is liable. Space is also provided for the claimant's number, the traffic department's number and the auditor of receipts' number, together with a description of the claim. This check is stamped on its face, "Freight Claim Account," and reads, "By the indorsement of this check the claimant acknowledges payment in full settlement of all claims described on the back hereof." The back of the check contains spaces on which the claimant's number, traffic department number and auditor of receipts' number are entered, together with the date, amount, way-bill number and description. Following the description there is printed, "In full settlement for above described claims," and this is followed by a line, "Make indorsements here," with a line below for indorsement.

The form of draft which is used to pay rush claims is illustrated herewith. The reverse of this draft contains spaces for the same information as that which has been described in reference to the check. These drafts are issued to claimants by the freight claim department. They are presented for payment by the banks and are paid at the office of the company at Champaign, Ill., by the issue of "freight claim" checks. When checks are issued they are numbered according to the claims filed. If a claim was paid by check No. 3985 the files would show the same number for the claim.

Deposit slips used by conductors and agents are made out in four parts. This form is illustrated herewith. Part No. 1 is kept by the bank as its memorandum. The upper part and the blanks for enumeration of the character of the deposit are the same in all four parts, but the printing at the bottom differs. Part No. 2, which is forwarded by the bank to the treasurer at Champaign, Ill., provides for a stamped receipt by the bank below these words: "G. M. Mattis, treasurer,


ILLINOIS TRACTION CO.
INTERURBAN LINES
FREIGHT CLAIMS ONLY
NO.

ON DEMAND
PAY TO THE ORDER OF ____ ILL., ____ 191

$ ____

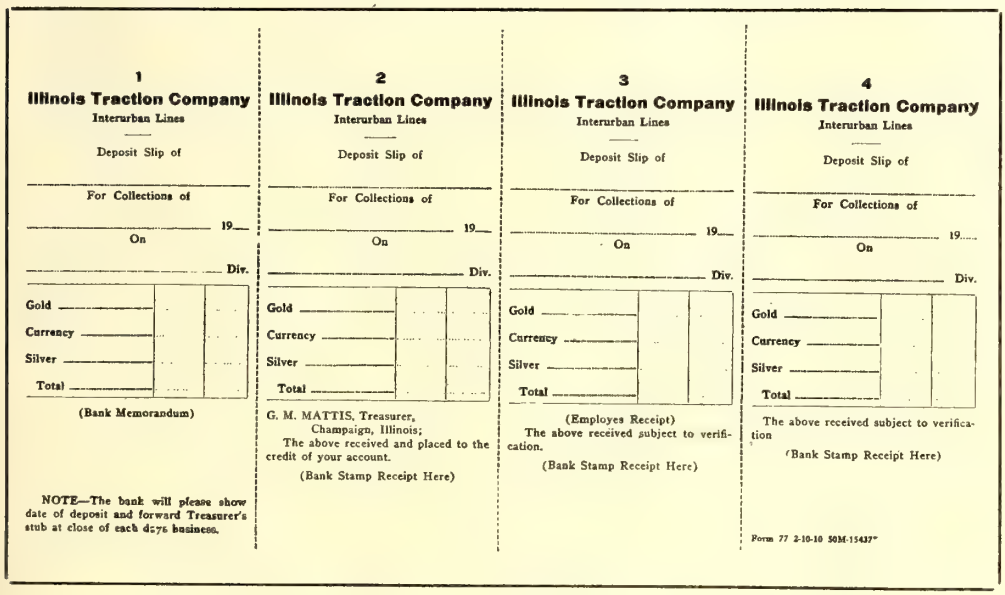
____ DOLLARS

TO GEO. M. MATTIS, TREASURER
CHAMPAIGN, ILLINOIS

FREIGHT CLAIM AGENT

Illinois Traction System—Form of Draft Used to Pay Rush Freight Claims

Champaign, Ill. The above received and placed to the credit of your account." Part No. 3, which is held by the person making the deposit and which is called "employee's receipt," reads: "The above received subject to verification." The bank also stamps its receipt on this part. Part No. 4, which the bank also stamps received subject to verification, is sent to the auditor's office at Champaign, Ill., by the conductor or agent. By this method, in case part No. 2 or No. 4 is lost in the mails, the company receives advice of credit from the bank for the deposit. All four parts of the deposit slip are made out by the conductor or agent, who gives the date covered by the collection and the division on which he works.


1
Illinois Traction Company
Interurban Lines
Deposit Slip of
For Collections of
On
Div.
Gold
Currency
Silver
Total
(Bank Memorandum)
NOTE—The bank will please show date of deposit and forward Treasurer's stub at close of each day's business.

2
Illinois Traction Company
Interurban Lines
Deposit Slip of
For Collections of
On
Div.
Gold
Currency
Silver
Total
G. M. MATTIS, Treasurer,
Champaign, Illinois;
The above received and placed to the credit of your account.
(Bank Stamp Receipt Here)

3
Illinois Traction Company
Interurban Lines
Deposit Slip of
For Collections of
On
Div.
Gold
Currency
Silver
Total
(Employes Receipt)
The above received subject to verification.
(Bank Stamp Receipt Here)

4
Illinois Traction Company
Interurban Lines
Deposit Slip of
For Collections of
On
Div.
Gold
Currency
Silver
Total
The above received subject to verification
(Bank Stamp Receipt Here)
Form 77 2-10-10 50M-15437

Illinois Traction System—Deposit Slip Used by Conductors and Agents

Journal entry vouchers, which are used by the auditor of disbursements in making journal entries on the books, are numbered in order and are filed with all information pertaining to the entry attached. As this information is attached in this way it is always possible to show the reasons why the entry was put through the books.

A cash voucher is used for the purpose of paying all bills in excess of $10. Three signatures are required, those of the treasurer or general manager and the general auditor and auditor of disbursements. As receipted invoices are not required the original invoices are attached to the stubs in each case and filed according to number. These vouchers are drawn on one of six banks and the name of the bank in each case is stamped on the face of the voucher. Provision is made on the voucher and on the stub for distribution of the invoice. The distribution is entered on the books from the stub.

The annual report of the Metropolitan Railway, Paris, France, for 1910, shows that the number of passengers carried was 251,701,253, as against 254,445,992 in 1909 and 229,700,519 in 1908, while the net receipts were $2,132,668 last year, as compared with $2,177,804 in 1909.

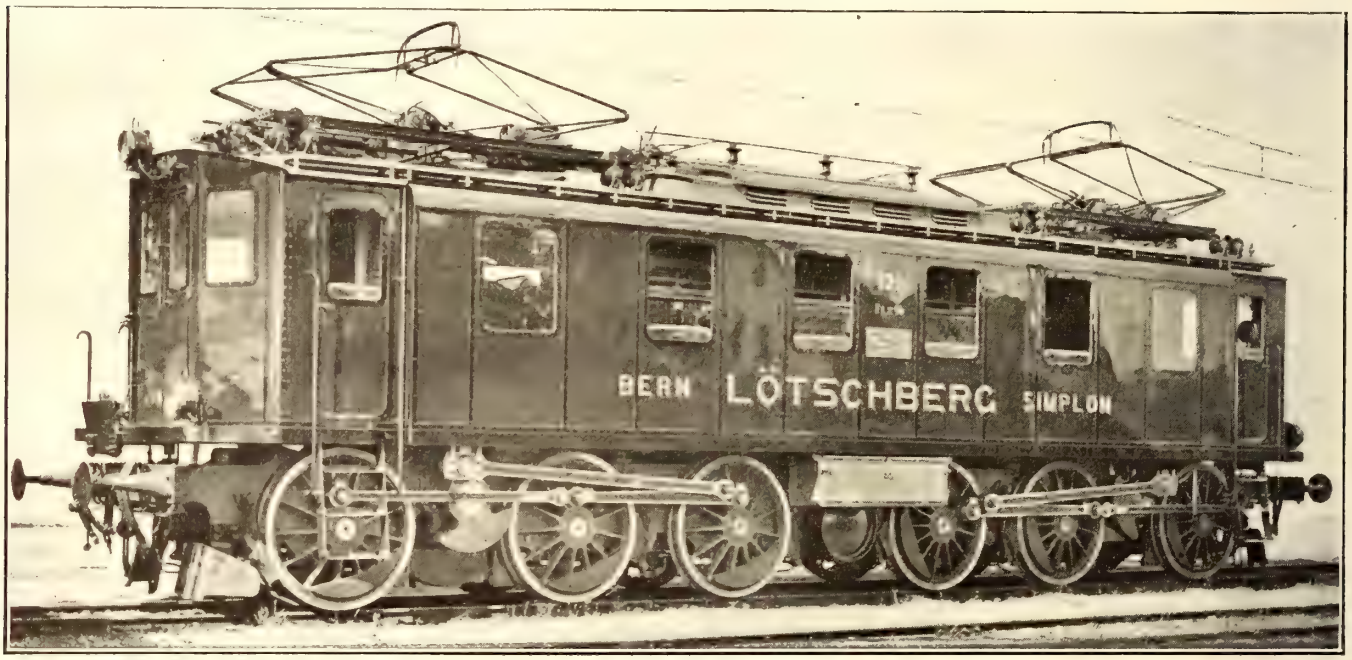
Single-Phase Locomotive for the Loetschberg Line in Switzerland

Full Particulars Are Given of a Side-Rod Locomotive of 2000 Hp. Recently Developed for Electric Trunk-Line Operation in Europe.

One of the most important through-line railways being constructed in Europe now is the Loetschberg railway, which is being built between Spiez and Brigue. At the latter place it will connect with the Simplon railway and in this way will furnish the shortest route between Milan and Berne.

Only a portion of the whole line, or that from Spiez to Frutigen, a distance of 8½ miles, is at present opened to traffic; the remainder will follow in from one to two years' time after the completion of the Loetschberg tunnel. The section from Spiez to Frutigen, formerly operated by steam locomotives, has been electrified and serves for the present as an experimental line.

The maximum grade of this section is 1.5 per cent and the average grade is 1.117 per cent, while the continuation of the line will have a maximum grade of 2.7 per cent.



Loetschberg Single-Phase Locomotive—Exterior View

About 40 per cent of the total length of the experimental line is in curves, of which the sharpest has a radius of 1000 ft. All of this track is now equipped with catenary overhead construction.

ELECTRIC LOCOMOTIVES

The electric rolling stock on this line consits of two single-phase locomotives and three motor cars. The latter and a 2000-hp locomotive were ordered from the "Elektrische Bahnen," Zurich (the joint office for electric traction on standard-gage lines in Switzerland of the Maschinenfabrik Oerlikon and the Siemens-Schuckert Works). The other locomotive, which is of 1600 hp, was supplied by the Allgemeine Elektricitäts Gesellschaft, of Berlin. The Allgemeine locomotive is fitted with two Winter-Eichberg motors, each driving through connecting rods two axles, combined with one pony axle fitted to one bogie truck. The normal output developed by this locomotive enables it to haul a 250-ton train at a speed of 25 m.p.h. up grades of 2.7 per cent.

In the following is given a short description of the 2000-hp locomotive, which was placed on the line first. The electrical equipment of this unit was designed and supplied by the Maschinenfabrik Oerlikon, and the framework and other non-electrical parts were supplied by the Swiss Locomotive Works, of Winterthur. The principal data of this locomotive follow:

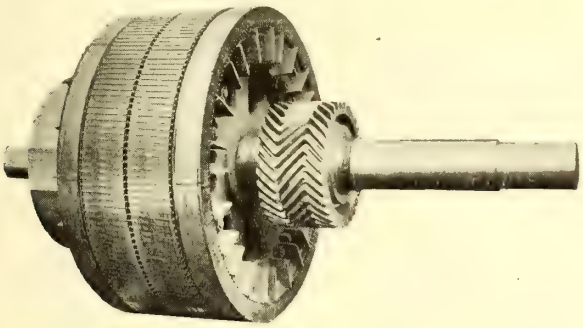
Mechanical data, in mm:	
Gage (4 ft. 8.5 in.)	1,435
Length over buffers	15,020
Width of cab	2,950
Height to top of cab	3,740
Height of cab floor above rail	1,500
Distance between centers of trucks	5,200
Total wheel base	10,700
Wheel base of each truck	4,050
Diameter of driving wheel	1,350
Width of rim of driving wheel	140
Electrical data:	
Line voltage	15,000
Number of motors	2
Frequency, cycles per second	15
Normal total rated hp	2,000
Normal speed, km per hour	42
Maximum speed, km per hour	70
Normal drawbar pull, kg	10,000
Maximum drawbar pull, kg	13,000
Gear ratio	1:3.25
Coefficient of adhesion at normal drawbar pull	1:6.8
Coefficient of adhesion at maximum drawbar pull	1:5.3
Weights in tons:	
Mechanical equipment, including brakes	46
Electrical equipment	44
Total	90
Weight available for adhesion	90
Maximum weight per driving axle	15
Weight of one truck, without motor	18.5
Weight of one motor	9.8
Weight of one transformer	5.5

MECHANICAL EQUIPMENT

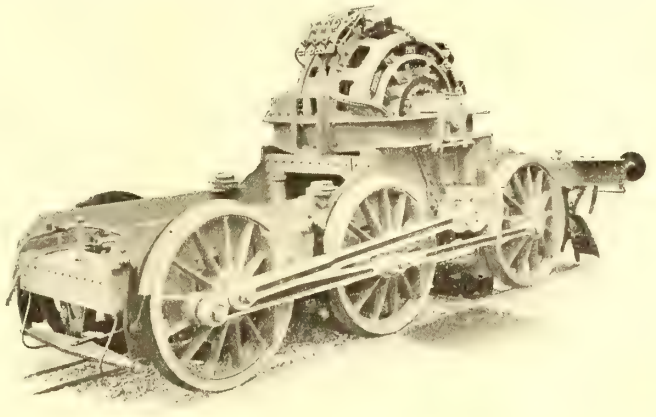
The locomotive is composed of two six-wheel trucks, and each truck is fitted with one motor. Each motor drives through a single reduction gear a countershaft, which, by means of a crank pin and connecting rod, operates the coupled driving wheels. The truck frame is supported on the axles by large elliptic springs. The motor is mounted rigidly on the truck frame.

The pinion is carried on the armature shaft between the core and the bearing on the pinion side. The gear teeth used are of the double herringbone pattern. The pinion and gear are 250 mm wide and have pitch circle diameters

of 447 mm and 1453 mm respectively, corresponding to a gear ratio of 1:3.25. The height of the motor shaft above the rail is 1.80 m. The countershaft carrying the gear is 265 mm above the driving axles and operates the three coupled axles by cranks and connecting rods 2.7 m in length. The crank pins on each side of each truck are placed 90 deg. apart. The transformers and other heavy auxiliary parts of the electrical equipment are carried on the trucks and not in the body of the locomotive, which is kept as light as possible.



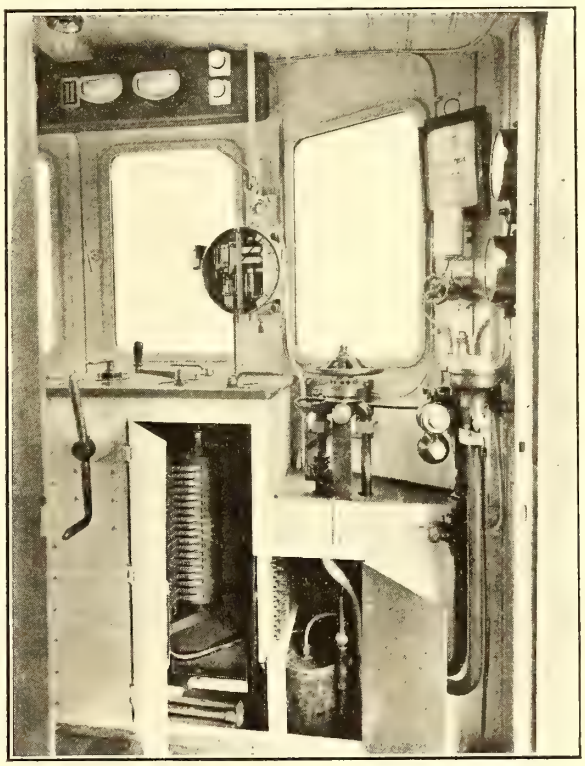
Loetschberg Single-Phase Locomotive—Armature and Pinion Mounted on Shaft



Loetschberg Single-Phase Locomotive—Truck Equipped with Motor

The locomotive body is divided into three compartments, one at each end for the motorman and a machine room in the middle. The equipment of each motorman's compartment is identical. Each is fitted with a benchboard comprising the controller, the switches for regulating the motor voltage and for operating the current collectors and the high-tension switches, the brake handles, the sanders and the signal whistle. The measuring instruments, such as tachometer, voltmeter and ammeter, are fixed above in front of the benchboard. In the rear of each motorman's compartment is a switchboard with switches for the lighting and heating and the auxiliary machinery, and a number of measuring instruments.





Loetschberg Single-Phase Locomotive—Side and End View of Motorman's Compartment

The current collectors are of the pantograph type and have a total width of 1200 mm. They are kept up against the overhead line wire by means of springs, brought into action by compressed-air cylinders. They have a range in height of 2550 mm.

TRANSFORMERS

Each of the two transformers is designed for a continuous rated output of 1000 kva, when artificially air-cooled. They furnish the energy required for the motors, the auxiliary machinery and the heating of the cars. They have been so liberally dimensioned that even should the artificial cooling be interrupted they still can be left under pressure and give their full output for a considerable length of time. The artificially air-cooled transformer has been preferred to the oil-cooled type owing chiefly to its lighter weight (5500 kg per transformer) and greater accessibility. The efficiency of the transformers, at all loads varying from 200 kva to 1300 kva, exceeds 95 per cent. The two iron cores of each transformer are placed horizontally side by side. The low-voltage winding on each core consists of one inner and one outer cylindrical winding, divided up in eight coils. Between the two low-voltage windings is placed the high-tension winding, which consists of two sections which may be connected in series or in parallel, so that, if necessary, the locomotive may also be run with a

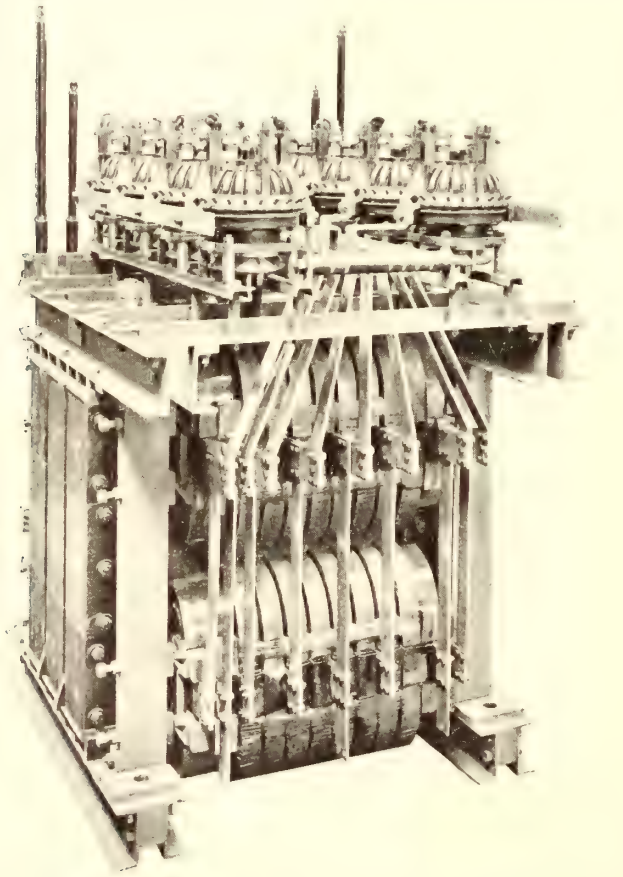
line pressure of 7500 volts. On the top of each transformer are fixed eight "step switches" operated by direct-current remote control, which are connected with the low-voltage coils and which permit taking from the transformers sixteen different voltages, ranging from 0 volt to 420 volts. Normally the low-voltage transformer windings and the motors are connected in series through the above-mentioned step switches.

MOTORS

The motors are twelve-pole Oerlikon compensated series machines with out-of-phase commutating field.

The frame is of cast steel and made in two parts, so that the upper part of the rotor may be lifted. The design of the frame is such that cooling air from all sides finds easy access to iron, windings and to the commutator, so that effective ventilation is assured even without artificial cooling. The rise in temperature, ascertained by a full-load test run of one hour (420 volts, 2100 amp) and without artificial cooling, amounted to 62 deg. C. on the collector, 52 deg. C. on the iron, 60 deg. C. on the stator windings and 75 deg. C. on the rotor windings. With artificial cooling the motor can give the above output continuously.

The stator windings comprise the exciting winding, which produces the magnetic field and is connected in series with the rotor, and the compensating winding. Both windings consist of copper tape, insulated by mica and embedded in the uniformly distributed half-closed slots of

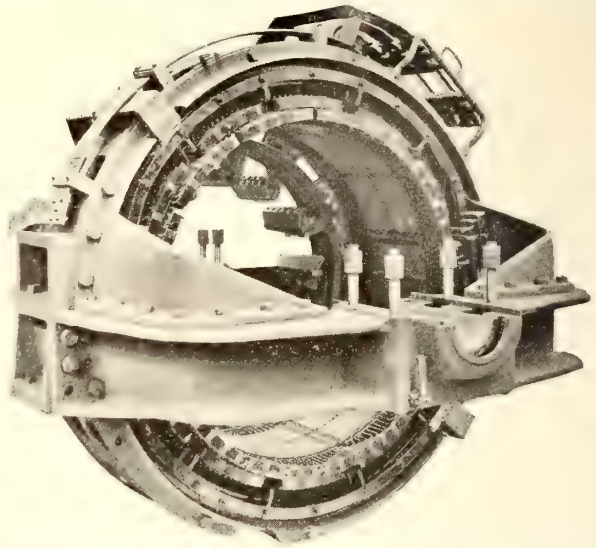


Loetschberg Single-Phase Locomotive—Transformer and Step Switches

the stator. The exciting and the compensating windings overlap by half a pole distance. Inside the compensating winding and inclosing one tooth is arranged the commutating-field winding, the current of which is caused to be out of phase with the armature current by a non-inductive resistance connected in parallel. This resistance is fixed directly below the motor on the truck frame.

AUXILIARY ELECTRICAL EQUIPMENT

Among the auxiliary equipment carried by the locomotive is a complete direct-current plant comprising a motor generator of 1.2 kw output and a storage battery of 2 × 18 cells, having a total rated output of 81 amp-hours. This plant supplies the direct-current energy required for operating the magnet coils of all the high-tension switches, and also for lighting the locomotive. The converter starts automatically and puts itself in parallel with the battery as soon as the locomotive is under pressure. The battery is also automatically charged. The employment of direct current for operating the magnetic coils of the switch gear



Loetschberg Single-Phase Locomotive—Motor with Armature Removed

greatly simplifies the regulating and the automatic switches.

The compressed air required for manipulating the current collectors, the Westinghouse brakes, the whistles and the sanders is furnished by a small air-compressor set driven through spur gearing by a 9-hp single-phase series motor. The cooling air required for the transformers and if necessary also for the motors is supplied by a low-pressure Sulzer fan, driven by a 10-hp single-phase motor.

The motors of the compressor set and of the low-pressure blower are supplied with energy at 150 volts, whereas the motor of the motor-generator obtains energy at 300 volts from the secondary windings of either transformer.

QUESTION BOX OF THE ENGINEERING ASSOCIATION

The question box of the Engineering Association was mailed to member companies July 20. It was compiled this year by a committee consisting of Norman Litchfield, Charles Rufus Harte and Rodney Hitt, and answers are requested by Aug. 15. The letter of transmissal says, in part:

"The number of questions put is unusually large, representing members from widely varying sections of the country, and indicates a very decided appreciation of the value of the Question Box. Your committee, therefore, earnestly hopes that the answers will be correspondingly complete and representative.

"It has been found that in some instances the blanks for questions did not reach the subordinate officials for whom they were intended, and executive officers are, therefore, particularly requested to forward these folders to their respective subordinates in order that they may be given opportunity to submit answers to the questions.

"In answering questions it is suggested that whenever possible the reasons leading up to the answer should be given, a mere affirmative or negative being of little of no value."

There are seventy-three questions under the heading of power distribution, eight under the heading of power generation, one under shops and forty-two under equipment.

Existing Fares of Wisconsin Road Upheld by Commission After a Valuation

The Eastern Wisconsin Railway & Light Company's Increased Interurban Fares Are Approved After Complete Analysis of Costs—Relative Current Consumption of City and Interurban Cars.

In a fare case involving the Eastern Wisconsin Railway & Light Company, of Fond du Lac, Wis., the Railroad Commission of Wisconsin, after a valuation of the properties involved, upheld the existing rates on the interurban system and approved the zone system of fares as the only practicable one under the circumstances. The decision gives the results of tests to determine the relative current consumption of city and interurban cars made by O. M. Rau, superintendent of electric lighting Milwaukee Electric Railway & Light Company.

The original complaint to the commission in this case was made by a farmer who objected to a new schedule of rates which took effect on Jan. 15, 1910, on the line between Fond du Lac and Oshkosh. Others also complained about the change. At the hearing it was shown that the company had changed its fare systems twice, first increasing the number of zones from four to six and then, in 1910, from six to eight. Under the first plan the fare within each zone was 10 cents, but 5 cents additional was charged for each zone after the first. Under the later plans a fare of 5 cents was charged for each zone. The distances of the various zones under the last fare arrangement are respectively 3.2 miles, 2.1 miles, 2.1 miles, 2.1 miles, 2.0 miles, 2.1 miles, 2.7 miles and 3.7 miles, making the fares range, for trips covering an entire zone, from 1.35 cents to 2.5 cents per mile.

In brief, the testimony of the company tended to show that the six-zone system fell so far short of paying operating expenses and depreciation, to say nothing of interest on the investment, that an increase of rates by the shortening of zones was absolutely necessary; that the company had made no charge to depreciation; that the increases in expense of operation of late years are largely caused by higher cost of labor and materials and the doubling of taxes paid by the company and also by the fact that, as the property becomes older, its maintenance cost is greater.

Eliminating the gas plant of the company, the engineering staff of the commission valued the property, as shown in Table I, published herewith. The railway was divided further between the city and interurban systems, as shown in Table II. These valuations were not accepted by the company as correct. Undervaluation of a number of items was asserted and a going value was claimed. No testimony was presented on these points and no decision rendered, as the company believed that even under the valuation as determined the rate of return was so low as to make a reduction of fares unjustifiable.

INCOME ACCOUNT AS REVISED

The income account shows total gross earnings for the year ended June 30, 1910, of $256,689, of which $104,616 was received from the railway, $84,110 from the electric department and $67,963 from gas. Operating expenses were: Railway, $61,830; electric, $41,369; gas, $55,815; total, $159,014. Taxes aggregated $10,584, divided as follows: Railway, $6,202; electric, $1,922; gas, $2,460. There was also a franchise payment of $1,000 on account of the railway. The net revenue from operation of $86,091 was divided as follows: Railway, $35,585; electric, $40,818; gas, $9,688. Against this balance there was charged for depreciation of the railway $19,171. The opinion of the commission shows also income accounts for the years ended Dec. 31, 1909, and Dec. 31, 1908. Revisions of the income account by the commission consisted of changes in the method of apportionment between the departments and the addition of a sum for depreciation. No change was made in the earnings as reported by the company. The changes in operating expenses are discussed by the commission in part as follows:

TABLE I.—VALUATION OF RAILWAY AND ELECTRIC PROPERTIES, JUNE 30, 1909.

Classification.	Railway—New.	Railway—Existing.	Lighting—New.	Lighting—Existing.
1. Land	$40,095	$40,095	$1,427	$1,427
2. Track & track structures	205,583	167,914	.....	.....
3. Cars & car equipment..	82,510	57,644	.....	.....
4. Elec. dist. system.....	82,750	73,590	75,962	63,378
5. Power plant equipment.	50,977	38,664	63,319	44,614
6. Bldgs. & misc. structures	20,739	18,791	10,380	8,920
7. Office furn. & appliances.	646	549	808	687
8. Tools, impl. and machry.	4,619	2,602	292	160
9. Horses, wagons, misc....	211	180	.....	.....
Total, items 1-9...	$488,130	$400,059	$152,218	$119,186
10. Add 12 per cent*.....	58,576	48,007	18,266	14,302
Total, items 1-10..	$546,706	$448,066	$170,484	$133,488
11. Stores and supplies....	13,221	13,221	11,378	11,378
Total, items 1-11..	$559,927	$461,287	$181,862	$144,866
12. Paving	12,633	6,316	.....	.....
Total, items 1-12..	$572,560	$467,603	$181,862	$144,866

*Addition of 12 per cent to cover cost of engineering and supervision, interest during construction, contingencies, etc.

TABLE II.—DIVISION OF RAILWAY VALUATIONS BETWEEN CITY AND INTERURBAN SYSTEMS, JUNE 30, 1909.

Classification.	City—New.	City—Existing.	Interurban—New.	Interurban—Existing.
1. Land	$3,105	$3,105	$36,990	$36,990
2. Track & track structures	57,690	49,278	147,893	118,666
3. Cars & car equipment..	53,732	35,653	28,778	21,991
4. Distribution system....	11,275	8,486	71,475	65,104
5. Power plant equipment..	36,194	27,451	14,783	11,213
6. Bldgs. & misc. structures.	11,452	10,411	9,287	8,380
7. Office furn. & appliances.	459	390	187	159
8. Tools, implements & machinery	3,279	1,847	1,340	755
9. Horses, wagons & misc.	211	180	....	....
Total, items 1-9...	$177,397	$136,801	$310,733	$263,258
10. Add 12 per cent*.....	21,288	16,416	37,288	31,591
Total, items 1-10..	$198,685	$153,217	$348,021	$294,849
11. Stores and supplies.....	6,610	6,610	6,611	6,611
Total, items 1-11..	$205,295	$159,827	$354,632	$301,460
12. Paving	11,802	5,734	831	582
Total, items, 1-12..	$217,097	$165,561	$355,463	$302,042

*Addition of 12 per cent to cover cost of engineering and supervision, interest during construction, contingencies, etc.

"*Power Expenses:* The company's division of the power expenses, as between the electric lighting and railway departments, is made upon the basis of the kw-hours consumed by each department. This appears to be proper, but in the apportionment for 1908, as made by the company, the sum of the amounts apportioned to the two departments is greater by $633 than the total power expense reported. The correction of this is the only change made in the power expenses.

"*General Expenses:* In the company's reports the general expenses are in part charged directly to the three departments and in part to an apportionment account which is distributed on the basis of the gross operating earnings of each department. It appears that a more accurate method of distributing this apportionment account would be upon the basis of the overhead expenses, i. e., the total expenses, excluding general and undistributed expenses and taxes. This method has been used by the commission.

"*Undistributed Expenses:* The undistributed expenses have been charged by the company in part to the different departments and in part to an apportionment account, which is distributed on the basis of gross earnings. These figures have been revised by making the basis of apportionment

the overhead expenses, the amounts directly charged to the three departments remaining unchanged.

"*Taxes:* The company states the total taxes actually paid during 1907, 1908 and 1909, but, since the tax paid at the first of each year is the tax accruing during the preceding year, the amount reported as paid during 1909 has been applied to the year ending Dec. 31, 1908. For the year ending Dec. 31, 1909, since the amount actually paid in 1910 is not reported, the tax commission's figures for the railway and electric departments are applied as taxes actually applicable to the year 1909. For the year ending June 30, 1910, the company's estimates appear to be fair as compared with preceding years, and are therefore used. In apportioning taxes among the departments, the taxes upon the gas property require no arbitrary apportionment, as they are paid separately into the city treasury, while the larger part of the taxes upon the other properties is paid to the State as a whole. As between the railway and electric properties, some arbitrary basis of apportionment is necessary, and the basis used by the commission is the existing valuation of the properties upon the preceding June 30, as found by the engineers of the commission.

"*Depreciation:* In addition to the operating expense accounts as reported by the company it is necessary to make a charge for depreciation. The engineering staff of the commission has worked out a series of depreciation percentages for railway and electric light and power properties, and these percentages have been applied. The rates of depreciation so used, on a straight line, 2 per cent sinking fund and 4 per cent sinking fund basis are shown in Table III.

TABLE III.—RATES OF DEPRECIATION.

	Railway.	Electric.
Straight line basis	5.55 per cent.	5.70 per cent.
2 per cent. sinking fund basis	4.67 per cent.	4.80 per cent.
4 per cent. sinking fund basis	3.90 per cent.	4.06 per cent.

"These percentages were applied to the valuation of June 30, 1909, for the depreciation for the years ending June 30, 1910, and Dec. 31, 1909, and to the valuation of June 30, 1908, for depreciation for the year ending Dec. 31, 1908. In arriving at the depreciable value for each year, land stores and supplies, paving and scrap value were omitted, and the 12 per cent addition for engineering, etc., is computed upon the remaining value. The figure obtained by the 2 per cent sinking fund method is the one adopted as a proper depreciation charge."

TABLE IV.—INCOME ACCOUNT—RAILWAY DEPARTMENT, YEAR ENDING JUNE 30, 1910.

Classification.	Total Railway.	City Line.	Interurban Line.
Earnings:			
Passenger	$100,727.25	$49,532.02	$51,195.23
Mail, express, chartered cars	2,668.94	88.80	2,580.14
Other than transportation	1,219.95	559.96	659.99
Total revenues	$104,616.19	$50,180.78	$54,435.36
Operating Expenses:			
Way and structures	$5,533.08	$2,139.75	$3,393.33
Equipment	5,839.80	2,493.33	3,346.47
Traffic	810.31	684.92	125.39
Power	21,343.70	9,924.57	11,419.13
Operation of cars	18,963.64	10,858.18	8,105.46
General	6,352.54	3,185.69	3,166.85
Undistributed	2,986.97	1,624.27	1,362.70
Total of above items	$61,830.04	$30,910.71	$30,919.33
Taxes	6,201.58	2,195.98	4,005.60
Franchise payment	1,000.00	.....	1,000.00
Total operating expenses	$69,031.62	$33,106.69	$35,924.93
Net revenue from operation	$35,584.52	$17,074.09	$18,510.43
Depreciation	19,170.86	7,457.46	11,713.40
Balance for interest, etc	$16,413.66	$9,616.63	$6,797.03
Or, upon valuation, Table II., per cent	2.87	4.43	1.91

DIVISION OF INCOME BETWEEN CITY AND INTERURBAN SYSTEMS

In order to determine the part of the railway department's expenses properly chargeable to the interurban system, the railway expenses were separated between the city and the interurban system. The earnings and operating expenses of the two systems had been kept separately by the company, and, except in cases where arbitrary apportionments were necessary, the company's charges to the city and interurban systems were accepted as correct. Besides the addition of depreciation, which was not included in the company's report, changes were made in the company's apportionment in the accounts of way and structures, power, general expense, undistributed expense and taxes. The division of earnings is shown in Table IV.

The accounts in which revision of the company's apportionments was made in making up the figures for Table IV are discussed by the commission in part as follows:

"*Way and Structures Expenses:* It has been the practice of the company to charge $450 per year to the interurban system and credit the same amount to the city system, on account of the use by the interurban system of the tracks of the city system within Fond du Lac. It would seem that, instead of this arbitrary charge, the interurban system's share of the way and structures expense should be based upon the amount of its car mileage within Fond du Lac. The engineering staff of the commission reports that 26 per cent of the total car mileage of the interurban system for the year ending June 30, 1910, was over the tracks of the city system. If 26 per cent of the interurban car mileage as reported for 1910 is added to the city car mileage as reported, the amount added will be 19.11 per cent of the total, and therefore 19.11 per cent of the total city system way and structures expense should be charged to the interurban system and credited to the city system. Using the same basis, 18.02 per cent of the city expense for 1909 and 15.24 per cent of that expense for 1908 is charged and credited in a similar manner. The resulting charge to the interurban system, instead of $450 for each year, is $320 for 1908, $555 for 1909, and $505 for 1910.

"*Power Expenses:* Most of the power is generated by the company, but a small part, used exclusively for the interurban line, is purchased. The company in its report apportions that part of the power which it generates, as between the city and interurban systems, on the basis of the current consumed by each system. This basis seems to be correct, but the method by which the company arrives at the consumption of each system cannot be accepted. As to the power purchased, the only data at hand are the records of a meter from March 1 to Aug. 15, 1909, as follows: Total, 5½ months, 124,394 kw-hours. Since there appears to be no other basis for estimating the amount of current purchased except to apply the above records for the years previous, the annual total is estimated at 275,000 kw-hours, a slight extra allowance being made for winter months.

CURRENT CONSUMPTION OF CITY AND INTERURBAN CARS

"With reference to power generated, the company reports that it has two meters in use, one of which records only interurban power generation, while the other records that of the city system, which is used by both city and interurban cars, and also that of a small part of the interurban system. The company assumed that its small city cars consume 1 kw-hour and its large city cars 2 kw-hours per car mile. After deducting the estimated city consumption thus obtained from the total wattage recorded by the second meter, the remaining wattage, plus that shown by the meter recording only interurban consumption, was taken by the company to be the total current generated for the interurban system. This added to the current purchased gave the total interurban consumption. Under this method the total consumption of the interurban system in 1909, for example, was estimated at 1,073,787 kw-hours, or 4.75 kw-hours per car mile. This figure per car mile is more than double that used for the large city cars.

"It seems, however, that there is no such difference in consumption between city and interurban cars as the company's estimates indicate. Tests of the company's cars, made by O. M. Rau, superintendent of electric lighting for the Milwaukee Electric Railway & Light Company, indi-

cate the relative consumption of city and interurban cars as summarized in Table V.

TABLE V.—POWER CONSUMPTION PER CAR MILE AND CAR HOUR, 50 HP, 4-MOTOR CARS, 29 AND 28 TONS, RESPECTIVELY.

City Running					Interurban Running					
Time, min.	Miles run	Total kw-hrs.	Kw-hours per car hour.	Kw-hrs. per car mile.	Time, min.	Miles run.	Total kw-hrs.	Kw-hours per car hour.	Kw-hours per car mile.	Per cent. city to int. kw-hours per car mile.
19	3.97	10.30	32.53	2.59	30	14.20	26.78	53.56	1.89	137.0
17	3.97	10.30	36.35	2.59	34	14.20	31.40	55.38	2.21	117.2
24	3.97	12.36	30.90	3.11	37	14.20	35.02	58.78	2.46	126.4
20	3.97	10.30	30.90	2.59	35	14.20	32.44	55.62	2.28	113.6
80	15.88	43.26	32.44	2.72	137	56.80	125.64	55.03	2.21	123.1
17	3.97	10.40	36.72	2.62	28	12.37	24.42	52.28	1.97	133.0
19	3.97	9.45	29.84	2.39	29	12.37	30.16	62.40	2.44	97.9
18	3.97	12.48	41.60	3.14	29	12.37	26.00	53.79	2.10	149.5
19	3.97	8.94	28.23	2.25	28	12.37	31.72	67.80	2.56	87.9
73	15.88	41.27	33.92	2.60	114	49.48	112.30	59.13	2.27	113.5
153	31.76	84.53	33.12	2.66	251	106.28	237.94	56.87	2.23	117.2

"Similar tests for the smaller cars used in the city exclusively show an average consumption of 2.30 kw-hours per car mile. The figures indicate that the consumption of the interurban cars is actually less than that of the same cars when used in the city. These figures, however, make no allowance for line losses, which are greater in the country than in the city. Mr. Rau states these losses to be about 7.5 per cent in the city and about 23 per cent in the country, and upon this basis the power consumption of the respondent's cars per mile would be about 2.90 kw-hours on the interurban system and 2.88 kw-hours on the city system.

"A compilation of the power output per car mile on a number of interurban railroads in the State shows that the output per car mile ranged from 1.91 kw-hours to 2.19 kw-hours in 1909, and from 2.43 kw-hours to 3.36 kw-hours in 1910.

"We are of the opinion that 3 kw-hours per car mile will more than cover the actual consumption of energy per mile in both city and country running by the interurban cars, but, allowing something extra to be sure of covering line loss, we have placed the average at 3.25 kw-hours per interurban car mile. The total amount of current applied to the interurban system is thus arrived at approximately by multiplying the car mileage of that system by 3.25, and the remaining current is assigned to the city system. Deducting from the total current used by the interurban system the amount purchased, we have the total amount generated by the respondent company for the interurban line. The detailed figures for these operations are shown in Table VI.

TABLE VI.—DIVISION OF OUTPUT BETWEEN INTERURBAN AND CITY LINES.

Year ending	Total Railway Power—Generated.	Total Railway Power—Purchased.	Total Railway Power—Total.	Car Mileage—Total.	Car Mileage—Interurban.	Car Mileage—City.
June 30, 1910	1,176,822	275,000	1,451,822	482,133	229,503	252,630

	Division of Total Power.				Division of Power Generated.			
	Interurban		City		Interurban		City	
Year ending.	Total kw.-hrs.	Per car mi.	Total kw.-hrs.	Per car mi.	Total kw.-hrs.	Per cent.	Total kw.-hrs.	Per cent.
June 30, 1910	745,885	3.25	705,937	2.79	470,885	40.01	705,937	59.99

"*General Expenses:* The general expenses of the railway system have for the most part been charged to a clearing account, which the company apportions between the city and interurban systems on the basis of gross earnings. It seems that a more accurate basis of separation would be the overhead expenses of the two systems, consisting of all operating expenses except general and undistributed expenses and taxes. Such amounts as were directly charged by the company to the interurban and city systems have been considered correct.

"*Undistributed Expenses:* The same change is made in the apportionment of the undistributed expenses between the city and interurban systems as in the case of general expenses. The company's division of its apportionment account is made on the basis of gross earnings.

"*Taxes:* The total taxes chargeable to the railway department have been apportioned between the city and interurban systems upon the basis of the valuation.

"*Depreciation:* The apportionment of depreciation between the city and interurban systems for the years ending June 30, 1910, and Dec. 31, 1909, has been made upon the basis of the valuation of the property of each system as of June 30, 1909, the apportionment of which is shown in Table II. Only items 2 to 9, inclusive, of the valuation are included in arriving at the separation. For the year ending Dec. 31, 1908, since no separation of the railway valuation of June 30, 1908, into city and interurban portions has been made by the engineers, the same percentages are used as those upon which the 1909 and 1910 apportionments are based."

CONCLUSIONS OF THE COMMISSION

In its conclusions the commission says:

"The result of the figures shown in Table IV is to indicate that the interurban system of the respondent company has at no time during the past three years earned as much as 2 per cent upon the physical valuation of that system as made by the engineers of the commission. The year ending June 30, 1910, during which the net earnings were 1.91 per cent upon the investment, includes five and a half months during which the new rates were in effect; while the preceding year, under the former rates, shows a net return of 1.09 per cent. It is apparent, therefore, that no order can be made which would reduce the earnings of the company below their present figure.

"The complaint as to the location of the zone limits is the principal objection of the petitioner. The zone system results in hardships upon certain patrons of the road, especially when a shifting of the zone points takes place. The zone system seems, however, to be the only practicable system of interurban rates upon the line operated by the respondent company. The petitioner suggested that a straight rate of 2 cents per mile, such as that charged by steam railroads, would be satisfactory and fair to everyone. The respondent company does not come within the provisions of the 2-cent fare law of this State so as to make a rate of more than 2 cents per mile unlawful. Moreover, an interurban line differs greatly from a steam railroad line in the frequency of its stops. A system of rates under which the fare would be 2 cents per mile between any two points at which the respondent's interurban cars might stop would be exceedingly difficult to administer. Instead of collecting a uniform fare throughout the car as each zone point is passed, the conductor would have to keep track of each passenger's trip, in addition to the burden of remembering a large number of distances and fares. The duties of a conductor upon an interurban car are so numerous that any system of fares which would add to them so materially as the 2-cent-a-mile system might seriously overburden him and interfere with the safety and regularity of operation. Then, again, with the present fare in most of the zones averaging something over 2 cents a mile, the respondent company seems unable to earn a fair rate of return, so that a change to the 2-cent-a-mile system would be a reduction in rates, which is entirely unwarranted at this time.

"With the exception of the zones located within the cities of Oshkosh and Fond du Lac, there is a marked uniformity in the length of zones. Such uniformity tends to reduce the inequalities of the zone system to a minimum, if it is not obtained by making patrons at the most important points pay an increased rate by reason of residing a short distance beyond a zone boundary. That is, the placing of a zone limit only a short distance from an important point, so that patrons going to and from that point

must pay an extra fare for the short ride to the zone point, might not be justifiable merely for the sake of uniformity of zone lengths. But in the present case it seems that the only point of importance which is subjected to an increased rate by the change in the zone limits is that at which the petitioner resides. If the petitioner's station were only a short distance from the zone point next south, it might be practicable to establish overlapping zones, as is the case farther north, and permit the traveler to go to the zone point which would give him the longer ride; but in the case of a station half way between two zones it is difficult to find any way by which the intermediate point can be given the same benefit as a point half a zone removed from it without doing injustice to patrons on other parts of the line.

"It would seem, therefore, that not only are the respondent company's revenues too low to warrant any reduction in rates, but the zone system, as at present in effect on the respondent's line, is so arranged as to satisfy reasonably well the requirements of the general public.

"In view of these facts the proceedings are, therefore, for the present, dismissed."

HEARINGS ON POWER BRAKES AND HEIGHT OF CAR STEPS IN NEW YORK

A hearing was held before Commissioner John E. Eustis, of the Public Service Commission of the First District of New York, on July 20, 1911, on the subject of power brakes for use on surface cars operated within the jurisdiction of the commission. Mr. Eustis asked if any of the companies desired to make a statement.

Arthur S. Masten, for the receivers of the Metropolitan Street Railway, said:

"We shall be very glad to submit to the commission such facts and figures as we have been able to obtain so as to be of assistance in coming to a conclusion. Ever since the receivers were appointed the company has been making careful observations in regard to brakes. We have tabulated our statistics as to the various kinds of accidents which occur in which the question of brakes is a factor, and we have also compared the cost of the two kinds of brakes. We have concluded that the way we have our brakes installed now is on the whole about as near right as is possible. It seems to us that after the cars get to a certain weight the air brake is preferable to the hand brake, but in the lighter type of cars the percentage of accidents is such that it is a real economy to continue with the hand brake. In other words, there is a line behind which the air brake is not economical, and a line behind which it is foolish to use the hand brake. It was not our intention to make any immediate change as regards our lighter cars. We are using the air brake on our heavy cars and whenever we re-equip a car and bring its weight beyond the limit which we consider advantageous we install the air brake."

George D. Yeomans, of the Brooklyn Rapid Transit Company, said that the company proposed to have statistics tabulated to show the effectiveness of the brakes installed on its cars.

A. G. Peacock said that all of the closed cars of the New York & Queens County Railway weighing 13,000 lb. were equipped with air and hand brakes.

Adrian H. Larkin said that the Richmond Light & Railroad Company had only a few double-truck cars. All its cars were equipped with hand brakes.

Edward A. Maher said that the Third Avenue Railroad had 551 cars, of which 406 were equipped with air brakes. The Union Railway had 473 cars, 206 of which were open cars, of which 181 were double truck and 25 single truck. Of the entire 473 cars, about 350 were equipped with air brakes. It was proposed to equip the remaining cars with air brakes. The Yonkers Railroad had 133 cars, all equipped with air brakes.

E. G. Connette, transportation engineer of the commission, gave the figures from the census report in regard to the number of power brakes in use in the United States. Mr. Connette said:

"From the study of the records it appears evident to me that considerable reduction in accidents would result if all cars weighing more than 25,000 lb. were equipped with power brakes; in fact, I believe that the equipment of double-truck cars even of lesser weights with power brakes would improve the conditions so far as accidents are concerned. I am very strongly of the opinion that all double-truck cars ought to be equipped with power brakes. The possible load of the car must be taken into consideration as well as the weight of the car itself in considering the subject of brakes."

James L. Quackenbush, for the Metropolitan Street Railway, said that despite the instruction given to motormen on the subject of accidents the personal equation on the front end of the car was such that the man operating a car which was equipped with a power brake took chances that the man operating a car equipped with a hand brake would not take.

Mr. Connette said that returns which showed the results which Mr. Quackenbush claimed for the Metropolitan Street Railway would seem to reflect on the inspectors and other road officers of the company who permitted misuse of the air brakes.

L. H. Palmer, superintendent of transportation of the company, said that the company found that motormen operated cars more safely with the hand brake than with the air brake, and that teamsters and drivers of vehicles took more chances with cars equipped with air brakes than they did with cars equipped with hand brakes. Mr. Palmer explained the training of motormen. The division general foremen disciplined men who have had accidents. Continued carelessness resulted in discharge. A new man always had more accidents than an old man, and it was impracticable to discharge a man for his first accident. Very often a slight accident had the result of increasing the efficiency of a man.

Mr. Quackenbush said that Mr. Palmer had been called because he did not want to have it appear on the record that the company had more failures on its part than it ought to have.

The hearing was adjourned until Aug. 14, 1911, at 10:30 a. m.

HEIGHT OF CAR STEPS

On the same day a hearing was held before Commissioner Eustis on the question of the height of car steps. Mr. Connette said that many complaints had been received about the steps and that the height of the first step of cars in operation in New York from the ground up varied with different types of cars from 12 in. to nearly 20 in. He had brought the matter to the attention of the commission so as to adopt if possible a uniform or standard height for car steps or at least to fix a maximum height. He suggested as maximum heights the following: From rail to step approximately 15 in. or 15¼ in.; from first step to platform, 13 in. or 13¼ in.; from platform of car to floor of car body, 11 in. or 11½ in. He then quoted from the report of Ford, Bacon & Davis on the Philadelphia Rapid Transit Company to show that the alighting and boarding accidents in Philadelphia had been decreased by the installation of the folding steps. The question of folding steps involved the reconstruction of platforms, and, in the discretion of the commission, the steps might be applied only to new equipment or where cars were rebuilt. To cut into the platform so as to make two steps would interfere with the safety devices which were installed under the car.

This hearing was also adjourned until Aug. 14. 1911.

CHANGES IN CLEVELAND ORDINANCE

The principal changes contained in the amendments to the original Cleveland Railway ordinance, adopted recently by the Cleveland City Council, relate to the purchase of the property by the city, the amortization or possible discount on bonds, and provisions that, it is believed, will maintain the value of the stock at par, as was intended by Judge R. W. Tayler when he wrote the grant.

Section 16, which defines the capital value, was amended so as to provide that, upon the refunding of bonded debt, there shall be paid out of the interest fund that rate per cent upon such refunded bonded debt which the refunding bonds may bear and such rate as may be necessary to amortize the discount, if any; the total, however, of interest and amortization provision not to be in excess of 6 per cent per annum on par. Another amendment of this section, relating to the provision that the company may sell its stock at not less than par and its bonds on a basis which will not be in excess of 6 per cent on par, stipulates that the company shall include in such rate provision for amortization of the discount, if any. It is further provided that if the bonds are sold at a premium the premium shall be used for extensions, betterments or permanent improvements or for payment of any existing indebtedness.

Section 19 was amended so as to allow the surplus remaining from operation each month to be deposited in the interest fund and to allow the investment of this fund in such securities as may be found desirable. Under Section 21 as amended the surplus remaining from the car-mile allowances, if any, shall be deposited in the interest fund at the end of each year, instead of at the end of each six-month period, as in the original franchise. This section also provides for the increase or decrease of car-mile allowances for all purposes by agreement between the city and the company, the matter to be submitted to arbitration in case of disagreement.

BETTERMENTS AND EXTENSIONS

In Section 28, as amended, provision is made for either the city or the company to propose betterments, extensions and permanent improvements, but the right of the city in this respect shall cease whenever the unexpired term of the present franchise or any renewal thereof is less than fifteen years. In case of proposals by the city the company is under obligations to make extensions, improvements or betterments, if by acting in good faith and employing the usual means it can secure the necessary funds by the sale of stock or bonds or by increasing the floating debt, unless the company should claim that by complying with the city's demands its ability to earn a sufficient amount to pay interest and dividends would be impaired, or that it is unable to finance the proposed betterments or improvements. In that case the question may be submitted to arbitration, provided, however, that the company shall at once expend $2,500,000 for such purposes and this shall not be a subject of arbitration. This money may be secured by the sale of stock or bonds, as may seem best, and provision for the interest or dividends shall be made as in the case of present investments. The street railway commissioner is authorized to employ such assistance as is needed in making plans for the improvements or checking up those made by the company, provided the expense does not exceed 1 per cent of the cost. This to be paid by the company.

Nothing shall be added to the capital value without the consent of the city under the provisions of Section 29 as amended.

Section 30 provides that the consent of the city must be secured before extensions, betterments or permanent improvements can be made on the suburban lines, and the cost added to the capital value. The city cannot increase the service above or reduce the fare below the requirements of existing contracts between the company and municipalities or county commissioners. Any dispute may be submitted to arbitration. No provision is made for fare in the suburbs as they may be admitted, but a portion of that part of the city which was formerly known as Collinwood may be given the low fare.

Policemen and firemen in uniform are to be carried free of charge under Section 31, and provision is also made whereby the street railway commissioner may have supervision over the platform crews to the extent of insisting that any laxity in the collection of fares must be corrected by the company upon notification.

Section 32, as amended, contains a provision giving the city the right to purchase the company's property at any time within the life of the grant on giving six months' notice of its intention. The terms fixed by the amendment change the original plan, in that it must pay the company the capital value, as fixed in Section 16, plus 10 per cent. This section defines just what deductions must be made under possible conditions that may exist at the time the property is taken over, as well as any additions that may have been made in the same way. Under Section 35, as amended, it is provided that if the city should have failed to exercise this right at the end of this grant or any renewal thereof, it may purchase the property on the same terms, but without the addition of the 10 per cent mentioned in Section 32, or it may purchase the portions of the system lying within the city on these terms, the outlying portions to be subject to agreement in regard to price. All this is contingent upon the city having legal right to purchase and operate a railroad system, and the last condition is made on the theory that any law enacted on this subject might forbid the city the right to own railroad properties outside its limits.

Section 37 provides that the city may name a purchaser for the property, in case the franchise or renewal is not renewed on the terms named in Section 35.

RIGHTS OF COMPANY UNDER REDUCED FRANCHISE TERM

As amended, Section 40 provides that in the event of the unexpired term of the franchise becoming less than fifteen years the rate of fare may be advanced to the maximum figure and the company shall have full charge of the schedules, without intervention from the city. The company shall continue to receive the sums provided in Section 16 from the interest fund, and when that fund contains $200,000 in excess of the required $500,000 the excess shall be used to reduce the capital value, by payments as follows:

1. Payment of any outstanding floating indebtedness.
2. Payment of any outstanding bonds which can under their terms be paid.
3. Creation of sinking fund to assist in securing a reduction of the capital value.

In case the city should renew the ordinance within the last period of fifteen years, allowances in the capital value must be made for the sinking fund accumulated or such payments as have been made.

Section 44 gives the city the right, if it has not exercised its prerogative to purchase the entire property before the expiration of the grant or renewal, either to purchase or to nominate an individual or company to purchase the line on St. Clair Avenue, with all its appurtenances, at a price to be agreed upon between the city and the company. In case of disagreement resort is to be had to arbitration.

It is reported that the city of Sumas, Wash., has made a ten-year contract with the British Columbia Electric Railway for furnishing power to Sumas, in which city the lighting question is in the hands of a civic body appointed for the purpose. This incident is of interest as it is stated to be the first time that the British Columbia Electric Railway has supplied power without the borders of the Dominion and in view of the international agreement regarding transmission of power across the border.

HEARING ON CONEY ISLAND FARES

A hearing was held before the Public Service Commission of the First District of New York on July 24 in regard to the question of fares to Coney Island.

After the order of the commission had been read G. D. Yeomans, counsel for the Brooklyn Rapid Transit Company, said that as the order read he understood that it meant a reopening of the whole question as to whether or not the fare to Coney Island should be 5 cents or 10 cents. Commissioner Willcox said that at the previous hearings in regard to the fare to Coney Island the commission had announced that the question might be opened again.

Mr. Yeomans said that the previous study of the question had extended over many months and that it would not be fair to the Brooklyn Rapid Transit Company to reopen the case at this time.

Mr. Yeomans was asked whether or not the Brooklyn Rapid Transit Company would be willing to establish a service at a 5-cent fare east-bound to Coney Island between 6 a. m. and 9 a. m. and a service west-bound from Coney Island at a 5-cent fare between 4 p. m. and 7 p. m. He replied that, while he was an officer of the company, he was not one of its executives and could not say what the management might be willing to do in this regard. He promised, however, to bring the question of reducing the fare during the hours mentioned to the attention of the management, and to report to the commission at a hearing to be held on July 27. The representative of the Coney Island & Brooklyn Railroad also agreed to report to the commission at the same time.

On July 26, 1911, T. S. Williams, president of the Brooklyn Rapid Transit Company, sent a letter to the commission in which he said that the company would be willing to place on sale as an experiment special round-trip tickets at 10 cents, good for a ride on its elevated lines to Coney Island between 6 a. m. and 9 a. m. east bound, and between 2 p. m. and 4:30 p. m. westbound. In his letter Colonel Williams said in part:

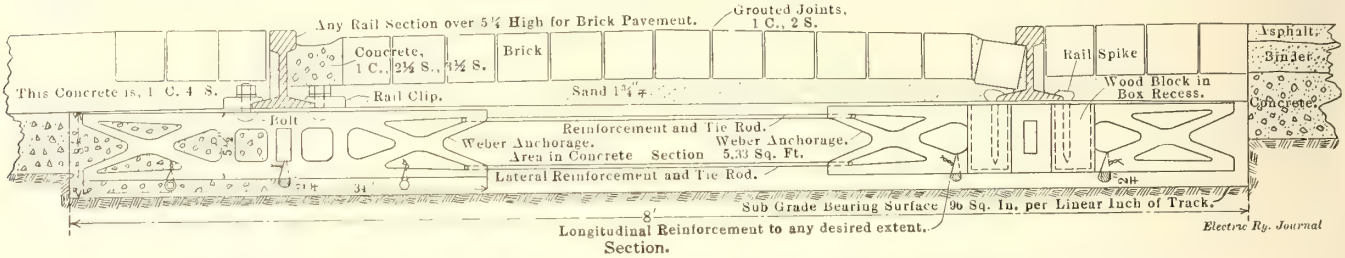
"Our proposal is that with the exception of Saturdays and Sundays (and legal holidays) we will sell at the stations of our elevated lines between the hours of 6 a. m. and 9 a. m. a special ticket for 10 cents, which will enable persons between such hours to go to Coney Island, such tickets being good for return trip from Coney Island between the hours of 2 p. m. and 4:30 p. m., this privilege to begin as soon as tickets therefor can be prepared (probably about Aug. 1) and to continue until Oct. 1, with no commitment on the part of the company to a continuance of the arrangement after this season, although we frankly say that if the experiment should not be too costly our disposition would be to make the same arrangement in succeeding seasons. We propose the limitation of the service to the elevated lines because these lines furnish the safest, most frequent and rapid service to the island. In adopting voluntarily your suggestions we wish to have it distinctly understood that in our opinion the lower rate during the hours mentioned is less than a reasonable one, and is accepted as an experiment."

The Public Service Commission has adjourned to Oct. 1, 1911, the hearing on the 5-cent fare set for Aug. 27, 1911.

NEW CONCRETE TIE

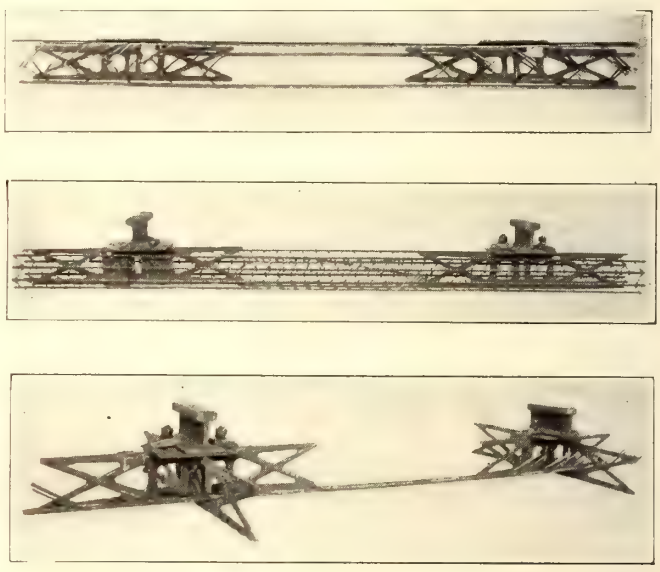
H. L. Weber, formerly chief engineer of the Columbus, Marion & Bucyrus Railroad and now chief engineer of the Utah & Grand Canyon Railroad, has invented the new type of reinforced concrete tie shown in the accompanying engraving. The design permits the use of a rail with any width of base from 3 in. to 7 in.

As shown, the rail is attached to an anchorage, which may be of forged steel, cast steel or malleable iron, and is in two parts with oppositely extending arms. The depth of the arms approximates that of the concrete base or finished concrete tie. In one form of anchorage Mr. Weber provides keyhole-shaped openings, into which fit the bolts which fasten the rail to the tie. Where the ordinary railroad spike or screw spike is to be used the anchorage is provided with a boxed recess which holds a wooden block with corrugated edges. The top of the anchorage has a rail plate or tie plate on which the rail rests.



Section Showing Preferred Form of Construction in Paved Streets with Weber Anchorage

This anchorage is adaptable to various forms of reinforced concrete ties, as shown in the accompanying illustrations. It can also be used in the sheet or platform type of subconstruction for paved streets, as shown in the line engraving. Mr. Weber is a strong advocate of this type of construction, in which the track and pavement foundation are treated as a unit, rather than the beam construction, in which the rails are mounted on steel ties embedded in concrete, and a reinforced concrete beam, say 6 in. or 8 in. in depth and 20 in. in width, is carried under each rail. He believes that after a depth of 5¾ in. to 6 in. is attained in the rail of the A. S. C. E. section it possesses all of the structural strength necessary for electric railway operation, and is also deep enough to permit the use of practically any type of paving. The only further requirement is a good bearing service for the rail, and this is provided far better by the platform type of construction than in the beam construction.



Different Forms of Weber Tie

CONVENTION OF THE TRAMWAYS & LIGHT RAILWAYS ASSOCIATION

The annual convention of the Tramways & Light Railways' Association in Great Britain was held in Edinburgh July 13-14. Four papers were presented. One related to "Tramways and Light Railways Legislation of the Future," by Alderman William Ivey, who recommended modifications in the existing laws. Digests of the other three papers follow:

TRANSFERS

This subject was treated by C. W. Shepherd, J. P., general manager Edinburgh & District Tramways Company. The speaker said that he was in favor of transfers when issued on penny fares, but not in favor of transfers when issued for half-penny fares. He considered the form of ticket used by his company desirable. The conductor on the second car should not collect transfer tickets, as that immediately gave the ticket a value, but should deface it by tearing a piece out, opposite the destination punch hole. The use of transfer tickets was fortunately not as great in Great Britain as in America, because of the longer ride possible in America on a transfer ticket. In Edinburgh the distance covered by a transfer ticket does not as a rule exceed a half mile by each car. The Edinburgh company has discontinued the practice of indicating any time limit on the ticket, but the latter states that it is good only for a continuous journey on the day of issue.

ELECTRIC TRACTION IN ENGLAND

G. H. J. Hooghwinkel read a paper entitled "A Few Reasons Why Electric Traction in England Remains Stationary." It was largely an argument in favor of single-deck cars, flexible track construction and the bow trolley. The principal arguments in favor of the double-deck car, as given by him, were that they take less room on the streets than a larger number of short cars or long single-deck cars, and a smaller number of employees is required than for single-deck cars of the same length. He believed, however, that if passengers were allowed to ride on the platforms the difference in length of car between single-deck and double-deck, carrying the same number of passengers, would not be great. It was difficult now, he said, to accommodate passengers on the platforms of double-deck cars because of the obstruction caused by the reversed staircases. Double-deck cars were also severe on the track. The accompanying table was presented, showing statistics from the various Continental cities where single-deck cars are used and from cities in the United Kingdom where double-deck cars are employed. The lower figures of power given for cars on the Continent are not due entirely to lighter cars, but also to the wider rail groove. He said that Munich recently removed its concrete track and was now laying its rail on wooden ties laid in gravel. A single-deck car 29 ft. over all, with a capacity for twenty sitting and twenty standing passengers, and weighing without load 7 tons, is used. Vienna has recently put in service a car measuring 27 ft. over all, with a seating capacity for twenty-two passengers, and weighing without load 5 tons. The frame is of steel with aluminum side panels.

	Population in thousands.	Passengers carried in thousands.	Car miles per An. in thousands.	Power cost in cents per motor car mile.	Receipts in cents per car mile.	No. of passengers per car mile.
SINGLE-DECK CARS (CONTINENTAL).						
Vienna	2,023	259,000	47,496	2.198	15.62	5.47
Amsterdam .	523	70,789	8,370	{ 1.542 / 1.846	13.44	7.04
The Hague.	206	30,000	4,989	1.344	14.34	6.05
Dresden	516	.....	18,437	....	....	....
Leipzig	537	67,000	18,437	1.702	12.8	5.50
DOUBLE-DECK CARS (UNITED KINGDOM).						
Liverpool ..	760	121,920	12,187	3.776	2.24	10.
Brighton ..	130	10,160	1,112	3.392	20.64	9.64
Dublin	390	52,661	7,750	2.896	18.05	6.8

The writer also believed that the use of the bow system would reduce the trolley wire maintenance and produce a much lighter overhead construction. Besides this, he recommended the use of radial trucks, pay-as-you-enter cars and trailers. He thought that the uniform fare used in the United States made the adoption of the pay-as-you-enter car more easy than when a graded fare was used, but believed that there was also a field for the pay-as-you-enter car with a graded fare. He recommended a penny minimum fare, to be obtained only by the use of strip tickets in advance, and with a universal two-penny fare for any distance under 5 miles, with right of transfer.

NOTES ON TRAMWAY PROBLEMS

This topic was treated in a paper by C. W. Mallins, general manager Liverpool Corporation Tramways. The writer claimed that the single-truck car was the most economical for British conditions, (1) because it would hold 70 passengers, which was about as many as one conductor could reasonably attend to, and (2) because it consumed less power than double-truck cars. He recommended a wheelbase of 7 ft. 6 in. or 8 ft. He regretted the continuous demands for preferential treatment in the way of fares by the working classes during certain hours of the day. Concessions granted to laborers and artisans were followed by requests for similar treatment to shop assistants, clerks and others, with the result that about 60 per cent of the public were now pleading for preferential treatment or free transportation. There were also demands for half-penny fares, transfers and extension of zones. The usual third-class steam railroad passenger rates in the United Kingdom were one penny per mile, and the writer believed that street railway undertakings should fix upon some general basis for charging for transportation, though this need not necessarily be one penny per mile.

DATA FROM VARIOUS GROUPS OF BRITISH ELECTRIC RAILWAY UNDERTAKINGS.

	Highest.	Lowest.	Average.
Cost of track construction per mile of single track, in £.....	9877	3255	6719
Cost of overhead construction per mile of single track, in £.....	2788	640	1790
Annual maintenance of track per mile of single track, in £.....	300	21	99
Cost of hired power per kw-hour, in pence.....	2.149	1.3	1.651
Cost of generated power per kw-hour, in pence..	.96	.405	.684
Average ride furnished for a penny fare, mile..	2.75	1.63	2.04

He presented statistics, printed herewith in the form of a table, showing financial and other data of different tramway enterprises. The first five items were based upon figures obtained in each case from twelve different companies and the last item from sixteen different companies. He also believed that a business could be secured for transportation of freight within the city.

APPOINTMENT OF CHICAGO SUBWAY BOARD

Mayor Harrison has appointed John Ericson, city engineer; E. C. Shankland, designing engineer, and James J. Reynolds, an operating engineer, to constitute an advisory board of engineers to recommend a plan for a passenger subway in Chicago as soon as practicable. Bion J. Arnold was chief subway engineer for Chicago during the preceding administration and prepared an elaborate report which will be considered by the new commission among other plans suggested. The members of the board will be paid at the rate of $12,000 a year.

Mr. Ericson has already made a subway report and is regarded as an authority on underground building foundations and subsoil conditions, and Mr. Reynolds is particularly familiar with transportation problems. The Mayor is reported to be in favor of a subway in the loop district only and says that important questions to be considered are whether it shall be a single-deck or double-deck system and whether it shall be constructed from building line to building line or from curb line to curb line.

FAST TRAINS IN INDIANA

The accompanying illustrations show one exterior and two interior views of the "Muncie Meteor," one of the comfortable high-speed trains which the Indiana Union Traction Company is operating for the convenience of its



The Muncie Meteor

interurban patrons. This train makes two trips each way a day between Indianapolis and Muncie. It is similar to the "Marion Flyer," which is operated between Indianapolis



Interior of Motor Car

and Marion for the same number of daily round trips. One of the departures in the make-up of these trains as instituted by H. A. Nicholl, general manager, is the use of



Interior of Trailer Parlor Car

a luxuriously furnished parlor trail car. This service is proving popular, especially as no extra charge is made for it.

COMMUNICATION

TEST OF COUPLERS AT INDIANAPOLIS

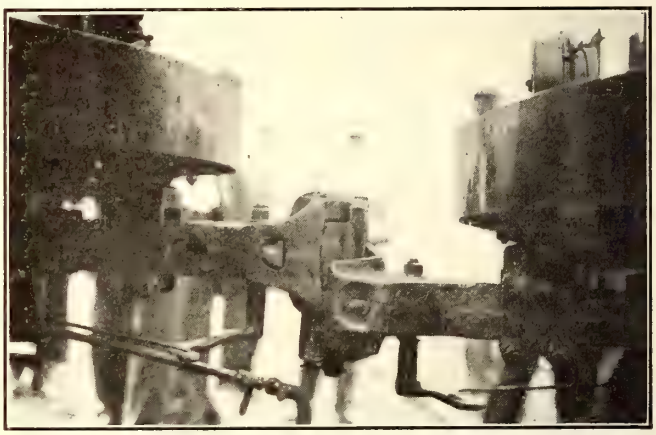
The McConway & Torley Company,
Pittsburgh, Pa., July 25, 1911.

To the Editors:

We inclose herewith a photograph taken of our Janney radial couplers in a test made at Indianapolis before the equipment committee of the American Electric Railway Engineering Association.

The report appearing in your paper last week about this meeting referred to the test, but did not give specific information in regard thereto, and in view of the fact that another picture was shown of two M. C. B. couplers in connection with that article, which did not refer to any test that was made so far as we are aware, we are afraid as the matter stands there is likely to be a misunderstanding on the part of your readers as to the picture believed to show the test of our couplers.

The accompanying photograph was taken at a point where the Terre Haute, Indianapolis & Eastern Railway crosses the Belt Line with a grade of about 3 per cent at either approach and a hump in the crossing due to the fact that one of the steam switch tracks is about 2 ft. lower than the main line tracks. These cause a severe



View Showing Couplers in Engagement on Severe Break in Grade

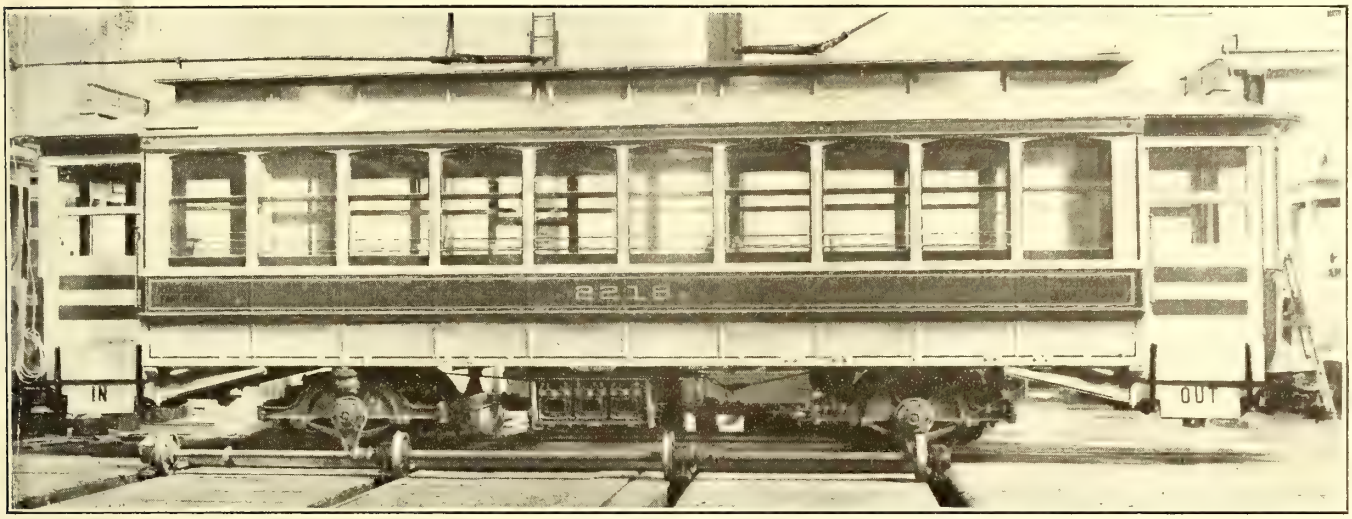
condition, and the interurban company has experienced trouble from trains coming uncoupled at this point. The coupler illustrated had an 11-in. face and at the time when the photograph was made it was found that one of the couplers had slipped vertically out of the other 4½ in., leaving the couplers still in engagement to the extent of 6½ in. This, we believe, is sufficient for all practical purposes, with a good margin of safety against possible uncoupling, and to demonstrate that it is unnecessary to provide special appliances with the M. C. B. type of coupler to take care of reasonable breaks in grade. When conditions are so severe that M. C. B. couplers having 11-in. knuckles will not operate satisfactorily and with safety, it would appear that the track at those points should receive the attention of the track department, and it should not be put up to the mechanical department to provide and take care of mechanism upon cars to obviate occasional abnormal track conditions which should be obviated otherwise.

The McConway & Torley Company,
Stephen C. Mason, Secretary.

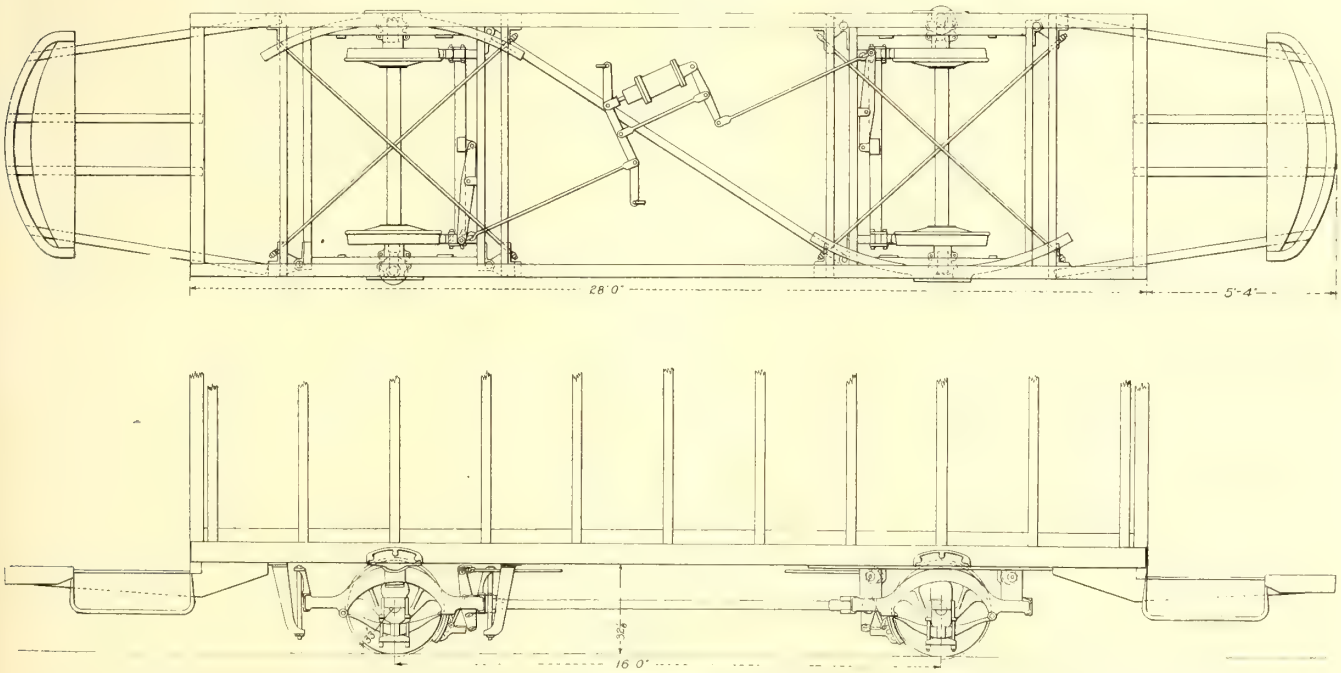
Col. D. C. Collier, director-general of the Panama-California Exposition to be held at San Francisco in 1915, and John C. Olmsted, landscape gardener, conferred at Brookline, Mass., recently in regard to plans for the architectural features of the exposition, which will possibly include an electric railway park.

THE HALSEY RADIAL TRUCK

Those who have been following the development of the radial or non-parallel axle truck abroad and its applications in this country will be interested to learn some particulars of a radial truck which has been designed especially to meet American electric railway conditions, even to the use of such standard parts as have been adopted by the American Electric Railway Association. This truck is the invention of James T. Halsey, Philadelphia, who began his experiments nearly three years ago. On Feb. 4, 1911, a sample four-wheel truck was placed in regular service on a certain city railway under a prepayment car with 28-ft. car body, which had been equipped originally with two parallel-axle four-wheel trucks and four GE-80 motors. As the result of this change it was found possible to maintain the usual schedule with but two of the original motors. The elimination of two motors and one truck reduced the total weight of the car from 45,000 lb. to 32,050 lb., a saving of 12,950 lb. It is estimated that, based on the cost of the original car equipment, the following amounts would have been saved by using this radial truck: Two motors, $900; four 33-in. rolled forged wheels, $80, and two axles, $40, a total of $1,020. The halving of the motor and truck equipment would also tend to reduce the maintenance of motors, bearings, journals, brakeshoes, etc., by approximately 50 per cent. As regards weight, it is asserted that, exclusive of wheels and axles, the truck is much lighter than any other of corresponding center-pin capacity. For the same center-pin load the radial truck, exclusive of wheels and axles, weighs less than one-half as much as a pair of maximum traction trucks and, furthermore, it requires no idler wheels and idler axles. One hundred per cent of the weight of the car body and load is made available for traction compared with 60 per cent for the maximum traction truck and 50 per cent for an eight-wheel equipment made up of one motor and one trailer truck.



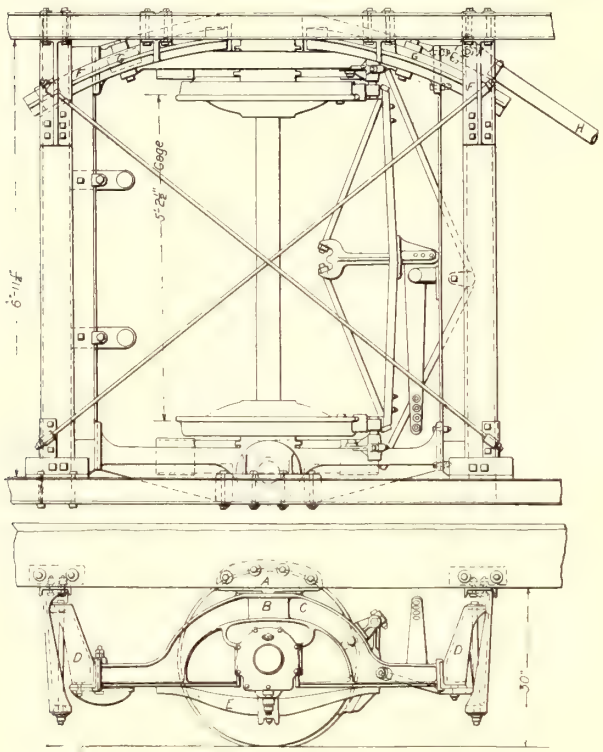
New Radial Truck—Former Double-Truck Car Now Equipped with One Four-Wheel Radial Truck



New Radial Truck—Plan and Side Elevation, Showing the Application of a 28-ft. Car Body to One Truck.

One of the greatest operating economies sought from a radial truck is, of course, the reduction of wheel wear, owing to the radial feature of the truck. In the case of the experimental car under consideration, the manufacturers state that it shows absolutely no wheel flange wear after six months' regular service over 33-ft. curves, and even after runs over a 25-ft. curve. They estimate that each of the eight wheels required for a four-motor equipment of

the type which was displaced would lose ¾ in. more of tread metal in renewing flanges than would each of the four wheels in the radial truck. This total saving of 6 in. in tread metal would be equivalent to the cost of three new wheels, or $60. The combination of less dead weight and reduced friction would also, of course, produce substantial economies in current consumption. In this case



New Radial Truck—Construction Details

the energy expense based on a reduction of 6 tons in weight for a car running 100 miles a day for 300 days in the year is estimated as $1,080 a year less, assuming an energy cost of 6 mills per ton mile.

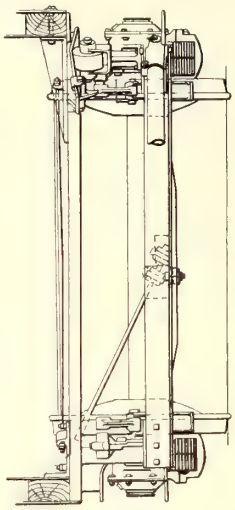
An important feature of the Halsey radial truck is that the wheelbase may be increased to any length desired so as to mount the car properly with the approved and practicable length of overhang at each end. The wheelbase need not be limited by the radius of the curve.

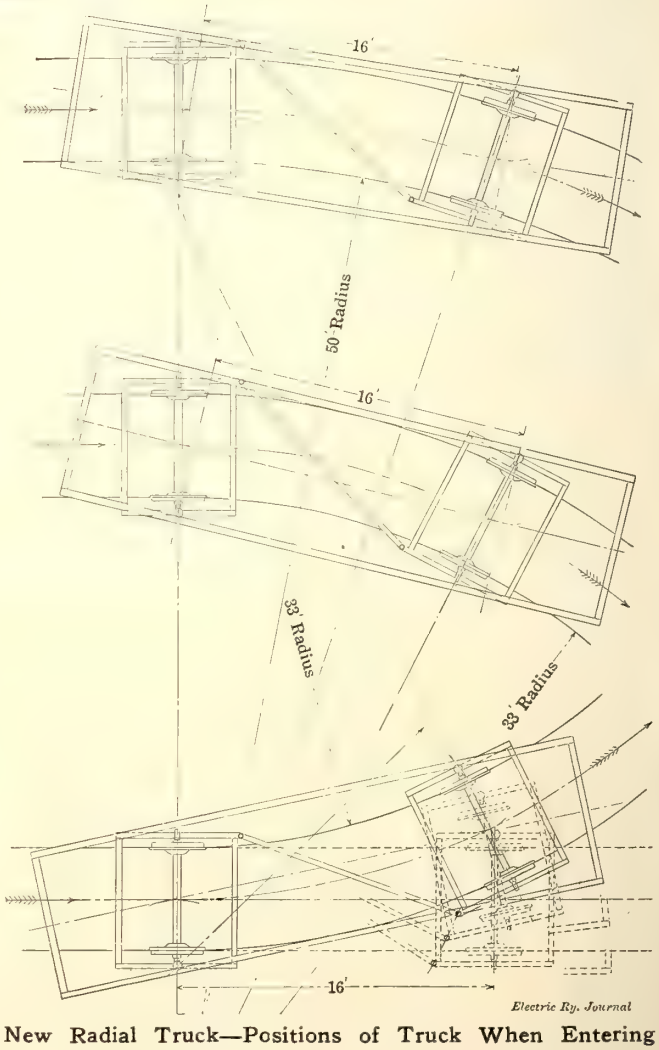
The simple construction of this truck will be noted from the accompanying working drawing. The part marked *A* is the top bearing, which is bolted to the side sill of the car. *B* is the bottom bearing, which is cast solid with the side frame *C*, and *DD* are the depending hangers which are located on the pivot side of each half truck and which constitute a four-point suspension in connection with the rollers *GG* on the free side. *E* is the longitudinal half-elliptic spring. *F* is the radial side bearing upon which the rollers travel. This side bearing is slightly inclined from the center in both directions toward the ends and when the car is on a tangent the rollers ride in a slight groove in the side bearing. The rollers are of cast iron, 6 in. in diameter and 4-in. face.

At the July meeting of the executive committee of the National Electric Light Association communications relative to the two frequencies now employed in the transmission of energy for railway service were read from B. F. Wood, of the Pennsylvania Railroad, and Henry L. Doherty, of New York. Mr. Doherty stated that the association should endeavor to establish the electrification of main lines of railroads in directions that would be of value to the central stations of the country. He expressed the opinion that it would be best and preferable to use 60-cycle current for railway work. The matter was referred to the committee on apparatus.

REPORT OF INTERSTATE COMMERCE COMMISSION

The report of the Interstate Commerce Commission giving the statistics of the railways of the United States for the year ended June 30, 1910, shows the following totals: Miles of single track, 1910, 240,439. Increase over 1909, 3605 miles. Locomotives in service, 1910, 58,947. Increase over 1909, 1735. Total number of cars, all classes, 1910, 2,290,331. Increase over 1909, 72,051. Total number of employees, 1910, 1,699,420. Increase over 1909, 196,597, Par value of capital outstanding, 1910, $18,417,132,238. Of the capital outstanding $6,710,168,538 was common stock, $1,403,488,842 was preferred stock, and the remainder, $10,303,474,858, represented funded debt. The number of passengers carried, 1910, was 971,683,199. Increase over 1909, 80,210,774. The number of tons of freight carried, 1910, was 1,849,900,101. Increase over 1909, 293,340,360 tons. The total operating revenues, 1910, were $2,750,667,435. The total operating expenses, 1910,





New Radial Truck—Positions of Truck When Entering and Passing Through a 33-Ft. Radius Curve

were $1,822,630,433. The total number of railway employees (omitting 95,328 not distributed) was apportioned among the six general divisions of employment as follows: To maintenance of way and structures, 504,979; to maintenance of equipment, 329,373; to traffic expenses, 21,652; to transportation expenses, 661,355; to general expenses, 53,385; and to outside operations, 33,348.

News of Electric Railways

Mayor Whitlock Reviews Franchise Negotiations in Toledo

In a long statement, issued on July 18, 1911, Mayor Brand Whitlock, of Toledo, Ohio, discusses the present condition of the negotiations between the company and the city.

Mr. Whitlock says he believes that the transportation problem will not be solved finally until the railways pass to the ownership of the various municipalities. He said that cities are powerless to fix rates of fare or rentals, or to order tracks removed where franchises have expired. The Mayor said in part: "In the first place, the city has no legal power over the company except that which is included in the ordinary police power. This power, however, does not extend to such subjects as regulation of the service and fixing of the rate of fare. The only potent right the city has is to contract with the company, and as it takes two to make a bargain, the city cannot compel the company to do what it does not wish to do. There is no legal power in the city, no law by which arbitrarily it can compel the company to grant desirable things. If there were the city would have compelled the company to 'give' 3-cent fares long ago. There is no law by which the city can compel the company to pay rental for streets on which its franchises have expired; no law, even, by which the city could legally accept rental, and if there were, that would not be the correct solution of the problem.

"I do not now propose my way of settling the question by having the lines owned by the city, because the law would not permit it. The truth is that the public utility companies are stronger than the city. Only last winter a bill indorsed by the Council was presented in the Legislature giving the cities the power to own and operate their own street railway systems, but this bill was defeated for the simple reason that the private privileged interest is more influential with the Legislature generally than is the public interest.

"The source of power in the city is not in the city officials, nor even in the people of the city, but in the Legislature of the State. The city cannot own and operate a street car system because the State Legislature will not let it; it cannot demand and collect a rental from the company because the State will not let it; it cannot give a franchise to another company because the company under the State laws has rights in those portions of the city streets where it still holds franchises that are superior to the city's rights.

"In the negotiations that have been going on beween the company and the city we have come to the crucial point, namely, the fixing of the fare, and as this depends upon the cost of service, and as this cost of service includes a reasonable return to the company on its actual investment, it is necessary to ascertain the value of the investment before the rate of fare can be fixed. In these evaluations millions and millions of dollars are involved and questions involving millions of dollars are not settled easily or speedily.

"The plan of negotiations agreed upon between the city and the company was that an ordinance be drawn, taking the memoranda prepared by Mr. Schreiber as a basis, leaving to the last the fixing of valuations and the rate of fare, the company's proposal of a board of three experts having been declined by the city. In the negotiations thus begun a contract was drawn section by section; in that contract, which necessarily took the form of an ordinance, the city retained power that few American cities to-day exercise over the operation of street car companies. It was provided, for instance, among other things, that the city was to dictate and control absolutely the service, including the character, operation and routing of the cars, etc., and, of vaster importance, the right to take over the system, when authorized by the State Legislature to own and operate public utilities, was explicitly retained and assured.

"Then the subject of the rate of fare was reached, and as the cost of service was to be the basis of the rate, it became imperative to find out what reasonable return was to be allowed the company on its investment. Thereupon the company renewed its original proposal to have the valuations fixed by a board of three experts. This the city again rejected and proposed that the value be ascertained by competent men, one representing the company and one representing the city. The company then refused to proceed further unless a third man were selected to umpire or arbitrate the difference between those two representatives. Then the city suggested as arbiter Judge John M. Killits. The company insisted that the arbiter be what is called an 'expert.' The city, of course, couldn't accept this proposal, and in committee of the whole Council said so, but reasserted its willingness to leave the arbitration to Judge Killits.

"In the meanwhile, however, Mr. Schreiber, the city solicitor, was to examine the law to ascertain whether or not the company's remaining franchises could be forfeited, because, if they can be, the city would be in position to invite proposals for an entire and unified street railway system. The city now awaits the company's definitive acceptance or rejection of Judge Killits as arbiter, and in the event of rejection, Mr. Schreiber's report on the law. It is evident that the practical street railway men in the country are or hope to be in the private employ of street railways and that their views of the respective rights of public and private properties are wholly prejudicial to the public interest.

"The differences in the valuation would arise when it was attempted to fix the so-called 'intangible values.' It was my hope when I had the honor to suggest Judge Killits' name that he would be found acceptable to the company, and that he would be permitted to work out some plan of settlement here as the late Judge Tayler worked out a plan of settlement under similar conditions in Cleveland. If the judge of the United States Court was qualified to act as arbiter in Cleveland, the judge of the United States Court in Toledo should be satisfactory. His selection would have settled the traction question in three months. The responsibility for delay must rest with the company.

"The public convenience is paramount to every other interest. Transportation is a necessity, and it cannot be interrupted. This fact is exactly what makes the franchise so valuable. For us to stop the cars would not settle the traction question.

"I have done the best I could. Everything I have done I have done in the hope of getting a 3-cent fare eventually. Everything I have forborne to do I have forborne in the same hope. I am anxious to have this question settled promptly, but for the sake of settling it promptly I do not propose to surrender the people's rights. The city is at a disadvantage, but the people, after all, have this immense advantage, namely, that every hour the company delays it is swept that much nearer to the abyss, for its remaining franchises will ere long expire, and then it will have no vestige of right left in the city's streets.

"It will not require so long a time to settle the question in Toledo as it did in other cities because we have the experience of those other cities to guide us. They have 3-cent fares in Cleveland to-day, and we will have them in Toledo if we can be firm long enough, but we will not have them if we yield weakly to those who want peace at any price, or to those who are ready for any settlement so long as it is made immediately, or what is worse, if we listen to those who by pretending to speak in the people's interest hope to secure a satisfactory settlement in the interest of privilege."

Transit Affairs in New York

The rapid transit situation in New York has been complicated to such an extent by the various proposals and counter proposals of the companies that it has been suggested that the commission issue a bulletin of information, authoritatively summing up, in a form as brief as is compatible with clearness, the main facts of the negotiations that have been carried on.

The Public Service Commission on July 27, 1911, awarded the contract for the construction of another section of the

Lexington Avenue subway, that between Fourteenth Street and Twenty-third Street.

President Mitchel, of the Board of Aldermen, before sailing for Europe on July 27, 1911, said that the Public Service Commission would proceed with the contracts on new routes with a view to closing negotiations with the Brooklyn Rapid Transit Company as approved by the Board of Estimate on July 21. Mr. Mitchell is reported to have said:

"The Brooklyn Rapid Transit Company will undoubtedly be the successful bidder, as the contracts will call for the kind of operation that can be supplied only by the Brooklyn Rapid Transit Company. If the Interborough Rapid Transit Company had made terms with the city the contracts would have been so drawn as to fit the peculiar physical conditions of that company's lines.

"Even if we never have an operating contract with either of the companies with which we were in negotiation, if the Public Service Commission goes ahead we are assured of a complete subway system under construction in the next few months. The system will be practically the triborough, with the very important addition of the Broadway loop. Many statements have been made to the effect that the matter is still unsettled, while in point of fact it has been settled as to construction and operation, and the best evidence of that settlement is the letting of contracts for construction.

"There will be three or four separate but independent contracts. The contracts will be so drawn that no one of them will be awarded without the others. The Lexington Avenue route, for instance, will not be let to the Brooklyn Rapid Transit Company unless it takes the two other routes, nor the Broadway line unless it accepts the Lexington Avenue line. Neither will the Queens routes be let to the Brooklyn Rapid Transit unless it takes the two other routes, nor the other routes unless it takes the Queens routes."

On July 27 the Board of Estimate considered the tunnel from the Battery to Brooklyn, the recommendation of the commission for a new route through Fifty-ninth Street and the contract for the section of the Lexington Avenue subway in New York between Twenty-sixth Street and Fourteenth Street.

Progress of New York, Westchester & Boston Railway

The Public Service Commission, at its meeting on July 12, 1911, acted favorably upon the application of the New York, Westchester & Boston Railway for permission to use the tracks of the Harlem River & Port Chester Railroad from One Hundred and Seventy-fourth Street to the Harlem River. The Board of Estimate and Apportionment has granted the company certain changes in its franchise. The action of these two boards will now permit the company to commence the construction of its transfer station and enable it to make at an early date connection with the Second and Third Avenue elevated lines of the Interborough Rapid Transit Company at the Harlem River. The transfer station will be 550 ft. in length and 250 ft. in depth, and contain five platforms, from which nine tracks may be reached. The entrances and exits will be on the street level, and the platforms may be reached either by direct staircases or by more easy ascent by means of ramps and short flights of stairs. In speaking of the plans of his company regarding the transfer station, L. S. Miller, president of the company, said:

"This station is a necessity, and will be an important part of Greater New York's rapid transit system, no matter who builds the projected subways or elevated lines, and if the construction of those lines in the Bronx keeps pace with the work that we are doing the congestion of New York city can be relieved to a large extent sooner than in any other way—say in two years and a half, as all of the work to be done consists of elevated structures. Our reason for establishing this extensive transfer station at One Hundred and Eightieth Street, instead of transferring our passengers at Willis Avenue or by a shuttle train to the subway at One Hundred and Seventy-seventh Street, is to effect those transfers before we get into a district that is already rapidly filling up. Moreover, it divides the traffic further away from its greatest density, enables the companies handling the traffic to do so to better advantage and extends the zone of a single 5-cent fare."

Pittsburgh Council Passes Conference Resolution

As a result of the message sent to the City Council of Pittsburgh on June 27, 1911, by Mayor Magee, in which he suggested that the officers of the Pittsburgh Railways should be invited to confer with the city officials in regard to transit matters, the Council of that city has passed the following resolution:

"Resolved, by the city of Pittsburgh in council assembled, and it is hereby resolved by the authority of the same, that the president of this Council notify the president of the Pittsburgh Railways Company that this Council desires to meet the executive officers or board of directors of the Pittsburgh Railways Company at an early date for the purpose of discussing the said questions in dispute and attempting to arrive at an amicable settlement of the same."

The ordinance in regard to the use of power brakes on street cars in Pittsburgh, which was referred to in the ELECTRIC RAILWAY JOURNAL of July 22, 1911, came before the Council for consideration on July 18, 1911, and was returned to the committee on public service and surveys of that body. As previously stated in the ELECTRIC RAILWAY JOURNAL, the committee recommended to the Council that the company be required to equip all motor cars with power brakes by Jan. 1, 1912, and to equip all new double-truck trailers with power brakes. The company was, however, to be permitted to continue to use hand brakes on its single-truck trail cars. It is said that when the ordinance comes before the Council again a vigorous effort will be made to have stricken from the measure the clauses which exempt the trail cars from the provisions of the measure.

The question of subways for Pittsburgh came before the City Council on July 20, 1911. Opinion of the members of the Council was divided as to the authority of the city to act as sponsor for any bonds that might be issued to provide rapid transit in the city. A. E. Anderson favored a city-built system. He expressed the opinion that means could be devised to overcome the present debt limit requirement. While he did not say so, it is understood that he would have any bonds issued for subway construction exempted from the debt limit provision by changing the law so as not to bring within its scope bonds for self-sustaining improvements. Others expressed the opinion that the city should lay out a comprehensive system and then advertise the lines for construction and operation, or else negotiate with the present companies which have applied for rights, on the basis of the city sharing in the profits of the lines with supervision over their operation.

Municipal Ownership Measure in Detroit

The measure passed by the Legislature of Michigan to make possible municipal ownership of street railway lines in Detroit goes into effect on Aug. 1, 1911. In anticipation, Alderman Glinnan, of Detroit, has prepared an ordinance to secure municipal ownership in Detroit, and has introduced the measure in the Council. The plan is to have the committee report the bill out soon after Aug. 1, 1911, and then call an election, giving the voters about sixty days in which to discuss the measure. The principal features of the bill follow: Five street railway commissioners are to have charge of the city street railway system. Two methods of selecting them are provided; one election on a non-partisan ticket, the other appointment by the Mayor, the Council to decide which method shall be submitted to the people. The commission to acquire street railway system exclusively for the city, build extensions, etc. Shall adopt civil service rules, based on merit. May purchase the existing lines or acquire them under condemnation proceedings. If no purchase or condemnation is accomplished in six months, may build on other streets, as directed by the Council. Contract to purchase or condemn must have approval of 60 per cent of the voters. Council to issue bonds to 1 per cent of assessed value of city, money to be used to bring about purchase. Council to issue additional street railway bonds secured by street railway property, including franchise, for not more than twenty years, proceeds to be used in completing payment of purchase price or condemnation award. Franchise and bonds must be approved by 60 per cent of voters. The rate of fare shall be sufficient to cover operat-

ing expenses, paving and watering between tracks, fixed charges and to pay bonds at maturity. The commission may sell surplus power.

Committee to Consider Public Utility Commission for Illinois.—A committee consisting of five State Senators and five State Representatives has been appointed by the Illinois Legislature to investigate the general subject of public service commissions, with a view to forming a public service commission in Illinois. Senator John Dailey, Peoria, has been appointed as chairman of the committee, and Representative William P. Holaday, Georgetown, as secretary.

Municipal Ownership in Winnipeg.—The Mayor of Winnipeg, Man., has announced that the city has decided to accept the offer of Sir William MacKenzie, president of the Winnipeg Electric Railway, and purchase the property of the company for $15,000,000. The acquirement will consist of an electric railway with fourteen years of the franchise yet to run, a power plant sixty miles east of the city, and a gas and electric light works. The city has a new municipal power plant under construction.

Electric Drive for San Francisco Cable Lines.—The United Railroads of San Francisco has converted its Mason and Washington power station from steam to electric drive, so that all their cable lines are now motor driven. The Castro and Pacific Avenue stations are operated with direct-current motors, while at Mason and Washington station the new installation is all alternating-current apparatus. The speed of all cables has been increased about 3 per cent, and owing to the practically constant speed of the motor the cables travel at a much more uniform speed now than with the old equipment, it having been found impossible to control the steam engines within less than 5 per cent.

Convention of Colorado Electric Light, Power & Railway Association.—The next meeting of the Colorado Electric Light, Power & Railway Association will be held at the Hotel Colorado, Glenwood Springs, Col., Sept. 13 to 15 inclusive. The program includes the following papers: "Lamp Efficiency," by S. E. Doane, Cleveland, Ohio; "Welding by the Oxyacetylene Process," by K. L. Brackett, Denver, Col.; "Electricity for Advertising Purposes," by G. E. Williams, Denver, Col., and "The Sale of Electric Power for Mining Purposes," by Franklin P. Wood, Cripple Creek, Col. F. D. Morris, Colorado Springs, Light, Heat & Power Company, Colorado Springs, is the secretary.

Funds for Philadelphia Terminal Improvements.—The Connecting Railway, Philadelphia, Pa., has made a mortgage to the Girard Trust Company, Philadelphia, Pa., as trustee to secure an issue of $15,000,000 of bonds to provide funds to carry out the plans of the Pennsylvania Railroad to electrify its terminal lines in Philadelphia. The Connecting Railway owns 36 miles of road in and about Philadelphia. The $3,613,650 of stock of the company is owned by the Pennsylvania Railroad, which operates the road under lease. There are now outstanding $2,059,000 of refunding mortgage, 3½ per cent, thirty-year guaranteed gold bonds of the Connecting Railway due on March 15, 1932, and $1,000,000 of first-mortgage, thirty-year guaranteed first-mortgage 4½ per cent bonds of the Philadelphia, Germantown & Chestnut Hill Railway, which will become due May 1, 1913.

Outing of New York Railway Men and Supply Men.—About seventy New York railway men and supply men enjoyed an outing at College Point, L. I., on Friday, July 14, 1911. The afternoon's sport began at 3 o'clock with a baseball game between the "Run Ins," or railway men, and the "Pull Ins," or supply men. The players for the "Run Ins" were Messrs. Clark, Banghart, Shaughnessy, Mullaney, McWhirter, Wood, Adams, Killeen and Lingerman. The "Pull Ins" lined up as follows: Messrs. Keys, Mason, Coonan, Ellicott, Ransom, Strickland, Van Anden, Boyer, Denton. The game was called by Mr. Kirschner, the umpire, after the seventh inning on account of rain. The score was 5 to 4 in favor of the "Run Ins." At 6:30 a shore dinner was served, W. W. Wood acting as toastmaster. The return trip to New York was made by steamer, arriving at 10 p. m.

Financial and Corporate

New York Stock and Money Markets

July 26, 1911.

The New York market to-day declined up to noon and recovered at the close. While the trading was largely professional, the market was influenced by the serious aspect of the Moroccan situation and by selling of stocks here for London account. Crop conditions are now regarded as favorable. The rates for money to-day were: Call, 2@2½ per cent; ninety days, 2¾@3 per cent.

Other Markets

Very little of interest has taken place in the Philadelphia market during the week as regards traction shares. Rapid Transit was sold in large quantities on Monday at 22½, and Union Traction on Wednesday dropped to 52.

Chicago trading has been active, but there have been but few important price changes. Slight concessions were made in Chicago Railways certificates, Series 2 and 4, and in the common issue of the Chicago Elevated Railways.

In Boston interest has been chiefly in copper shares. The market in general has been rather dull and sales have been of small volume. Boston Elevated sold at 130 on Wednesday, a new level for the year.

Augusta-Aiken Railway & Electric preferred gained a point to-day on the Baltimore Exchange. Other changes were few and trading was light.

Quotations of traction and manufacturing securities as compared with last week follow:

	July 19.	July 26.
American Light & Traction Company (common)	a305	a305
American Light & Traction Company (preferred)	a108	a107
American Railways Company	a44	a44¼
Aurora, Elgin & Chicago Railroad (common)	a44⅛	a44½
Aurora, Elgin & Chicago Railroad (preferred)	a87	a87
Boston Elevated Railway	a129	a129½
Boston Suburban Electric Companies (common)	a15	a15
Boston Suburban Electric Companies (preferred)	75	75
Boston & Worcester Electric Companies (common)	a12½	*12½
Boston & Worcester Electric Companies (preferred)	a58	a56
Brooklyn Rapid Transit Company	83¼	82⅛
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	87¾	86¾
Capital Traction Company, Washington	a130	a132
Chicago City Railway	a190	a190
Chicago & Oak Park Elevated Railroad (common)	3	3
Chicago & Oak Park Elevated Railroad (preferred)	5	5
Chicago Railways, ptcptg., ctf. 1	a90	a95
Chicago Railways, ptcptg., ctf. 2	a28	a28¼
Chicago Railways, ptcptg., ctf. 3	a9½	a9¾
Chicago Railways, ptcptg., ctf. 4	5½	a6
Cincinnati Street Railway	*130½	a130¼
Cleveland Railway	a99⅛	99⅞
Columbus Railway (common)	*81½	81½
Columbus Railway (preferred)	*92	a100
Consolidated Traction of New Jersey	a75½	a76
Consolidated Traction of N. J., 5 per cent bonds	a105	a105
Dayton Street Railway (common)	a25	a25
Dayton Street Railway (preferred)	a100	a100
Detroit United Railway	74	a76
General Electric Company	162	163½
Georgia Railway & Electric Company (common)	a155	a156
Georgia Railway & Electric Company (preferred)	93	a95
Interborough Metropolitan Company (common)	19⅝	18
Interborough Metropolitan Company (preferred)	55¾	51¼
Interborough Metropolitan Company (4½s)	81⅞	79⅝
Kansas City Railway & Light Company (common)	a19	a19
Kansas City Railway & Light Company (preferred)	a41	a44
Manhattan Railway	141½	a143
Massachusetts Electric Companies (common)	a23⅜	a22¾
Massachusetts Electric Companies (preferred)	94½	a93½
Metropolitan West Side, Chicago (common)	a27½	*27½
Metropolitan West Side, Chicago (preferred)	a75	*75
Metropolitan Street Railway, New York	15	15
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	a73½	a74⅜
Northern Ohio Light & Traction Company	*49¾	a51
Northwestern Elevated Railroad (common)	a30	*30
Northwestern Elevated Railroad (preferred)	a70	*70
Philadelphia Company, Pittsburgh (common)	a55½	a54¼
Philadelphia Company, Pittsburgh (preferred)	a44	a44¾
Philadelphia Rapid Transit Company	a22⅜	a22⅝
Philadelphia Traction Company	a86½	a86½
Public Service Corporation, 5% col. notes (1913)	*101	*101
Public Service Corporation, ctfs.	a107	a107
Seattle Electric Company (common)	a110½	a110⅜
Seattle Electric Company (preferred)	102¾	103
South Side Elevated Railroad (Chicago)	a76	*76⅞
Third Avenue Railroad, New York	11¼	a11
Toledo Railways & Light Company	a7½	*7½
Twin City Rapid Transit, Minneapolis (common)	a110¼	109
Union Traction Company, Philadelphia	a52⅜	a52¼
United Rys. & Electric Company, Baltimore	*19½	a19⅞
United Rys. Inv. Co. (common)	a37½	a38½
United Rys. Inv. Co. (preferred)	a70	69
Washington Ry. & Electric Company (common)	a42⅞	*42⅞
Washington Ry. & Electric Company (preferred)	a89½	*89½
West End Street Railway, Boston (common)	a88½	88½
West End Street Railway, Boston (preferred)	a102½	a103
Westinghouse Elec. & Mfg. Co.	75⅞	75
Westinghouse Elec. & Mfg. Co. (1st pref.)	a120	a120

a Asked. *Last sale.

ANNUAL REPORT

Halifax (N. S.) Electric Tramway Company, Ltd.

The following statement compares the operations for three years:

	1910	1909	1908
Railway earnings	$214,184	$198,423	$184,927
Electric light and power and sundry earnings	203,855	191,323	182,437
Gas and products earnings	59,070	57,834	57,254
Total earnings	477,109	447,580	424,618
Operating expenses	246,634	239,606	234,713
Bond interest	30,000	30,000	30,000
Net earnings	200,475	177,974	159,905
Dividends paid and interest	98,000	85,130	87,058
Surplus	102,475	92,844	72,847

Against the net earnings of $200,474, there were charged $98,000 for dividends, $21,125 for renewals and betterments and $1,103 for accounts written off. The final surplus as of Dec. 31, 1910, was $518,048.

D. MacKeen, the president, in discussing the operations of the year, says:

"As will be observed from a perusal of these statements, an encouraging increase in the volume of business has marked the operations of the year.

"In view of the general condition of the company, the directors decided during the year to make a substantial reduction in the rates for electric light — the general consumers being allowed a further discount of 10 per cent from Oct. 1. This additional concession to consumers is equivalent to something over 1 per cent on the capital stock of the company. The directors trust that their action will meet with the approval of the shareholders.

"The proportion of operating expenses to income was reduced to 51.94 per cent.

"In addition to other improvements during the year, the sprinkler system, referred to in last year's report, was installed, thus reducing the risk of loss by fire and enabling the company to obtain insurance at greatly reduced rates.

"The property has been well maintained during the year."

Traffic statistics compare as follows:

	1910	1909	1908
Per cent operating expenses to income	51.94	53.54	55.29
Passengers carried	4,848,767	4,465,308	4,162,986
Car mileage	907,498	888,024	814,375

Bay State Street Railway, Boston, Mass.—Formal consolidation of the Boston & Northern Street Railway and the Old Colony Street Railway was completed July 21, 1911, at a special meeting of the stockholders of the companies. The name The Bay State Street Railway was adopted as the new designation of the combined roads. To make the formal change of name the approval of the Railroad Commissioners and the Commissioner of Corporations will be required. The officers of the new company will be the same as the officers of the old companies, the two consolidating companies having had identical officers. The new company will have fourteen directors, the two companies each having had seven. The directors follow: Gordon Abbott, C. F. Adams, second, J. S. Bartlett, C. E. Cotting, J. H. Cunningham, D. B. Darroll, Philip Dexter, R. S. Goff, F. S. Hall, John P. Morse, J. A. Parker, Percy Parker, G. L. Stone and P. F. Sullivan.

Boston (Mass.) Elevated Railway.—Governor Foss, on July 21, 1911, approved the legislative act authorizing the consolidation of the West End Street Railway and the Boston Elevated Railway. The stockholders of both companies will meet on Sept. 12, 1911, to authorize the consolidation.

Chicago (Ill.) Elevated Railways.—Henry A. Blair has announced the completion of the merger of the elevated railways of Chicago in all its details. The organization committee, consisting of Henry A. Blair, Frank A. Vanderlip and Samuel McRoberts, has been named as the trustee of the Chicago Elevated Railways. This committee will have all powers, voting all of the stock, etc., and will be in full control. The governing committee follows: Henry A. Blair, Samuel Insull, Ira M. Cobe, F. A. Delano, Chicago; Frank A. Vanderlip, Samuel McRoberts and Edward W. Harden, New York. Mr. Blair probably will be made chairman. The executive committee comprises: Samuel Insull, chairman; Henry A. Blair and Ira M. Cobe. The separate organizations of the four companies comprising the merger, the Metropolitan West Side Elevated Railway, the South Side Elevated Railroad, the Northwestern Elevated Railroad and the Chicago & Oak Park Elevated Railroad, will be maintained for some time. It is stated that the organization agreement provides that the dividends on the $16,000,000 of 6 per cent cumulative preferred stock of the Chicago Elevated Railways shall begin on Sept. 1, 1911, and that the first quarterly payment will be made on Dec. 1, 1911.

Columbus, Delaware & Marion Railway, Columbus, Ohio.—Eli M. West, appointed receiver of the Columbus, Delaware & Marion Railway in 1909 by the Franklin County courts, has filed charges of contempt of court with Judge E. B. Kinkead, Columbus, against C. C. Williams, former Common Pleas judge of Franklin County; John G. Webb, president of the Columbus, Delaware & Marion Railway; George Whysall, former co-receiver of the road, and Guy M. Walker, New York. This step grew out of the appointment of George Whysall as receiver of the property by Judge Daniel Babst in the Marion County courts recently. The claim is made that a court order, issued in 1909, has been violated in an effort to take the matter to the Marion County Court. Eli M. West, receiver of the company, has deposited $23,600 with the Mercantile Trust Company, New York, to pay the interest on $920,000 bonds of the company, due on Feb. 1, 1911.

Illinois Valley Gas & Electric Company, Streator, Ill.—Under date of July 19, 1911, a circular letter and a copy of the deposit agreement were sent to the shareholders of the North Shore Electric Company, Economy Light & Power Company and the Illinois Valley Gas & Electric Company, calling for the deposit of stock with the committee, consisting of Samuel Insull, Henry A. Blair, Frank G. Logan, Charles H. Randle and H. M. Byllesby, looking toward the merger of the three companies. The agreement between the stockholders, the committee just mentioned and the Illinois Trust & Savings Bank, as depositary, gives the committee power to work out the merger as it deems best. The interests which are promoting the merger have given themselves a year to work out the details of the new corporations, and if the stock of the new company is not delivered to the depositary before July 1, 1912, the purpose of the agreement just sent out to the stockholders of the three companies is to be deemed abandoned without further action.

Louisville & Interurban Railroad, Louisville, Ky.—The Louisville & Interurban Railroad has filed amended articles of incorporation at Louisville, Ky., increasing its capital stock from $1,500,000 to $3,750,000 to discharge the indebtedness of the company to the Louisville Railway.

Metropolitan Street Railway, New York, N. Y.—The brief of the Guaranty Trust Company of New York in the so-called "termination of release" proceeding in the suit brought by the Pennsylvania Steel Company and the Degnon Contracting Company against the New York City Railway and the Metropolitan Street Railway has been filed in the United States Circuit Court. This proceeding is under an order of the court to determine as to the time the release executed Feb. 14, 1902, by the Metropolitan Street Railway to the Interurban Street Railway, now the New York City Railway, terminates; whether expenditures made and obligations incurred by Receivers Joline and Robinson between Sept. 24, 1907, and Aug. 1, 1908, are chargeable against the New York City Railway and whether receipts of these receivers during this period are to be credited to the New York City Railway. The company asks in the brief that the court order that the receiver of the New York City Railway be charged with all expenses and liabilities actually paid and incurred by him and that he is entitled to all revenue collected from the mortgaged property.

Sherbrooke Railway & Power Company, Sherbrooke, Que.—The stockholders of the Sherbrooke Railway & Power Company have ratified the purchase of the assets of the Hanstead Electric Company and the Eastern Townships Electric Company.

Upper Hudson Electric & Railroad Company, Catskill, N. Y.—The Public Service Commission of the Second District of New York has received an application for approval of consolidation, under the name of Upper Hudson Electric

& Railroad Company, of the Schoharie Light & Power Company, the Catskill Illuminating & Power Company and the Upper Hudson Electric & Railroad Company, the consolidated company to have an authorized capital stock of $500,000 and to execute a mortgage securing the issue of bonds in the amount of $1,000,000

Washington, Baltimore & Annapolis Electric Railway, Washington, D. C.—The reorganization committee of the Washington, Baltimore & Annapolis Electric Railway and the Baltimore Terminal Company gave notice to holders of certificates of deposit and subscription allotment warrants that the new bonds would be ready for delivery after July 24, 1911. It was proposed to deliver stock deposit receipts representing the common stock instead of actual certificates of common stock to such underwriters as had agreed or desired to become parties to the stock deposit agreement. The managing committee representing the holders of the common stock is composed of George T. Bishop, George R. Sheldon and Frank H. Ginn.

Dividends Declared

Fairmont & Clarksburg Traction Company, Fairmont, W. Va., 2½ per cent, preferred.

Harrisburg (Pa.) Traction Company, 3 per cent.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Me., quarterly, 1½ per cent, preferred.

Lincoln (Neb.) Traction Company, quarterly, 1½ per cent, preferred.

Manchester Traction, Light & Power Company, Manchester, N. H., quarterly, 2 per cent.

Mexican (Mex.) Tramways, quarterly, 1¾ per cent.

Union Street Railway, New Bedford, Mass., quarterly, 2 per cent.

West Penn Railways, Pittsburgh, Pa., quarterly, 1¼ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period.			Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
AMERICAN RAILWAYS.							
1m.,	June,	'11	$359,547	.....	.....	.....	.....
1 "	"	'10	337,404	.....	.....	.....	.....
12 "	"	'11	4,029,464	.....	.....	.....	.....
12 "	"	'10	3,780,338	.....	.....	.....	.....
AURORA, ELGIN & CHICAGO RAILROAD.							
1m.,	June,	'11	$161,382	$83,833	$77,549	$36,536	$41,013
1 "	"	'10	151,851	76,794	75,057	34,467	40,590
12 "	"	'11	1,735,675	995,955	739,720	416,643	323,077
12 "	"	'10	1,596,777	885,892	710,886	375,395	335,491
GALVESTON-HOUSTON ELECTRIC COMPANY.							
1m.,	May,	'11	$128,831	$75,724	$53,107	$24,668	$28,439
1 "	"	'10	103,823	66,317	37,505	23,548	13,959
12 "	"	'11	1,390,298	817,282	573,016	297,257	275,760
12 "	"	'10	1,239,668	753,235	486,433	272,535	213,898
HOUGHTON COUNTY TRACTION COMPANY.							
1m.,	May,	'11	$24,108	$11,836	$12,271	$6,498	$5,774
1 "	"	'10	25,472	15,100	10,373	6,317	4,056
12 "	"	'11	304,758	162,863	141,896	78,552	63,343
12 "	"	'10	321,633	168,764	152,869	76,083	76,786
HUDSON & MANHATTAN RAILROAD.							
1m.,	June,	'11	$375,871	$162,502	$213,369	$212,293	$1,076
JACKSONVILLE TRACTION COMPANY.							
1m.,	May,	'11	$47,625	$25,698	$21,927	$10,053	$11,875
1 "	"	'10	46,721	25,530	21,191	9,307	11,884
12 "	"	'11	584,448	322,045	262,404	117,656	144,748
12 "	"	'10	528,100	277,921	250,179	113,321	137,858
NORTHERN TEXAS ELECTRIC COMPANY.							
1m.,	May,	'11	$136,227	$70,689	$65,539	$25,032	$40,507
1 "	"	'10	117,766	64,484	53,282	19,722	33,560
12 "	"	'11	1,525,094	801,653	723,441	266,503	456,938
12 "	"	'10	1,332,859	721,490	611,369	212,244	399,125
PADUCAH TRACTION & LIGHT COMPANY							
1m.,	May,	'11	$21,350	$12,079	$9,271	$89,847	$1,616
1 "	"	'10	19,330	11,748	7,582	6,987	595
12 "	"	'11	255,952	140,336	115,616	89,947	25,668
12 "	"	'10	236,428	142,229	94,199	81,654	12,544
PENSACOLA ELECTRIC COMPANY.							
1m.,	May,	'11	$23,844	$13,388	$10,455	$5,850	$4,605
1 "	"	'10	21,806	13,632	8,174	4,998	3,176
12 "	"	'11	281,186	163,925	117,262	65,839	51,423
12 "	"	'10	256,079	148,622	107,456	55,313	52,143
PUGET SOUND ELECTRIC RAILWAY.							
1m.,	May,	'11	$148,828	$101,743	$47,085	$48,206	$1,121
1 "	"	'10	169,190	105,837	63,354	50,680	12,674
12 "	"	'11	1,865,301	1,246,422	618,879	605,818	13,061
12 "	"	'10	1,940,613	1,289,495	651,118	594,227	56,891
SAVANNAH ELECTRIC COMPANY.							
1m.,	May,	'11	$56,777	$38,231	$18,547	$217,934	$124
1 "	"	'10	52,379	34,307	18,072	18,020	52
12 "	"	'11	655,729	436,615	219,115	217,934	1,180
12 "	"	'10	610,360	396,749	213,611	211,779	1,832

Traffic and Transportation

Campaign Against Team Interference in Chicago

The Chicago (Ill.) Railways Company has begun a crusade in the interest of improved schedules by appealing to team owners to keep their teams off the street-car tracks as much as possible. Agents of the railway company ride on the street cars and take the numbers of wagons that do not turn out promptly upon the ringing of the gong. The next day the company sends a courteous letter to the owner of the wagon, calling attention to the penalty imposed by the city code for such an offense, appealing to the public spirit of the team owners, and calling attention to the fact that the city receives 55 per cent of the net receipts of the company. The body of this letter follows:

"This company desires in a friendly way to call your attention to the action of the driver of your wagon number who delayed our car on Street, between and on at about by refusing to get off car tracks promptly after having been notified repeatedly by the ringing of the gong on the car.

"For your information, would say that, under Section 1953 of Municipal Code of Chicago, there is a penalty enforcible of $5 and costs for every such established offense.

"We also beg to say that under our present ordinance the city receives 55 per cent of the street railway net receipts, and that, therefore, as a matter of self-interest, all citizens should co-operate to the end that good street-car service may obtain and the city of Chicago's proportion of such revenue be not impaired.

"We take the liberty of asking you, as a matter of civic pride, if you will kindly instruct your drivers of vehicles to refrain from delaying or interfering with the operation of our street cars."

The blanks filled out by the company agents show the car line, direction, car number, street location, time, name of team owner and number of wagon. A column has been left for remarks. Under the heading of "Remarks" appear entries such as follow: "Held for over 200 ft."; "Held for one-half block"; "Pulled in ahead of car and made car come to a full stop before turning out"; "Remained on track for two blocks and paid no attention to gong. Ample room to turn out." Judging from the reports, coal wagons and brewery wagons delay the cars more than any other types of vehicle. Express wagons are also frequently mentioned in the reports.

R. G. Hutchins, vice-president, who is signing the letters sent out by the company, has received hundreds of responses from team owners, indicating that they desire to co-operate with the company in reducing the causes of delay. Some of these letters have commented upon the increasing diplomacy of motormen in dealing with the drivers. The Chicago Railways Company operates about 2000 cars over 450 miles of track, and carries a daily average of 1,500,000 passengers over 63 distinct lines.

Position of New Jersey Commission with Regard to Commutation Rates to New York

In connection with its refusal to act upon the complaint of the New Jersey State Commuters' Association relative to the rates between points in New Jersey and New York City, the Board of Public Utility Commissioners has issued a memorandum asserting that it will not attempt to assume power it does not possess. The association suggested that the board should take as a basis the old rates from each suburban town to New York and deduct therefrom the amount of money which the railroads pay for transit through the subway or by way of the ferry. The remainder, it was asserted, would be the rate which the commission should order to be charged from such suburban towns to Hoboken or Jersey City. The board gave the following reasons for not adopting the suggestions of the association:

"1. Because a similar procedure might be taken as regards every passenger and freight rate in the United States. To suppose that the United States government

through its courts would even sanction this piecemeal disintegration of all rates into intrastate rates and thus acquiesce in the nullification of federal power over interstate commerce is a sheer absurdity.

"2. Because for this board to attempt such a course would subject it rightly to the suspicion that it is willing by devious indirection to grasp at powers beyond its jurisdiction. Such a course might be pursued by an unscrupulous attorney, motived by no other purpose than to win or try to win at all hazards, but it is below the level of fair procedure in a body which must command so far as it rightly can the confidence even of public utility corporations.

"3. The plan proposed is quite unnecessary, inasmuch as the very points on which it hinges were in the case of Shephard against Northern Pacific Railway Company et al. decided adversely by the Circuit Court for the District of Minnesota on April 8, 1911, by Judge Sanborn, and the final decision upon appeal must eventually come from the Supreme Court of the United States."

In conclusion the board said:

"This board will not attempt to assume powers it does not believe itself to have, and it will not be coerced into any course or policy which it considers contravenes the supreme law of the land. It therefore urges that those who are aggrieved by the advance in commutation rates to New York await with what patience they can command the final and legitimate disposition of the case. To attempt a premature and ill-considered adjustment can only delay the final and rightful determination of the whole matter."

Fare Decision in Washington.—The Supreme Court of the State of Washington has affirmed the opinion of the trial court that the Seattle, Renton & Southern Railway must not charge a fare of more than five cents within the city limits of Seattle as now fixed.

Meeting of Central Electric Traffic Association.—The Central Electric Traffic Association met in the office of the chairman at Indianapolis on July 18, 1911, and discussed routine matters relative to the welfare of the association. The next meeting will be held Sept. 25, 26 and 27, 1911.

Accident in New Jersey.—Three men were killed and more than a dozen passengers were seriously injured in a head-on collision on the afternoon of July 21, 1911, between two cars of the North Jersey Rapid Transit Company near Ridgewood, N. J. One of the persons killed was F. J. Pelgrim, superintendent of the company.

Side Doors for All Subway Cars.—The Public Service Commission of the First District of New York has adopted an order for a hearing on a proposed order to compel the Interborough Rapid Transit Company to equip all subway cars used in the local as well as in express service with side doors at the center. The hearing has been set for Aug. 16, 1911, before Commissioner Eustis.

Automobile for Inspection Work.—W. G. Irwin, president of the Indianapolis, Columbus & Southern Traction Company, Columbus, Ind., has had an automobile equipped for use as his private car in making inspection trips over the company's lines. On the wheels of the automobile, from which the tires have been taken, wooden rims have been placed, protected with steel rims equipped with flanges.

Advertising Lake Shore Electric Railway Service.—The Lake Shore Electric Railway, Cleveland, Ohio, has recently issued a number of notices calling attention to its regular and special service for large excursions and encampments at the resorts which it serves. A vest-pocket folder of eighteen pages, which gives reasons why one should travel on the Lake Shore system, has been prepared by J. F. Starkey, general passenger agent.

Transfer Petition Refused in Massachusetts.—On July 13, 1911, the Massachusetts Railroad Commission dismissed a petition of the Mayor of Brockton which asked for additional transfer privileges in that city. The case has come before the board several times before, and on Sept. 15, 1910, a similar application was dismissed. The board states that "nothing now appears to show a different situation from that then before the board, and we must adhere to our former rulings."

Reduction in Fare Between Weymouth and Braintree.—A reduction in fare for workingmen, between Rockland and Weymouth, Mass., has been granted by the Old Colony Street Railway at the instance of the Weymouth & Braintree Improvement Association. The company will issue a book good for certain hours of the day which will give the class of passengers mentioned a 7-cent rate in place of the 10-cent rate between Rockland and Weymouth. The company will also give transfers to Rockland on rainy days.

Hearing in Regard to Transfers in Brooklyn.—The Public Service Commission of the First District of New York has ordered a public hearing to establish the necessity for issuing an order to require the surface lines of the Brooklyn Rapid Transit Company and its Fifth Avenue elevated division to exchange transfers at certain points in South Brooklyn, and also to determine whether the company should be required to transfer passengers where its elevated lines cross at Fulton Street and Flatbush Avenue. The structures are at different levels at this intersection.

Arbitrators Chosen in Trenton.—In accordance with the understanding between the New Jersey & Pennsylvania Traction Company, Trenton, N. J., and its employees, by which the men who went on strike recently returned to work, the company has named as its representatives to arbitrate the question of wages J. A. Campbell, president of the Trenton Potteries Company, and Gardner Cain, a real estate operator of Trenton. The men have named Frank Hutchins, one of the candidates for city commissioner of Trenton, and Luke Travers, a labor representative.

Car Capacity Ordinance Vetoed in Seattle.—Mayor George W. Dilling has vetoed the bill passed by Council to regulate street car traffic by limiting the number of persons to be carried on street cars used in Seattle. The Mayor's general reason for disapproving the bill was that the proposed ordinance would not remedy existing conditions, while it would impose fixed rules difficult to meet and which would prove annoying to the traveling public. The bill limits the capacity of each car with cross seats to 50 per cent more than the seating capacity, with an allowance of 60 per cent on all cars which are fitted with longitudinal seats.

Employees of Cincinnati Traction Company on Vacation Trip.—Twenty-six employees of the Cincinnati (Ohio) Traction Company, winners of the popularity contest at the recent outing of the Street Railway Employees' Mutual Protective Association, left Cincinnati recently in a special Pullman over the Big Four Railroad to enjoy the vacation trip awarded them. The party went direct to Boston and then by steamer to New York. After two days spent here, they went to Atlantic City for nine days. They will return by way of the Pennsylvania lines, arriving in Cincinnati on Aug. 1. The men were given $25 in gold for pin money. All expenses of the trip will be borne by the association.

Advertising Campaign of Louisville & Northern Railway & Lighting Company.—The advertising campaign of the Louisville & Northern Railway & Lighting Company, New Albany, Ind., is attracting attention, especially in connection with the reduction of accidents. Space is used in the Sunday newspapers circulating in the territory served by the company, and a series of educational advertisements is being run, explaining some of the dangers resulting from carelessness, and suggesting methods of preventing accidents. The records of the company show that during the past three years, partly as the result of the advertising which the company has done, accidents have been reduced 60 per cent. Just now the company is co-operating with the proprietors of Glenwood Park, near New Albany, who are conducting a summer Chautauqua, in advertising the attractions to Louisville people, with the result that the attendance at the Chautauqua has been much larger than ever before.

Car Capacity Ordinance in St. Paul.—When the ordinance introduced in the Assembly of St. Paul, Minn., to limit the carrying capacity of cars in that city came before the committee on streets of the Assembly recently W. J. Hield, general manager of the Twin City Rapid Transit Company, which operates in St. Paul and Minneapolis, explained that the ordinance in effect in Minneapolis limiting the capacity of cars had proved very unsatisfactory. Employers of labor in Minneapolis were decidedly opposed

to the measure, as it increased the number of employees who were late and afforded the employees an excuse which was reasonable. Assemblyman Handy agreed with Mr. Hield that the ordinance would work to the detriment of both the employer and the employee, and at his request the measure was put over for thirty days. The measure introduced in St. Paul differs from the ordinance in force in Minneapolis in that it would make it a misdemeanor to keep persons waiting more than ten minutes for a car not filled to the capacity fixed in the ordinance.

Another Ruling on Reduced Fares by New Jersey Commission.—William H. Bannard, postmaster at Asbury Park, N. J., advised the Board of Public Utility Commissioners of New Jersey, recently, that the Atlantic Coast Electric Railway, which has been selling tickets at a reduced rate to the government for the transportation of letter carriers and special delivery messengers, had ceased to do this, claiming that the practice was made unlawful by the Public Utility Act. The board advised Mr. Bannard of its ruling to the effect that free transportation, without discrimination on behalf of a municipality, of policemen, firemen and inspectors of boards of health, in the performance of their public duty, is not regarded as a violation of the law, and expressed the opinion that the principle upon which this ruling is based would also apply to the transportation of letter carriers and special delivery messengers on behalf of the United States government at reduced rates, and that the practice of issuing tickets and free transportation to such carriers and messengers would not be considered a violation of the law.

The Question of Fare to Ensley.—The following statement was issued following a recent conference of the City Commissioners of Birmingham, Ala., and officials of the Birmingham Railway, Light & Power Company at which the subject of the company extending the 5-cent fare to Ensley was considered: "In an informal discussion of the Ensley 5-cent fare question between Commissioners Lane and Weatherly (Mr. Exum being absent) and A. H. Ford and Lee Bradley, for the Birmingham Railway, Light & Power Company, it was represented to the commissioners that the new management of the street railway had not assumed active administration, but would probably do so in a few days. It was further represented that the management of the new company had not given consideration to the Ensley 5-cent fare proposition. At the request of the commissioners Mr. Ford and Mr. Bradley agreed to submit the request of the Board of Commissioners, heretofore made on the old management of the company, to the new management, and to obtain at an early date the response of the latter to the commissioners' report."

Michigan United Railway's Summer Folder.—The Michigan United Railways, Jackson, Mich., of which A. W. McLimont is general manager, and F. W. Brown general express and passenger agent, has issued an attractive summer folder and timetable of 12 pages, each 8 in. x 9 in. in size, prepared by Eugene E. Soules, publicity agent. The folder is printed in three colors and plentifully illustrated. The first page presents a map of the southern part of Michigan, showing the 300 miles of route over which the cars of the company operate in giving its service across the State from Detroit, through Jackson, Battle Creek and Kalamazoo to South Haven, also showing its north and south lines from Jackson to Lansing, and thence either to St. Johns or Owosso. The map page is followed by several pages describing and illustrating garden spots and recreation resorts in Southern Michigan reached by the Michigan United Railways. Two pages are devoted to timetables, another page to the express and freight service of the road, another to points of interest, rates of fare, hotels and railroad and steamship connections. Considerable space is given to the description of the territory served by the Kalamazoo, Lake Shore & Chicago Railway, recently leased by the Michigan United Railways. The Kalamazoo, Lake Shore & Chicago Railway passes through the famous Michigan fruit belt, and its trains make connections at South Haven with steamers operating to and from Chicago. Thus the Michigan United Railways gives service from points on its interurban system to Chicago. The folder concludes with the usual notes to patrons and a description of its chartered-car service.

Personal Mention

Mr. J. B. Sucese has resigned as general superintendent of the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., and the position has been abolished.

Mr. W. H. Murphy, who has been superintendent of the Trenton, Bristol & Philadelphia Street Railway, Bristol, Pa., has been appointed superintendent of transportation of the company.

Mr. L. H. Mountney has resigned as superintendent of the Carbon Transit Company, Mauch Chunk, Pa., to become general manager of the State Belt Electric Street Railway, Pen Argyl, Pa.

Mr. Edward Riedel has resigned as general manager of the Walnut Ridge & Hoxie Light, Power & Transit Company, Walnut Ridge, Ark., to become electrical engineer and master mechanic of the Doe Run Lead Company, Rivermines, Mo.

Mr. H. S. Dickey, who has been traffic manager of the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind., has been appointed general passenger and freight agent of the company, and the office of traffic manager has been abolished.

Mr. C. H. Dallow has been appointed purchasing agent of the Louisville & Northern Railway & Lighting Company, New Albany, Ind., effective Aug. 1, 1911, to succeed Mr. W. H. Newhouse, resigned. Mr. Dallow has been connected with the executive offices of the company for several years.

Mr. J. M. Burns, who has been assistant superintendent of the Morris County Traction Company, Morristown, N. J., has been appointed superintendent of the electrical and mechanical departments of the company. Mr. Burns was graduated from Cornell University in June, 1910, with a degree of electrical engineer. He entered the service of the Morris County Traction Company immediately after graduation, and previous to his appointment as assistant superintendent of the company, in the fall of 1910, he served as electrician and draftsman and had charge of all the track bonding and testing.

Mr. F. I. Hardy has been appointed superintendent of transportation of the Chicago, South Bend & Northern Indiana Railway, South Bend, Ind. Mr. Hardy has been engaged in railway work fourteen years, during which time he has served the Southern Pacific Company, the New York Central & Hudson River Railroad, the Indiana Union Traction Company and the Ft. Wayne & Northern Indiana Traction Company in various capacities. The office of general superintendent of the Chicago, South Bend & Northern Indiana Railway has been abolished, and the general passenger and freight agent, chief dispatcher and all local superintendents report to and receive instructions from the superintendent of transportation.

Mr. John B. Austin, who has been engineer of maintenance of way of the Long Island Railroad, New York, N. Y., since 1904, has been appointed superintendent of the company in charge of operation, to succeed Mr. Frederick Hartenstein, resigned. Mr. Austin was born in Philadelphia on Oct. 31, 1873. He was graduated from the University of Pennsylvania in 1894, as a civil engineer. In 1895 he was appointed construction engineer of the Scranton & Pittston Traction Company. From 1896 to 1899 he was assistant engineer of the bureau of surveys at Philadelphia, on the Reading subway. From 1899 to 1902 he was roadmaster of the Great Northern Railway and chief clerk to the assistant general superintendent and chief clerk to the general superintendent. From 1902 to 1904 Mr. Austin was superintendent of the yard department of the Lackawanna Steel Company, at Buffalo, N. Y.

Mr. H. H. Archer has resigned as general manager of the Morris County Traction Company, Morristown, N. J., to become general manager of the Parkersburg, Marietta & Interurban Railway, Parkersburg, W. Va. Mr. Archer began his railway career with the Pennsylvania Railroad in 1874, and continued with the company until 1881, serving as section laborer, telegraph operator and locomotive fireman. From 1881 to 1884 he was with the Wilmington & Northern Railroad as station agent and train dispatcher, and from

1884 to 1888 he served the Philadelphia division of the Baltimore & Ohio Railroad as train dispatcher and yard master. Mr. Archer next entered the employ of the Wilmington (Del.) City Railway and remained with the company from 1888 to 1892, serving one year as superintendent, one year as general manager and two years as general manager, secretary and treasurer of the company. From 1892 to 1897 Mr. Archer was in business in Scranton, Pa. Later he went to Trinidad, British West Indies, as manager of the Belmont Tramway Company, and subsequently became connected with the National Asphalt Company as resident engineer in Venezuela. In 1903 and 1904 Mr. Archer was connected with a Canadian syndicate which was engaged in consolidating the tramway and electric interests at Trinidad. In 1904 he returned to the United States to take charge of the Woodside-Schamberg interests in West Chester, Pa., as general manager. From 1906 to 1908 he specialized in power-plant economics. Mr. Archer was appointed engineer of construction of the Morris County Traction Company in 1909, and was subsequently made general manager of the company. The Morris County Traction Company operates 45 miles of line in New Jersey and has 16 miles of line under construction.

OBITUARY

Frederick L. Threedy, former general manager of the North Chicago Street Railway, Chicago, Ill., is dead.

F. J. Pelgrim, superintendent of the North Jersey Rapid Transit Company, Paterson, N. J., died on July 21, 1911, as a result of injuries which he received in a collision between cars of the company near Ridgewood, N. J.

Leander F. Taylor, superintendent of the Augusta division of the Lewiston, Augusta & Waterville Railway, died on July 4, 1911, at his home in Augusta, Maine, aged fifty years. Mr. Taylor entered electric railway work in 1891 as a conductor with the Augusta, Hallowell & Gardiner Street Railway and in 1897 was made superintendent of the company. In 1907 the Augusta, Winthrop & Gardiner Railway, which succeeded the Augusta, Hallowell & Gardiner Street Railway, was absorbed by the Lewiston, Augusta & Waterville Railway and Mr. Taylor was made a division superintendent. The lines from Augusta to Waterville and from Gardiner to Lewiston were built and added to Mr. Taylor's division, placing under his supervision more than 60 miles of electric railway.

The United Railways & Electric Company of Baltimore is now operating its cars by power from the Pennsylvania Water & Power Company, which is brought from McCall's Ferry. Under the contract between the United Railways & Electric Company and the Pennsylvania Water & Power Company, which was entered into last February, both corporations have since been engaged in installing necessary cables, switching apparatus and other electric devices. According to W. A. House, president of the United Railways & Electric Company, this work was not expected to be completed until next September. It is not proposed to discontinue entirely operations at the Pratt Street power station, but to utilize the river power in conjunction with that generated at Pratt Street. The power is transmitted from the Orangeville substation to the Pratt Street power station, where it is distributed to the substations of the United Railways. At these stations it is stepped down from 13,000 volts and transformed into direct current.

Among the matters which have been referred to the public policy committee of the National Electric Light Association is a suggestion that action be taken to induce the United States to prohibit the importation of electrical energy from Windsor, Ont., to Detroit, Mich. The Ontario Hydroelectric Commission is reported to be unwilling to build a transmission line to Windsor unless permitted to supply energy also to Detroit. The project is meeting with opposition from certain local central-station companies in Canada, which would be involved in financial and political difficulties if the line were constructed through their territory.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Sacramento & Woodland Railway, Sacramento, Cal.**—Application for a charter has been made in California by this company, which is a subsidiary company of the Vallejo & Northern Railway, to build an electric railway between Sacramento and Woodland, connecting at Woodland with the Vallejo and Northern Railway. Capital stock, $1,000,000. T. T. C. Gregory, president. [E. R. J., July 8, '11.]

***Millen & Newington Railroad, Millen, Ga.**—Application for a charter has been made in Georgia by this company to build a 25-mile electric railway between Millen, Newington and some point on the Brinson Railway in Screven County. Capital stock, $75,000. Incorporators: E. S. Lane, H. S. McCall, W. H. Marsh, W. M. Parker, D. H. Blackburn, J. T. Walker, J. H. Evans, Jr., W. R. Turner, R. G. Daniels, and A. S. Anderson.

***Springfield Northwestern Interurban Railroad, Springfield, Ill.**—Incorporated in Illinois to build an electric railway from Springfield, via Greenview and Athens to Petersburg and Mason City, the line to branch off at Athens west to Petersburg and north to Mason City. About 60 per cent of the right-of-way has been secured. The main office will be at Springfield. Capital stock, $15,000. Incorporators: Homer J. Tice, Greenview; Richard Y. Kincaid, Athens, and Samuel E. Prather, George L. Harnsberger and W. Frank Workman, all of Springfield.

***Leavenworth & Excelsior Springs Railway & Power Company, Leavenworth, Kan.**—Application for a charter will be made soon by this company to build a 40-mile electric railway between Leavenworth and Excelsior Springs. D. A. McKibben and W. B. Walker are the promoters.

***Cleveland & Youngstown Railroad, Columbus, Ohio.**—Incorporated in Ohio to build an electric railway between Cleveland and Youngstown via Cuyahoga, Portage, Trumbull and Mahoning Counties. It is expected to extend it eventually to Leavittsburg. The construction of a 12-mile line between Garrettsville and Leavittsburg would make a through line between Cleveland and Youngstown. Capital stock, $10,000. Incorporators: James P. Wilson, Fred J. Heim, Theodore A. Johnson, John T. Harrington and Thomas A. Jacobs.

***Hood River Terminal Company, Salem, Ore.**—Application for a charter has been made in Oregon by this company to build an electric, gasoline or steam railway from a point on the Oregon-Washington Railroad in Hood River to the steamboat landing, ½ mile east of Salem. The company also desires to construct a line from the north end of First Street in Hood River northerly to a point where the east line of the Coe Donation land claim, if extended northerly, would intersect the line of extreme low water in the Columbia River. The company is capitalized at $5,000. Incorporators: W. A. Delashmutt, A. B. Irelan and W. S. Chapman.

***Ellwood City & Kopple Electric Railway, Ellwood City, Pa.**—Application for a charter has been made in Pennsylvania by this company to build an electric railway from Ellwood City to Koppel. Most of the right-of-way has been secured and surveys will soon be begun. Incorporators: T. A. Wilson, R. A. Todd, Fred C. Johnson, H. K. Gregory and W. J. Coursin, all of Beaver Falls.

FRANCHISES

Redwood, Cal.—The Peninsular Railway, San José, has received a franchise from the Board of Trustees for a 6-mile electric railway from Redwood City to Woodside.

Turlock, Cal.—The Tidewater & Southern Railway has received a franchise from the Board of Trustees to build an electric railway between Stockton and Turlock.

***Jackson, Ga.**—W. F. Smith has received a franchise from the Council to build an electric railway in Jackson. The line is to extend to Indian Springs, with a branch to Griffin.

East St. Louis, Ill.—The Southern Traction Company has asked the Council for a franchise to extend its tracks on Market Avenue.

East St. Louis, Ill.—The East St. Louis & Suburban Railway has asked the Council for a franchise to build an electric railway from Relay Depot to the east end of the Illinois approach of the St. Louis bridge.

Loogootee, Ind.—The Vincennes, Washington & Eastern Traction Company, Vincennes, Ind., has asked the Common Council for a franchise to extend its tracks over Main Street from where the line enters Loogootee to the eastern part of the city.

Perry, Ia.—B. C. Dilenbeck, Perry, has received at a special election a fifty-year franchise to build an electric railway in Perry. [E. R. J., May 27, '11.]

Louisville, Ky.—The Louisville Railway has asked the City Council for a franchise to extend its Seventh Street line one mile to the plant of the B. F. Avery & Sons Company.

New Orleans, La.—Leigh Carroll, representing the Algiers Railway & Light Company, has received a franchise from the Council to extend its tracks over certain avenues in New Orelans.

Montague, Mass.—The Connecticut Valley Street Railway has asked the Selectmen for a franchise to build the connecting link of the electric railway between Miller's Falls, Ewing and Orange.

Worcester, Mass.—The Worcester Consolidated Street Railway has been granted a franchise by the Board of Aldermen to use T-rails on its extensions of the Barncoat Street, Pleasant Street and Granite Street lines, providing that the T-rails be replaced by girder rails at the end of fifteen years.

***Duluth, Minn.**—N. J. Upham, representing the Suburban Traction Company, has a twenty-five-year franchise from the City Council to build a 7-mile electric railway in Duluth and extending into the country tributary to Duluth. The franchise states that the company must have that part of the line from the Maple Grove Road to Highland Street completed and in operation by July, 1912.

Jersey City, N. J.—The Public Service Railway has asked the Street and Water Board for a twenty-year franchise to make certain extensions and improvements in Jersey City.

Little Falls, N. Y.—The Little Falls & Johnstown Electric Railroad has been offered a ninety-nine-year franchise by the franchise committee to build its electric railway over certain streets in Little Falls, if it will build an extension to Moreland Park within ten years.

Rome, N. Y.—The Utica & Mohawk Valley Railway has received a franchise from the Common Council to extend its track on East Dominick Street and West Dominick Street, and for its suburban railway to enter Rome by way of Mill Street and Dominick Street.

Schenectady, N. Y.—The Schenectady Railway has received several franchises from the Board of Aldermen to extend its lines in Schenectady.

Watertown, N. Y.—The Black River Traction Company will ask the Common Council for permission to double-track its Court Street line in Watertown.

Durham, N. C.—The Durham Traction Company has asked the County Commissioners for a franchise for an extension to Watts Hospital.

Raleigh, N. C.—The Carolina Light & Power Company has received a franchise from the Board of County Commissioners to build a 5-mile extension from Glenwood out the Fairview Road to Lassiter's Mill.

Middletown, Ohio.—The Ohio Electric Railway has asked the City Council for a franchise to build its tracks in Middletown.

Olympia, Wash.—P. H. Carlyon has received a franchise by the City Council for the construction of a belt line railway around the Carlyon fill on the waterfront in Olympia. [E. R. J., April 15, '11.]

Milwaukee, Wis.—The Milwaukee Electric Railway & Light Company has received a franchise from the Council to extend its Twenty-seventh Street line north of North Avenue to the city limits of Milwaukee.

TRACK AND ROADWAY

Oakland, Antioch & Eastern Railway, Oakland, Cal.—Through a $2,000,000 bond deal closed in New York by this company the extension of the road into Oakland and Stockton is now assured. The new road has a traffic agreement with the Key Route which will permit cars to reach the pier of that system and to run to the center of Oakland. The new company also holds a franchise along Shafter Avenue in Oakland in the name of the Oakland & Bay Shore Railroad. The Anglo-California Trust Company will act as trustee in the bond deal.

***Tulare County Power Company, Porterville, Cal.**—This company plans to build and is securing right of way for an electric railway to connect Porterville and Lindsay on the north and Tulare on the west. This is a coöperative company financed by power users and ranchers in Tulare County.

***Van Nuys, Cal.**—The Los Angeles Suburban Homes Company, Los Angeles, is building an electric railway through Cahuenga Pass, from Hollywood to Van Nuys. This company is also building a 10-mile electric railway to connect Van Nuys and Owensmouth.

West Peak Railroad, Meriden, Conn.—This company advises that it will begin work on the construction of its 1200-ft. incline railroad to the summit of West Peak about Aug. 15. The company's power station will be located at Meriden. It will furnish power for lighting purposes and operate two cars. Capital stock authorized, $100,000; bonds authorized, $50,000. C. J. Danaher, Meriden, is interested. [E. R. J., July 8, '11.]

***Galesburg, Ill.**—James C. Long, Monmouth, it is reported, plans to build an electric railway from Galesburg to Alexis. Surveying has been begun.

***Chicago, Marseilles & Peoria Railway, Peoria, Ill.**—This company has been organized to build an electric railway to connect Chicago, Streator, Peoria and Marseilles. Capital stock, $5,000,000. Charles M. Nichols, New York, promoter.

Sioux City (Ia.) Service Company.—This company plans to build an extension of its line to Crystal Lake.

Boston & Eastern Railway, Boston, Mass.—This company has filed with the City Clerk of Salem plans showing the route of its proposed line between Boston and Beverly.

Battle Creek, Coldwater & Southern Railway, Battle Creek, Mich.—The J. T. Adams Construction Company, Columbus, Ohio, has been awarded the contract by this company for the construction of its 28-mile electric railway to connect Battle Creek and Coldwater. [E. R. J., June 3, '11.]

***Suburban Traction Company, Duluth, Minn.**—This company will award a contract at once to build a 7-mile electric railway over various streets in Duluth and extending into the country tributary to Duluth. About 5 miles of track will be built this year. N. J. Upham, Duluth, is interested.

Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo.—Cameron, McManus & Joyce, Keokuk, Ia., have been awarded the contract by this company for grading 5 miles of the route on the Clay County side of the Missouri River. George S. Beardsley, Kansas City, is interested. [E. R. J., Apr. 1, '11.]

***Bretton Woods, N. H.**—It is reported that plans are being considered for an electric railway between the principal resorts in the White Mountains. Bretton Woods would be the center, and from here one line would go around the Presidential Range, taking in Jefferson, Gorham, Jackson, North Conway, Intervale and Crawford Notch, while another line would go to Maplewood, Bethlehem and Profile.

Trenton (N. J.) Street Railway.—Plans are being made by this company to extend its line in Chambersburg from Stanton Street to Emery Avenue, Franklin Street and Cedar Lane.

Corning, Keuka Lake & Ontario Railway, Corning, N. Y.—This company has applied to the Public Service Commission, Second District, for permission to build a railroad from Corning to Sodus Bay, on Lake Ontario, a distance of 90 miles.

Waterville, N. Y.—D. C. Hadcock, Oneida, and associates will soon organize a company to build a 24-mile electric railway to connect Oriskany Falls, Augusta Center, Knoxboro, Vernon Center and Bronson's Crossing, on the West Shore Railroad, then to Lowell and Rome. [E. R. J., June 24, '11.]

North Carolina Public Service Company, Greensboro, N. C.—The Robertson Construction Company, Charlotte, N. C., is grading about 1½ miles of extension from Lindley Park to Terra Cotta for this company.

Portland Railway, Light & Power Company, Portland, Ore.—Work has been begun by this company on a 1-mile extension on Bybee Avenue from the Sellwood line on Milwaukee Street through Westmoreland and Eastmoreland.

***Tarentum, Brackenridge & Butler Railway, Butler, Pa.**—Samuel Gamble, Carnegie, has been awarded the contract by this company to build its 3½-mile electric line from Birdville to Butler. J. M. Griffith and H. M. Brackenridge will report on the advisability of using Edison storage battery cars.

Ephrata & Lebanon Street Railway, Lebanon, Pa.—A contract has been awarded by this company for 6000 tons of rails for its line between Lebanon and Ephrata.

Lebanon & Campbelltown Street Railway, Lebanon, Pa.—Sealed proposals will be received at the office of the engineer of this company at the Hershey Trust Company Building, Hershey, Pa., up to Aug. 17, for the roadbed and track construction to Twelfth Street, Lebanon. All materials except masonry to be furnished by the company. H. N. Herr, engineer. [E. R. J., July 15, '11.]

Phœnixville, Valley Forge & Stratford Street Railway Phœnixville, Pa.—This company placed in operation on July 15 its railway between Phœnixville and Williams Corner. This is part of its proposed line to connect Phœnixville and Valley Forge.

Piedmont & Northern Railway, Greenville, S. C.—Work has been begun by this company on its line from Gastonia to Lowell.

Amarillo (Tex.) Traction Company.—This company advises that it has been operating its line with gasoline motor cars for over a year, but is now changing to electricity. The line is 2 miles long and connects West Amarillo and San Jacinto Heights. The company will operate two cars and will rent power from the Amarillo Water, Light & Power Company, Amarillo. Its repair shops are located at Tenth Street and Virginia Avenue, San Jacinto Heights. N. A. Brown is interested. [E. R. J., July 8, '11.]

Southern Traction Company, Dallas, Tex.—The complete route of this line, as now selected by this company, extends 100 miles from Dallas to Waco, via Hutchins, Wilmer, Ferris, Waxahachie, Forreston, Italy, Milford, Hillsboro, West and Days Lake, with a 35-mile branch from Ferris via Ennis to Corsicana. J. F. Strickland, president. [E. R. J., April 22, '11.]

Nashville-Gallatin Interurban Railway, Gallatin, Tenn.—The Fidelity Securities Corporation, Nashville, which is building this line, is in the market for 70-lb. rails with plates, etc., for 24 miles of track. Delivery is to be made within the next five months. H. H. Mayberry, 431 Stahlman Building, Nashville, Tenn., president.

Belton & Temple Traction Company, Temple, Tex.—Within the next three months work will be begun by this company on a 2-mile extension of its line to the Tal-Coe addition on the south side of Temple. Other improvements will also be made.

Utah & Salt Lake Electric Railway, Salt Lake City, Utah.—Surveys have been completed on the proposed electric railway between Salt Lake City and Payson. The route is over a private right-of-way the greater part of the distance. Simon Bamberger, president of the Salt Lake & Ogden Electric Railway, is said to be interested. [E. R. J., Mar. 8, '11.]

Southern Wisconsin Railway, Madison, Wis.—The Columbia Construction Company, Milwaukee, has been awarded the contract by this company to build 4,500 ft. of single track and some double track in the city of Madison, Wis.

Milwaukee Western Electric Railway, Milwaukee, Wis.—Arrangements have been made by this company for an extension of its line from North Lake to Hartford. About 60 per cent of the right-of-way has been secured. The proposed extension from Sussex to Waukesha has been decided upon and contracts are now being secured for the right-of-way.

Mercer Electric Railway, Athens, W. Va.—This company advises that work has been begun on its 7-mile electric railway between Princeton and Athens. Capital stock authorized, $100,000; capital stock issued, $32,000. Officers: R. G. Meador, president; T. B. Cook, vice-president; J. F. Halroyd, secretary; R. G. Meador, general manager, all of Athens. [E. R. J., July 15, '11.]

Grafton (W. Va.) Traction Company—The Farris Bridge Company, Pittsburgh, has been awarded the contract by this company to build a single-track 754-ft. bridge across the Tygart Valley River. Boyer, Patterson & Morris, Philadelphia, have been awarded the contract by the Farris Bridge Company to build three concrete piers and two concrete abutments for this bridge.

Union Utilities Company, Morgantown, W. Va.—During the next 90 days this company will award contracts to build about 2½ miles of new track to Dellslow and two small concrete bridges.

Morgantown (W. Va.) Interurban Railway.—Surveying has been begun by this company on its electric railway from Morgantown to Point Marian, Pa. J. H. McDermott, president. [E. R. J., July 15, '11.]

SHOPS AND BUILDINGS

Wilmington, New Castle & Southern Railway, New Castle, Del.—An option has been taken by this company on a building at Front Street and Market Street, in Wilmington, to be used as a station for its new line.

Rockford & Interurban Railway, Rockford, Ill.—Work has been begun by this company on its new carhouse on Kishwaukee Street in Rockford.

Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind.—A new terminal station will be built by this company on the block bounded by Main, Webster, Pearl and Ewing Streets, in Ft. Wayne. The structure will be 150 ft. x 300 ft.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.—This company has leased the first floor of a three-story brick building, now almost completed, to be occupied as a passenger station at Lebanon. The station is to be equipped with all modern conveniences.

New York, Weschester & Boston Railway, New York, N. Y.—This company will build a transfer station at 180th Street in New York. The building will be 550 ft. x 250 ft. and contain five platforms, from which nine tracks may be reached. The entrances will be on the street level and the tracks may be reached by direct stairways.

Northern Ohio Traction & Light Company, Akron, Ohio.—The village council of Kenmore has vacated Lakeside Avenue south of the Boulevard and granted this company a twenty-five-year franchise to handle cars on part of the Boulevard. This opens the way for construction of the company's carhouses, repair shops and machine shops, which will cost about $500,000. The company has purchased sixteen acres of land there and a contract will be awarded within sixty days for the construction of the buildings.

Toledo, Fostoria & Findlay Railway, Fostoria, Ohio.—It is reported that this company will enlarge and remodel its union interurban station in Fostoria.

Mt. Hood Railway & Power Company, Portland, Ore.—This company has completed plans for a new terminal station between Vancouver Avenue and Williams Avenue, in Portland. The structure will be 60 x 70 ft., and entirely of steel and reinforced concrete. The cost is estimated to be about $45,000.

Galveston-Houston Electric Railway, Galveston, Tex.—This company will build a carhouse and offices on the block bounded by Texas Avenue, Capital Avenue, Smith Street and Brazos Street. The carhouse will be a one-story 160 ft. x 100 ft. brick building. The offices will front on Texas Avenue.

Milwaukee Western Electric Railway, Milwaukee, Wis.—This company has obtained title to the Alton lots in Pewaukee, upon which it expects to build a new passenger station.

POWER HOUSES AND SUBSTATIONS

Birmingham Railway, Light & Power Company, Birmingham, Ala.—This company will soon build a cooling tower. The cost is estimated to be about $25,000.

Pacific Railway Company, Los Angeles, Cal.—The General Electric Company has been awarded a contract by this company for four 1000-kw motor generator sets, three 600-kw motor generator sets and eighteen 450-kw transformers.

San Diego, (Cal.) Electric Railway.—This company has placed in operation its new power station in San Diego.

Pueblo & Suburban Traction & Lighting Company, Pueblo, Col.—This company has ordered, through H. M. Byllesby & Company, Chicago, three 500-kva oil-insulated, water-cooled, 44,000-volt transformers, from the Westinghouse Electric & Manufacturing Company.

Gainesville Railway & Power Company, Gainesville, Ga.—This company has awarded the contract to the Westinghouse Electric & Manufacturing Company for two 135-kva oil-insulated, self-cooling, 11,000-volt transformers, one switchboard and two regulators, constituting a complete substation equipment.

Dixon, Rock Falls & Southwestern Electric Railway, Tampico, Ill.—A site has been selected by this company about 2 miles south of Tampico on which to build a new power house.

Des Moines (Ia.) City Railway.—This company has purchased from the General Electric Company one 500-kw rotary and one 2000-kw low-pressure turbine, and from the Westinghouse company one 300-kw rotary converter.

Louisville & Interurban Railway, Louisville, Ky.—The power house on the Louisville & Eastern division of this company at Marcia, Ky., has been converted into a substation, power being transmitted to Marcia from the central stations of the Louisville Railway, which controls the Louisville & Interurban Railway. The installation of the substation equipment at Marcia has been completed and the steam plant there is no longer in operation. The equipment at Marcia was installed by the Westinghouse Electric & Manufacturing Company.

Valparaiso & Northern Railway, Valparaiso, Ind.—This company's power station in Valparaiso was destroyed by fire on July 16.

Bangor Railway & Electric Company, Bangor, Maine.—This company has purchased a hydraulic plant of the Bodwell Water Power Company, costing nearly $1,000,000.

Portland Railway, Light & Power Company, Portland, Me.—This company has placed an order with the General Electric Company for one 500-kw and one 300-kw motor generator set and a switchboard. These generators will be installed in new substations and will be supplied with power purchased from the lighting company.

Boston (Mass.) Elevated Railway.—This company is building a new transformer station on Kendall Square, in Cambridge. The building is 50 ft. x 80 ft. and 50 ft. high, and of brick and stone construction.

Ohio Valley Electric Railway, Cincinnati, Ohio.—Plans are being considered by this company for the construction of a new substation in Huntington.

Philadelphia (Pa.) Rapid Transit Company.—This company has awarded the contract to the Westinghouse Electric & Manufacturing Company for two 3000-kva, one 2000-kva and two 1500-kva self-starting rotary converters. These are all of the six-phase, 25-cycle type, and they will deliver direct current at 600 volts. The transformers for supplying current to these rotaries were also ordered from the Westinghouse Electric & Manufacturing Company, and will include six 1100-kva, three 750-kva and six 375-kva air-blast transformers, 25 cycles, for 13,200 volts on the high-tension side.

Chattanooga Railway & Light Company, Chattanooga, Tenn.—This company has placed an order with the General Electric Company for one 1000-kw motor generator set, four 1500-kw transformers and a switchboard.

Manufactures & Supplies

ROLLING STOCK

Memphis (Tenn.) Street Railway is said to be considering the purchase of twenty cars.

Baltimore & Ohio Railroad, Baltimore, Md., it is reported, will order two electric locomotives.

Peninsular Railway, San José, Cal., has ordered one 36-ft. car from the W. L. Holman Company.

Trenton, Bristol & Philadelphia Street Railway, Bristol, Pa., is in the market for two double-truck cars.

Pensacola (Fla.) Electric Company has ordered four 21-ft. closed cars from the St. Louis Car Company.

Dallas (Tex.) Electric Corporation has ordered ten 26-ft. double-truck city cars from the Cincinnati Car Company.

Northern Texas Traction Company, Ft. Worth, Tex., has ordered ten 26-ft. double-truck city cars from the Cincinnati Car Company.

Grand Forks (N. D.) Street Railway has ordered one 28-ft. semi-convertible car body, mounted on Brill 21-E trucks, from the American Car Company.

Boston (Mass.) Elevated Railway has purchased one Brill-27 MCB motor truck without wheels and axles, and five Brill-27 MCB-2 trailer trucks without wheels and axles, from The J. G. Brill Company.

Connecticut Valley Street Railway, Greenfield, Mass., has ordered two 30-ft. closed car bodies with cross seats and three 30-ft. closed car bodies with longitudinal seats from the Wason Manufacturing Company.

Capital Traction Company, Washington, D. C., has ordered twenty double equipments of No. 306 interpole railway motors, with type K-2 control, from the Westinghouse Electric & Manufacturing Company.

Columbia Railway, Gas & Electric Company, Columbia, N. C., has ordered six double equipments of No. 306 interpole railway motors and type K-36 control from the Westinghouse Electric & Manufacturing Company.

Chicago (Ill.) Railways has ordered three hundred four-motor car equipments from the General Electric Company. This order calls for twelve hundred 35-hp, type GE-226 motors and six hundred K-35 controllers with auxiliary equipment for three hundred cars.

Southwestern Traction & Power Company, New Orleans, La., which is building a 65-mile line to connect Lafayette, New Iberia and Morgan City, La., is said to be in the market for three interurban passenger and baggage cars and one electric locomotive. Headquarters, Hennen Building Annex, New Orleans.

Philadelphia (Pa.) Rapid Transit Company has included the following details in the specifications for the thirty closed-steel motor cars being built by The J. G. Brill Company, for use on the Market Street elevated line:

Length over vestibule, 49 ft. 7¼ in.	Curtain fixtures.....Forsyth
Width over posts at belt, 8 ft. 7 in.	Curtain material...Pantasote
Height from top of rail to sills .....4 ft. 1 in.	Gears and pinions, Ry. Co.'s Std.
Body .....metal	Journal boxes....Symington
Interior trim .....mahogany	Motors .....G.E. 66
Underframe .....metal	Motors.....inside-hung
Air brakes....Ry. Co.'s Std.	Paint .....S.-W.
Axles, 6 in. dia. at motor bearings	Roofs .....monitor
Bolsters .....composite	Sash fixtures.....double sash
Bolsters, truck.....cast steel	Seats .....long.
Brakeshoes ...Ry. Co's Std.	Seating material.....rattan
Car trimmings .....bronze	Side bearings .....Stucki
Center bearings..Symington	Springs .....Brill
Control system.....G.E.	Trucks.....Brill,-27-MCB-3
Couplers .....Van Dorn	Varnish .....Murphy
	Ventilators .....Automatic
	Wheels, 34-in. Midvale rolled steel

International Railway, Buffalo, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of July 15, 1911, as having ordered sixty semi-convertible near-side cars from The J. G. Brill Company, has specified the following details for these cars:

Seating capacity 53	Fenders .....non-protruding
Weight (car body)..17,000 lb.	Gongs .....Dedenda

Bolster centers, length	21 ft.
Length of body	34 ft. 7⅜ in.
Over vestibule	45 ft. 2½ in.
Width over all	8 ft. 6 in.
Sill to trolley base	12 ft.
Body	wood
Interior trim	cherry
Headlining	maple veneer
Roof	Brill plain arch
Underframe	metal
Air brakes	Ry. Co.'s Std.
Axles	Brill Std.
Bumpers	Brill angle iron
Car trimmings	bronze
Control	G.E.
Curtain fixtures	Forsyth
Curtain material	Pantasote
Destination signs	Hunter
Hand brakes	Peacock
Heaters,	truss plank and panel type
Headlights	Crouse-Hinds
Journal boxes	Brill Std.
Motors	G.E. 210
Motors	outside-hung
Push button signal	Cons.
Sash fixtures	double
Seats	Brill stationary back
Seating material	rattan
Springs	Brill
Step treads	Mason
Trolley retrievers	Earll
Trucks	Brill 39-E.
Ventilators	spec'l mushroom
Wheels	34-in. and 22-in.

TRADE NOTES

Seattle Car Manufacturing Company, Seattle, Wash., has completed plans for a new forge and machine shop to be erected at Renton, Wash.

Manning, Maxwell & Moore, Inc., New York, N. Y., have elected J. H. Evans secretary, treasurer and director of the company, to succeed Colby M. Chester, Jr., resigned.

Cleveland Trolley Wheel Company, Cleveland, Ohio, has been incorporated with a capital stock of $50,000 by C. E. Beam, L. L. McAdams, C. W. Hartley, William H. Thompson and Charles Ammerman.

H. W. Johns-Manville Company, New York, N. Y., is erecting a twelve-story office building at Forty-first Street and Madison Avenue, New York. It will be of fireproof steel construction throughout, fronting 48 ft. on Madison Avenue and 68 ft. on West Forty-first Street, and will be ready for occupancy May 1, 1912.

The J. G. Brill Company, Philadelphia, Pa., has received the following orders for export: Byington & Company, three 24-ft. gondola motor bodies mounted on Brill-21-E trucks; Buenos Aires Pacific Railway, Buenos Aires, Argentina, four Brill-27-E-3 trucks without wheels and axles; United Electric Car Company, for Pretoria Tramways, South Africa, four Brill-27-GE-1 trucks without wheels and axles; E. G. Long & Company, five Brill-21-E trucks.

Baldwin Locomotive Works, Philadelphia, Pa., has called a meeting of its stockholders, to be held on Sept. 21, 1911, for the purpose of approving a reduction in the capital stock from $20,000,000 to $1,000. This corporation was the one originally formed in 1909 to take over the interests of the old partners in Burnham, Williams & Company. Baldwin Locomotive Works has now been superseded by The Baldwin Locomotive Works as the operating corporation.

Pawling & Harnischfeger Company, Milwaukee, Wis., announces that Alonzo Pawling, president and treasurer, has disposed of his interests in the company and retired from business life. The Pawling & Harnischfeger Company was founded by Mr. Pawling and Henry Harnishchfeger in December, 1884. Henry Harnishchfeger becomes president and treasurer of the company; W. H. Hassenplug, vice-president; F. P. Breck, second vice-president, and S. H. Squier, secretary.

Terry Steam Turbine Company, Hartford, Conn., has appointed Ashley P. Peck district sales manager for the Middle West, with offices at 814 People's Gas Building, Chicago, Ill. Mr. Peck was actively connected with the machinery sales field of Chicago prior to 1902 and since that date for three years was manager of the Milwaukee district sales office of the National Electric Company. Since 1905 he has been connected as sales engineer with the New York office of the Allis-Chalmers Company.

W. N. Matthews & Brother, St. Louis, Mo., announces the appointment of John L. Fay as sales engineer throughout the entire United States, effective Aug. 1, 1911. Mr. Fay was formerly superintendent of construction of overhead system for the Union Electric Light & Power Company, St. Louis, and has been connected with various electric construction and lighting companies for more than twenty-five years. Mr. Fay is the inventior of the Fay insulator, which eliminates the use of tie wire and the Matthews fuse switch.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has appointed W. W. Briggs assistant sales manager with headquarters at San Francisco, Cal., and jurisdiction over the Pacific Coast. Mr. Briggs has been connected with the sales department of the company since 1899 and in May, 1905, he was made district manager. The Westinghouse Electric & Manufacturing Company reports the receipt of the following orders: City of Barnesville, Ga., for one substation equipment consisting of three 150-kva, oil-insulated, self-cooling, 6600-volt transformers and one two-panel switchboard; Cataract Power & Conduit Company, Buffalo, N. Y., three 300-kva, oil-insulated, water-cooled, 22,000-volt transformers; Demarara Electric Company, British Guiana, S. A., for No. 12-A railway motors and type R control; City & County Contract Company for one 80-ton switching locomotive with quadruple equipment of No. 410 single-phase, alternating-current motors and unit switch control for the New York & Westchester Railroad. The frame and running gear will be built by the Baldwin Locomotive Works.

ADVERTISING LITERATURE

General Railway Signal Company, Rochester, N. Y., has issued Bulletin No. 114-A, which describes and illustrates its selective signaling system, model 3, form B.

Indianapolis Brass Company, Indianapolis, Ind., has appointed the Midland Company, Inc., Richmond, Va., to act as its representatives in Virginia and North Carolina.

Power Specialty Company, New York, N. Y., has issued Bulletin No. 201, which describes and illustrates the Power water cooler which the company is introducing into this country.

D & W Fuse Company, Providence, R. I., has issued Catalog No. 15, in which is listed and illustrated a complete line of cartridge fuses and cut-outs which the company manufactures. The catalog also contains a brief description of the more important methods of construction of the inclosed fuse. It is divided into five sections and contains 112 pages.

International Oxygen Company, New York, N. Y., has issued a 16-page booklet, in which are presented the principles of construction and operation of the I. O. C. system for producing pure oxygen and hydrogen; also a brief survey of the industries where these gases are utilized, together with a comparison of the relative merits of oxygen combined with hydrogen and that of oxygen combined with acetylene for auto-welding and oxy-cutting.

Ohio Brass Company, Mansfield, Ohio, has printed supplement No. 2, in which are listed several new devices of special interest to the electric railway trade. Among these is a line of overhead construction devices with renewable flexible bronze tips, including splicing ears, malleable iron frogs, insulated cross-overs and section insulators. The Tomlinson MCB coupler is listed for the first time, as is also the O-B thermo-bonding process. The supplement also includes a new line of trolley harps, wheels, bushings, etc.

The J. G. Brill Company, Philadelphia, Pa., in *Brill Magazine* for July, 1911, presents an illustrated biography of John Blair MacAfee, who is identified with several large electric railway properties in the country. Among the feature articles are the following: "Conditions Which Govern the Type of Car for City Service, Liverpool, England," "Closed Trail Cars for the Emigration Cañon Railway, Utah," "Interurban Cars for the Norfolk & Southern Railroad," "Pay-Within Cars for Beaumont, Tex," "Large Open Cars for Asbury Park, N. J."

Curtain Supply Company, Chicago, Ill., has issued a very complete illustrated catalog of 46 pages of its curtain fixtures, roller diaphragms and curtain materials. The closed car curtains and the open car curtains are described separately, and as an introduction to each of these subjects there are valuable suggestions in regard to rollers, mounting and handling curtains, adjusting fixtures, etc. An index at the front of the publication arranged alphabetically contains upward of sixty subjects receiving attention. In a foreword the company says that it can undertake at all times the manufacture of articles which require the same general factory equipment as does its regular output.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVIII NEW YORK, SATURDAY, AUGUST 5, 1911 No. 6

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.
HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President
CURTIS E. WHITTLESEY, Secretary and Treasurer.
TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

HENRY W. BLAKE, Editor.
L. E. GOULD, Western Editor.
Associate Editors:
RODNEY HITT, FREDERIC NICHOLAS, WALTER JACKSON.
News Editors:
G. J. MACMURRAY, FRANK J. ARMEIT.

CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1021 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Thursday, 9 A. M., of the week of issue.

Copyright, 1911, by MCGRAW PUBLISHING COMPANY.

Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, AUGUST 5, 1911.

CONTENTS.

Answers for the Question Box..... 215
Precautions in Signal System Operation..... 215
Methods of Training Motormen..... 216
Subway Extensions in Berlin..... 216
The Public Functions of the Engineer..... 217
The Exhibits at the 1911 Convention..... 218
Terms of the Subway Proposals..... 218
Development of the Aurora, Elgin & Chicago Railroad..... 220
Electric Railway Legislation in Massachusetts..... 228
Schöneberg-Berlin Underground Railway..... 229
Déri Motor on Martigny Single-Phase Railway..... 235
Annual Report of the Vienna Tramways..... 236
Instruction Methods of the Second Avenue Railroad, New York.... 237
Electric Railways in Buenos Aires..... 239
Metropolitan Street Railway Reorganization..... 240
Government Bulletin on Cost of Materials..... 241
Electrolysis Situation in Chicago..... 242
Exhibits at the Atlantic City Convention..... 243
Performances of Storage Battery Cars..... 245
Collapsible Steel Forms for Concrete Culverts..... 245
Inter-Pole Direct-Current Motors..... 245
Simplified Controller Diagrams..... 246
Aluminum Car Panels and Fittings in Zurich..... 246
New Cars for the Arkansas Valley Interurban Railway..... 247
English Semi-Convertible Car..... 248
Electrolytic Hydrogen and Oxygen Generators..... 249
New Car Headlining..... 249
London Letter..... 250
News of Electric Railways..... 251
Financial and Corporate..... 254
Traffic and Transportation..... 257
Personal Mention..... 259
Construction News..... 260
Manufactures and Supplies..... 263

Answers for the Question Box

Last year there was some talk of discontinuing the publication of the "Question Box" of the Engineering Association on the ground that the members of the association were no longer interested. The large number of questions to be answered this year which were contained in the circular letter sent out last week is convincing proof that the "Question Box" has a legitimate right to exist as a means of interchanging information about the practical details of electric railway engineering. One hundred and twenty-four questions sent in by more than fifty companies and associate members have been selected by the committee from among a still larger number submitted as being of timely interest and otherwise suitable for inclusion in the "Question Box." It is not expected that any one member will answer more than a few of the many questions which have been asked, but almost every engineer in glancing over the list should find one or more questions relating to subjects which he is qualified to discuss, and he should be willing to contribute his share of knowledge and experience to the common fund. Inasmuch as the questions relate for the most part to practical subjects, the most valuable answers can be made by men occupying subordinate positions, who nevertheless are intrusted with the details of the work to which the questions refer. Every one who can answer any of the questions should have an opportunity of so doing, and in this the responsible heads of the engineering departments of electric railways can help along a good cause by encouraging the men under them to study the questions submitted and answer them if possible. With such a large number of questions, a full and adequate discussion of all of the topics considered in the "Question Box" at the convention would take up the time of at least two or three sessions. This is too much to expect. Even if no oral discussion whatever is had, the educational value of the "Question Box" will not be lessened materially.

Precautions in Signal System Operation

A recent head-on collision between a regular car and an extra car on a single-track Eastern interurban railway equipped with block signals was the result of reckless operation following a signal failure due to lightning. The trainmen of the regular car had not been notified that an extra car was opposing them and they assumed that the signal was out of order because it indicated "danger" without apparent cause. Without ascertaining from the dispatcher whether an opposing car was in the block ahead they proceeded on their time-card rights and collided with the extra car, which was trying to make the next siding. This accident points out two dangers affecting especially small roads which operate cars on long headway. One is that

of installing unreliable signal apparatus or of failing to maintain the signals at all times in good operating condition, so that the trainmen lose confidence in their indications and acquire the vicious habit of running by danger signals when to stop and wait would prevent their making schedule time. The other danger is the absence of a rigid rule to cover procedure in case a car is stopped by a signal which obviously is out of order. The latter danger could be obviated by a rule similar to rule No. 144 of the Illinois Traction System, which reads: "When a train is stopped by a block signal that is evidently out of order, after waiting two minutes, the motorman must call up the dispatcher and proceed only after the dispatcher has given the authority for so doing on the form used for a regular order." Had such a rule been in force on the line where the collision occurred the accident probably would have been prevented. As the best maintained signal system may be disabled temporarily, the necessity of providing for such a contingency must not be overlooked.

Methods of Training Motormen

The elaborate equipment and methods which a large railway uses for producing skilful motormen were described in an article in the May 13 issue entitled "The Platform Instruction System of the Philadelphia Rapid Transit Company." It has been deemed well, however, to supplement this description by the article published elsewhere in this issue on the platform instruction system of a comparatively small railway like the Second Avenue Railroad, New York. While differing greatly in size, both companies have the same problem of developing into serviceable employees not only the best men who enter the service, but also those men who enter the electric railway field with the fixed idea of leaving it as soon as something better turns up. The effort of the railway management to dispel this feeling should begin at the very moment that the applicant is accepted for the instruction course. First of all, the instruction should not be given in some dark, obscure corner of the carhouse, but in a light, well-ventilated and cheerful-looking room where the students can work in reasonable comfort. It might even be well to follow the practice of the Second Avenue company in other respects, such as providing the instruction room in summer with iced spring water and electric fans. A little thoughfulness of this sort will exert much influence for good, as the men are made to feel at once in a subtle way that their well-being is being considered by their future employer. The second point lies in the nature of the instruction itself. Most of the applicants have had so little book learning that the prospect of memorizing a catechism fills them with apprehension. Demands of this kind should be kept to a minimum. There are so many fascinating things about electricity that it is indeed a poor teacher who cannot interest his pupils in the mysteries of motor and controller action. The principle of the Second Avenue Railroad's instruction system is based upon the belief that the meaning of every step in car operation can be permanently engraved in the memory of the future motorman if it is properly brought out by some striking demonstration with simple apparatus in addition to the use of the customary system of platform drills.

SUBWAY EXTENSIONS IN BERLIN

In view of the enormous amount of underground railway construction which has just been approved for New York and the agitation in other American cities for similar means of transit it may be timely to discuss the latest extension to the subway system of Berlin, Germany. In size the Schöneberg-Berlin installation, which is described in this issue, is not a very impressive undertaking, inasmuch as it is only 1.85 miles long. Nevertheless it is quite interesting from the standpoints of transportation and of city development. As is well known to many of our readers, the city of Berlin and parts of the adjacent suburbs are densely built up with apartment houses, which average five stories in height. This congested condition, combined with a zone system of comparatively high fares, made financially successful the pioneer subway-elevated line, which is operated east and west through the best traffic areas of Berlin by the Elevated & Underground Railway Company. This company found it impracticable, however, to build extensions in the western suburbs owing to the onerous franchise terms which were demanded by the independent municipalities of Schöneberg, Wilmersdorf and Charlottenburg. Instead each of these communities began to plan its own routes without much regard to the course to be followed by its neighbors, although all of these lines would have to feed, at least for a time, the existing system because of the latter's central geographical position. It is significant that the Schöneberg line, which is the only one of these projects so far undertaken and completed, will be operated for the next four years by the present company as part of its system.

The new Schöneberg subway illustrates one way of securing extensions of existing subway lines, where the company is unwilling to build for the traffic to be secured, or is unable to reach terms for such work with the municipality. This question came up seriously in New York before the recent decision in favor of a comprehensive system of subways, and the plan was seriously suggested there to raise the money necessary to secure the construction of extensions of the existing subway by special assessments against the property directly to be benefited. No other logical method of satisfying the strenuous demands for subway extensions from property holders in different outlying sections of the city seemed available. In a sense, this was the plan followed in the extension of the Schöneberg subway.

There is a great difference in the benefits which accrue to the citizens of Berlin and New York from subway development. In Berlin every extension, whether owned by a private company or a municipality, means an increase in fare, whereas in New York it is possible to-day for a passenger to ride for 5 cents more than twice as far as he is able to ride in Berlin for 10 cents. In the future the odds will be still more against the New York company because it has been shown that even without extensions the average length of ride in New York is increasing.

In this connection it might be said that one serious drawback to the service supplied by the Berlin subway and elevated system, from the rider's point of view, is the absence of any express tracks. As there is no provision

for their subsequent installation, this inconvenience will become more and more burdensome as the rapid transit system is extended.

The general transportation features and rolling stock practice of the new Schöneberg subway offer little of striking interest to the operator of heavy electric railways who is already familiar with German methods. There is much to interest him, however, in the methods of construction and in the elaborate precautions which have been taken to insure the convenience of the passengers and their safety in emergencies. Another most interesting feature of the latest Berlin subway is the combination of art and utility in the design of the stations and portals. The entire project, in fact, was so largely a matter of civic pride rather than of plain business methods that the designers were given a free hand in applying what they should consider the most appropriate embellishments. While no private corporation could be expected to follow the lavish example of Schöneberg in this respect, there is no valid reason why a municipality should not grant subsidies for the artistic construction of railroad structures which are of a quasi-public character. In fact, this is often done by ambitious suburban towns in this country in the case of steam railroad stations, and the practice might well be extended to passenger stations and shelters on electric railways.

THE PUBLIC FUNCTIONS OF THE ENGINEER

The present trend of civic affairs brings the engineers and operating officials of railway systems steadily into closer and closer interrelation with public officials and commissions. Whatever the merits of the situation, it is a fact that public service corporations of every kind are being brought more and more closely under the supervision of the civil government, be it national, state or municipal. Hardly a day passes when some question is not under actual examination between public officials and transportation companies. In the past investigations of this sort have been hampered by considerable acrimony on one or both sides, and have frequently led to disagreeable if not unfortunate results. At present the situation has greatly improved, the public having learned that the modern railway man has a keen sense of his responsibility toward the people who constitute his patrons and their representatives, and the transportation companies themselves have found that with the new state of things has come a more friendly spirit and a more reasonable view of the responsibility of companies toward their stockholders. These last, it must not be forgotten, are to be found in every class of every community, and this fact itself tends to establish a better mutual understanding.

The situation as a whole brings, or ought to bring, the real directors of railway activities to the front in dealing with the representatives of the company. The time has gone by when the two parties at a hearing on transportation matters can be advantageously represented merely by a pair of bristling lawyers bent on gaining only the utmost possible advantage for their respective clients. A broader view of equities has arisen, in which a plain statement of the working facts of a road has vastly more weight with a commission or even with its attorney than an obviously *ex parte* presentation of the case by the legal department. It, therefore, behooves the real operators of the transportation system, who are responsible for the details that make its success or failure, to put themselves in a position to be able to lay down the facts in the case frankly, clearly and fully when they are required, and experience has shown that carrying out this policy often smooths the path over difficulties and even prejudices apparently formidable. When questions arise which can be settled only by an appeal to fundamental facts it is the man who has these facts at his finger tips whose opinion commands the greatest respect. A statement made with hesitation or coupled with a profession of ignorance as to collateral matters apparently related to the subject at hand always produces a bad impression and a suspicion, however unjust, of endeavoring to conceal the truth. The public does not realize the degree of subdivision of labor necessary in the modern transportation system and how genuinely ignorant, unfortunately, some heads of the departments may be of the work which is being carried on by others. There is real need of such a closer co-ordination of work as shall enable chief engineers and heads of operating departments, to say nothing of the higher officials, to have the existing conditions well within their grasp. Often a few words of explanation from one who knows what he is talking about will forestall a wearisome investigation, exasperating to every one connected with it.

The constant tendency in the operation of the affairs of a large company is toward this subdivision of effort. It is as necessary in administrative affairs as it is in manufacturing, but, and this is the point which we wish specially to impress, it can be carried to an extreme in the one case as in the other. The business of a large concern soon gets beyond the personal grasp of any one man, but there is no reason why it should get beyond the grasp of the group who are actually directing the activities of the whole organization. The time comes, we think, when it is generally advisable to adopt measures to counteract the effects of too great specialization of effort by such means as may be available. A half dozen men in a railway corporation who really know what is going on, who are in the habit of comparing notes and of keeping up with the progress of the art, as far as may be, in each other's specialties, form a force that is pretty nearly invincible from the standpoint of operating efficiency and of prompt and effective dealing with public questions. The well-carried-out system of conferences between department heads, practised already in many organizations, is invaluable in securing this solidarity of action.

We believe, however, that the problem involves more than this. There is also a large field for personal effort. If the chief engineer understands the practical workings of the transportation department pretty thoroughly and both have gained a sympathetic view of the troubles of the master mechanic, the three combined make a force vastly more effective than the three separately, and when, as now, the strong tendency is toward playing the game with the public absolutely on the square, with the cards on the table, the practical value of men with a profound knowledge of the situation ought to be obvious.

THE EXHIBITS AT THE 1911 CONVENTION

The first indication of an approaching convention is always the published list of manufacturers who propose to exhibit there. This list for the 1911 convention is published elsewhere in this issue and is very representative of the electric railway manufacturing industry. It also shows that the exhibit will be at least up to all past standards in extent, character and interest. In fact, the applications for space now exceed in area those at this time last year.

Most railway men who have attended conventions for years have come to take the exhibit feature largely as a matter of course. By this we do not mean that they do not utilize to the fullest advantage the opportunity of profiting by examining the apparatus shown and by discussing its uses with the manufacturing experts in attendance. We mean simply that they look upon the exhibits as an inseparable feature of the convention and that the vast majority would protest strongly, as they did a few years ago, against any suggestion that the manufacturers abandon their exhibits.

We can easily conceive, however, the surprise at the extent and instructive value of the exhibits of any one who had previously never attended a convention. Here under one roof he would find assembled the latest type of practically every class of machinery employed in electric railway operation. The very largest and heaviest machines, such as turbines and generators, might not be shown, and they would be represented by smaller types. But the exhibit would include such heavy apparatus and equipment as large pieces of special work, cars, trucks and often even electric locomotives. The convention visitor will not only have the opportunity of examining all of this equipment, but of seeing it working, so far as such a condition is practicable. In the machine-tool section drills, planers and lathes fitted with the most modern form of high-speed tools will be in service. Wheels will be turned and pressed on axles and motor casings will be re-bored. The same practical exemplification of the uses of the other equipment will be in progress elsewhere in the hall. Nor is this all. In charge of these exhibits or at them a visitor will find the best engineering and operating talent in the country represented among the users and manufacturers, men who have spent practically their entire lives in developing these machines and in using them.

If we assume there are 200 exhibitors at a convention, it would take an electric railway manager or engineer practically a year to visit each city where this same apparatus was manufactured and to see actually in service the same equipment as that to be shown at Atlantic City. The year thus spent would undoubtedly be profitable to any one engaged in the practical side of electrical railroading. But even if one employed his time in this way he might not find in their home cities all of the representatives or engineers of the manufacturers who would attend a convention, and he would, of course, not find on any such trip as many railway men with whom he could confer about the merits of the individual apparatus exhibited. Some of those railway men who attend a convention, as well as many who remain away, do not perhaps realize its full importance unless they stop to consider in just what other way they could see the same apparatus and meet the same men, and should compute the time which such an undertaking would require.

The fact should not be forgotten that the prosperity and even the existence of an electric railway undertaking is indissolubly bound up with the character of the apparatus used. No skill in operating methods only will compensate for a lack of proper equipment; indeed, the highest operating knowledge presupposes a full acquaintance with the developments of the manufacturing art in electric railway equipment. And in no place can this acquaintance be so quickly and accurately gained as at the annual convention.

TERMS OF THE SUBWAY PROPOSALS

The statement of President Shonts, of the Interborough Rapid Transit Company, in defense of the final offer of that corporation for rapid transit development in New York City, which was rejected by the city representatives, emphasized the point that the directors were not justified in destroying a valuable earning property by making further concessions in terms. That the earnings of the present subway system were computed by the Public Service Commission of the First District at between 17 and 18 per cent on the investment of the company is evidence, whether perfectly accurate or not, of an earning capacity of an extraordinary character. It is not remarkable that the Interborough Company should seek by every means within its power in the negotiations to conserve the returns on its investment or, on the other hand, that the Brooklyn Rapid Transit Company should be tempted by the example furnished by the present profitable subway to enter upon a great program of expansion.

These conditions make it of interest to review the offer which represented the last concession of the Interborough Company. It was proposed by that company to construct, equip and operate the subway lines allotted to it by the report of the special committee, as amended, upon payment by the city of one-half of the cost of construction. The initial capital expenditure of the company under this plan, counting the cost of the present subway lines, as of June 30, 1911, at $48,029,668, would be approximately $125,000,000. Upon the final equipment and operation of the new lines the gross receipts of the existing system and the new lines were to be pooled and certain agreed deductions made. These consisted of operating expenses, provision for depreciation, renewals and obsolescence, taxes, insurance and rentals to the city on the present subway. While the return to the company was stated nominally as the next charge on the gross receipts it was to be cumulative and thus assured. Any deficits that existed were to be adjusted annually out of a fund which the company was to provide as part of its capital expenditure and they would thus be capitalized. The rate of return was to be 9 per cent upon all capital furnished by the company during the entire period of the contract, consisting of 5 per cent interest and 1 per cent sinking fund upon the capital furnished by the company for the new subways and the old system, plus 3 per cent which was to have been termed compensation for the pooling of the receipts, leveling the leases of the present subway and exchange of different lines so that the city

could acquire complete operating parts of the enlarged system, and, in general, "for services in connection with the operation of the property."

These are broad references to details of the negotiations that have been under discussion for many months. The receipts as classified were to consist under either the Interborough or the Brooklyn contract of: (a) The value of the tickets collected at stations; (b) miscellaneous earnings from stations; (c) a pro-rata of advertising and other general receipts. By the leveling of leases is meant the acceptance by the Interborough Company of shorter terms on its present system so as to make the leases of all the lines expire at the same period, forty-nine years from the commencement of operation of the new subways, or, as estimated, in 1964. Under the present contracts the leases of the principal lines built under Contract No. 1, covering the original system, expire in 1954, or, allowing for the option of a renewal for twenty-five years, in 1979; and the leases under Contract No. 2, which covers the tunnel under the East River and the Brooklyn extension, expire in 1943, or, allowing for the optional renewal extension, in 1968. The proposed exchange of lines was designed to give the city the right to take over at the end of ten years, if it desired, either one of the two main north and south routes which would have been created under the enlarged subway system; that is to say, either the present subway line north of Forty-second Street with the projected extension down Seventh Avenue to the lower west side of Manhattan Island and Brooklyn, or the present subway line south of Forty-second Street with the projected extension in Lexington Avenue to the Bronx.

After provision for the preferential payment to the company the next charge on the receipts was to consist of interest and sinking fund requirements upon the capital furnished by the city for the construction of new lines. From the remaining receipts in any year the city was to receive a sum which would raise the total payments to it to 9 per cent on its capital investment in the new subways. Any remaining receipts were to be divided equally between the company and the city.

Without detailed explanation of certain points of difference, arising mainly from territorial questions, between this plan and that of the Brooklyn Rapid Transit Company, which has been accepted by the city authorities, attention may be called particularly to the modifications of the financial arrangement. In the Brooklyn plan it was proposed to pool the gross receipts of present lines embraced in the agreement and new lines to be constructed in accordance therewith and to provide first for operating expenses, with depreciation, renewals and obsolescence. From the balance there was to be retained by the company annually, in lieu of all earnings on existing lines, before other charges were met, a sum representing the net profits from operation of the existing lines included in the agreement during the year ended June 30, 1911, but not to exceed $3,500,000, proper deductions having been made for current depreciation; the receipts of existing lines above this sum to be pooled for distribution upon the general terms fixed. The next charge was interest and amortization upon the new capital supplied by the company for construction. Under the offer of the company provision was to be made then for taxes, insurance and rentals of leased lines, if any. However, the amended report of the committee of the Board of Estimate and Apportionment and the Public Service Commission recommended that the company incorporate with its existing lines, in such manner as the commission might propose, subsidiary lines held under lease and that no allowance be made under operating expenses for further rental of such lines. The last charge was to consist of interest and amortization upon the cost to the city of the lines constructed by it. After these deductions the balance was to be divided equally between the city and the company.

The city authorities were insistent upon the application of like bases in certain particulars in the contracts with either or both companies. Both the Interborough Company (together with its subsidiary, the Manhattan Elevated Railway) and the Brooklyn company were to be required to submit their plants to examination by a board of engineers to be named by the Public Service Commission and to make provision to cover such deferred maintenance as the commission might require to be met. Whether this provision was to be made from existing surplus or current earnings was to be optional with the companies. Costs of construction were to be the costs in money. It was partly owing to the provision that the city should have the right to take over the lines at the end of ten years on payment of a bonus of 15 per cent that the city authorities maintained that discount on bonds should be excluded from the cost of construction. In the general terms favored by the city conferees for application to any new contract it was suggested that in connection with the annual charges of the operator for carrying the cost of equipment provision be made for a sinking fund of not to exceed three-quarters of 1 per cent per annum to meet obsolescence. It was also suggested that in any segregation of operating costs that might be made between old and new lines, the costs of transportation, power, maintenance of equipment, general expenses and general taxes, the costs for the extensions should be determined on a per passenger basis, according to unit results on the entire system.

With respect to the final effect of the proposed new plan on the Interborough Company finances the city committee considered as conservative the estimate of the company that accumulated deficits on the preference payment of $12,150,000 a year would be discharged within eight years from the beginning of operation, while the deficits of the city on its interest accounts would be discharged in five years more. The rate of increase in population in New York City in the decade 1910-20 was estimated at from 38.7 per cent, the rate in 1900-10, to 45 per cent. In a special study of this subject the commission stated that no one had estimated the increase in the next decade at less than 35 per cent, and it assumed that traffic should increase in this period not less than 70 per cent.

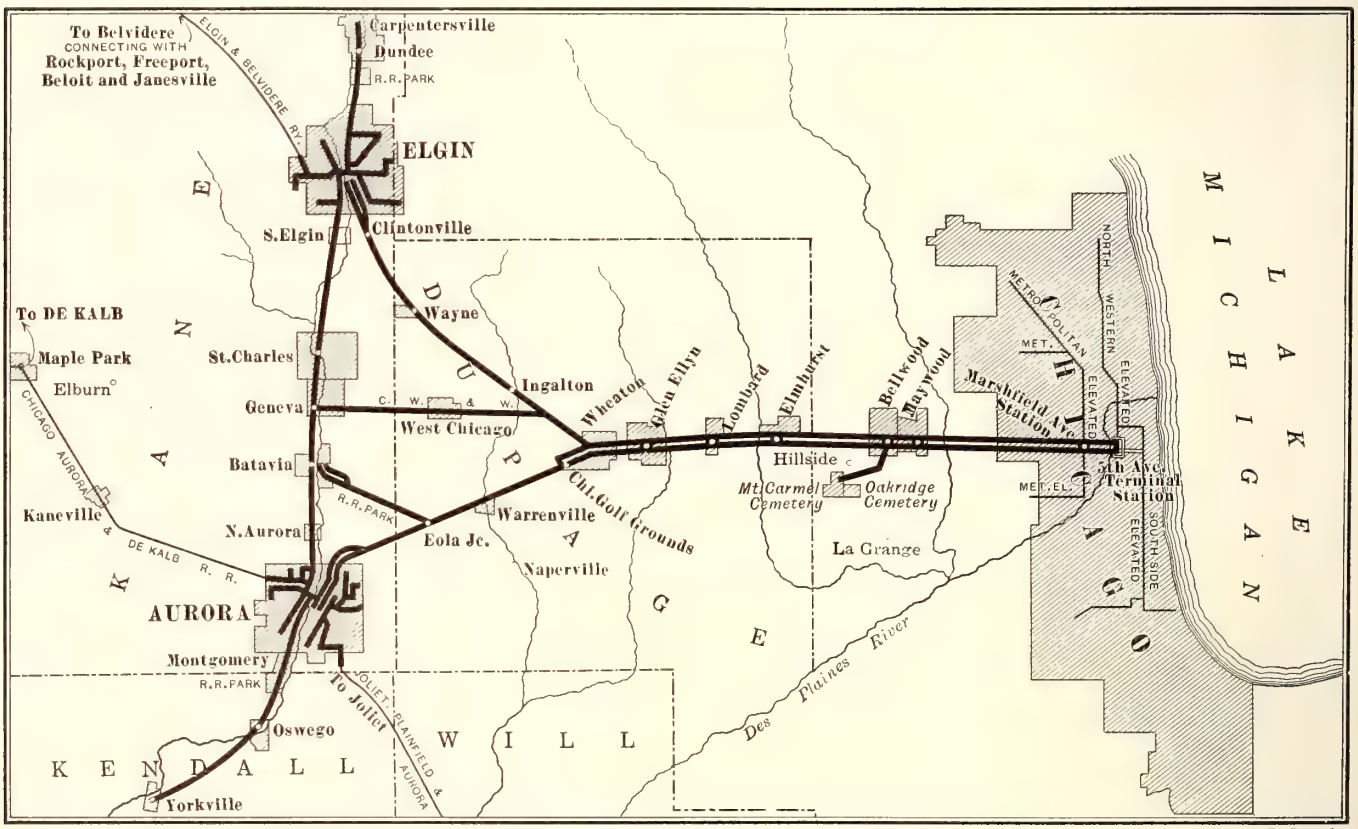
If no serious dilution of its earning capacity is effected through the construction of extensions in outlying districts the Interborough subway remains an enterprise which will illustrate the great profit possible for pioneer development of this character in this country. Because of the strength of its position in this respect this company was able to determine the limits beyond which it would not go.

Development of the Aurora, Elgin & Chicago Railroad

This Road, Now Nine Years Old, Was Built for Very High Speed Service. The Traffic Has Increased Rapidly and Numerous Interesting Operating Changes Have Been Required to Meet New Conditions.

The Aurora, Elgin & Chicago Railroad Company operates frequent trains on a high-speed third-rail road between Chicago and four terminals in the Fox River valley, 40 miles west. It also furnishes these western terminals with city street railway service in Elgin and Aurora. Lighting and power service is supplied to eight cities and towns. The accompanying map shows the third-rail and trolley routes operated and the relative location of the cities served.

The first section of the third-rail division, that between Aurora, Wheaton and Fifty-second Avenue, Chicago, was opened for public service on Aug. 25, 1902, and on May 26, 1903, the section from Wheaton to Elgin was put in operation.



Electric Ry. Journal

Aurora, Elgin & Chicago—Map of Route

During the first two and one-half years the Aurora, Elgin & Chicago Railroad Company's cars ran to a terminal station at Fifty-second Avenue, Chicago, where through passengers had to transfer to cars of the Metropolitan West Side Elevated Railway. The Fifty-second Avenue terminal is 6.5 miles from the "loop" district, which is the business center of Chicago. In March, 1905, the companies entered into a traffic agreement providing for the use of the Metropolitan tracks for entrance to the center of Chicago by the Aurora company's cars, and a large terminal station was built at Fifth Avenue and Jackson Boulevard in the "loop" district. The Metropolitan company operates over private right-of-way, and its franchise in Chicago covers the right to cross streets. At the time at which the traffic agreement was made this franchise had forty years to run and the agreement between the two roads is for the life of the franchise and any extensions thereof.

General Engineering Features of the Property

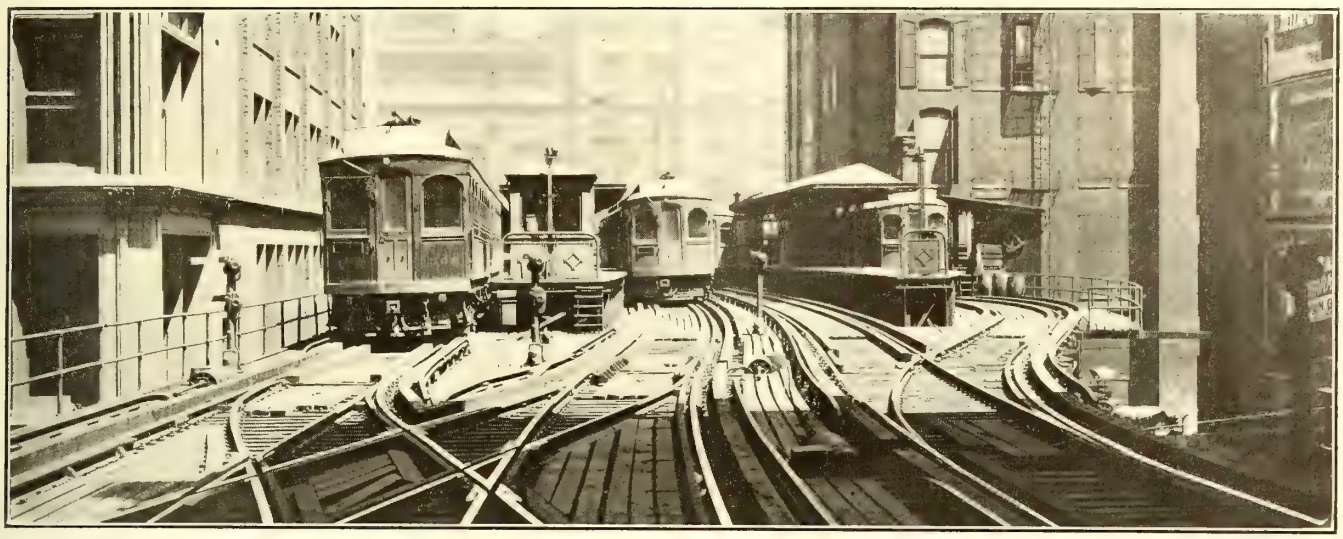
Several articles published in the Street Railway Journal during 1902 described the construction details of the Aurora, Elgin & Chicago Railway, which at that time exemplified the most advanced ideas then held in regard to high-speed interurban electric roads. The road was designed to compete actively with several large steam roads, in whose territory lying just out of Chicago to the westward it had been built. At that time the use of a third-rail for operating interurban cars was somewhat of an experiment, and to provide for such a project in the complete and necessarily expensive way that was followed seemed to many at the time like building for the very distant future. That the enterprise has been a success and that the standards set at that time were warranted the present business and condition of the road fully attest. It is the purpose of this article, after briefly reviewing the original scheme, to describe some of the more interesting operating features, as well as the more important changes and extensions which consolidation and the development of a unique property have demanded.

Originally the road was designed for strictly high-speed interurban service, with the expectation that local trains would stop on the average every 3 miles, and that limited trains would stop every 7 or 8 miles. The excellent service offered, however, has caused the territory to be built up rapidly, and this condition has had a reflex influence on itself, which might properly now be termed

"rapid transit suburban service," as there are twenty-seven regular local stops in the 25 miles between Chicago and fic. Each of the single-track sections has long through sidspite the fact that largely the same territory is traversed by five paralleling steam trunk lines, because of the shorter

Ridge and Mount Carmel cemeteries, near Chicago, was built in 1906 to care for the rapidly increasing funeral traffic. Each of the single-track sectio..s has long through sidings which greatly facilitate operation.

From Fifty-second Avenue, the end of the elevated



Aurora, Elgin & Chicago—Loading Platform Above Fifth Avenue Terminal Station

structure in Chicago, westward through Wheaton to the operate at a maximum of 70 m.p.h. The road hauls freight and has track connections, either directly or through belt-line roads, with all of the steam lines entering Chicago.

ROADWAY AND TRACK

As shown by the map on page 220 the line has a double track between Chicago and Wheaton, a distance of 25.5 miles. West of Wheaton the tracks diverge. One

structure in Chicago, westward through Wheaton to the four termini at Aurora, Batavia, Geneva and Elgin, all track, including that within municipalities, is upon private right-of-way. The Fox River valley division from Carpentersville southward through the four cities just named and on through Oswego to Yorkville is built upon the highway when it passes through the municipalities, but largely upon private rights-of-way in the country. The right-of-way of the third-rail division varies in width from 66 ft. to 100



Aurora, Elgin & Chicago—Joint Station on Metropolitan Elevated at Marshfield Avenue Junction

extends northwesterly from Wheaton to Elgin, a distance of 16 miles, the other in a southwesterly direction to Aurora, a distance of 15 miles. There are also branches from Eola Junction, on the Aurora branch, to Batavia, 6 miles, and from Geneva Junction, on the Elgin branch, to Geneva, 10 miles. A 3-mile trolley line from Bellwood to Oak

ft. and is protected by a woven wire fence 5 ft. high, the street and highway intersections being closed in with wing fences and the track is protected throughout by Climax tile cattle guards.

The table on the following page shows the trackage of the system subdivided into sections.

MILES OF TRACK OF AURORA, ELGIN & CHICAGO RAILROAD

	Main.	Second.	Siding.	Industrial.	Total
Third-Rail Division.					
Chicago to Aurora	32.66	22.54	0.14	3.67	59.01
Batavia branch	5.89	0.88	....	1.14	7.91
Wheaton to Elgin	15.89	0.56	0.77	1.22	18.44
Cemetery branch	2.25	....	0.25	0.15	2.65
Geneva Jc. to Geneva	9.35	....	0.40	0.07	9.82
Total	66.04	23.98	1.56	6.25	97.83
Fox River Division.					
Aurora-Elgin	18.88	....	0.80	0.11	19.79
Aurora-Yorkville	12.14	2.03	0.08	0.21	14.46
Elgin-Carpentersville	4.20	....	0.26	....	4.46
Total	35.22	2.03	1.14	0.32	38.71
Aurora city lines					18.10
Elgin city lines					14.98
Total all lines					169.62

1½ horizontal to 1 vertical. In grading the single-track branches, many of the heavy cuts were excavated for the full double-track width so that in the future, when double track is needed, much of the expense of grading at these points will be avoided. The maximum grade was kept at 1 per cent maximum and the curves on the high-speed section in the country at 3 deg. An 80-lb. A. S. C. E. standard rail in 60-ft. lengths with broken joints is used, the joints on one rail being laid opposite the center of the other rail. There are 2816 ties to the mile. Cedar ties of standard size are used on straight track and white oak ties on the curves. Six inches of ballast was placed under the ties. During the past nine years the cinders from the power house have been used as ballast. The cedar ties show



Aurora, Elgin & Chicago—Concrete Bridge at Geneva

FOUR-TRACKING

Some of the trains of the Metropolitan West Side Elevated run for 3 miles over the tracks of the Aurora, Elgin & Chicago from the joint station at Fifty-second Avenue to Forest Park, an amusement resort at Desplaines Avenue. The traffic on this section is now so large that the Aurora company has arranged with the Metropolitan elevated company for the construction of two additional tracks as far west as Desplaines Avenue for the use of the local elevated trains. The cost of these two additional tracks will be borne entirely by the Metropolitan company under the terms of the traffic agreement between the two companies. The right-of-way is of ample width to accommodate this new trackage.



Aurora, Elgin & Chicago—View on Double-Track Division Near Glen Ellyn

THIRD-RAIL TRACK

On double track the roadbed of the third-rail division is 30 ft. wide and in cuts 34 ft. wide, with banks sloped

the effect of very little rail cutting after nine years of heavy traffic, and the oak ties, so far as can be estimated, will have a life of from ten to fourteen years. The ties when installed received no preservative treatment. A Commonwealth weed burner has recently been purchased for track maintenance work.

The third-rail, which is a 100-lb. T-section, is supported by white oak ties, 6 in. x 8 in. x 9 ft., spaced 10 ft. apart.



Aurora, Elgin & Chicago—Example of a Standard Through Girder Bridge

The steel in the third-rail is low-carbon and has a conductivity as compared with copper of about 1 to 8. The wear of the third-rail is practically negligible. The original type of third-rail insulator is still employed. The insulators are of wood impregnated with paraffine and provided with malleable-iron bases and caps.

BRIDGES

All bridges and culverts along the third-rail division are

of sufficient strength to carry heavy standard railroad equipment. They were designed to carry Cooper's E-40 loading, with a factor of safety of four. Ten of the bridges are of steel and vary in length from 20 ft. to 157 ft. All other bridges and culverts are of concrete. Some of the concrete bridges have arches 70 ft. long and all have ballasted decks, so that the track surface is unbroken. An illustration of one is presented on this page.

GENEVA BRANCH

The Geneva branch is the newest section of the third-rail division, and was made a part of the operating system in 1909. In the design of the roadbed and structures of this division the standards on the original part of the road were closely followed. This branch when built was known as the Chicago, Wheaton & Western Railroad.

The Geneva branch joins the Elgin branch at Elgin Junction, about 2 miles west of Wheaton, and from there extends due west through West Chicago to Geneva, on the Fox River trolley division. West Chicago has a population of 3500 and is an important steam railroad junction point. Here the new third-rail division is carried over the yards of the Chicago & Northwestern Railroad and the Elgin, Joliet & Eastern Railway on a through truss with a span



Aurora, Elgin & Chicago—Bridge Over Steam Railroad Tracks at West Chicago

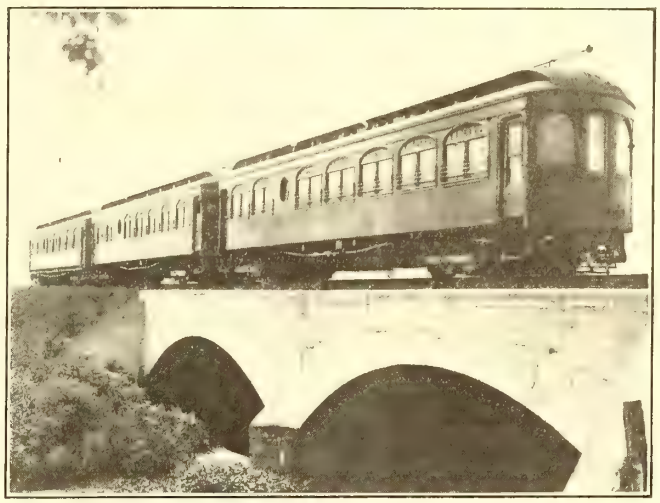
of 260 ft. and long earthwork approaches, which contain 220,000 cu. yd. of earth. In making borrow pits to obtain this material a deposit of about 50,000 cu. yd. of excellent gravel was uncovered. Geneva is entered over a large concrete bridge across the Fox River. This structure has six 56-ft. arches and one 40-ft. arch, all of which support a roadway 50 ft. wide. A view of this bridge is shown.

The track on the new Geneva branch is laid with 70-lb. rail in 33-ft. lengths, connected by "Continuous" joints and bonded with two No. 0000 bonds. The third rail is a 60-lb. T-section, carried on Ohio Brass Company porcelain insulators and bonded with two 250,000-circ. mil compressed terminal foot bonds. This track is ballasted with washed gravel. Its grades and curves conform to those of the original road.

TRACK AND THIRD-RAIL BONDS

The track of the original third-rail divisions, when built, was bonded at each joint with two 250,000-circ. mil "Protected" rail bonds 12 in. long and with 16/16-in. terminals. The third-rail, weighing 100 lb. per yard and in 33-ft. lengths, was bonded with two 500,000-circ. mil foot bonds per joint. These bonds are U-shaped and have 1-in. terminals. Both styles of bond were furnished by the Electric Service Supplies Company, and were applied in large part by the use of hydraulic punches and compressors.

The apparatus of the rail-bonding department now includes a bonding car, furnished by the Electric Railway Improvement Company, for electrically welding bonds to the rail and equipped with various types and sizes of clamps



Aurora, Elgin & Chicago—Ballasted Floor Concrete Bridge

and electrodes, so that any capacity of bond may be applied to the head or web of either the running rail or the third-rail. The company also owns and operates a test car of the Herrick type for making an autographic record of the condition of all bonds. This car is run over the system periodically. A test by it of the condition of all the third-rail tracks, conducted six years after the bonds had been installed, showed that 98 per cent of the bonds were perfect. Practically all of the 2 per cent defective bonds were found either at special track work or at highway crossings where



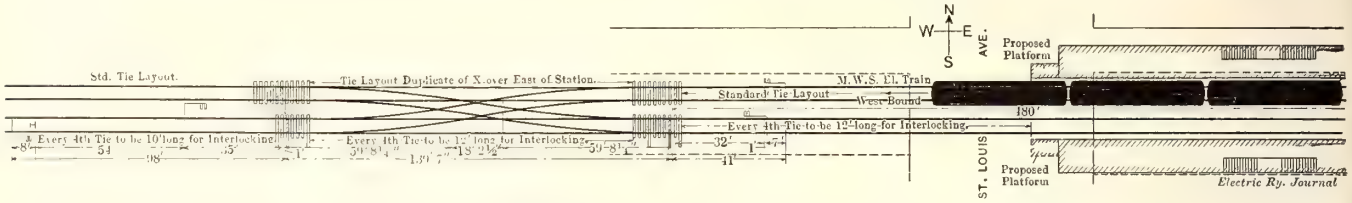
Aurora, Elgin & Chicago—Station at Elgin

it had not been possible conveniently to keep the rail joints tightly bolted.

STATIONS

The principal station on the road is the Fifth Avenue terminal, near Jackson Boulevard, in the Chicago Loop district. This station, which has four tracks, all above the roof of the building, is used jointly with the Metropolitan Elevated road. The usual waiting room, restaurant, barber shop and toilet facilities are provided here, and the head-

quarters of the general passenger and freight agent are on the ground floor. There are two other stations in Chicago, both on the elevated route. One is at Marshfield Avenue, at the junction of the four-track and the three double-track divisions of the Metropolitan Elevated. The other is a joint terminal at Fifty-second Avenue. The latter consists of two depots connected by a subway and alighting and will reduce the time of station stops materially during the rush hour. When the platforms have been raised to the level of the car floors it is planned to install agents at these stations near Chicago and to sell one-day round-trip tickets, good only on the date of sale. The color of the tickets will be changed from day to day to permit their easy identification.



Aurora, Elgin & Chicago—Diagram Showing Arrangement of Pocket Tracks at St. Louis

arranged for easy transfer of local passengers between the through interurban trains and the local elevated trains. Views of these stations are published.

At Aurora, Elgin and other Fox River cities the passenger stations are remodeled store buildings changed to meet the service requirements. The Aurora station is used jointly with the Joliet, Plainfield & Aurora and the Aurora & DeKalb interurban lines, and the Elgin station is occupied jointly with the Elgin & Belvidere interurban line. This latter station is reached on a private right-of-way, extending 1 mile along the river front to the main street intersection of the business district.

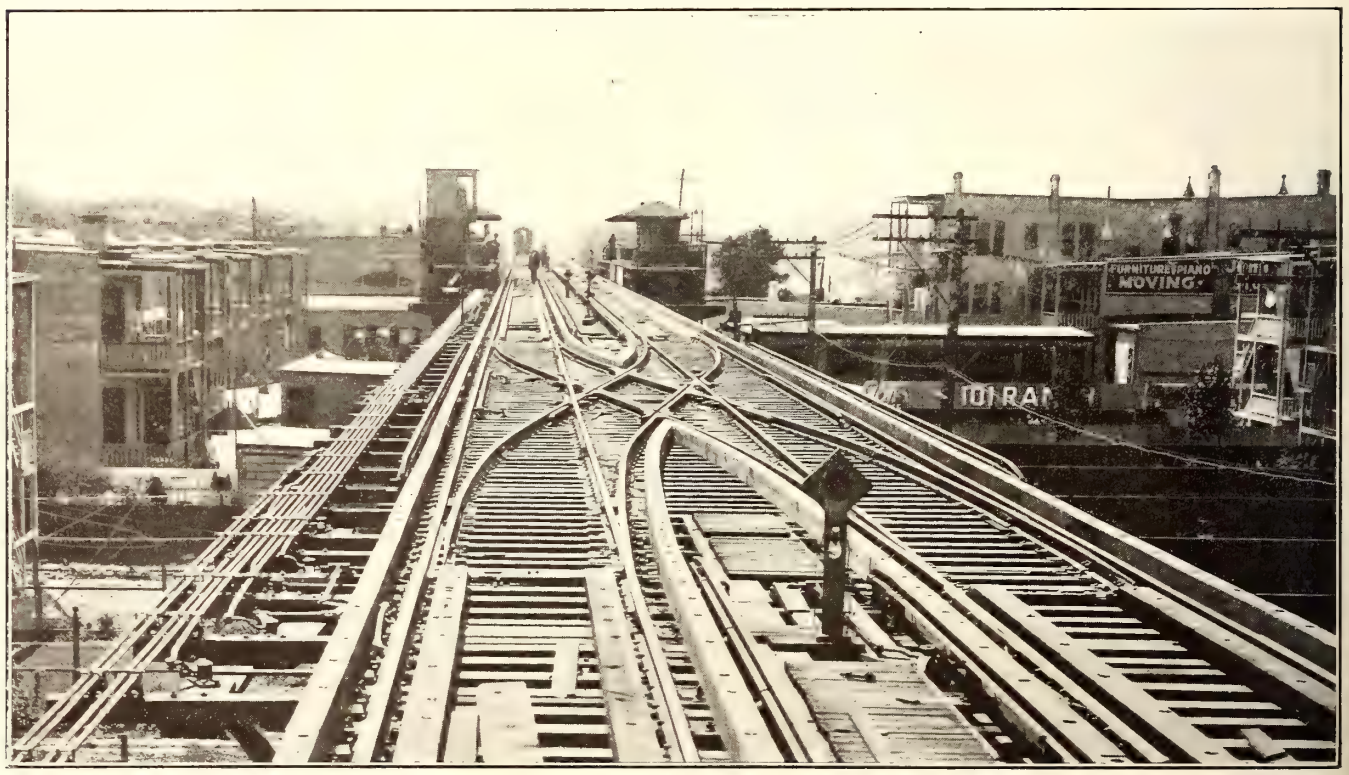
Shelter stations of attractive designs, as described in the Electric Railway Journal for Oct. 2, 1910, have been built at six points along the third-rail division. These stations cost approximately $2,000 each, and are of a permanent, fireproof type, as illustrated on page 225.

The general operating headquarters, located at Wheaton, are installed in a three-story brick building, formerly used as a hotel, but since re-equipped for an office building.

Because of the rapidly increasing traffic to and from the suburban stations near Chicago the ten platforms at five stops, between Fifty-second Avenue and Bellwood, will be raised to the height of the car floors and made long enough for four-car trains. This will accelerate boarding and

POCKET TRACKS ON METROPOLITAN ELEVATED

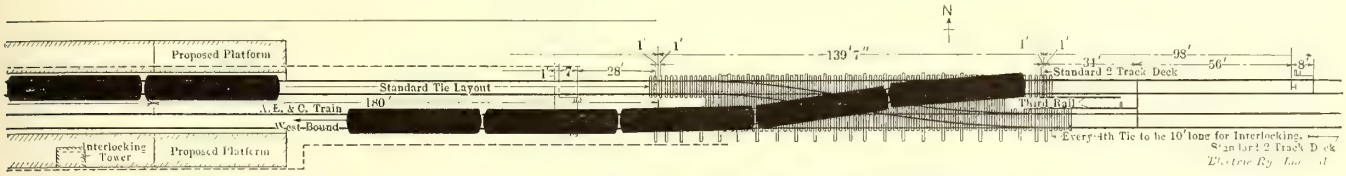
A new interlocking plant controlling two sets of diamond crossovers has just been put into service at St. Louis Avenue on the Metropolitan elevated structure. This new plant is installed so that the trains of the Aurora, Elgin & Chicago Railway, which overtake the slower Metropolitan trains midway between the Marshfield Avenue junction on the elevated structure and the Fifty-second Avenue terminal, may be passed around the Metropolitan trains while the elevated trains are standing at the St. Louis Avenue platform. Ordinarily an interurban train leaving Fifth Avenue overtakes and passes a Metropolitan train at Marshfield junction, where the four-track division of the Metropolitan Elevated is subdivided into three double-track divisions. After loading at Marshfield Avenue the interurban trains then run westward on the Garfield Park double-track structure. The running time of these trains, however, is so much faster than that of the elevated



Aurora, Elgin & Chicago—One of Two Diamond Cross-Overs for Pocket Tracks at St. Louis Avenue

company's cars, which stop at every platform, that ordinarily a second elevated train one interval ahead of that first passed is overtaken at St. Louis Avenue, halfway between Marshfield Avenue and the joint terminal station at Fifty-second Avenue. Similarly the inbound trains of the Aurora, Elgin & Chicago usually overtake the elevated company's trains near St. Louis Avenue.

Until the new interlocking plant was installed the interurban trains were obliged to follow the elevated trains at the slower speed for about 2 miles from St. Louis Avenue west to Fifty-second Avenue, or east to Marshfield Avenue. The accompanying diagram shows the arrangement of tracks and signals just installed at St. Louis Avenue to remedy this condition and permit an elevated train while making a stop at this station to be passed by an interurban train. A half-tone on page 224 gives the general appearance of one end of the track layout. The interlocking plant is of the mechanical type, and crossovers have No. 7 frogs. The work in connection with these crossovers and the interlocking was installed by the Metropolitan Elevated forces.



Avenue by Which an Aurora Train Is Passed Around a Metropolitan Elevated Train

SIGNALS

During the past year automatic block signals have been installed at two locations on the Elgin branch of the third-rail division of the Aurora, Elgin & Chicago Railroad, where the view was obstructed by curves, and the company will install in the near future a comprehensive system of block signals on its entire third-rail division.

The equipment already installed on the Elgin branch was manufactured by the General Electric Company. It consists of a. c. motor-operated signal mechanisms which actuate standard steam railroad semaphores mounted at the tops of steel masts. The indication given by the signals is at all times controlled by the position of the cars on the track, and the installation is so laid out that but one car at a time is permitted to operate over the portions of the roadway where the view is obstructed. Energy for the control and operation of the signals is obtained from the power-distribution system of the road.

In addition to these block signals, signal equipment has been purchased for the district between Maywood and Bellwood, about 3 miles of double track. Here the purpose is to facilitate the safe movement of the funeral trains, which, in operating westward from Chicago past Maywood, must cross over the eastbound tracks in order to reach the single-track branch leading south from the junction at Bellwood. The speed of the limited trains is very high through this section, and it is desirable to display distant indications of the occupancy of the tracks by funeral trains moving against normal traffic.

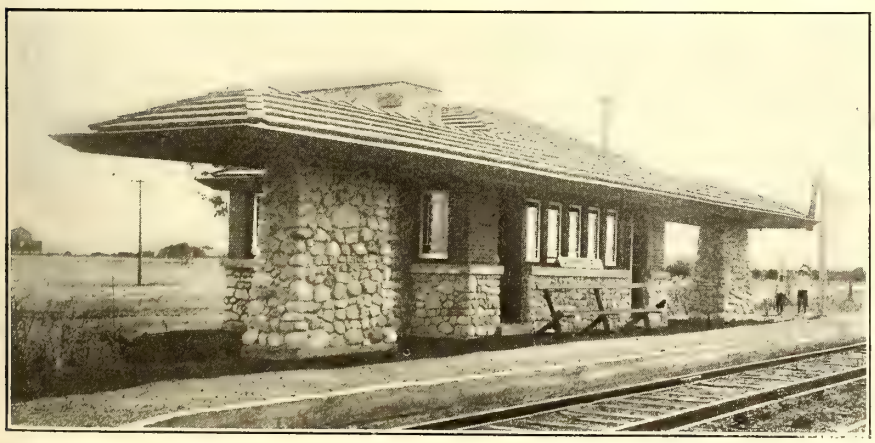
On the Fox River division a number of trolley-contact signals of the United States Electric type have been installed to protect the congested sections of track.

The principal highway crossings along the third-rail route are protected by bells and signals manufactured in part by the National Electrical Manufacturing Company, of Elgin, and in part by the Hoeschen Manufacturing Company, of Omaha. These crossing signals are all designed to announce the approach of a train by the ringing of bells and lighting of lamps This service is being extended as needed and about twenty-five Hoeschen bells are now on order.

HIGH-SPEED PASSENGER TRAIN SERVICE

The Aurora, Elgin & Chicago Railroad operates its passenger trains on very close headway, in view of the extremely high speeds at which the trains runs. The schedule includes fifteen limited trains from the western terminals to Chicago in the morning, eleven limited trains from Chicago westward in the afternoon, in addition to thirty-nine local trains eastbound and forty-six local trains westbound. During the morning and evening rush hours—that is, from 6 to 10 a. m. and from 3:30 to 6:30 p. m.—the headway of trains between Chicago and Wheaton is not more than 15 minutes, and from Wheaton west on the three branches the headway is not more than 30 minutes.

The third-rail trains just mentioned connect with those of three interurban lines. At Elgin connection is made with the Elgin & Belvidere Electric Railway, which extends 36 miles northwest from Elgin to connect Belvidere with the Rockford & Interurban Railway system reaching Rockford and Freeport, Ill., and Beloit and Janesville, Wis. The cars of the latter two roads are not operated into Chicago, but make close connection with the Aurora, Elgin & Chicago cars, using the terminal in Elgin, and passengers are handled on interline tickets. At Aurora connection is made with the cars of the Chicago, Aurora & DeKalb road, and interline tickets are sold from Chicago via this road to DeKalb, distant 71 miles west of Chicago. Connection is made also at Aurora with the Joliet, Plainfield & Aurora road, which has an hourly service between the cities included in its name.



Aurora, Elgin & Chicago—One of Six of the Later Type of Shelter Stations

The car-mileage report on page 226 for the month of May, 1911, is interesting because it shows a very complete segregation of the service and because it includes a statement of the sizes of trains on different sections of the third-rail division. Such reports are rendered monthly and are made use of by several departments.

The trains operating to and from Chicago, on account of their high speed, have been able to gain and hold the patronage of probably 70 per cent of all the through business. Practically all the property between Fifty-second Avenue, Chicago, and Wheaton, 18.9 miles, has been subdivided and is being rapidly sold and built up by people who go to Chicago for business each day. Thus the commuter traffic is increasing at a rapid rate.

The rates of fare for the five different classes of tickets issued have been determined largely by the severe steam-railroad competition. A table reproduced on page 226 shows the fares in detail from the Fifth Avenue terminal station in Chicago to each of the important stations between Maywood and Elgin.

The competition of frequent through high-speed steam trains requires very fast running by the electric cars, so as to hold the advantage from the transportation standpoint. Multiple-unit train service is regularly operated, the motor cars having 500-hp capacity each and being geared to 70 m.p.h. The necessity for this very high gear ratio is felt

THE AURORA, ELGIN & CHICAGO RAILROAD COMPANY

Car Mileage Report

Month of MAY 1911.

LINE	This Year	Last Year	Increase	Decrease	Total This Year
Third Rail					
Passenger	260814	262565		1024.9	
Excursion	1062	2390		*1328	
TOTAL	261876	265155		1678.1	261876
Fox River Div.					
Aurora-Elgin	36101	41061		*5780	
A. Y. & M.	14096	14357		*261	
Elgin-Carpentersville	12212	12862		*650	
Express	2800	3278		*478	
TOTAL	65209	72378		*7169	65209
City Lines					
Aurora	69143	63700	5443		
Elgin	34900	31643	3257		
Fox River P. Ry.	7138	4574	2624		
TOTAL	131241	119931	11312		131241
Total Revenue Mileage	476326	457464	20862		476326
Third Rail					
Freight and Exp.	21508	15972	5536		
Grand Total Revenue Mileage	500234	473436	26798		500234
Third Rail Non-Revenue					
Work Train	4896	6615		*1719	
Fox River Non-Revenue					
Work Train	3463	3600		*137	
TOTAL	8359	10215		*2056	8359
GRAND TOTAL ALL MILEAGE	508593	483652	24741		508593

Total Mileage Third Rail Division

Passenger Motor	201656	201334			
Work Motor	30453			30817	
Half Motor	42232	45478		*3246	
Coach	25712	28855		2857	
A. E. & C. Freight Cars	5143	3275		*690	
Foreign Freight Cars	3442				
TOTAL	308680	287943	20737		308680

Total Mileage Fox River Division

Interurban	65209	72378		*7169	
City	131241	119929	11312		
Work	3463	3600		*137	
TOTAL	199913	195908	4005		199913
TOTAL ALL DIVISIONS	508593	483852	24741		508593

*—INDICATES DECREASE

NUMBER OF TRAINS OPERATED

Between Wheaton and Chicago

	THIS YEAR Trains	THIS YEAR Cars	LAST YEAR Trains	LAST YEAR Cars	INCREASE Trains	INCREASE Cars
1 Car	388	388	625	625	*237	*237
2 "	1042	2084	1008	2016	34	68
3 "	324	972	183	549	141	423
4 "	9	36	6	24	3	12
5 "	1	5			1	5
6 "						
7 "						
Total	1764	3485	1822	3214	58	271
CARS PER TRAIN THIS YEAR						1.98

Between Wheaton and Aurora

1 Car	738	738	710	710	28	28
2 "	159	318	185	370	*26	*52
3 "	17	51	27	81	*10	*30
4 "			1	4	*1	*4
5 "						
6 "						
Total	914	1107	923	1165	*7	*58
CARS PER TRAIN THIS YEAR						1.21

Between Wheaton and Elgin

1 Car	735	735	673	673	62	62
2 "	179	358	245	490	*6	*132
3 "	4	12	15	45	*11	*33
4 "			3	12	*3	*12
5 "						
6 "						
Total	918	1105	936	1220	*18	*115
CARS PER TRAIN THIS YEAR						*1.20

Metropolitan Equipment Used

MOTOR 2240

COACH 4480

TOTAL 6720

Mileage Clerk

Aurora, Elgin & Chicago—Monthly Report Showing Car Mileage Subdivided and Compared with Previous Year

more and more each year as new suburbs develop and as the number of stops is increased.

OPERATING SPEEDS

As an illustration of the severe requirements which the cars have to meet in the way of speed attention is called to the running time of the different classes of trains between Elgin and Chicago. These trains are typical of those operating to Chicago from the other western termini. The distance from Elgin to the Fifth Avenue downtown terminal in Chicago is 41.5 miles, and the scheduled running time for limiteds is 70 minutes. Thus the average speed, including all stops, is 35.6 m.p.h. It should be remembered that this run includes 6.5 miles over an elevated railway structure on which 19 of the 70 minutes are required. Considering only the run from Elgin, over the Aurora, Elgin & Chicago Company's own tracks, to the junction with the elevated road at Fifty-second Avenue, the limited trains make this distance of 35 miles in 51 minutes, or at a speed of 41.2 m.p.h., including stops. In the 35 miles four interlockings are passed and ten passenger stops are made by all trains.

The speed on the elevated structure is about 17.4 m.p.h. if the interurban cars do not overtake the elevated cars. As delays are quite probable during the rush-hour service on the elevated, it becomes necessary for the interurban cars when they reach their own tracks to exceed considerably the scheduled speeds just noted, in order to maintain their own service, and this requirement was one of the important factors in determining the high gearing used.

Local trains make the 41.5-mile run from Elgin to the downtown Chicago terminal in 1 hour and 25 minutes, their

RATES OF FARE AND DISTANCES ON THE AURORA, ELGIN & CHICAGO RAILROAD

Between Fifth Avenue Terminal Station, Chicago, and	Miles.	Single-Trip Fare.	Round-Trip Fare.	Fare by Using $5.00 Interchangeable Coupon Ticket.	54-Ride Monthly Individual Ticket.	60-Ride Monthly Individual Ticket.
Maywood	11.0	$0.10	$0.20	....	....	$5.40
Bellwood	13.0	.15	.30	....	....	6.15
South Elmhurst	16.0	.20	.40	$0.16⅔	$5.70	6.30
Lombard	20.5	.25	.50	.20⅚	6.00	6.65
Glen Ellyn	23.0	.30	.55	.25	6.40	7.10
Wheaton	25.5	.35	.65	.29⅙	6.75	7.50
Chicago Golf Grounds	26.5	.40	.75	.33⅓	7.65	8.50
Warrenville	30.5	.45	.85	.37½	8.10	9.00
Aurora	39.5	.60	1.10	.50	9.00	10.00
Glenwood Park	39.5	.55	1.00	.45⅚	....	....
Batavia	40.0	.55	1.00	.45⅚	8.75	9.70
West Chicago	31.8	.45	.85	.37½	7.75	8.40
Geneva	37.1	.55	1.00	.50	8.75	9.70
St. Charles	40.0	.55	1.00	.50	8.75	9.70
Wayne	34.8	.50	.95	.41⅔	8.55	9.50
Elgin	42.0	.60	1.10	.50	9.00	10.00

average speed being 29.3 m.p.h. for the entire run and 32.7 m.p.h. for the run over the Aurora, Elgin & Chicago tracks.

In the foregoing fast schedules time is included for changing the make-up of a number of trains at Wheaton, It is the practice throughout the day, so far as possible, to combine the single-car and two-car trains from the western termini to form longer multiple-unit trains at Wheaton for the run to Chicago. Thus trains from the Elgin and Geneva divisions consisting of one or two cars are



Aurora, Elgin & Chicago—Typical Way Station on Single-Track Branch

scheduled to arrive at Wheaton one minute apart and there be coupled for operation as one train into the Fifth Avenue terminal at Chicago. Similarly, certain of the trains on the westbound trip are divided at Wheaton and the different cars sent to the separate western terminals. This method of operation brings about a reduction in number

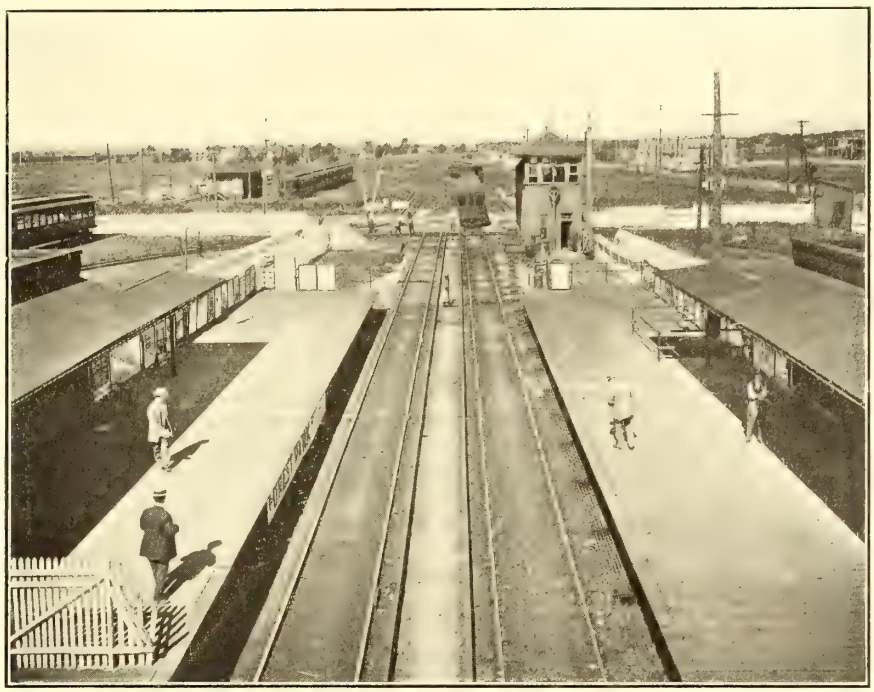
of the men required for handling traffic and reduces the number of trains over the Wheaton-Chicago section—a feature which is most important, due to the rapidly increasing traffic.

PARLOR AND DINING-CAR SERVICE

Parlor buffet cars are operated on trains spaced three hours apart out of Chicago. The company owns and operates two of these cars. The bodies are similar to those of the standard passenger cars, but the interiors are subdivided by the kitchen into a main compartment and smoking compartment. The interior fittings include tables, wicker chairs and equipment for serving high-grade meals to thirty passengers at one time. A crew includes four buffet employees, in addition to a parlor-car conductor. The service privileges are handled by contract, and they are very well patronized. A charge of 15 cents is made to each passenger who rides on the parlor buffet cars, but the receipt for this extra fare is accepted as 15 cents in payment for any purchases made from the buffet department. The average number of passengers carried on each 40-mile trip is sixteen.

PARKS

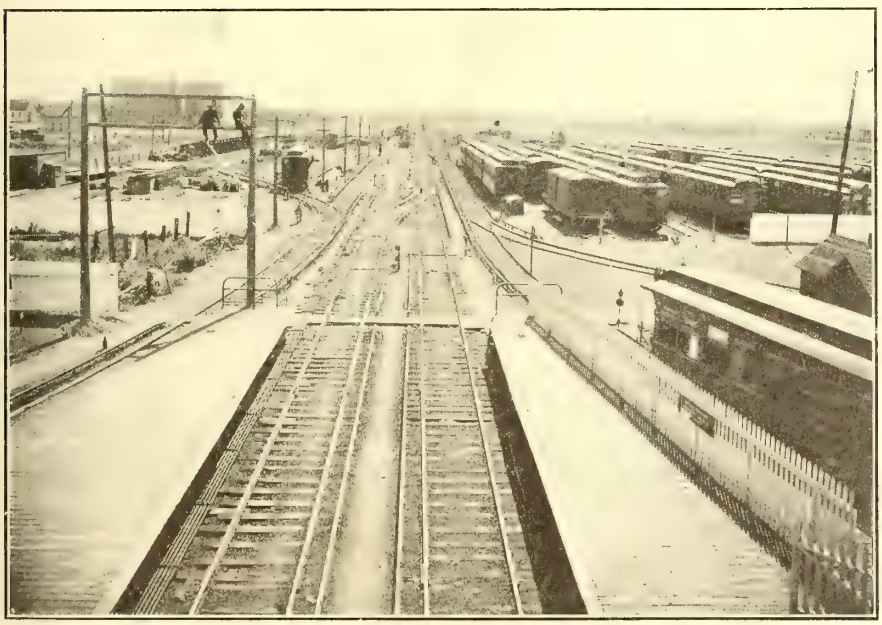
The Aurora, Elgin & Chicago Railroad owns two large parks, one on the trolley line south of Aurora and the other near Batavia. Both parks are on the Fox River. The park south of Aurora is well equipped with the usual amusement features. The one near Batavia includes about 100 acres of woods, and is kept in its natural state. It is used principally as picnic grounds for excursion parties from Chicago. These parks were described in this paper for Jan. 30, 1909, page 177.



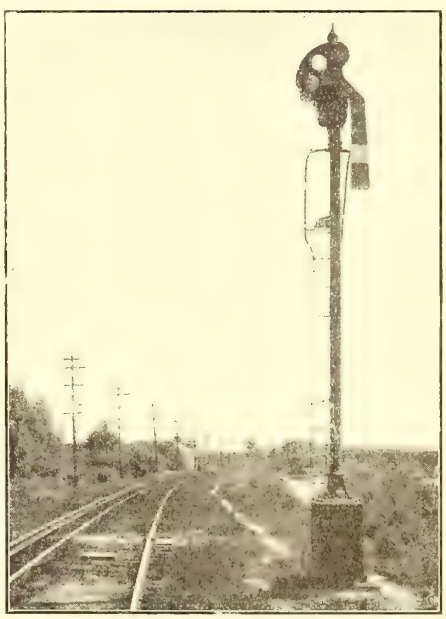
Aurora, Elgin & Chicago—View Westward from Fifty-sec ond Street, Showing Terminal Yards and Milk Station

NEWSPAPER TRAINS

Another special service which this road during the last eight years has demonstrated to be profitable is that of handling newspapers in bulk. Special newspaper trains



Aurora, Elgin & Chicago—View Eastward from Fifty-second Street Station, Showing Approach to Metropolitan Elevated Structure



Aurora, Elgin & Chicago—Signal Mast on Elgin Division

FUNERAL TRAINS

A funeral-train service is operated to and from the five large cemeteries on the Aurora, Elgin & Chicago lines, the larger part of the traffic originating in Chicago and being shared jointly with the Metropolitan West Side Elevated Railway. Special equipment has been provided for this service, as described in the ELECTRIC RAILWAY JOURNAL for Oct. 8, 1910, page 619. No funerals are handled on regular trains, only chartered cars being used for this service. It is stated that the revenue from the funeral-train service amounts to more than $1,000 per month, and that from three to five trains are handled each day.

are run out of the Chicago terminal at 3:30 each morning; these trains make the 41-mile run to the Fox River termini in 70 minutes. On Sunday two cars are required to handle the large Sunday editions. Payment for the service is made according to weight, which frequently exceeds 250,000 lb. per month. The service is much appreciated by the

patrons along the road, because it makes possible the distribution of the city editions in the suburban territory, rather than the out-of-town editions which are distributed on the steam trains.

FREIGHT AND EXPRESS SERVICE

In addition to its dense passenger traffic this company operates a freight and local express service; the through-express business is in charge of the United States Express Company. Tariffs are issued for the freight service, and practically all classes of business are accepted. The United States express service is operated from Chicago over the Aurora, Elgin & Chicago line and the connecting Elgin & Belvidere road to Rockford, on the Rockford & Interurban Railway lines, and thence to Beloit and Janesville, Wis.

While freight has been handled on the third-rail division since the road began operation, only recently has the service been inaugurated on the Fox River trolley division. The company is now negotiating with connecting lines in Aurora and Elgin with a view to handling local express and merchandise freight business on through billing, and if these arrangements are made the service will make available a new territory for interchanging of shipments, covering all the cities and towns of importance from Janesville, Wis., on the north to Kankakee, Ill., on the south, and with Chicago connections over the third-rail division. It is quite possible that this service will be extended to the Illinois Valley line of the McKinley traction system when that company has completed the connecting link which is now being graded between Morris and Joliet, Ill. A recent campaign of solicitation by the express and freight department has considerably increased the freight revenue.

In addition to the passenger and freight and express service, a milk train is operated, which during the year 1910 handled more than 200,000 cans of milk and cream from the farming district west of Wheaton into Chicago. The railway company collects a revenue of 15 cents per can between any two stations. The details of this service were described on page 622 of the Electric Railway Journal for Oct. 8, 1910.

EMPLOYEES' MEETINGS

Three hundred trainmen are employed in operating the service of the Aurora, Elgin & Chicago Railroad, including its street-car service in Aurora and Elgin. On the interurban divisions steam railroad practice is closely followed in dispatching and protecting trains in service. Because of the high speed at which trains are operated and the short headway extraordinary efforts are made to keep the personnel of the operating force at a high standard. The requirements for admission to train service are strict, and the men, in addition to a thorough practical training on the main line and the branches, are required to pass written examinations of 95 per cent or better on the books of rules. Also, the department heads hold open meetings regularly with the trainmen and consider such subjects as the prevention of accidents, contact with the public, avoidance of controversies, etc. At these meetings papers are read and discussed by the employees. This feature of the work has been received with considerable interest by the men and has resulted in a notable improvement in service conditions.

SECOND ARTICLE

In a second article, to appear in this paper, full particulars will be published of the power station, rolling stock, shops and other portions of the equipment of the Aurora, Elgin & Chicago Railroad.

The annual outing of the employees of the Urbana & Champaign Railway, Gas & Electric Company was held on July 15, 1911, at Homer Park on the Illinois Traction System. About 400 employees of this local property of the Illinois Traction System and their families attended as the guests of Mr. McKinley and the company.

ELECTRIC RAILWAY LEGISLATION IN MASSACHUSETTS

The Massachusetts Legislature just adjourned enacted considerable legislation affecting street railway interests. The most important of the bills passed concerned Boston. Early in the session a bill was passed providing for the merging of the Boston & Northern Street Railway and the Old Colony Street Railway. This merger has since been carried out.

The bill providing for the consolidation of the West End Street Railway and the Boston Elevated Railway resulted in a contest. The stockholders of the West End Street Railway held out for an 8 per cent guaranteed dividend in case the roads were merged. The Governor held that 7 per cent was enough. The law as finally enacted provides that the companies shall vote on consolidation on or before Sept. 15, 1911. If the stockholders of the West End Street Railway consent to the proposition of selling its franchises, property and rights to the Boston Elevated Railway the common stockholders will get 7 per cent in perpetuity; or, if they so decide, they may take 7 per cent until 1922 and then have a commission appointed by the Supreme Court to decide whether the dividend should be increased to a percentage not to exceed 8 per cent.

As an accompanying proposition the bill for constructing three new subways and tunnels was enacted late in the session.

The amendment providing that employees of street railways should not work more than nine in eleven consecutive hours instead of twelve, as at present, was defeated.

The bill to give the Boston & Eastern Railway a certificate of exigency and the right to construct a tunnel under Boston Harbor was passed and signed by the Governor.

Authority was given Plymouth and Sandwich to purchase shares of the capital stock, bonds and notes of the Plymouth & Sandwich Street Railway, or any other electric railway company authorized to construct a line between these two towns, up to a maximum of $50,000 if two-thirds of the legal voters voting at town meetings called for the purpose within five years shall so decide. It is required by the act that the Railroad Commission shall certify that the road has funds sufficient to insure its completion.

An act was passed that authorizes the Railroad Commission to modify or suspend the restrictions relative to operating street cars across railroad crossings.

By a new statute a maximum fine of $1,000, or a year's imprisonment, or both, is imposed as the penalty for making false returns to the Gas and Electric Light Commissioners, the Railroad Commissioners, the Highway, the Bank and the Corporation Commissioners.

A new act prohibits common carriers from requiring passengers to enter or leave cars at their own risk, and allows passengers to recover damages in spite of such a rule.

A new law provides that, in the taxation of legacies and securities, the property of a non-resident decedent shall include "so much of each share of street railway, railroad, telegraph or telephone company stock of any company incorporated under Massachusetts laws and also under those of some other state or country as is proportional to the part of such company's line lying within the Commonwealth."

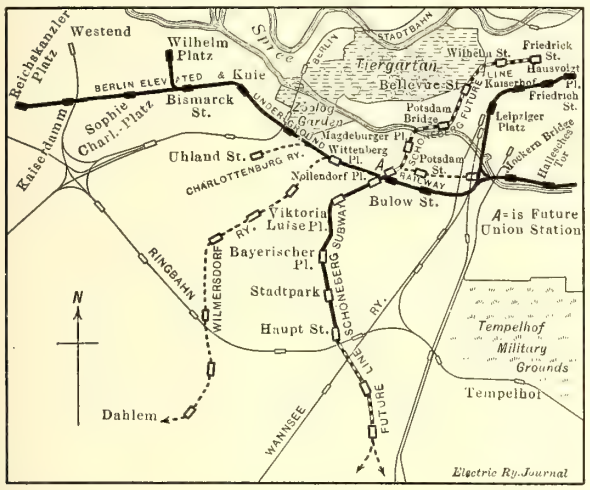
Nothing came of the promises of improvements made by the New York, New Haven & Hartford Railroad and the Boston & Maine Railroad on condition that the Legislature should pass the necessary legislation. The most important bill reported was one which called for the electrification of the Boston and Providence division of the New York, New Haven & Hartford Railroad as far as Readville. Another bill reported provides for the electrification of the Boston & Maine Railroad from the city terminal to Beverly.

The plan of Governor Foss to substitute a public service commission for the commissions that have to deal with the affairs of public service corporations failed.

Schöneberg-Berlin Underground Railway

This Line Has Been Constructed by the Municipality of Schöneberg, One of the Western Suburbs of Berlin. It Is Operated Under a Traffic Agreement with the Privately Owned Berlin Elevated & Underground Railway.

On Dec. 1, 1910, Schöneberg, one of the important western municipalities adjoining Berlin, Germany, opened a municipally owned underground electric railway 2990 m (1.85 miles) long. The first object of this line was to secure rapid transit from the city of Schöneberg to the heart of Berlin, via transfer to the present privately owned elevated and underground railway (Berliner Hoch-und-Untergroundbahn), which extends east and west throughout Berlin. The second object was to encourage the development of sparsely settled territories in this municipality. The accompanying map shows the portion of the line already built, the proposed continuation of 1650 m (1.02 miles) through Schöneberg and also the proposed extension of 3300 m (2.04 miles) into Berlin, which would make unnecessary the present two-level transfer stations at Nollendorfplatz. Passengers from one line to the other must now use a combined ramp and stairway as the difference in level is about 22 ft. According to the agreement with the municipality, the operation of the Schöneberg line will be in the hands of the contractor for the first year and in those of the Berlin Elevated & Underground Railway



Schöneberg Subway—Rapid Transit Lines in Berlin

for the four years following. The present traffic agreement with the latter company permits a passenger to ride the same number of stations for a given fare, whether the stations are on the municipal or the private system.

The present northern terminal of the Schöneberg subway is the station at Nollendorfplatz. It is planned to build eventually a new station near this place, which will be used in common by the two present undertakings and also by the subway lines which will be built by the neighboring communities of Charlottenburg and Wilmersdorf. The present Schöneberg stations and their distances apart are given in the following table:

STATIONS.

No.	Name of Station.	Distance in Meters.	Feet.
1.	Nollendorfplatz	...	...
2.	Viktoria-Luisen Platz	740	2,427
3.	Bayerischer Platz	840	2,755
4.	Stadtpark	675	2,214
5.	Hauptstrasse	500	1,640
		2,755	9,036

TRAFFIC AND FARES

It was estimated that 5,670,000 passengers would be carried the first year. Assuming the use of two-car trains at intervals of 10 minutes for four hours a day and at intervals of 5 minutes for fifteen and three-quarter hours a day, there would be required 426 trains a day, as the distance between the terminals is 2.745 km (1.7 miles). The annual number of car kilometers would be 853,700, the product of $2 \times 426 \times 365 \times 2.745$. This would make an average of seven passengers per car kilometer (ten passengers per car mile). The actual traffic, however, has amounted to about 24,000 a day, or 9,000,000 a year. Consequently six cars are to be added to the present equipment to permit the operation of three-car trains at the present schedule, or two-car trains every 3⅓ minutes. The schedule speed is 25.3 km (15.7 miles) an hour, and the maximum speed 47 km (29.1 miles) an hour.

There are two classes of fares, as on the Berlin Elevated & Underground Railway. The minimum third-class fare is 10 pf. (2½ cents) and the maximum 20 pf. (5 cents). The lowest second-class fare is 15 pf. (3¾ cents) and the highest is 30 pf. (7½ cents). The maximum fares are to subway stations outside the Schöneberg system.

CONSTRUCTION OF THE SUBWAY

The section through which the Schöneberg subway is built is thickly populated. Consequently some of the streets contained so many water, gas, electric and other mains that it was not always possible to avoid curves. Furthermore, the soil of Berlin is so sandy and so permeated with water that the effective waterproofing of the concrete walls and flooring proved one of the most important features of construction. The work of excavation began on Sept. 8, 1908, and despite the many physical difficulties, the present route was completed on Dec. 1, 1910, as previously mentioned. The contractor for practically every feature of construction and operation, except the drainage, was the Siemens & Halske Company. It is interesting to add that this noted electrical company consistently employed electrical machinery throughout, with the exception of the narrow-gage gasoline locomotives which were used to haul the loaded dirt cars.

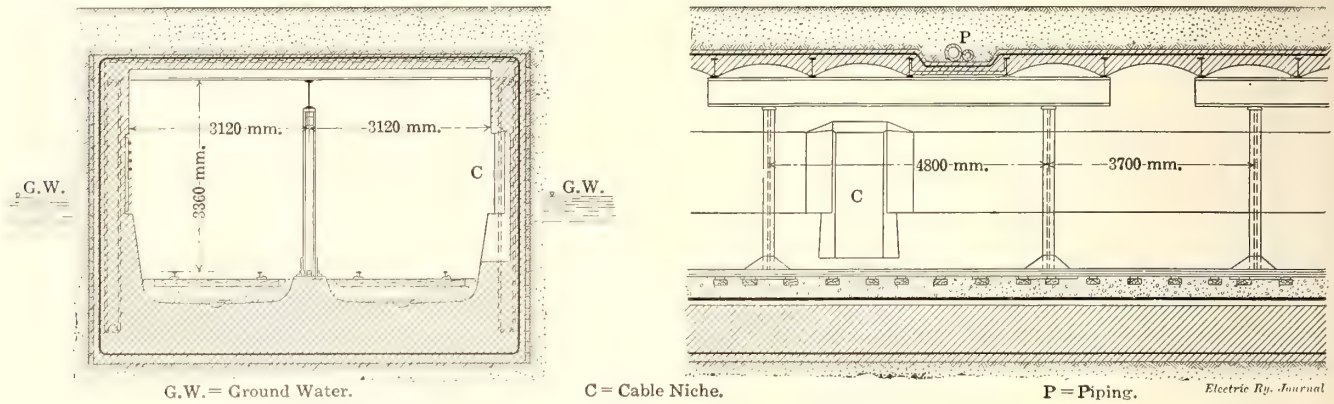
The present subway is of the so-called shallow type, but it is planned to build a part of the suburban extension as an open cut. The usual distance between the roof of the tunnel and the top of the street pavement is 70 cm (2.3 ft.) except at the stations, where it is 40 cm (1.3 ft.), in order to reduce the number of steps for passengers. The difference between the highest and lowest point of the subway floor throughout the system is only 6.6 m (21.6 ft.). The sharpest curve on the free-running section has a radius of 105 m (344 ft.) and at stations of not less than 200 m (656 ft.).

The tunnel clearances are the same as those used in the Berlin private subway. Between stations the usual width of the tunnel is 6.24 m (20.5 ft.) and the clear height from the top of the rails to the roof is 3.3 m (10.8 ft.). The distance between rail centers on the tangents is 3.24 m (10.6 ft.), but larger clearances are provided at curves. The walls of the tunnel are arranged to carry conduits and have niches for cable boxes every 50 m (164 ft.). At stations, however, the cables are carried under the platforms because the walls opposite the platforms are used for advertisements.

About three-quarters of the present line was built through water-soaked ground. Where this was the case the side walls were covered with a triple layer of waterproofed asphalt paper, but otherwise only two layers were used. The concrete floor of the tunnel contains two longitudinal gutters which lead to a sump whence the drainage is pumped by hand into the city sewers. While the presence of water proved inconvenient during the construction

period, it is not undesirable in operation because it tends to keep the tunnel at an agreeable uniform temperature throughout the year.

Three-fourths of the total construction cost, namely, 7,919,200 marks ($1,979,800), was required for the building of the tunnel structure. The unit cost, however, was lower than for the original Berlin subway owing to the use of reinforced concrete for the walls. The walls of the older subway, which were of concrete, were 1.1 m (3.6 ft.) thick, whereas the Schöneberg walls are only 0.55 m (1.8 ft.) thick. This reduction in over-all width greatly reduced the expense of shifting underground piping.



G.W. = Ground Water. C = Cable Niche. P = Piping. *Electric Ry. Journal*

Schöneberg Subway—Cross-Section and Longitudinal Section

METHOD OF CONSTRUCTION

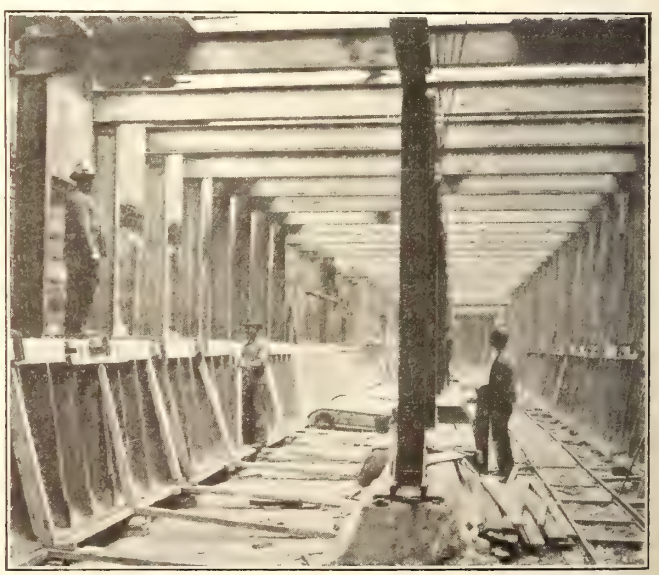
The first step in the construction of the line was to drive I-beams at intervals of 1.7 m to 2 m (5.6 ft. to 6.6 ft.) in line with the side boundaries of the subway. No fencing was erected nor was excavation begun until the piles had been driven in place throughout. After the removal of the paving, the soil between the lines of I-beams was removed to a depth of 3 ft. to 6 ft. Then planks were dropped on the outer side of the I-beams, while stiffening beams and wedges were placed between the opposite beams. Thereupon the excavation was continued until the proposed floor level was reached except where the presence of ground water required other methods. The floor level was covered with 15 cm (6 in.) of concrete as soon as the excavation was completed. At the same time the inner sides of the I-beams were boarded and concrete plates 8 cm to 10 cm (3.2 in. to 4 in.) thick were rammed between the two walls of planking, but only as far as the flanges of the I-beams. Following this a triple waterproofing layer was placed on the floor and also on the sides to a height of about 1 m (39.37 in.). The floor was then covered with 5 cm (2 in.) of sand, which served as a cushion for the final concrete covering 80 cm (31.5 in.) thick. This concrete was applied with pneumatic rammers. The next work was the erection of the concrete piers for the center line of tunnel columns, the triple waterproofing of the tunnel walls to 1 m above the ground water line, and the double waterproofing of the rest of the walls. When this was completed the tunnel was ready for the deck girders and the structural steel columns (the latter placed 5.6 ft. centers), the outer rows of which became the reinforcement of the final concrete walls. The deck was concreted by means of wooden forms which were suspended between the deck girders. The roof was then waterproofed and covered with a protective layer of sand concrete 10 cm (3.9 in.) thick.

When the I-beam piles had served their purpose they were pulled out instead of being left in the ground as a part of the final structure. This withdrawal was made possible because the inner line of wooden planks was attached to the I-beams by means of hook bolts, while the webs themselves were free of concrete.

The tunnel is ventilated by six side openings of the type shown in one of the views on the next page. These air shafts have stairways which lead to the sidewalk and thus they serve also as emergency exits. The top of the shaft is covered by grill work, which can be easily opened from below. The wide stairways at stations also are an appreciable factor in the ventilation of the subway. However, the most effective means for introducing fresh air en route is presented at the Stadtpark station, where the line passes through what is practically an open cut for 70 m (230 ft.).



Schöneberg Subway—Planking Bolted to the I-Beam Piles



Schöneberg Subway—Erection of Structural Steel Work

THE STATIONS

The stations differ from those of the Berlin system in being of the island type. The platforms are 7.6 m (25 ft.) wide. The advantages of an island station are that only one stairway is required, that it is more convenient for passengers and that there is considerable saving in station attendance labor. With the exception of one station the platforms are 45 m (148 ft.) long to accommodate three-car trains. Provision is made, however, to extend the platforms to a length of 95 m (312 ft.) to accommodate seven-car trains, and also for the construction of a second stairway at each station. There is usually a clearance of 5.2 m (17 ft.) between the platform and roof. The platforms are 80 cm (2.6 ft.) above the head of the rails. The average over-all width of a platform is 13 m (42.6 ft.) except at the Stadtpark station, where it is 16.2 m (53 ft.). The platforms are of reinforced concrete with an asphalt finish and granite edges. The station stairways are 4 m wide (13 ft.). The portals have an illuminated sign ("Untergrundbahn"), indicating that the stairway leads to the subway. The station platforms are divided by a row of ornamental columns. The walls opposite the station platforms are treated with tile. The color treatment and artistic style of every station is different, so that regular passengers have no difficulty in recognizing their alighting place even if they fail to see the name of the station. No station toilets have been built for the passengers, as there are many public toilets in Schöneberg. The toilets which are provided for employees are drained into the city sewers above by means of hand pumps.

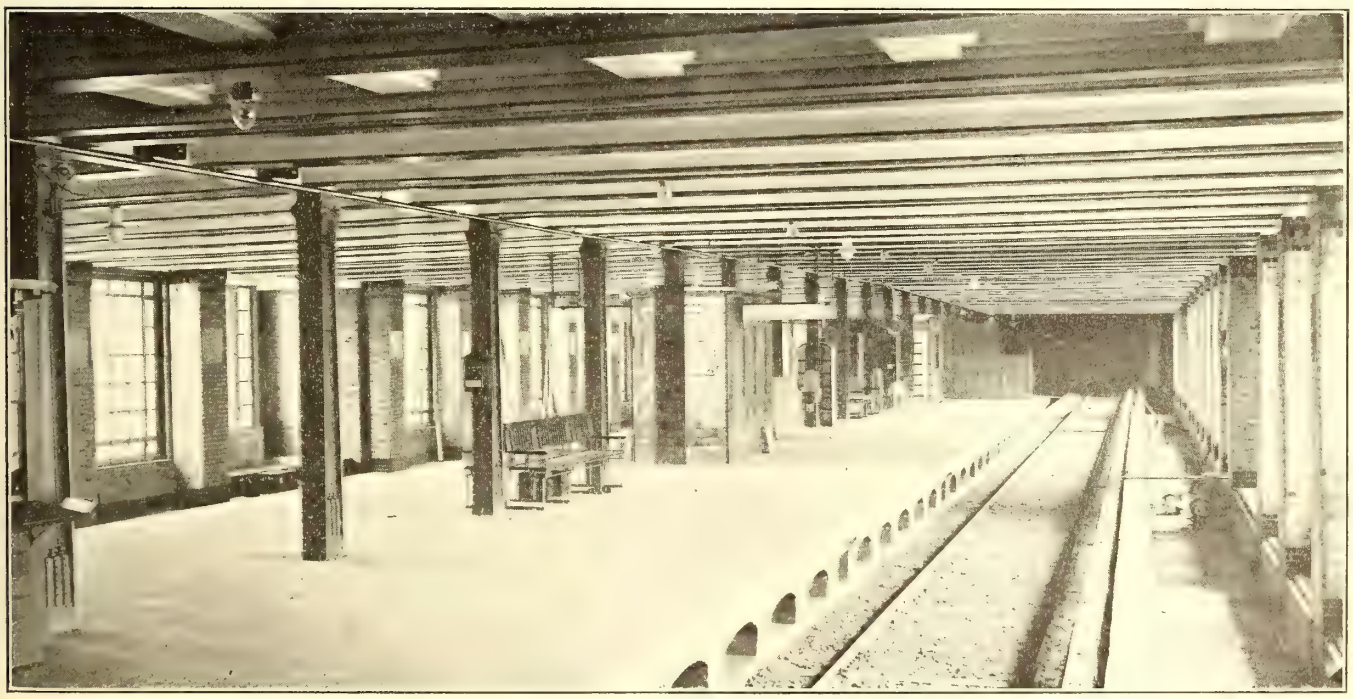


Schöneberg Subway—Waterproofing the Outer Concrete Walls



Schöneberg Subway—Emergency Exit and Ventilating Shaft Combined

Special attention was paid to the architectural treatment of the portals of the station stairways, every one being planned to harmonize with the architecture of the neighborhood. Thus the portal at Hauptstrasse is along very simple lines because this station is in the heart of a business section. On the other hand, the portal at Bayerischer Platz is very ornate, owing to the fact that it is located in a parked district. The general treatment there is like that of a pergola and baskets containing flowers are sculptured on the individual columns. The Victoria-Louise portal is



Schöneberg Subway—Interior of Stadtpark Station Built Through a Cut in a Public Park

distinguished by the use of two great lanterns, while the separate columns are treated with various allegorical sculptures which typify Power, Energy, Electricity, etc.

The most remarkable station construction is that at Stadtpark. At this place it was necessary to cross a public park alongside a lake without injuring the topographical beauty of the surroundings. It was decided to run the line in the open, but to flank the tracks by a metal and stone frame with movable sash, the whole being surmounted by groups of statuary and crossed by wide, ornamental stairways for pedestrians who wish to cross the railway. The columns between the windows are rather deep to give the desired effect of massiveness in proportion to height. This construction, together with the railway station portal, is shown in one of the accompanying illustrations. It will be noted also from the view of the interior of this station that passengers standing in the station or riding by it may enjoy excellent views of the park, which are a welcome contrast to underground travel.

When the proposed union station at Nollendorfplatz is built the tracks at the present terminal will serve for car storage. As a certain amount of tripper service probably will be required when the Schöneberg line is extended into the heart of Berlin, these storage tracks will prove useful in minimizing dead mileage. This station will be so arranged that all trains of all electric underground and elevated railways going to Berlin will be at one level, while all trains coming from Berlin will be at another level. If this plan is carried out it will also be possible to operate trains from one system over the lines of another.



Schöneberg Subway—Side View of Open Cut Station Through the Stadtpark, Showing the Artistic Treatment of the Structure, Stairways for Crossing Over the Railway, Statuary, etc.—The Subway Portal Is at the Extreme Left

TRACK CONSTRUCTION

The track construction is similar to that on the Berlin subway system. The standard rail is a Haarmann T-section 115 mm (4.5 in.) high, 58 mm (2.3 in.) wide at the head, 90 mm (3.8 in.) wide at the base, weighing approximately 54 lb. per yard and laid in lengths of 12 m (39.4 ft.). Bessemer steel is used for tangents, and for all curves exceeding 200 m (656 ft.) radius. Steel rails containing 3 per cent nickel are used on curves of less than 200 m radius and on braking sections. The guard rails on the large radius curves are of the same section as the running rails. Suspended joints and lipped tie plates 10 mm (0.39 in.) thick are standard. There are eighteen ties per 12 m (39.4 ft.). These ties are 15 cm (5.9 in.) high and 23 cm (9 in.) wide. The ties are of fir. Those placed in the tunnel were treated with zinc chloride, because this preservative is odorless. The ties are laid in gravel or broken stone ballast 40 cm to 45 cm (16 in. to 17 in.)



Schöneberg Subway—Speyer St. Portal, Bayerischer Platz



Schöneberg Subway—Portal at Viktoria-Luisen Platz

thick. One of the accompanying views taken at a station shows the zig-zagged angle irons which are screwed into the ties at curves to help to maintain the gage.

The contact rail, which is of soft iron of T-section, is placed on vulcanized-rubber insulators having a cast-iron base. As different clearances are used for the third-rail in the tunnel and in the yard, it is possible to use automatic means for cutting the lines in and out of circuit.



Schöneberg Subway—Standard Motor Car

ROLLING STOCK

The present rolling stock consists of twelve motor cars, each of which has twelve seats in the second-class compartment and eighteen seats in the third-class compartment in addition to a small compartment for the motorman. Each car also has standing room for twenty-five passengers, so that the maximum load of a standard two-car train is 110 passengers. One of the two cars is for smokers. The conductor is stationed in the third-class compartment next to the cab of the motorman so that he can observe the latter through a small window. The principal doors are in the sides of the car and are of the sliding type. The end doors are for the regular use of the crew and for the emergency use of the passengers. The cars are 12.77 m (41.9 ft.) over all in length, 2.36 m (7.7 ft.) over all in width and 3.18 m (10.4 ft) high from rail to roof. The car bodies are carried on two trucks of 1.8 m (5.9 ft.) wheelbase. The wheels are of 850 mm (33 in.) diameter.

The electrical equipment of each car consists of two 750-volt, 40-hp d.c. motors. Multiple-unit control is used. The brakes consist of a hand equipment and Siemens-Schuckert air brakes, which can be operated by the passengers in case of emergencies. Short-circuiting brakes are also available in case of failure of the air brakes. The weight of a motor car without passengers is 20 metric tons. Each car is illuminated by sixteen 40-watt tantalum lamps. The ends of the car body are also provided with reflectors each of which contains a red and a white incandescent lamp. The white lamp burns at the forward end and the red lamp at the rear end. The cars are painted in conformity with the Berlin system, namely, yellow for the third-class section and red for the second-class section. The sides of the car are ornamented with the coat-of-arms of the city of Schöneberg.

All of the cars are equipped with Hartmann & Braun current clocks. These clocks are widely used in Germany and have recently been introduced in this country. The clock operates only when current is in the motor circuit. It has been found on the Schöneberg system that after these clocks were introduced the current consumption had fallen about 10 per cent. In registering the motorman's records allowance is made for the condition of the car operated and for other factors which would influence the value of the indication.

ENERGY SUPPLY, LIGHTING, TELEPHONES, ETC.

Energy for the operation of the line is purchased from a private company under a ten-year contract. It is transmitted at 6600 volts to the substation, shown in one of the accompanying views. The present equipment of the substation consists of two 750-kw motor-generator sets which change the 6600-volt alternating current directly to 780-volt direct current and a 375-cell storage battery which has a discharge capacity of 888 amp-hours in circuit with a reversible booster. The battery also supplies 750-volt lighting current through two independent circuits for the



Schöneberg Subway—Substation with Carhouse and Shops in the Background on the Left

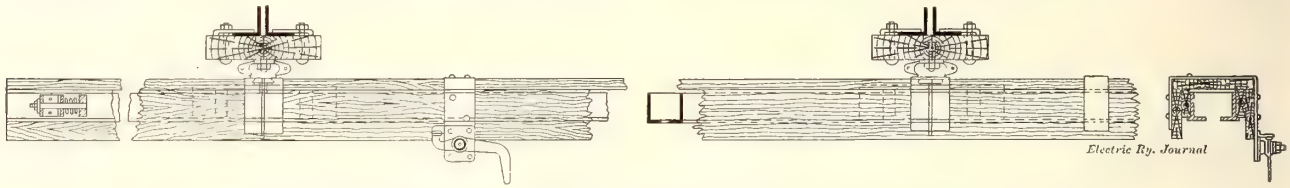


Schöneberg Subway—High-Tension Substation Apparatus in Castor-Mounted Cabinets for Quick Disconnection

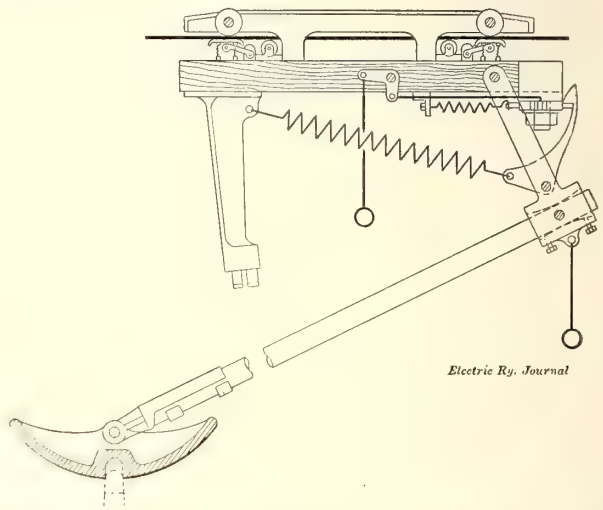
tunnels and stations. The substation is built of ornamental burnt brick. It contains the high-tension switching apparatus in the cellar, the d.c. switching apparatus on the ground floor and the rest of the machinery on the two upper floors. The mezzanine floor on the d.c. switch floor contains the instrument board and general offices. The living rooms of the attendant are on the fourth floor. Provision has been made for the installation of two future motor-generator sets and another booster.

As previously noted, the lighting of the tunnel and stations is effected by two independent circuits. One of these is a bare copper wire, which is carried on porcelain insulators so that it is easy to tap the line at any point for lighting and power. The third lighting circuit, which supplies a number of lamps at and near every station and in the ticket offices, is in the system of the local lighting company. Thus it would still be possible for passengers to find their way out of the stations even if all railway circuits broke down entirely.

Operation of the tunnel service is greatly assisted by the use of a private telephone system. An elaborate clock synchronizing system is also installed to insure the same time at all stations. The clocks are operated electrically in half-minute impulses, which are in synchronism with the master clock. A relay system is used wherever the distance from the master clock would be too great to insure absolute synchronism. The clocks are regulated to keep the same time as those of the Berlin subway system.



Schöneberg Subway—Overhead Conductor and Trip for Third-Rail Cars



Schöneberg Subway—Contact Shoe to Engage with Contact Piece on Car



Schöneberg Subway—Contact Rod and Shoe Free



Schöneberg Subway—Contact Rod and Shoe in Use

CARHOUSE AND SHOPS

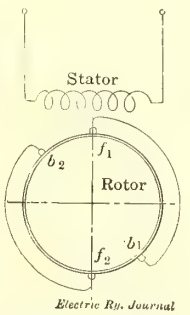
The carhouse and shops are reached over a single-track siding near the Hauptstrasse station. The present yard layout permits the handling of five-car trains. A novel feature in German carhouse practice is the use of depressed pits. The various shops are in two buildings adjoining the carhouse, one of which is used for truck work, electrical repairs, blacksmith shop, and the other building for carpentry, painting, miscellaneous car body work and for offices. A small isolated building contains the utility rooms for employees and the office of the gatekeeper, who also has charge of a telephone switchboard. All buildings are heated from a central plant.

An ingenious scheme is provided to shift cars in the carhouse without employing the third-rail. This is accomplished by using an overhead trolley carriage one side of which has a collecting mechanism running in an overhead contact trough and the other a pair of wheels which run on an overhead track parallel to the trough. The current passes from this overhead collector through the carriage rod, which carries a contact shoe at its lower end. This rod is under tension in order to keep the shoe free of the car roofs when not in use. When the rod is pulled down

by means of a string the shoe makes contact with a recessed casting on the top of the car. As soon as the shoe is interlocked in this way the car can be moved along until it strikes a stop in the trough. This stop breaks contact automatically when the car reaches the third-rail section. The former method was to have a man use a contact rod which was hooked over the trolley. Of course, this made it necessary for him to follow the car until it had entered the third-rail section. The great advantage of the new method is that the car or train can leave the building without regard to the location of the current conductors.

DÉRI MOTOR ON MARTIGNY SINGLE-PHASE RAILWAY

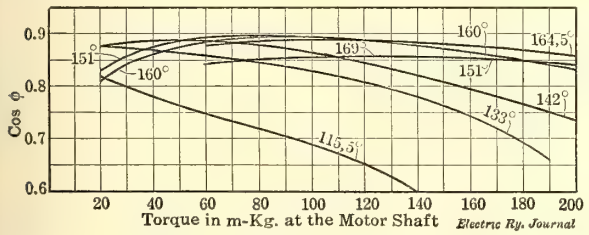
A recent article in the *Schweizerische Bauzeitung* describes a new single-phase railway in Switzerland 19.3 km (12 miles) long, extending from the Swiss government railroad at Martigny to Orsières. Its maximum grade is 3.5 per cent. The line was built for electric operation with trains consisting of one motor car and one or two trailers having a maximum weight of 70 metric tons and carrying about 100 passengers at a speed of 30 km to 45 km an hour (18.6 m.p.h. to 27.9 m.p.h.) and with freight trains made up of a maximum of 80 tons in motor-car weight and 50 tons in trail-car weight for operation at speeds of 15 km to 25 km an hour (9.3 m.p.h. to 15.5 m.p.h.). The freight motor cars are available for passenger service when required.



Déri Motor—Brush Positions

Direct current at 2400 volts was first considered for the line, but the final decision was in favor of an 8000-volt, single-phase trolley. It was intended to use twenty-five cycles, but the frequency was changed to fifteen cycles to harmonize with the officially recommended frequency limits for the electrification of the Swiss trunk lines. Energy for operation is obtained from the station of an electrochemical company.

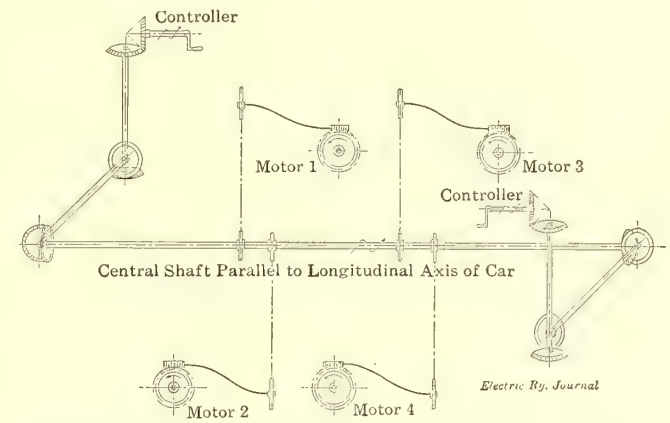
For reasons of economy catenary construction could not be used for the overhead line except for certain sections where extra safety is required. The trolley wire of the entire line consists of hard-drawn round copper wire of 50 sq. mm (No. 0 wire) cross-section. The brackets in open country are carried on wood poles spaced 35 m. (115 ft.). The normal clearance between the trolley wire and the head of the rails is 6 m. (19 ft. 8 in.), but rises to 7 m. (22 ft. 11 in.) at street crossings, and drops to 4.8 m. (15 ft. 9 in.) in tunnels. The insulation between the trolley and the brackets is threefold, namely, two trolley insulators of vulcanized rubber and porcelain and one grooved porcelain span insulator. The catenary brackets are furnished with double bell-type porcelain insulators which carry a 17-strand steel catenary. The trolley wire on the catenary section is suspended at intervals of 3 m. (9 ft. 10 in.). The spacing of the poles on the catenary section is 50 m (164 ft.), except at curves and switches. The rails are bonded with Brown's metallic alloy, in addition to which wire bonds are installed about every 100 m (328 ft.).



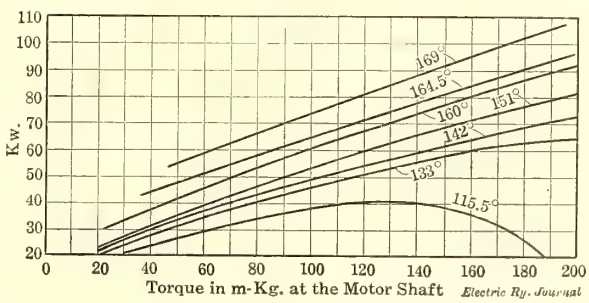
Déri Motor—Variation of Power Factor for Different Brush Positions

The present rolling stock consists of two passenger motor cars, two freight motor cars, three passenger trailers and four ballast cars. All of the motor cars have two plate-frame trucks of 2500 mm (8 ft. 2 in.) wheelbase and wheels of 1150 mm (45 in.) diameter. Every car, whether motor or trailer, carries a hand brake, straight air brake and an automatic brake. A separate system of brake levers is installed at each end of the car to leave the rest of the underbody free for the electrical equipment. A connection is provided between both sets of levers to permit the operation of all brakeshoes from either platform.

The motor cars are of particular interest, as they have been equipped with the Déri single-phase commutator motor furnished by Brown, Boveri & Company. This motor is of the repulsion type, and therefore has a common winding in its stator for compensation and excitation. The stator receives constant voltage and is connected to its rotor only by lines of magnetic force. As shown in the accompanying diagram, the rotor of a two-pole motor has two sets of brushes, *f*-1 and *f*-2, which are fixed permanently in the axis of the stator field, and *b*-1 and *b*-2, which can be turned around the commutator. One brush of the fixed and one of the movable set are connected by flexible cables. The other two brushes are similarly connected. When the motors are at rest both the movable and fixed brushes are in the axis of the stator field. A displacement of the movable brushes from zero position will cause the motor to turn. The rotor revolves in the direction opposite to the movement of the brushes and its speed increases according to the degree of brush displacement from zero position.



Déri Motor—Transmission for Shifting the Brushes



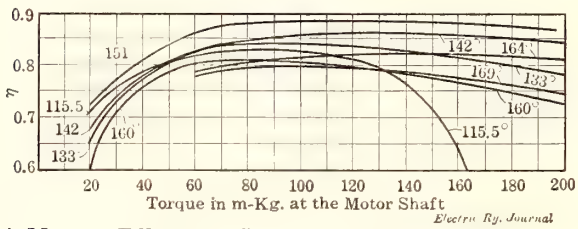
Déri Motor—Kilowatt Output for Different Positions of the Brushes

This motor has series characteristics, inasmuch as its speed drops with an increase in torque, but it also has shunt characteristics, because its speed increases with an increase in the shifting of the brushes. Ordinarily motors of this type which have not been specially dimensioned for heavy starting currents will operate sparklessly with a starting current equal to about 2.5 times the normal output. Good commutation is secured for full-load running within limits

varying from 50 per cent to 125 per cent of the synchronous speed.

The regulation of the Déri motor by mechanical brush shifting instead of voltage control constitutes its great difference from other single-phase commutator motors. The characteristics of this motor may be summarized as follows:

It is always operated at constant voltage, hence the car

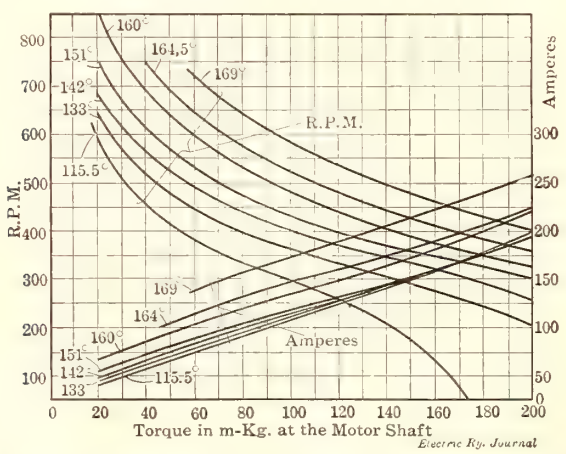


Déri Motor—Efficiency Curves (Without Gearing Losses)

transformer has only one secondary tap. Regulation is not effected by means of voltage steps, but by a change in the position of the brushes. Hence it is continuous, and the motor really has an infinite number of running positions. No special reversing means are required, as the direction of rotation is changed simply by reversing the direction in which the brushes are turned. As this is a repulsion machine with a rotor independent of external circuits, it is especially suitable for high-voltages lines because the voltage due to induction and speed can be kept very low under all conditions. If desired, the motor may be permanently connected in the zero position of the brushes, in which connection it consumes wattless magnetizing current only.

The prejudice against a motor of the brush-shifting type has hitherto prevented its use on railways, although small sizes have been built for cranes and mill work. The result of a year's satisfactory experimenting on the Stansstad-Engelberg Railway led to the introduction of this motor on the Martigny line. The manufacturers are now building 800-hp motors of this type for a number of important European lines, including the Dessau-Bitterfeld section of the Prussian-Hessian State Railways, the Bavarian State Railways and the Midi Railway of France.

The Martigny design is a four-pole motor built for single-phase operation at 500 volts, 15 cycles. Its hour rating is 90 hp, and its synchronous speed 450 r.p.m. The weight of the motor, gearing and gear case is 2500 kg (5500 lb.). Four motors are carried on each car, but the



Déri Motor—Amperage at the Brush Holders and R.P.M.

gear ratios differ in accordance with the speed requirements for passenger and freight service. The accompanying diagrams show the operating characteristics of this motor.

Current is collected at 8000 volts and transformed to 500 volts by transformers on the car. Pneumatically operated stator switches are provided to cut the motors out of circuit without interfering with the transformer connections for the lighting and compressor circuits. The brushes are shifted by a combination of bevel gears, a central shaft parallel to the axis of the car, driving chains and flexible shafting, all as shown on page 235. The brushes may be moved from zero to full-load position by no more than six turns on the controller handle. It is stated that the brush shifting is practically synchronous and uniform on all motors, and that the motors have operated successfully even when the line potential has dropped to 4000 volts.

ANNUAL REPORT OF THE VIENNA TRAMWAYS

The report of the Vienna Tramways for the year 1910, as issued by Director Spängler, shows that 271,584,931 passengers were carried, as compared with 267,449,171 passengers in the year 1909. This represented an increase of 1.5 per cent as compared with 9.1 per cent for the preceding year. This unfavorable condition was due partly to an increase in fares and partly to poor weather. There were operated 80,358,302 car km (49,822,147 car miles), an increase of 5.84 per cent. The gross earnings were 42,193,738 kroners ($8,565,329), an increase of 13.9 per cent. On the electrically operated lines of the system the operating expenses exclusive of welfare work constituted 60.9 per cent of the gross earnings as compared with 61.1 per cent in 1909. The average earnings per car kilometer were 52.5 hellers (15.4 cents per car mile), an increase of 7.6 per cent. The average income per passenger was 16.13 hellers (3.22 cents), compared with 14.44 hellers (2.9 cents) in 1909. The total mileage of the system, measured as single track, was 503.3 km (312 miles). The 9786 employees of the company received 17,532,963 kroners ($3,559,191) in 1910, an increase of 14.5 per cent over the year before. This sum was equivalent to 40 per cent of the gross earnings. In addition 6 per cent of the gross earnings was set aside for employees' welfare purposes, such as pensions and sick benefits.

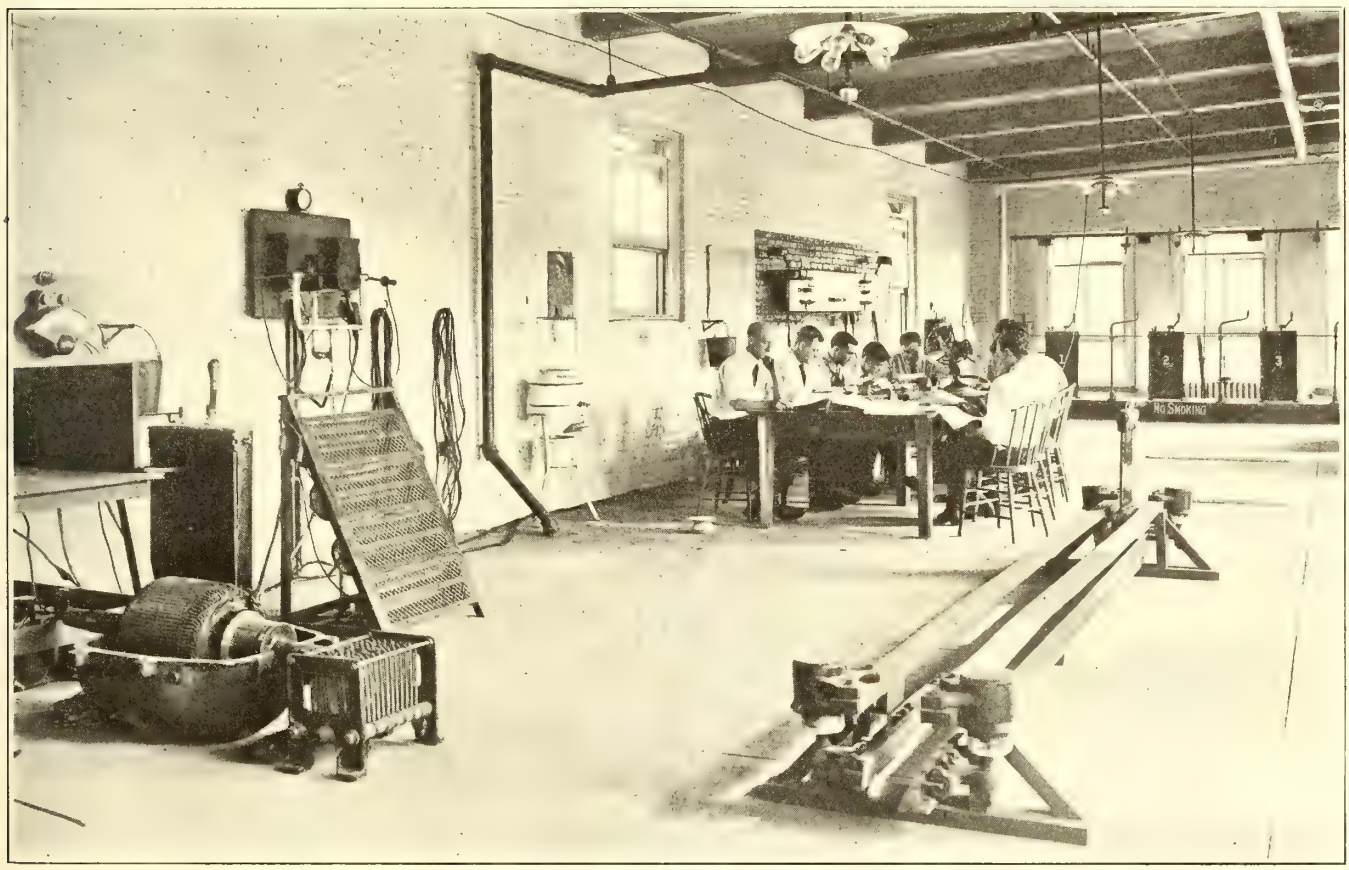
The use of current clocks has produced a steady decline in the current requirements per car kilometer. In one case the clocks showed a difference of 68 per cent in the efficiency of two motormen who were operating under the same speed conditions over a given route. In another test it was found that a good motorman maintained the schedule for 312 days with 33,200 current-minutes, whereas a poor motorman required 55,070 current-minutes. Premiums for current saving were awarded to the amount of 54,940 kroners ($11,528) for a total of 6433 cases. The improvement of the motormen is shown by the fact that 28 per cent received premiums in 1910 as compared with 15 per cent in 1909. The current clocks on the cars are supplemented by clocks which have been installed at forty-eight time points. These clocks have been found very effective in spurring the motormen on to maintain their schedules, in reducing energy consumption and in aiding statistical work, such as mileage determinations. At the end of the fiscal year there were 1201 motor cars and 1348 trailers in service. The latest rolling stock, numbering ninety-nine motor cars and 205 trailers, is of the vestibule type with separate passages for entrance and exit, as in American prepayment cars. These cars have reduced the length of stops by some 25 per cent. The new motor cars use interpole motors which are large enough to haul two trailers. The running and braking resistance grids are placed under the seats for use as heaters.

At a recent special meeting of the representatives of six companies leased by the East London Railway, London, England, a resolution was passed which practically insures the immediate electrification of the company's lines. The cost was estimated by the engineers at not more than £65,000.

Instruction Methods of the Second Avenue Railroad, New York

This Course Is of Particular Interest to Small Companies Which Cannot Afford Elaborate Equipment

The Second Avenue Railroad Company, New York, has recently opened a school for motormen and conductors in its carhouse at Second Avenue and Ninety-sixth Street. It is in a well-lighted corner room, 70 ft. long by 21½ ft wide, and is equipped with three GE-1000 motors and motor parts, K-27, K-39-A and K-39-B controllers, cast grid rheostats and parts; also typical conduit layouts, such as full-size portions of straight track, interrupted contact rail and an automatic track switch. Four controllers and brake equipments are placed on stands at one end of the room in connection with circuit breakers, hood-switches and signal bells to simulate operating conditions when recruits are being drilled. The rest of the room contains demonstration devices and large simplified wiring diagrams of the company's standard equipment, which consists of K-39-A controllers and two GE-216 motors per car.



Second Avenue Railroad—General View of the Instruction Room

Applicants who have successfully passed the physical examination for motormen are supplied with a handbook of motor equipment of cars and placed at the controller stands, where they are taught to go through all of the customary platform operations. When this work has been mastered the instructor gives them a series of lectures on the behavior of equipment and by means of experimental equipment shows the results of improper operation and what emergency repairs and replacements can be made on the line. An unusual feature of the course is that the men are taught how to telephone accurately any equipment troubles which they are unable to repair themselves; also to telephone accidents and blockades. Twelve men are usually tutored at one time. The instruction course prepares students for road experience in about ten days to three weeks.

A special course consisting of four one-hour talks and demonstrations is being given on alternate days to motormen who were employed by the company before the opening of the present school. The instruction for these men is given mainly to minimize the abuse of apparatus. Conductors are also given instruction in the handling of car equipments, such as the application of the rear brake and throwing of the overhead switch on three bells, how to back cars, handling of lighting circuits, etc. They are also taught how to trip and reset circuit breakers when cars are going up grades because the motormen are not allowed to leave the platform. These circuit breakers are completely inclosed in transite-lined cabinets except that a hand-hole is provided at the bottom for operation.

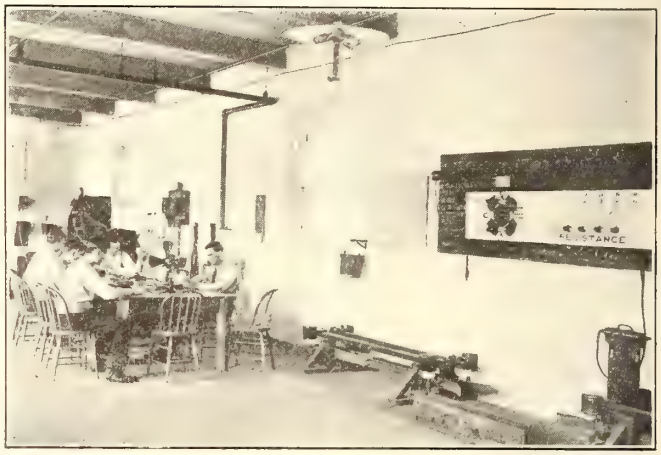
The several demonstration devices are of the simplest possible kind, in view of the fact that the average applicant has little or no understanding of electricity. Thus the torque or twisting action of a motor is illustrated in a homely way by means of a pan filled with nails and other iron odds and ends. This pan is placed on one of two field coils, which, when magnetized, draw the nails up and toward the source of attraction. Another method of illustrating torque is obtained by using a single armature coil which is placed on a wooden form. When this outfit is set between a pair of magnetized field coils it will revolve a little each way.

The damage caused by reversing is shown experimentally by the flashing at commutator bars. The principle of the

blow-out magnet is made clear by permitting two live wires to come into contact and then extinguishing the arc by placing a blow-out magnet over the same. It is also shown how a change in the position of the blow-out deflectors alters the direction in which the arc is extinguished. This



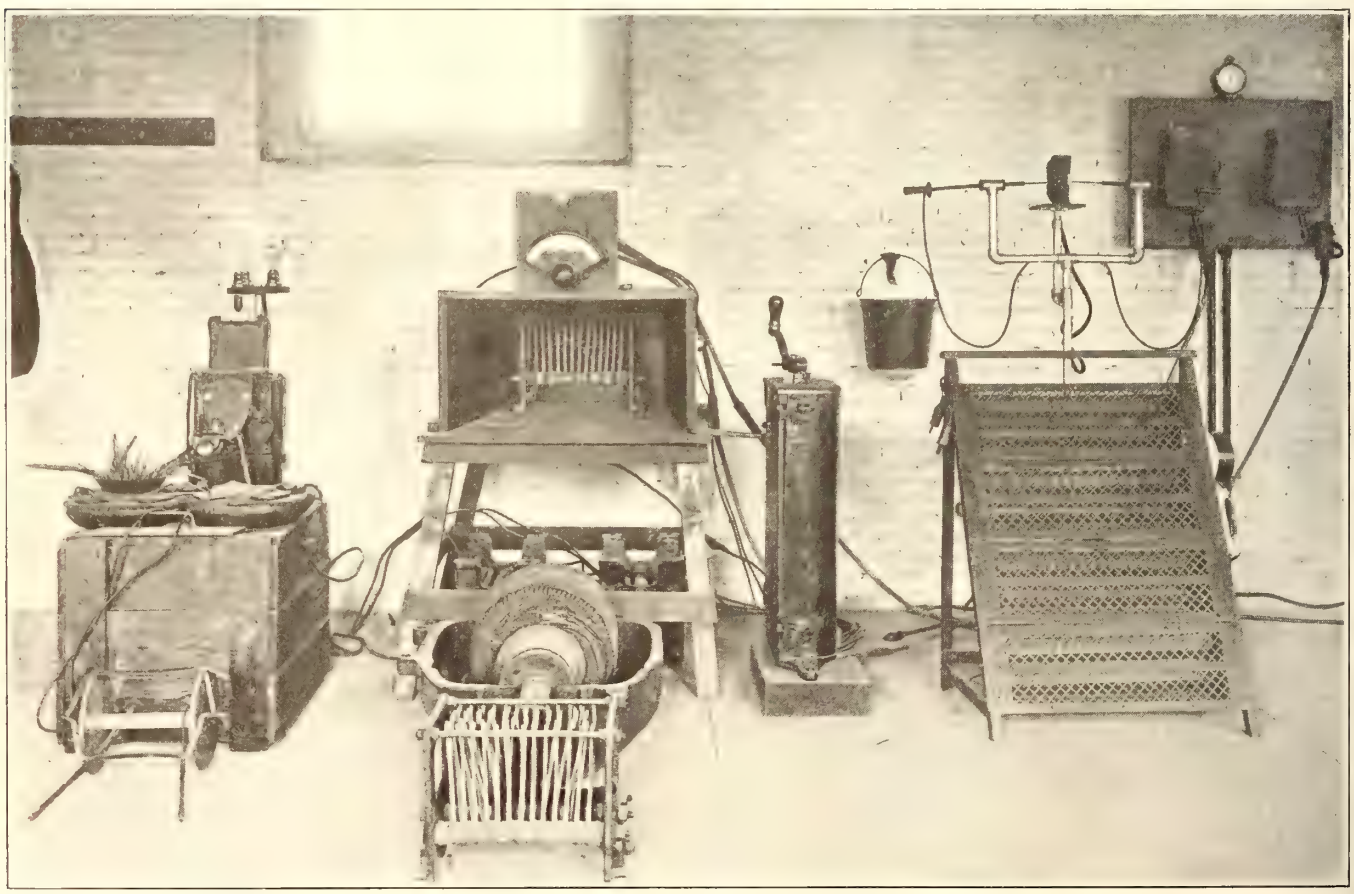
Second Avenue Railroad—Motormen's Instruction Stands



Second Avenue Railroad—A Part of the Instruction Room

device shows how arcs are blown between controlling contacts and why the circuit is opened at all breaks in the conductor rails. To explain this feature there is provided a fully wired plow with a section of contact rail to show the breaks at switches and crossings. If the plow leaves the rail at these points with the circuit closed, the arc thus formed will be intense enough to heat the highly tempered plow springs to such a degree that they lose their elasticity.

Burnt-out armature coils are exhibited to explain the effect of cutting out resistances too fast. The danger of running too long on resistance points is shown by means of a cast grid rheostat which is placed in a transite-lined box opened on one side and painted black inside for the sake of contrast. The rheostat is placed in circuit with a controller and brought up to white heat in from 20 to 25 seconds and sometimes is even entirely destroyed. The necessity for having circuit breakers on cars is made clear by the melting of wires and fuses. The frequent cause of plow fuse trouble is shown by cutting out resistances too fast when starting under severe track conditions and improper use of brakes. This very important feature is fully demonstrated with a service contact plow, conductor rails, one K-27 controller, two cast grid rheostats and one 35-hp motor with drum and brake attached.



Second Avenue Railroad—Demonstration Apparatus Such as Field Coils, Damaged Armature, Overheated Resistance and Magnetic Blow-Out

The instructor and inspectors meet once a month to discuss ways and means to prevent accidents and minimize the abuse of the company's equipment. Each day several

conductors and motormen are questioned about their duties by the inspectors while riding over their posts. A copy of the questions asked and the answers given is sent to the superintendent's office with the inspector's daily report.

An important improvement has been made in the controllers. Formerly when it was necessary to employ a hand-plow in emergencies the flexible ends of the plow connections were hooked to the T-1 and T-2 terminals of the K-39-A, K-8 and K-27 controllers. This connection made it possible to use only the rear controller because the blow-out magnet was not in circuit. It is now possible to use either controller as a special connection has been made between the blow-out magnet and the T-2 contact.

The Second Avenue Railroad is now operating 287 motor cars on 23.20 miles of track under George W. Linch, receiver, and J. Henshaw, superintendent. The instruction work is in charge of Joseph H. Guise.

ELECTRIC RAILWAYS IN BUENOS AIRES

An article by H. Wulff in a recent number of the *Elektrotechnische Zeitschrift* describes electric railway conditions in Buenos Aires, Argentine Republic. This city has grown from a population of 177,000 in 1868 to 1,314,063 at the end of 1910. The present street railway mileage is 606 km (376 miles) without considering several out-of-town lines which run into the city. The two city companies are the Compañia de Tranvias Anglo-Argentina, Ltd., which operates 522.3 km (324 miles), and the Compañia de Tranvias Lacroze de Buenos Aires, Ltd., which operates 83.7 km (52 miles). Three other companies serve harbor and suburban traffic under franchises of the national government. The Compañia de Tranvias Electricos de Buenos Aires y Quilmes operates suburban service exclusively, except for some freight business over the lines of the Anglo-Argentina company from the Quilmes brewery to distributing depots in the city. The Compañia Electricos del Sud has 14.7 km (9.1 miles) of track in the city and operates to the southern suburbs of Lanus, Banfield, Lomas and Temperley, the last of which is 19 km (11.8 miles) distant from Buenos Aires. The Compañia de Tranvias del Puerto y Ciudad de Buenos Aires is exclusively for harbor traffic, but already has 26.3 km (16.3 miles) within the city limits.

PRINCIPAL CITY SYSTEMS

The Anglo-Argentina company was formerly an English undertaking, but it is now owned by the Compañia Generale de Tramways of Buenos Aires, with headquarters in Brussels, Belgium. This company is a fusion of several systems, the final consolidation having been effected about the middle of the year 1909. The comparative figures for the year 1908 and 1909 and for the first six months of 1909 and 1910 respectively are as follows:

COMPARISON OF THE YEARS 1909 AND 1908.

Year.	Gross Earnings in Francs.	Operating Expenses in Francs.	Surplus in Francs.	Ratio Operation to Gross.	Car Kilometers.	Traffic.
1909	53,371,000	31,651,000	21,720,000	59.30	61,835,000	243,185,000
1908	50,289,000	31,046,000	19,243,000	61.73	59,332,000	227,040,000
Increase for 1909, in francs	3,082,000	605,000	2,477,000	——	2,503,000	16,145,000
In per cent.	6.13	1.95	12.87	——	4.22	7.11

FIRST SIX MONTHS OF 1910 AND 1909.

Year.	Gross Earnings in Francs.	Operating Expenses in Francs.	Surplus in Francs.	Ratio Operation to Gross.	Car Kilometers.	Traffic.
1910	29,381,000	17,171,000	12,210,000	58.44	33,189,000	133,706,000
1909	26,114,000	15,586,000	10,528,000	59.86	30,292,000	118,761,000
Increase for 1910, in francs	3,267,000	1,585,000	1,682,000	——	2,897,000	14,945,000
In per cent.	12.51	10.17	15.98	——	9.57	12.58

The increase in business for 1910 was due partly to the Centennial Fair celebrating the independence of the Argentine Republic and the World's Fair which was held in connection therewith. It is expected, however, that the business for the year 1911 will exceed even that of 1910. The stockholders of this company received a dividend of 6 per cent in 1909. The profits for 1910 permitted a dividend of 7¾ per cent on the common stock and 10 per cent on the preferred stock.

The Anglo-Argentina company when it electrified its lines in 1904 built its own power station and substations. Later it sold the generating plant to the Deutsch-Uberseeische Elektricitäts-Gesellschaft, from which it buys energy at 2.8 cents per kw-hour. In 1910 the company purchased 64,000,000 kw-hours, which was equivalent to an



Electric Railways of Buenos Aires

average of 0.77 kw-hour per car kilometer (1.12 kw-hours per car mile). This figure included the energy used in the carhouses and for other auxiliary purposes incident to transportation. In the mileage calculations, two trailers are considered equivalent to one motor car. The high average energy consumption per car kilometer is due in part to the condition that many of the older streets are very narrow and so congested that the motorman must frequently operate on resistance points when running between the regular stops, which are 125 m (410 ft.) apart. The narrow streets also have many short radius curves. A third reason is the difficulty of getting competent motormen. Buenos Aires is a city with a rapidly shifting cosmopolitan population. During the harvest season many employees resign for the sake of earning higher wages for a few months in the fields. The Anglo-Argentina company now employs 7650 motormen and conductors. It has 1466 motor cars, 700 trailers and sixteen carhouses. The car inspection depots employ 765 men. Owing to the uncertainty of shipments from Europe extensive shops have been built for the manufacture of armatures, fields, controller parts, resistances and castings of all kinds. Occasionally the company also builds cars complete. The shops employ

750 men for manufacture and repairs. This large number is required because of the great diversity in equipment which the company took over from the consolidated lines.

The feeder and overhead line department has 130 men and eighteen tower wagons. One of the difficult problems of the company has been the maintenance of the track. Much of the old track was unsuitable for electric operation, but it was not practicable to change all of it at once because the city had just undertaken an extensive paving program. At this time asphalt and wood paving are used to a fairly equal extent in the city. Even the most substantial sub-structure, especially in asphalt, has proved unsatisfactory owing to the heavy traffic in the narrow streets. The track department employs about 850 men.

The Lacroze company operates 250 motor cars and trailers. The motor cars are of modern United States construction, but the trailers are rebuilt horse cars. This line was electrified during the years 1905 to 1907, and has its own power station. The following table shows the comparative earnings of the Anglo-Argentina company and the Lacroze company for the years 1906 to 1910, inclusive:

COMPAÑIA ANGLO-ARGENTINA.

Year.	Gross Earnings, in Francs.	Passengers Carried.
1906	41,586,000	186,376,000
1907	45,545,000	216,403,000
1908	50,289,000	227,040,000
1909	53,371,000	243,185,000
1910	59,264,000	274,956,000

COMPAÑIA LACROZE DE BUENOS AIRES.

Year.	Gross Earnings, in Francs.	Passengers Carried.
1906	3,362,000	14,205,000
1907	4,248,000	18,348,000
1908	6,250,000	26,981,000
1909	6,849,000	29,758,000
1910	9,172,000	40,955,000

SUBWAY LINES

In September, 1909, a subway franchise was granted to the Compañia Ferro-Carril Oeste de Buenos Aires, Ltd., for a line 3.5 km (2.2 miles) long crossing the city from west to east. The principal purpose was to have a freight line from the harbor to the terminal of this company, but it was also intended to have a passenger line with two city stations. The Anglo-Argentina company, believing its interests threatened, thereupon secured franchises for a subway system to be connected to its surface lines. This franchise was granted on Dec. 28, 1909. The first subway company then obtained a revised franchise for underground lines to be used for freight service exclusively and to be built below the level of any lines constructed by the Anglo-Argentina company. The two companies now have a traffic agreement which will permit passengers on the Anglo-Argentina underground railway to purchase through tickets for the suburban lines of the other system.

According to the new franchise, the Anglo-Argentina company is to build a line 17 km (10.5 miles) long from east to west, one line 4 km (2.5 miles) long from north to south, and one 6 km (3.7 miles) long from southeast to northwest to join the Plaza de Mayo with the Plaza Italia in Palermo. Subway passengers will ride over the connecting surface lines without charge. The franchises are granted for eighty years, at the end of which period all rolling stock, carhouses, yards, tunnels and other structures become the property of the city. The fare is to be 10 cents for a ride on either the surface or subway line alone, and 15 cents for a combination ride. Workmen's tickets are sold at reduced rates during certain hours of the day. The railway must pay annually to the city 6 per cent of its gross earnings. Should the annual earnings exceed 50,000 pesos per kilometer ($70,000 per car mile) of single track the company must also pay 12 per cent of the excess gross earnings. There are also some minor taxes, but no new taxes or increases are to be imposed during the life of the present franchise. The stations of the subway lines will be 400 m (1312 ft.) apart. It is expected to have the first 3.5 km (2.2 miles) of the subway ready by March, 1913.

METROPOLITAN STREET RAILWAY REORGANIZATION

At the final hearings before the New York Public Service Commission for the First District, upon the plan for the reorganization of the Metropolitan Street Railway Company of New York, little new testimony was given by the witnesses for the committee of bondholders. The commission introduced as a witness E. G. Connette, its transportation engineer. Mr. Connette presented an estimate of the cost of reproduction and present value of the physical property of the Metropolitan system. This estimate is published on the opposite page.

Mr. Connette testified that the figures were computed from data in his department prepared by Bion J. Arnold, supplemented by investigations made to complete the information and complete the various percentages and the depreciation.

CONTRACTOR'S PROFIT

In this statement no contractor's profit was allowed on removal of obstruction, including pavement, because of the statement of the engineer who valued this part of the property that the amounts allowed were liberal enough to include any possible percentages for contractors' profits, sub-contractors' profits, contingencies, engineering, incidentals, etc. No general contractors' profit was allowed on cars, as equipment could be ordered by a company from specifications furnished by the manufacturing company and the intervention of a contractor was unnecessary. Contractors' profits were not allowed on fixed tools and appliances, Fourth Avenue tunnel stores and supplies, office furniture and fixtures and floating tools. Fixed tools and appliances were generally installed after the company found what would be required, and Mr. Connette could not assume that a general contractor would be permitted to provide these. The Fourth Avenue tunnel was not appraised by the commission and the figures of Ford, Bacon & Davis on this item were accepted. It was not customary to allow a general contractor's profit on stores and supplies and the same argument that applies to tools and appliances would apply also to furniture and fixtures Floating tools would be purchased from time to time. For similar reasons no allowances were made for engineering incidentals, administration, etc., for these items.

The allowance for incidentals, administration, engineering, etc., was 15 per cent, except in the case of electric and horse cars, for both of which it was 5 per cent.

In the calculation of depreciation, Mr. Connette said, the estimated life of the various elements, based upon obsolescence, inadequacy and age, was taken. The expired life of the various elements, in accordance with the testimony introduced on behalf of the joint committee of bondholders, was accepted. Depreciation was computed on the straight line plan.

LIFE OF APPARATUS

Under cross-examination by Charles F. Mathewson, counsel for the joint committee of bondholders, Mr. Connette testified that he estimated the life of the power plant at twenty years, the electric cars at twenty years and the horse cars at thirty-three years. So far as electric motors for cars were concerned, the progress of the art was not effecting changes as rapidly now as it had done in the past.

Street railway companies, after operation for a period of years and with proper maintenance, carried a constant factor of depreciation of from 20 per cent to 25 per cent, which in the opinion of Mr. Connette did not interfere with operation at 100 per cent efficiency so far as the public was concerned.

Mr. Connette testified that he did not know of any street railway company in the country which had set aside a cash sum for depreciation equal to the depreciation computed on the straight line basis, as presented by him in this case.

In answer to a question by Mr. Mathewson, it was stated by Mr. Connette that in rate cases only the elements that

METROPOLITAN STREET RAILWAY COMPANY PLAN FOR REORGANIZATION

COST TO REPRODUCE, DEPRECIATION AND PRESENT VALUE AS PREPARED BY ENGINEERS OF PUBLIC SERVICE COMMISSION.

Item.	Net Cost.	Contractor's Profit.	Net Cost Plus Contractor's Profit.	Incidentals, Administration, Engineering, etc.	Cost to Reproduce.	Salvage Value.	Wearing Value.	Depreciation.	Present Value.
Electric track:									
Removal of obstructions incl. pavement	$3,234,070.00		$3,234,070.00		$3,234,070.00		$3,234,070.00		$3,234,070.00
Foundation and excavation	7,337,020.00	$733,702.00	8,070,722.00	$1,210,608.30	9,281,330.30	$534,047.75	8,747,282.55	$1,602,794.83	8,218,535.47
Paving in track	2,096,643.00	209,664.30	2,306,307.30	345,946.10	2,652,253.40		2,652,253.40	1,326,126.70	1,326,126.70
Tram rail, straight track	1,552,157.00	155,215.70	1,707,372.70	256,105.91	1,963,478.61	352,189.16	1,611,289.45	805,644.72	1,157,833.89
Slot rail	549,743.00	54,974.30	604,717.30	90,707.60	695,424.90	185,831.44	509,593.46	254,796.73	440,628.17
Conductor lines	487,164.00	48,716.40	535,880.40	80,382.06	616,262.46	68,670.13	547,592.33	273,796.17	342,466.29
Special work and paving	1,168,141.00	116,814.10	1,284,955.10	192,743.27	1,477,698.37	163,108.35	1,314,590.02	657,295.01	820,403.36
Horse track and special work	1,123,791.00	112,379.10	1,236,170.10	185,425.52	1,421,595.62	76,865.68	1,344,729.94	672,364.97	740,230.65
Ducts	2,444,899.00	244,489.90	2,689,388.90	403,408.34	3,092,797.24		3,092,797.24	375,774.86	2,717,022.38
Cables	3,522,689.00	352,268.90	3,874,957.90	581,243.69	4,456,201.59	1,270,730.45	3,185,471.14	1,600,699.25	2,855,502.34
Power plant and sub-stations	4,276,177.00	427,617.70	4,703,794.70	705,569.21	5,409,363.91	1,081,872.78	4,327,491.13	1,525,440.62	3,883,923.29
Buildings	8,439,606.00	843,960.60	9,283,566.60	1,392,534.99	10,676,101.59		10,676,101.59	1,740,204.56	8,935,897.03
Buildings—Equipment	244,387.00	24,438.70	268,825.70	40,323.86	309,149.56	61,829.91	247,319.65	40,313.10	268,836.46
Electric cars	8,546,112.00		8,546,112.00	(5%) 427,305.60	8,973,417.60	347,719.93	8,625,697.67	3,730,614.24	5,242,803.36
Horse cars	677,830.00		677,830.00	(5%) 33,891.50	711,721.50	5,515.84	706,205.66	643,000.25	68,721.25
Fixed tools and appliances	137,798.00		137,798.00		137,798.00	27,559.60	110,238.40	27,559.60	110,238.40
Fourth Avenue tunnel	466,356.00		466,356.00	69,953.40	536,309.40		536,309.40		536,309.40
Stores and supplies	1,623,519.00		1,623,519.00		1,623,519.00		1,623,519.00		1,623,519.00
Office furniture and fixtures	106,052.00		106,052.00		106,052.00		106,052.00	26,513.00	79,539.00
Floating tools	130,694.00		130,694.00		130,694.00		130,694.00	32,673.50	98,020.50
	$48,164,848.00	$3,324,241.70	$51,489,089.70	$6,016,149.35	$57,505,239.05	$4,175,941.02	$53,329,298.03	$14,795,612.11	$42,709,626.94

were actually used in the manufacture of the product were taken into consideration. In capital cases all the property owned by the company was generally included. Sometimes properties were bought upon the basis of their earning value.

On July 20 Mr. Connette stated that the appraisal of the Third Avenue Railroad property was checked very carefully and adjustments made between the values determined in the two valuations made respectively by Bion J. Arnold for the commission and Henry Floy for the committee of bondholders. Because of these adjustments only 10 per cent was allowed for contingencies, etc. In the Metropolitan case the inventory was not checked and rechecked so that it was believed to be reasonable and proper to allow an additional 5 per cent to cover omissions and inaccuracies.

After the completion of the testimony of Mr. Connette the hearing was closed by the commission.

Final arguments of counsel were heard by the commission on July 21.

E. J. Kohler, of counsel for the bondholders of the Fulton Street Railroad, urged that the commission require some substantial provision for that company in the plan of reorganization.

Gilbert H. Montague, receiver of the Fulton Street Railroad, said that he would file a brief.

GOVERNMENT BULLETIN ON COST OF MATERIALS

The United States government has just issued Bulletin No. 93 on the cost of materials. This is a supplement to its previous reports, Nos. 77, 81 and 87, and brings the statistics published in these reports down to January, 1911.

As in the previous bulletins, a series of tables is published showing the average wholesale prices of 257 commodities, and these are further divided into raw commodities and manufactured commodities. The average price for these commodities for the period from 1890 to 1899 is taken as 100. On this basis the average for 1910 of the raw materials was 139.7, as compared with 136.8 in 1909, the highest figure up to that time. For the manufactured commodities the average price during 1910 was 129.6, as compared with 128.6 in 1907, the next highest yearly average. In 1909 the yearly average was 123.9. The total average for all commodities, raw and manufactured, was 131.6, as compared with 129.5 in 1907, the next highest yearly figure. The figures by months during 1910 show comparatively little variation. March was the highest month for the total of all commodities and August the lowest.

The bulletin also contains a report of cost of living in the United States. This is taken from the report made by the British Board of Trade, and contains a comparison of the American with British figures. Twenty-eight cities were covered by the investigation, which was confined almost entirely to families in which the total weekly income was $30 or less. With one or two exceptions the price of food was found to be the highest in the cities in the Southern States and in the New England States, and lowest in the cities in the Central West. New York occupied exactly a middle position. Rents were highest in the Borough of Manhattan, New York. St. Louis came next and Greater New York third. There was no marked difference in rents between the Eastern, Western and Southern sections of the country, although there was a marked difference between some individual cities in those sections.

The average incomes of workmen in the same industries in Great Britain were considerably less than in the United States, and the classified expenditures showed that the amount spent on food in the average American workingman's family begins at a figure a little higher than that at which the British maximum of the corresponding kind stops.

ELECTROLYSIS SITUATION IN CHICAGO

Mayor Harrison of Chicago has approved the appointment of Ray Palmer, a Chicago engineer, to investigate the city underground structures in so far as they may or may not be affected by electrolytic action. Mr. Palmer has been engaged on similar work in Milwaukee. He is to be paid a salary of $750 a month and employ his own assistants. The present appointment follows conferences on electrolysis which have been called by L. E. McGann, commissioner of public works of Chicago. At these conferences two reports have been considered, one of a preliminary nature presented by Bion J. Arnold, chairman of the board of supervising engineers of Chicago traction, and the other by the Chicago Bureau of Public Efficiency. This bureau is privately supported and was organized for the purpose of making constructive suggestions for improvement in the accounting and purchasing methods and the handling of the payrolls of the local city government and for co-operating with public officials in the installation of new methods. It also proposes to furnish the public with exact information regarding public revenues and expenditures and thereby promote efficiency and economy in public service. The report on the electrolysis situation which this bureau has just issued was conducted under the charge of A. J. Hammond, chief engineer of the bureau, and H. J. McDargh, assistant engineer. The report comprises seventy-two pages and an inset map.

The preliminary report by Mr. Arnold announces the reasons for and the lines of study followed in the preparation of an exhaustive investigation of electrolysis in Chicago which has been made by a sub-committee of the board of supervising engineers. This report has not yet been issued, but it is described in a letter written by Mr. Arnold to the commissioner of public works on July 27. An abstract of this letter follows:

"Soon after the board of supervising engineers came into existence the question of the prevention of electrolysis was discussed and it was decided that the reconstruction of the surface car-line tracks should be so done as to eliminate, so far as practicable, the escape of current from the rails. This was done by supplementing the rails on all new track work with a return copper conductor or conductors, the function of this return copper being to assist the rails in carrying the return current to the power stations or substations. Where the cars are a considerable distance from these power stations or substations and the traffic is light a small amount of copper in addition to the rails is sufficient; but in order to meet the probable future increase in the number of cars and to provide a path for the current in case of broken joints, we decided that no track should be laid unless it was supplemented with a return conductor and that for double track a conductor not less than 500,000 circ. mil should be used. Furthermore, as the flow of current is greater near the substations and power houses and the traffic is heavy there, this supplemental conductor has been increased in proportion to the work so that in many instances there have been from two to twelve 1,000,000 circ. mil cables laid to supplement the rails.

"The present ordinances, upon the advice of the writer given during their formative period, require that the joints of the rails shall have a conductivity equivalent to the conductivity of the rail itself, and the board of supervising engineers has seen that this provision is strictly carried out by providing welded joints in all new track and by testing each joint to see that it complies with the above stipulation. At a few points, such as on track special work, where it has been impracticable to weld the joints, copper cables connecting the main rails through all such special work have been provided. The rails have also been connected together and to the supplemental return cables with copper cross bonds at frequent intervals in order to equalize potentials and to utilize the full carrying capacity of all the rails. Thus the board has seen that all new construction of surface lines has been done in such a manner as to prevent, to the greatest degree practicable, electrolysis due to the existence of the tracks of the surface car-line companies.

"After adopting our standard plans it became evident that the necessary information upon which to base conclusions regarding what should be done with other structures to prevent, so far as practicable, the destructive effect of electrolysis upon the underground utilities in the city could best be accomplished by co-operative action on the part of the public utility companies of the city and the board of supervising engineers. It was thought by this method much duplication of work would be saved and that the results thus obtained would be more valuable than would be secured if each company endeavored to conduct independent investigations of its own. The result was that a sub-committee on electrolysis, consisting of representatives of the board of supervising engineers and of each of the public utility companies of the city, was appointed, and this sub-committee, consisting of the best talent of the respective companies and of the board of supervising engineers for handling this subject, has been investigating the subject for over three years and has compiled many useful data and arrived at conclusions which should be of great benefit to the public utility corporations and the city of Chicago when these recommendations are put into effect.

"The method of the committee is to treat the subject purely from a scientific and practical standpoint, discussing all matters freely and frankly, the object being to ascertain and recommend a practical method for the prevention of electrolytic action between the various underground metallic surfaces within the city of Chicago likely to be affected by return currents of any grounded system. A brief outline of the work of this sub-committee is as follows:

"The committee has investigated and reported upon the conductivity of cement, concrete and earth materials. It has made measurements of resistances, cables and conduits to rails, water pipes and gas pipes; reported extensively upon methods employed to protect the lead sheaths of the cables, studying the relation of the voltage to the electrolytic corrosion of iron; made an extensive study and prepared a bibliography of the work previously done; made extensive electrolytic surveys and improved local conditions at many places; carried on two years' experimental work of electrolytic observations of sample track of the board of supervising engineers' standard construction; prepared formal reports recommending certain policies, such as the desirability of interconnecting return system installations, drainage system, etc.

"The committee is at present trying out an extensive drainage system for protecting pipes in power stations.

"The committee's final recommendations are just about to be formulated and, in the meantime, certain physical connections have been made between the tracks of the surface companies and of some of the elevated companies with marked effect in the reduction of the flow of current and consequently a reduction in electrolytic effect.

"Many more localized interconnections have been installed and are being watched for the character of the results. Where trouble develops at any location the committee determines what shall be done to remedy the situation as the local condition requires.

"It has been my intention, as soon as this committee made its formal recommendations, to take the subject up with the city officials with a view of securing their co-operation in carrying out a definite policy for the bettering of conditions, provided this method is agreeable to the various utility companies represented on the committee, believing that the information compiled by this committee under the guidance of the board of supervising engineers, at considerable expense to the companies, would be of

value, not only to the companies, but also to the city, provided a spirit of co-operation between the various utility companies and the city, having for its object the rectification of faults rather than the fixing of the legal responsibility for these faults, can be agreed upon."

REPORT OF BUREAU OF PUBLIC EFFICIENCY

The report made by the Chicago Bureau of Public Efficiency is dated July, 1911, and is entitled "Electrolysis of Water Pipes in the City of Chicago." Herbert R. Sands, a director of this bureau, says it is believed that at least two-thirds of the water pumped into the city mains is wasted and that a large part of this waste is attributed to leaky water pipes, which possibly may be impaired by electrolysis. Because of this condition the bureau had its engineers make a preliminary study of the electrolytic conditions as affecting the Chicago water mains.

The report recommends that a complete electrolysis survey of the entire city should be made by the city authorities. Such a survey should include (1) location of all positive and negative territories; (2) examination of all water pipes found to be carrying current, ascertaining whence the current comes, its point of departure and where it goes; (3) analysis of soil in positive districts; (4) sufficient tests of railway track rails to determine their efficiency as conductors. It is asserted that the board of supervising engineers has collected considerable data on the subject, but that nevertheless much remains to be done.

The report goes on to consider the relation of electric railways to electrolysis and briefly refers to legal proceedings by cities and water companies, also dwelling on the importance of the subject in Chicago and the necessity for immediate action. Some "horrible examples" of electrolysis are cited, possibly the most interesting being the following:

"One of the large department stores in Chicago experienced the injurious effect of electrolysis through the failure of one of its 6-in. mains in the basement. This bureau received an invitation to investigate and found that current from the electric railways was entering the building by the water and gas service pipes and following the piping and structural steel of the building until it found its way to the rails of the Illinois Tunnel Company's track. This investigation disclosed a 6-in. pipe in the building carrying 59 amp of current."

The People's Gas Light & Coke Company, according to this report, has greatly reduced the damage to its system by bonding with copper wires the gas mains in positive territories to the track rails. Further, each joint in the gas mains was bonded with two No. 0000 copper wires. These joints are 12 ft. apart. In addition, at a number of places copper cables varying from 500,000 to 1,000,000 circ. mils were tapped into the gas mains and carried to negative busbars at power stations.

The report goes on to show how its survey was made and in an appendix is a long list of readings made at various locations with voltmeters and ammeters. Discussing remedies the report says that the double trolley system will be impracticable. Various methods heretofore suggested are mentioned, and while the Chicago Bureau of Public Efficiency does not recommend any particular one of these, it believes that means of relief are available.

PROPOSED HIGH SPEED ELECTRIC LINE AT ROME

A provisional agreement has been entered into between the Syndic of Rome and Messrs. Berthelot and Gilbert Boucher, representing two groups of French capitalists, for building a high-speed electric railway from Rome to the sea. A company with a capital of $4,000,000 has been formed for this purpose, and a first provisional deposit of $16,000 has been made, which will be increased to $160,000 as soon as the agreement becomes final. The line is to be doubled-track, to start from the new projected maritime suburb of Rome near Ostia, some 3 miles south of the mouth of the Tiber, and to reach Rome at the Porta San Paolo. Here the line is to be taken underground and is to reach the city terminus at Piazza Venezia. The speed to be maintained throughout will be about 44 m.p.h.

EXHIBITS AT THE ATLANTIC CITY CONVENTION

The committee on exhibits of the American Electric Railway Manufacturers' Association has completed the work of assigning space for exhibits at the convention this year to the first lot of applicants. The space required to supply the demand so far totals over 65,000 sq. ft., which is more than that needed at the same time last year. A list of the companies which up to date have signified their intention of exhibiting at the convention with the spaces to be occupied by them is published below.

Acme Indicator Co., Cleveland, Ohio, (405)
Allis-Chalmers Co., Milwaukee, Wis., (21-23)
American Abrasive Metals Co., New York City, (437)
American Brake Shoe & Foundry Co., Mahwah, N. J., (302)
American Mason Safety Tread Co., Boston, Mass., (401)
American Railway Guide Co., Chicago, Ill., (10)
American Railway Supply Co., New York City, (403)
American Steel & Wire Co., Chicago, Ill., (358-359-360-361)
Anderson Mfg. Co., Albert & J. M., Boston, Mass., (221)
Archbold-Brady Co., Syracuse, N. Y., (402)
Atlas Railway Supply Co., Chicago, Ill., (172)
Automatic Ventilator Co., New York City, (226)

Baldwin Locomotive Works, Philadelphia, Pa., (105-107-109-111)
Bayonet Trolley Harp Co., Springfield, Ohio, (271)
Brill Co., The J. G., Philadelphia, Pa., (1-3-5)

Cambria Steel Co., Johnstown, Pa., (321-323)
Carnegie Steel Co., Pittsburgh, Pa., (362 to 373 inc.)
Chicago Pneumatic Tool Co., Chicago, Ill., (100-102-104)
Chicago Railway Equipment Co., Chicago, Ill., (438)
Chicago Varnish Co., Chicago, Ill., (425-426)
Cleveland Frog & Crossing Co., Cleveland, Ohio, (166)
Coe Manufacturing Co., W. H., Providence, R. I., (181)
Columbia Mach. Wks. & Mal. Iron Co., New York City, (185)
Consolidated Car Fender Co., Providence, R. I., (276-278)
Consolidated Car Heating Co., New York City, (376 to 379 inc.)
Crouse-Hinds Co., Syracuse, N. Y., (216)
Curtain Supply Co., Chicago, Ill., (380-381-382)
Cutter Electrical & Mfg. Co., Philadelphia, Pa., (174)

Dayton Fare Recorder Co., Dayton, Ohio, (280-281)
Dearborn Drug & Chemical Co., Chicago, Ill., (7)
Detroit Steel Products Co., Detroit, Mich., (168)
Dixon Crucible Co., Jos., Jersey City, N. J., (19)
Drouvé Co., G., Bridgeport, Conn., (170)
Duff Manufacturing Co., Pittsburgh, Pa., (431-432)

Eclipse Railway Supply Co., Cleveland, Ohio, (265-267)
Edwards Co., The O. M., Syracuse, N. Y., (325-327-329-331)
Electric Railway Improvement Co., Cleveland, Ohio, (386-388-389)
Electric Railway Journal, New York City, (2-4-6-8)
Electric Service Supplies Co., Philadelphia, Pa., (311)
Electric Traction Weekly, Chicago, Ill., (9)
Ellcon Co., New York City, (333)
Emery Pneumatic Lubricator Co., St. Louis, Mo., (219)
Eureka Tempered Copper Works, North East, Pa., (268)

Flood & Conklin, Newark, N. J., (258-260)
Ford & Johnson Co., The, Michigan City, Ind., (269)
Forsyth Brothers Co., Chicago, Ill., (342-344)

Galena-Signal Oil Co., Franklin, Pa., (39-42 inc.)
General Electric Co., Schenectady, N. Y., (25 to 38 inc.)
General Railway Signal Co., Rochester, N. Y., (420)
Globe Ticket Co., Philadelphia, Pa., (279)
Gold Car Heating & Lighting Co., New York City, (217)
Goldschmidt Thermit Co., New York City, (212-214)
Griffin Wheel Co., Chicago, Ill., (138-140)

Hale & Kilburn Mfg. Co., Philadelphia, Pa., (421 to 424 inc.)
Hess-Bright Manufacturing Co., Philadelphia, Pa., (144-146)

Heywood Bros. & Wakefield Co., Wakefield, Mass., (439-440)
Home Rubber Co., Trenton, N. J., (274)
Hunt Company, C. W., West New Brighton, N. Y., (148-150-152-154)
Hunter Illuminated Car Sign Co., Flushing, N. Y., (44)

Indianapolis Brass Co., Indianapolis, Ind., (210)
International Register Co., Chicago, Ill., (201-203-205)
Inter-Ocean Steel Co., Chicago, Ill., (136)

Jeandron, W. J., New York City, (232)
Jenkins Brothers, New York City, (414)
Johns-Manville Co., H. W., New York City, (237-239-241)
Johnson Fare Box Co., New York City, (261-263)
Jones & Laughlin Steel Co., Pittsburgh, Pa., (306-308)

Long Co., E. G., New York City, (251)
Lorain Steel Co., Johnstown, Pa., (348 360-351-352-353)

Matthews-Davis Tool Co., St. Louis, Mo., (117-119)
May & Turner Co., Atlanta, Ga., (413)
McCabe, J. J., New York City, (127-129-131)
McConway & Torley Co., Pittsburgh, Pa., (310-312-314)
McGuire-Cummings Mfg. Co., Chicago, Ill., (272)
McQuay-Norris Mfg. Co., St. Louis, Mo., (134)
Midvale Steel Co., Philadelphia, Pa., (433-434-435-436)
Milburn & Co., Alexander, Baltimore, Md.
Murphy Iron Works, Detroit, Mich., (99)

Nachod Signal Co., Philadelphia, Pa., (142)
National Brake & Electric Co., Milwaukee, Wis., (120-122-124-126-128)
National Brake Co., Buffalo, N. Y., (262-264)
National Carbon Co., Cleveland, Ohio, (176-178)
National Lead Co., New York City, (317-319)
National Lock Washer Co., Newark, N. J., (320-322)
National Tube Co., Pittsburgh, Pa., (354-355-356-357)
Nelson Valve Co., Philadelphia, Pa., (123-125)
New York Air Brake Co., New York City, (229-231-233-235)
New York Switch & Crossing Co., Hoboken, N. J., (248-250-252)
Niles-Bement-Pond Co., New York City, (90)
Niles Car & Manufacturing Co., Niles, Ohio, (273)
Nuttall Co., R. D., Pittsburgh, Pa., (147-149)

Ohio Brass Co., Mansfield, Ohio, (242 to 247 inc.)
Ohmer Fare Register Co., Dayton, Ohio, (200-202-204-206)

Pantasote Co., New York City, (301)
ParSil Metal Co., Glenside, Pa., (275)
Paxson Co., J. W., Philadelphia, Pa., (249)
Pennsylvania Steel Co., Steelton, Pa., (12-14-16-18)
Pittsburg Steel Co., Pittsburgh, Pa., (222-224)
Pyrene Manufacturing Co., New York City, (165)

Rail Joint Co., New York City, (180)
Railway Improvement Co., New York City, (335-337-339)
Railway Materials Co., Chicago, Ill., (328)
Railway Roller Bearing Co., Syracuse, N. Y., (113-115)
Railway Track-Work Co., Philadelphia, Pa., (156-158-160)
Ramapo Iron Works, Hillburn, N. Y., (400)
Recording Register & Fare Box Co., New Haven, Conn., (130)
Rooke Automatic Register Co., Providence, R. I., (346)
Root Spring Scraper Co., Kalamazoo, Mich., (411)

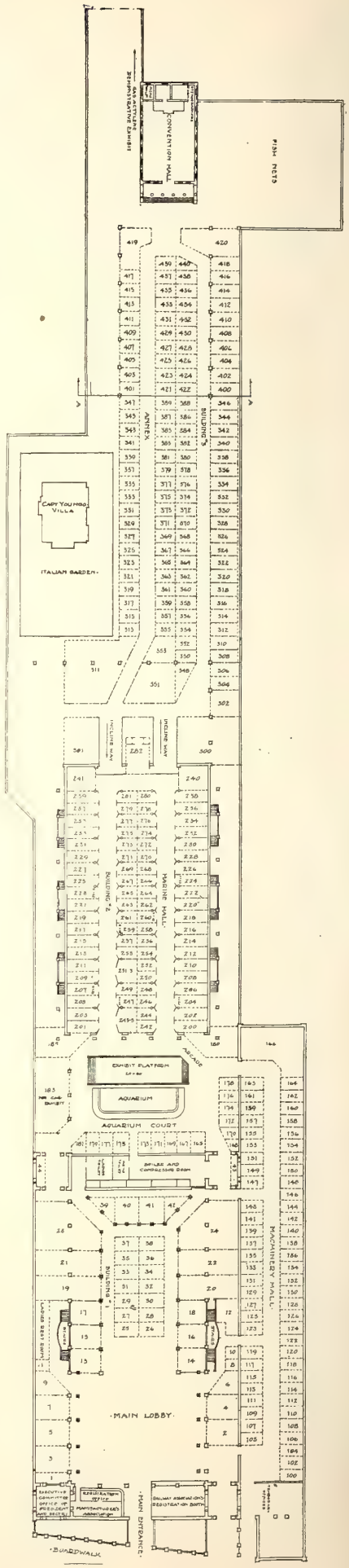
Samson Cordage Works, Boston, Mass., (313-315)
Schutte & Koerting Co., Philadelphia, Pa., (341)
Sherwin-Williams Co., Cleveland, Ohio, (20)
Smith Heater Co., Peter, Detroit, Mich., (254-256)
Speer Carbon Co., St. Marys, Pa., (255)
Standard Coupler Co., New York City, (324-326)
Standard Leather Packing Co., Boston, Mass., (409)
Standard Paint Co., New York City, (277)
Standard Roller Bearing Co., Philadelphia, Pa., (106-108)
Standard Underground Cable Co., Pittsburgh, Pa., (282)
Star Brass Works, Kalamazoo, Mich., (151)
Sterling Varnish Co., Pittsburgh, Pa., (429-430)
Symington Co., T. H., Baltimore, Md., (427-428)

Taylor Electric Truck Co., Troy, N. Y., (110 to 118 inc.)
Taylor Stoker Co., Providence, R. I., (153-155)
Templeton, Kenly & Co., Chicago, Ill., (266)
Tool Steel Gear & Pinion Co., Cincinnati, Ohio, (383)
Traction Materials Co., New York City, (417)
Transportation Utilities Co., New York City, (374-375)
Trolley Supply Co., Canton, Ohio, (343-345)

Union Switch & Signal Co., Swissvale, Pa., (300)
Universal Audit Co. of New York, New York City, (415)
Universal Safety Tread Co., Boston, Mass., (387)
U. S. Electric Signal Co., West Newton, Mass., (157-159-161-163)
U. S. Light & Heating Co., New York City, (257-259)
U. S. Metal & Manufacturing Co., New York City, (304)

Van Dorn & Dutton Co., Cleveland, Ohio, (132)

Walker & Bennett Manufacturing Co., New York City, (407)
Watson-Stillman Co., New York City, (338-340)
Western Electric Co., New York City, (234-236-238-240)
Westinghouse Companies, Pittsburgh, Pa., (22-24-133 to 143 inc.)
Wharton, Jr., & Co., Wm., Philadelphia, Pa., (13-15-17)
Wheel Truing Brake Shoe Co., Detroit, Mich., (347)
Whipple Supply Co., New York City, (381-385)
Whitmore Manufacturing Co., Cleveland, Ohio, (162-164-164A)
Wilson Remover Co., New York City, (43)
Wonham, Sanger & Bates, New York City, (218-220)



PERFORMANCES OF STORAGE BATTERY CARS

The Federal Storage Battery Car Company, New York, has issued some striking average figures on the daily performance of Beach cars equipped with Edison batteries. A double-truck car carrying 190 cells and four 15-amp, 200-volt motors ran 312.2 miles, made 1.9 stops per mile, propelled a weight of 16.8 tons at 20.2 m.p.h. over an average maximum grade of 1.84 per cent and required only 43.8 watt-hours per ton-mile. Its longest run on one charge was 135



Storage Battery Car for Suffolk Traction Company

miles over the tracks of the Erie and Pennsylvania railroads between West Orange and Atlantic City, N. J. The corresponding average figures for seven single-truck cars equipped with 90 to 110 cells and two 30-amp, 85-volt motors were as follows: 76.07 miles daily, 7.5 stops per mile, 7 tons total weight, 63.4 watt-hours per ton mile and grades up to 8 per cent. One of these seven cars, as furnished to the Suffolk Traction Company, is shown in the accompanying illustration. The individual record of this car is as follows: Ran 110 miles a day, made five stops per mile, carried seven passengers per car mile, operated over grades of 3.8 per cent to 4.5 per cent and required 63.4 watt-hours per ton-mile. The weight of this car is 7 tons, and its wheel-base is 8 ft. 6 in. It is geared for a schedule speed of 22 m.p.h. including stops. This car has taken the place of steam equipment on a branch of the Long Island Railroad. It makes eight round trips a day and is reported to effect a saving of $35 a day in operating expenses.

COLLAPSIBLE STEEL FORMS FOR CONCRETE CULVERTS

The Concrete Form & Engine Company, Detroit, Mich., is making collapsible steel forms for building concrete culverts, conduits, sewers, small bridges, trestles, tunnels and similar structures. The use of these forms is asserted to save from 25 per cent to 50 per cent in construction. They are made of No. 16 galvanized steel and are subjected

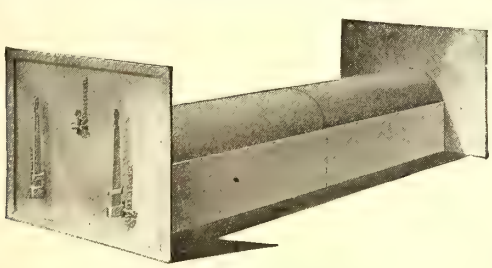


Fig. 1—Complete Form

to so little hard use during their application as to be practically indestructible. A complete form consists of two semi-circular tops, four side pieces and two end plates, as illustrated in Fig. 1. As shown in Fig. 2, the tops rest upon arms which are attached to the sides and extended at proper intervals, all controlled by a draw rod and lever. By pulling the lever the top is lowered enough to permit its withdrawal. The sides are collapsed by releasing the swinging arms which connect and hold them rigid. The end plates are fastened to the top and sides by removable keys. The forms are withdrawn from the concrete in from twelve hours to twenty-four hours according to conditions.

As the tops and sides are interchangeable, the owner of a 24-in. complete form could build larger or smaller culverts simply by securing tops of appropriate sizes. Fur-

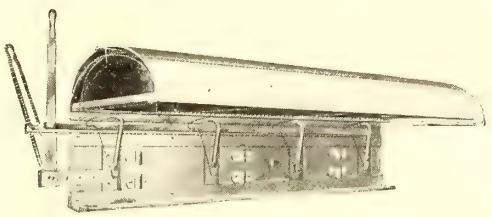


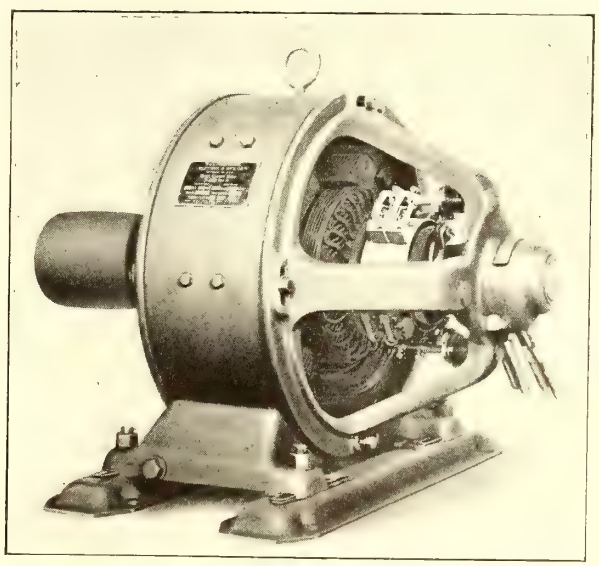
Fig. 2—Top and Side of Form

thermore, by building the foundation walls a little lower or higher the height can be controlled to suit the operator. The weight of complete forms varies from 375 lb. for the 12-in. size to 1000 lb. for the 72-in. size. No special hoisting apparatus is required, however, because the forms are removed in sections.

INTERPOLE DIRECT-CURRENT MOTOR

The Westinghouse Electric & Manufacturing Company has announced a new direct-current motor for general power service, called "Type SK." One of its strongest features is the excellent commutation, which is obtained partly by the use of interpoles and partly by the careful design of the commutator, brushes and brush holders. Other important characteristics are the large dust-proof bearings and the efficiency of the oiling system. Large oil rings keep the bearing surfaces well lubricated whenever the motor is in operation, but the oil cannot leak or be thrown out of the oil well.

The motor frame is of a new design. It is a ring of open-hearth steel made by hot-rolling the slab into shape



Interpole Stationary Motor

and welding the ends together. The armature is so wound that wide spaces are left between the ends of the coils and ample ventilating ducts are provided in the core. The coils are form wound, laid in open slots and held by fiber wedges and bands. The shaft can be pressed out without disturbing the armature windings and com-

mutator connections. These motors are made for 115 volts, 330 volts and 550 volts, in capacities of from 1½ hp to 50 hp.

SIMPLIFIED CONTROLLER DIAGRAMS

BY E. C. PARHAM

A car-wiring diagram when reduced to a drawing of convenient size has so many wires running to points apparently close together that it is hard to follow even a regular circuit from beginning to end with any degree of certainty, especially for one not familiar with such circuits. The substance of this article is to show a conventional but simple method of representing a car-wiring diagram in such a manner that the effect of a ground, open circuit or wrong connection and the irregular circuit thereby established becomes almost evident.

Fig. 1 is a wireman's diagram of four motors, controlled by a K-6 General Electric controller, or its equivalent, and the path of the current established by the first controller notch is indicated by the arrowheads. It will be noted that the main controller fingers are represented by circles inked in black; the reverse fingers by circles with dotted centers; the cut-out switch posts by circles with crosses, and the connecting-board posts by plain circles. All controller wires which are installed at the factory are indicated by dotted lines, and all wires which are to be installed by the wireman are indicated by full lines, after the method used in standard factory diagrams.

Fig. 2 is a simplified reproduction of Fig. 1, and the conventional marks are so used that any given part of the circuit or all of it, as shown in either diagram, can be readily identified in the other. Fig. 2*a* is the circuit development for "series-ahead", Fig. 2*b* for "series-back"; Fig. 2*c* for "parallel-ahead," and Fig. 2*d* for "parallel-back." The most convenient layout for using such diagrams is to draw them on a slate so that connections may be readily erased and replaced by those to be studied. Thus the diagrams show clearly the effect, so far as the circuits are concerned, if the *F*1 and *A*2 wires are confused when the controller is connected up. They also illustrate the different conditions established when the controller is "ahead," "back" or in "series" or in "parallel." With an ordinary diagram satisfactory study of irregularities in a car circuit is difficult because of the difficulty which most people experience in holding such circuits as a whole in mind. With the diagrams submitted all complications disappear and only a knowledge of the law of current preference is required.

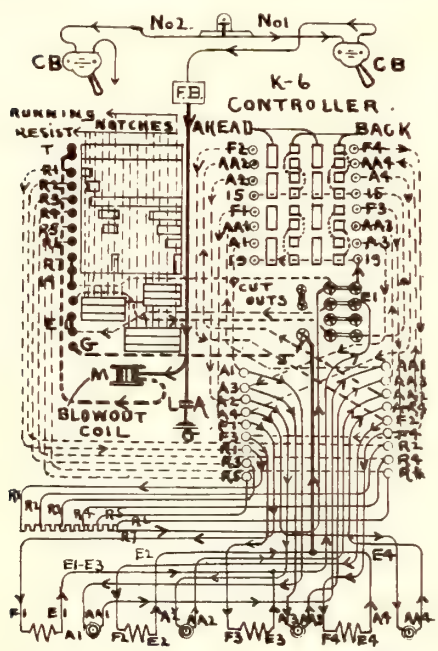


Fig. 1—Ordinary Controller Diagram

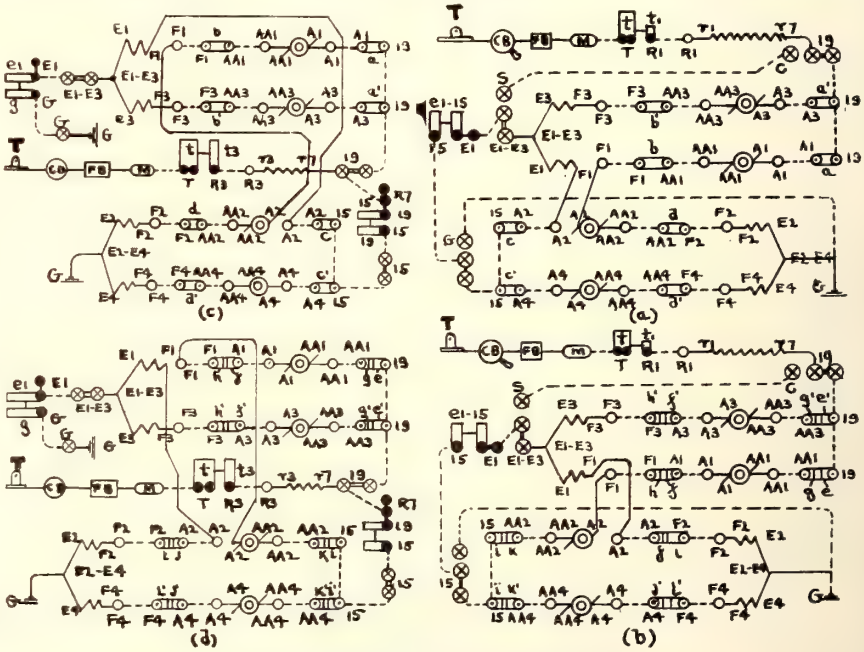


Fig. 2—Simplified Controller Diagrams

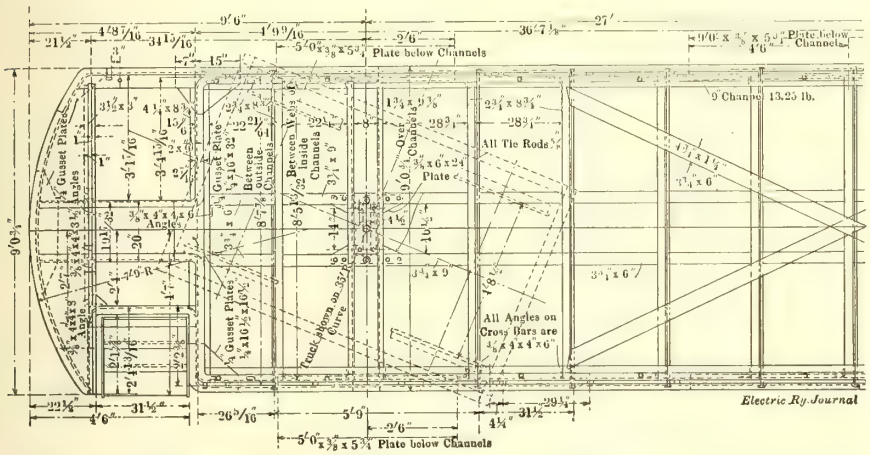
ALUMINUM CAR PANELS AND FITTINGS IN ZURICH

Through the courtesy of the management of the Zurich Municipal Street Railways some interesting information is available on the experience which this corporation has had with aluminum for car panels, roof members and other purposes. The reasons for adopting aluminum were twofold, namely, to save weight and to minimize the discoloration due to the rusting of metal parts. The light car colors used in Zurich made the latter question quite a serious one. Aluminum was first employed in the roof framing of twenty-five motor cars which were built in 1910. These cars showed so little oxidation that the next lot of cars ordered was equipped with aluminum roof members, panels and dashers, and aluminum was specified even for the grab handles and window guard bars. The aluminum trimmings are not as bright as the old nickel trimmings, but they are more satisfactory in the long run because there is no plating to wear off and expose a dull metal. The aluminum used is an alloy which contains a small amount of copper. It is sold by the Aluminium Gesellschaft, Berlin, under the trade name of "Dura-Aluminium." It is hard-drawn and forged and possesses great tensile strength. The panels on the latest cars are 2 mm (0.078 in.) and the dashers 2.5 mm (0.098 in.) thick as compared with 1.75 mm (0.69 in.) and 2.25 mm (0.88 in.) thickness on the first cars. These changes have added 17 kg (37 lb.) to the weight. The roof members are 4 mm (0.156 in.) or 6 mm (0.234 in.) thick, according to service requirements.

An extract from the specifications under which these cars were built states that the panels must be sand-blasted with fine sand before painting. After blasting the panels are cleaned with turpentine. The schedule is as follows: Primary coat, one day; puttying, one day; pause, two days; second coat, one day; pause, one day; third coat, one day; pause, two days; Ripolin varnish, one day; pause, two days; second coat Ripolin, one day; pause, two days; third coat Ripolin, one day; pause, two days; ornamentation and lettering, three days; pause, one day; total, twenty-two days.

NEW CARS FOR ARKANSAS VALLEY INTERURBAN RAILWAY

The Arkansas Valley Interurban Railway Company has recently constructed a high-speed trolley line from Wichita, Kan., northward through Valley Center and Sedgwick to Newton. The plans of this road contemplate further extensions northwest from Sedgwick to Hutchinson and from Wellington southward to Arkansas City, with branches to Wellington and Winfield. The road is being built by Wichita business men for the benefit of the city. The bonds have been sold largely in the Kansas farming communities. The first section from Wichita northward 18 miles to Sedgwick was opened for service Dec. 17, 1907. O. A. Boyle is vice-president and general manager.



Bottom and Side Framing of Motor Car for Arkansas Valley Interurban Railway

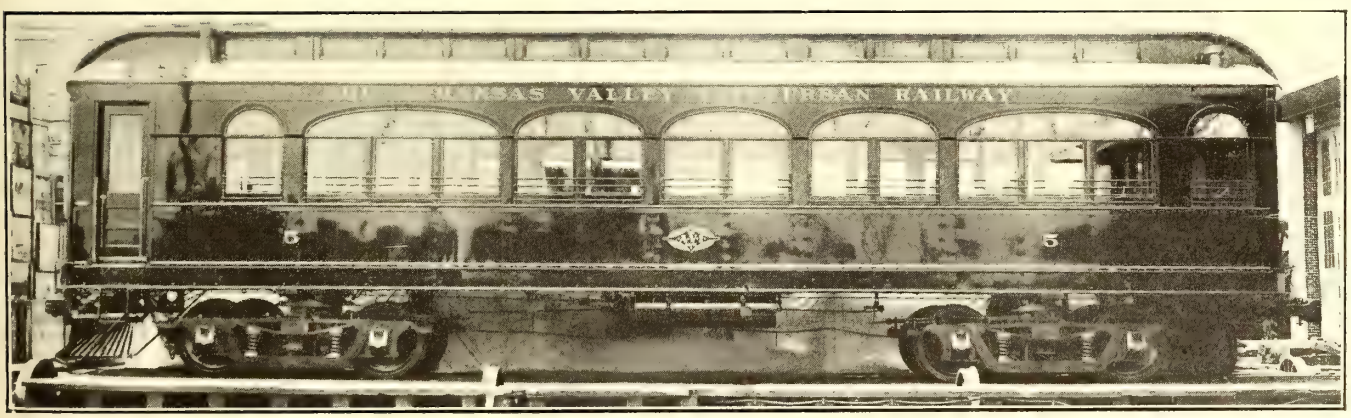
The new road is built on a private right-of-way varying from 66 ft. to 80 ft. in width and located in a flat country which permits long tangents and few grades. All the important bridges are of concrete and steel. The tracks are laid with 70-lb. rails and Duquesne joints. The rail ends are bonded with No. 0000 twin-terminal bonds and the entire track and roadway construction conforms to the latest interurban standards for high-speed work. Energy for the operation of the road is obtained through a 33,000-volt, 60-cycle current from the large new power plant of the Kansas Gas & Electric Power Company, of Wichita. The cars of the interurban line enter Wichita over the tracks of the local city system, the Wichita Railroad & Light Company, one of the McKinley syndicate properties. The Arkansas Valley interurban has its own terminal property which will accommodate both freight and passenger stations. This piece of property is located close to the business center of Wichita, which has a population of more than 55,000 and is reached by five steam railway systems.

The St. Louis Car Company has just completed five 46-ft. combination passenger, smoking and baggage cars for this railway company. These cars include some novel features of underframe design and interior arrangement. The general dimensions of the car are: Length of the car over bumpers, 46 ft. 0 in.; length over the vestibules, 45 ft. 2 in.; length inside the main passenger compartment, 23 ft. 7½ in.; length inside the rear vestibule, 4 ft. 0 in.; width inside between the wainscoting, 8 ft. 1¼ in.; width outside over the sheathing, 9 ft. 0 in.; extreme width, 9 ft. 2 in.; height from the track rail to the underside of the sills, 3 ft. 5 in.; height under the side sill to the top of trolley board, 10 ft. 0 in.; extreme height from the top of the track rail to the top of the trolley board, 13 ft. 7 in.; minimum curve radius, 35 ft. 0 in.

The new cars are divided into a baggage and smoking compartment seating seventeen passengers, a main compartment seating thirty-six passengers and a rear vestibule. Single-end operation only is provided for and a motorman's cab has been set off from the forward left-hand corner of the car. Just behind the motorman's cab a protected space has been arranged for a Cooper hot-water heater. The toilet room with its dry hopper is located on the rear platform. The cars have but one passenger entrance and this is at the right-hand side of the rear vestibule. The bodies are mounted on the St. Louis Car Company's No. 23-B trucks with rolled-steel wheels. The dimensions relating to the wheels and trucks are as follows: Diameter of wheels, 34 in.; tread, 3 in.; flange, 1 in.; wheelbase, 6 ft. 6 in.; track gage, 4 ft. 8½ in., and diameter of axles, 5½ in.

BOTTOM FRAMING

The accompanying plan view of one-half of the underframing will illustrate its novel construction. The side sills consist of two 9-in. 13¼-lb. channels laid back to back and spaced with wrought-iron bars riveted between them. The channels have extensions over the upper flanges into which the side posts are bolted. The outside channel on the left-hand side of the car extends in one piece from the center of the front bumper, along the side, and around the rear bumper to the steps on the right-hand side of the car. The outer channel on the right-hand side of the car begins at the right-hand end of the rear bumper, extends inwardly around the outline of the step opening and thence along the side of the car and around the front to join the other outer channel at the center of the front bumper, where they are spliced. These two channels completely encircle the outline of the car and are reinforced



Standard Car of the Arkansas Valley Interurban Railway

with gusset plates. The inside channels are bent around the end sills and carried toward the center of the car at each end to a point in line with the center sills, and thence extend forward and are connected with the buffer beams by gusset plates. The special forming of these inside channels, which are continuous from end to end of the car, affords substantial draft sills and center support for the buffer. The double-channel iron side sills are covered on the bottom by 6-in. x ⅜-in. plates riveted to the lower flanges. The cross and end sills are of white oak trussed and tied to the inside channels. The truss plank is yellow pine, 1¼ in. x 10 in. in section, screwed and bolted to the posts and side channels.

The body framing, which is of white ash ribbed and plated with long-leaf yellow pine, is sheathed on the outside with No. 16 sheet steel. The roof, which is of the steam-coach type, is supported by continuous steel carlines anchored to post rods. The intervening roof framing is made of ash.

There are thirteen windows on each side of the body and one in the toilet room, located on the rear platform. The sashes are in two parts, the upper extending over two or three lower sashes to form a gothic window glazed with cathedral glass. The sashes are made of mahogany designed to rise not less than 22 in. They are fitted with Edwards O-D 13 fixtures. The deck sashes also are mahogany filled with cathedral glass. The windows are equipped with Pantasote curtains mounted on Edwards heavy spring rollers and having Curtain Supply Company ring fixtures. The interior finish of the cars is mahogany in the passenger compartment and oak in the baggage and smoking compartment. All the doors are made of solid mahogany, the rear end of the car having a sliding door in the center and the bulkhead between the interior compartments having a swinging door. The baggage compartment has a 36-in. sliding side door also equipped with a screen. The motorman's cab has a swinging outside door and a creep door leading to the baggage compartment. The interior of the rear vestibule is finished in mahogany and the outside of both vestibules is plated with No. 14 sheet steel.

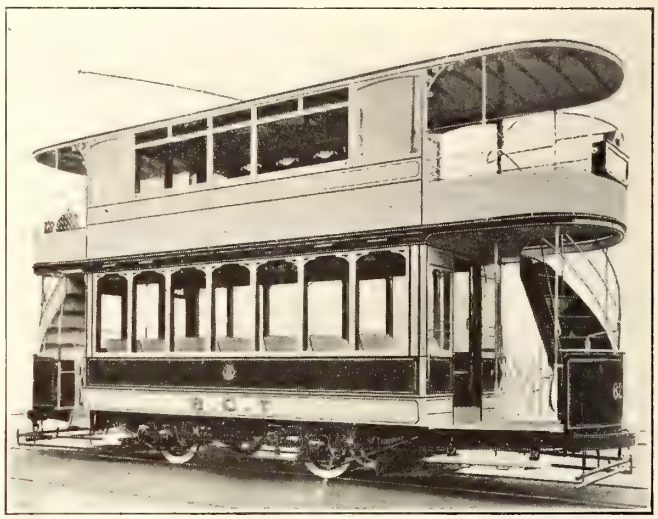
The single set of passenger steps at the right-hand side of the rear vestibule has three oak treads covered with Empire safety treads. The steps are supported by steel hangers and risers. The step opening is covered with a trapdoor so arranged that it cannot be lowered when the doors are open. Each car contains eighteen St. Louis Car Company stationary seats in the passenger compartment, one of which is longitudinal. The seats have 36-in. cushions and 25-in. backs and are covered with plush. The six seats in the smoking compartment are also stationary and upholstered in rattan. This compartment has two wood drop seats in the baggage end. All the cross seats in the car have arm rests and are provided with corner grab-handles, head rolls and adjustable foot rails.

Some of the specialties included in these cars are as follows: Peacock handbrake with vertical wheel, Globe ventilator over saloon, M. C. B. type couplers for radial operation, St. Louis continuous parcel racks and interior trimmings of bronze, Stempel fire extinguisher mounted on brackets, perforated rubber aisle matting, Westinghouse SME straight air-brake equipment with No. 2 compressor and form J governor and 10-in. brake cylinder with alarm whistle, St. Louis Car Company sanders arranged to sand rails on 35-ft. radius curve, and Knutson No. 2 trolley catcher and retriever. The front end of the car is fitted with an angle-iron pilot so arranged that the front coupler will intercouple with another on a car of the same length and same truck centers, and will be able to operate satisfactorily around curves of 40-ft. radius.

The line department of the Terre Haute, Indianapolis & Eastern Traction Company has installed foot-operated switches for controlling the lights in its telephone booths.

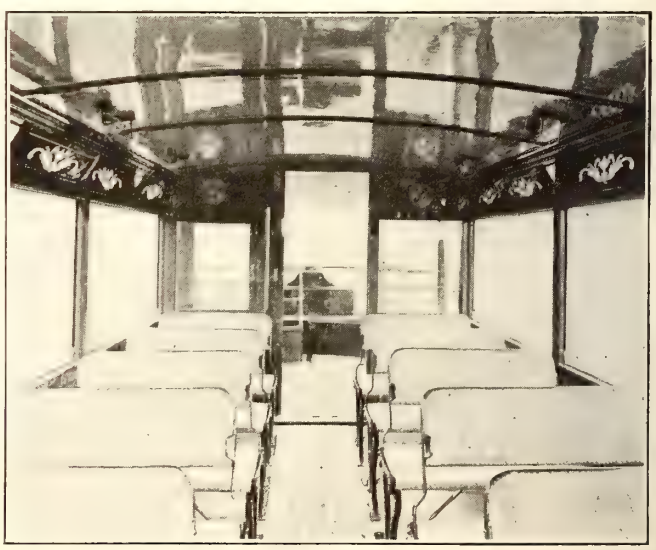
ENGLISH SEMI-CONVERTIBLE CAR

The United Electric Car Company, Limited, Preston, England, has recently delivered to the Blackpool Corporation Tramways the handsome double-deck, semi-convertible car shown in the accompanying illustrations. The clear opening when both windows are lowered is 3 ft. 9½ in., which gives practically the effect of an open car. A special feature of the body is the width of 7 ft. 6 in. over the



Double-Deck, Semi-Convertible Car for Blackpool

corner posts. This width permits the use of an aisle 17 in. wide and of a reversible rattan cross seat which seats two passengers comfortably. The interior of the car is most luxurious, the ceiling being of three-ply bird's-eye maple veneer, paneled out with embossed oak moldings. The lighting is by a neat four-light cluster in the center and four single-light fixtures. The framing of the body is of teak, with interior finish of quartered oak. The length of the platforms is 6 ft., or 9 in. longer than the recognized English standard. A special feature is the clear and wide



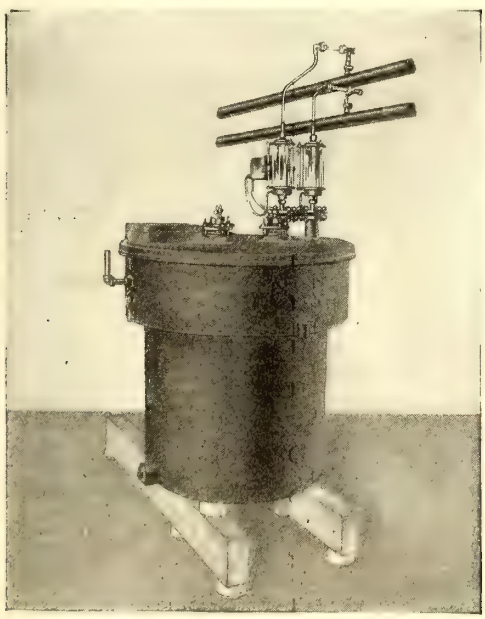
Interior View of Upper Deck, Blackpool Car

entrance or exit under the staircase to facilitate loading and unloading at the end of a journey. The staircase is very wide, easy to descend or ascend and follows the sweep of the dash. The interior of the upper deck is almost as attractive as the lower saloon. The seats and backs here are also of rattan. The side windows are of plate glass and are without frames. They operate independently with the aid of lazy-tongs.

The car is mounted on the Preston flexible axle yoke truck with a wheel base of 8 ft. 6 in. This truck is meeting with great favor. Some of the many advantages asserted for it are: Ease in turning sharp curves, long spring base, even wear on tires and longer life for tires and axles. The general dimensions of the car are as follows: Length of body over the corner posts, 18 ft. 10 in.; length of each platform, 6 ft.; length over the bumpers, 31 ft. 10 in.; width over the window posts, 7 ft. 6 in.; width over the roof, 7 ft. 8 in.; clear height inside at center (lower saloon), 6 ft. 10 in., and height from rail to top of trolley plank, 16 ft. 3¼ in. The total seating capacity is sixty-six passengers.

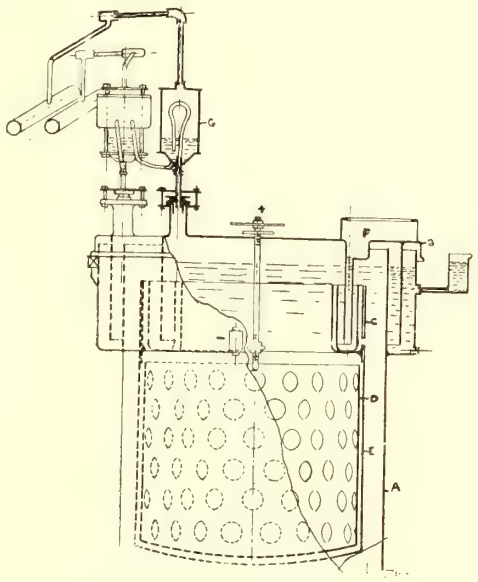
ELECTROLYTIC HYDROGEN AND OXYGEN GENERATORS

In order to produce the best results in welding or cutting with an oxy-acetylene or oxy-hydrogen torch it is essential that the purest gases should be used. Oxygen which contains the least impurities is the most efficient and economical as if it contains any appreciable amount of inert gases, such as nitrogen or chlorine, the efficiency of the flame produced by the torch is very much reduced. The International Oxygen Company, Newark, N. J., is now building electrolytic oxygen and hydrogen generators which produce these two gases free from all impurities. These generators are made in units and from five to ten units are operated together. The construction of the generators is very simple. An iron tank serves as the negative pole of the electrolytic cell. From the cover of this tank are suspended a hydraulic joint and a perforated iron tank, which forms the positive pole. An asbestos sack suspended from the hydraulic joint surrounds the perforated or positive electrode and divides the tank into two annular compartments. A solution of distilled water containing a small quantity of an inert alkali to increase its electrical conductivity is poured into the tank through a hole in the top and fills the tank and the hydraulic joint.



Electrolytic Oxygen and Hydrogen Generator

When a current of electricity is passed through the generator the water is decomposed into its constituent gases, hydrogen two parts and oxygen one part. The oxygen forms on the inner or positive electrode and the hydrogen on the outer or negative electrode. The two gases are thus produced in separate compartments formed by the asbestos sack and they are absolutely pure and unmixed. The hydraulic joint or water seal is an effective safety device and prevents the accumulation of any dangerous pressure in either compartment of the generator. The gases as they form bubble up through the liquid electrolyte and are drawn off at the top of the tank. Two glass lanterns filled with water are attached to the top of the tank and the gases bubble through these before passing to the off-take pipes. By this means the action of the generator



Sectional View of Generator

may be ascertained at all times. No expert supervision or manipulation is required for these generators. It is only necessary to add daily sufficient distilled water to make up for the quantity decomposed. The generator may be operated continuously or intermittently as desired. Each unit requires a current of about 2 volts and from 300 amp to 400 amp. One kw-hour will produce about 3 cu. ft. of oxygen and 6 cu. ft. of hydrogen. One generator with a current of 350 amp will produce 65 cu. ft. of oxygen and 130 cu. ft. of hydrogen per day. One gal. of distilled water is required for 100 cu. ft. of oxygen and 200 cu. ft. of hydrogen. A group of ten generators will supply sufficient gas to operate from four to six cutting or welding torches. For groups of this size a low-voltage motor-generator is used to supply the current required. It is necessary, of course, to compress both gases for use in the torches.

A NEW CAR HEADLINING

A new car headlining made by Eugene Dietzgen Company, New York, has recently been installed by several electric railways in this country. The aim in developing this headlining was to turn out a light and strong material much lower in cost than other headlinings and yet free from the tendency to warp, crack or buckle. The material is rendered very pliable and resilient owing to the extreme length of its fibers. It therefore adapts itself readily to changes in temperature and atmospheric conditions. When curved, this headlining retains its shape permanently. It is made in four different thicknesses (⅛ in., 3/16 in., ¼ in. and 5/16 in.) to meet the requirements of all grades and classes of construction. Headlining most suitable for street railway cars weighs only 11½ oz. per square foot. This material has a smooth surface which renders it susceptible to the finest kind of finish in any color or style of ornamentation.

The final appraisal made by the State Board of Tax Commissioners places the valuation of electric roads in Indiana at $23,383,012, a gain of $1,006,774 over the appraisal of the electric roads in the State in 1910.

LONDON LETTER

(From Our Regular Correspondent)

Trackless trolleys were inaugurated recently in Leeds and Bradford. These cities are the first in Great Britain to experiment with the railless system, and both municipalities became interested in the subject at the same time. The systems have been inspected by Major Pringle, on behalf of the Board of Trade, and duly passed by him, and they are now in successful operation. The trackless system has been in use for some years in about a dozen places on the Continent, and the various deputations which have left England to visit the different cities in Europe where the trackless trolley is in use have reported in its favor. It is to be hoped that the experiment commenced by Leeds and Bradford will prove successful and enable the municipalities and companies to extend the facilities of transportation to the outlying and more thinly populated districts. After the inauguration in Bradford the guests there were conveyed to Leeds, where they joined those who had taken part in the Leeds inauguration.

The tramways running to Handsworth and along the Bristol Road to Selly Oak and King's Norton, hitherto operated by the city of Birmingham Tramways Company, have passed into the hands of the Corporation of Birmingham. The company's leases recently expired, and the tramways committee of the City Council has taken over the lines, both inside and outside the city, and will in future work them as part of the corporation tramway undertaking. In doing this the corporation, by arrangement with the districts concerned, anticipates the Greater Birmingham Act, which comes into operation next November, and by which the area covered by Birmingham will be very largely increased. In order that no delay might occur owing to the transference of the lines from the authority of the company to that of the city, the substitution of electricity for the cable system on the Handsworth route has been effected in advance. Poles and wires have been erected, and the overhead work has been completed. The track, which is not altogether suitable for electric traction, has been bonded, and the cables supplying the current have been laid by the tramways committee up to the city lines.

Much time has recently been spent by the tramways committee of the Birmingham City Council in deciding the question of the extension of the tramway system into Greater Birmingham. Negotiations with the City of Birmingham Tramways, which hitherto controlled a very large portion of the tramways in the Birmingham district, are now practically completed and before long the tramways will pass into the hands of the corporation, which will then be able to extend them without hindrance.

At an extraordinary meeting of the Metropolitan District Railway a resolution was carried approving an agreement entered into by the company and the London Electric Railway to acquire the Lots Road (Chelsea) generating station of the Underground Electric Railway. A bill authorizing the transfer of the undertaking has already passed Parliament. The London Electric Railway and the Underground Railway have approved the agreement.

The annual report of the Manchester Corporation Tramways shows that the lines now measure 184 miles and serve a population of 900,000. The number of passengers carried was more than 165,000,000, and the gross profit was £290,951, or nearly £14,000 more than in any previous year. Over 67 per cent of the fares amounted to 1d. The traffic revenue worked out at 11.043d. per car mile, and the working expenses were 7.174d. per car mile. Progress in the parcels department has been rapid. Four years ago only 141,7815 parcels were carried, and the profit amounted to only £265. Last year 948.074 parcels were carried, and the profit was £2,484 on total receipts amounting to £10,-018.

The annual congress of the Tramways & Light Railways Association was held at the Carlton Hotel, Edinburgh, on July 13 and 14. On the first day the following papers were read: "Transfer Fares," by C. W. Shepherd, general manager Edinburgh & District Tramways; "A Few Reasons Why Electric Traction in England Remains Stationary," by G. H. J. Hooghwinkel. In the evening the chairman and directors of the Edinburgh & District Tramways entertained the association at dinner. On July 14 two papers were read: "Notes on Tramway Problems," by C. W. Mallins, general manager Liverpool Corporation Tramways; "Tramways and Light Railways Legislation of the Future," by Alderman W. Ivey, West Ham Corporation Tramways Committee. In the evening there was a joint dinner with the members of the Royal and Imperial Automobile Clubs of England and Germany, at the Royal Hotel.

The newly constructed tramline between Churwell and Morley, completely linking the latter town with Leeds, has been opened, the first car being driven by the Mayor of Morley (Alderman). The work of extending the line which already existed between Leeds and Churwell was begun in the early months of the present year. The scheme altogether will cost between £35,000 and £40,000. The line is a single one, but the facilities of the service will be by no means impaired by this, for it is well equipped with sidings and one of the most up-to-date systems of signaling is to be installed.

Colonel Yorke recently made the Board of Trade inspection of the London County Council Tramways which connect the Battersea lines with King's Road, Chelsea, by way of Battersea Park Road and Battersea Bridge. F. Hall, M. P., chairman of the highways committee of the County Council; Mr. Fell, chief officer of tramways, and Mr. Way, of the chief engineer's office, accompanied the inspecting officer, who expressed his satisfaction with the line, which will open up the Hyde Park district to Southwest London. The County Council has now five tramways over five bridges, namely, at Blackfriars, Westminster, Vauxhall, Battersea and Putney. At the latter place the line from Hammersmith is now being extended to Wandsworth.

The bill to empower the building of the new St. Paul's Bridge across the river Thames, to take the place of the present Southwark Bridge, has been read a third time in Parliament, and will in due time receive the royal assent. The building of the bridge will therefore duly proceed, and though there is nothing in the bill about tramways, it being incompetent for the City Corporation to introduce a tramway scheme into a bill of this kind, yet it was definitely stated in the House of Commons that there existed an agreement between the corporation and the London County Council that the necessary tramways across the bridge would be built. The amended scheme to bring the bridge to the center of St. Paul's Cathedral, to make a beautiful vista of the noble building to be seen from the river, has not succeeded, and, strange to say, was not recommended by the committee of architects appointed for the purpose of judging the case.

A select committee of the House of Lords has passed the preamble of the bill promoted by the Central London Railway which authorizes the company to make a double line about one-half mile in length, commencing at Wood Lane Station and terminating by a junction with the authorized Ealing and Shepherd's Bush Railway of the Great Western Railway. The bill has already passed the House of Commons. J. D. Fitzgerald, who appeared for the promoters, said that the Great Western Railway had been authorized to construct a railway between Ealing and Shepherd's Bush, which would be electrically equipped, and if the proposed extension was carried out it would give a direct service between Ealing and the city. When the Liverpool Street extension of the Central London Railway was opened it would give direct communication between Ealing and Liverpool Street. Henry Oakley, late chairman of the Central London Railway, gave evidence to the effect that the company had undertaken to run one hundred and thirty-six trains a day to Ealing. It was proposed at first to have two stations on the extension—one at Ealing and the other at North Acton.

Other cities are also becoming interested in this subject. Among the many important schemes for tramway extensions into the various suburbs the Council of Sheffield recently proposed that Parliamentary powers should be obtained to run a trackless trolley along the new Rivelin Valley Road and back to Manchester Road.

It is also worthy of note that the Corporation of Brighton has withdrawn all opposition in the House of Commons to the Brighton, Hove & District Railless Traction scheme, which has already been sanctioned by the House of Lords.

A. C. S.

News of Electric Railways

New Subways and Tunnels for Boston

By the provisions of an act just passed by the Legislature of Massachusetts and approved by the Governor, the Boston Transit Commission will construct three tunnels and subways as a further development of the city's transportation system. The present underground portion of Boston's transit facilities consists of a subway under Tremont Street and its approaches, which are leased from the city by the West End Street Railway; a tunnel under Washington Street, from near Oak Street to Haymarket Square, which is leased from the city by the Boston Elevated Railway, and the East Boston tunnel, extending from Court Street, in Boston, under the harbor to the waterfront at East Boston, and occupied by the Boston Elevated Railway, a toll charge of 1 cent being collected on each passenger for the maintenance of the tunnel. The new constructions will be (1) the Boylston Street subway, (2) the Dorchester tunnel, and (3) the East Boston tunnel extension.

The Boylston Street subway will contain two tracks, and will begin with an open cut near the junction of Commonwealth Avenue and Beacon Street and thence continue under Commonwealth Avenue, Charlesgate West, the Fenway, Charlesgate East, Newburg Street, Boylston Street, to near the junction of Boylston Street and Tremont Street, and under Tremont Street or Boston Common to the Park Street station of the present Tremont Street subway. Stations will be located at Massachusetts Avenue, Copley Square, Boylston and Tremont Streets and Park Street. The present Tremont Street tunnel may be enlarged to accommodate the two additional tracks from Boylston to Park Street. The total length of this subway will be 10,350 ft.

The Dorchester tunnel will be designed for two tracks, will connect with the tracks of the Cambridge connection under Boston Common and Tremont Street, and will run under Winter and Summer Streets to Dewey Square, and thence to the junction of Dorchester Avenue and Broadway, South Boston; thence by way of Dorchester Avenue to Andrew Square, Dorchester—a total distance of about two miles. The act provides for stations at the corner of Washington and Summer Streets, at South Station in Dewey Square, at Broadway and Dorchester Avenue, and at Andrew Square. There will be passageway connections with the present Tremont Street subway, with the Washington Street tunnel and the South Station. The present Park Street Station will be enlarged and altered to accommodate the increase in travel at that point.

The East Boston tunnel extension will begin at the present Court Street terminal, and be continued under Court Street, Tremont Row and Bowdoin Square, and under Cambridge Street to a suitable connection with the surface tracks near Lynde or North Russell Streets. There will be stations in Scollay Square and Bowdoin Square.

Under the provisions of the act the lease of the present Tremont Street subway to the West End Street Railway, which is to be consolidated with the Boston Elevated Railway, is extended to July 1, 1936. The lease of the present East Boston tunnel is extended to the same date, the rental from the expiration of the present lease—June 10, 1922—until July 1, 1936, to be 4½ per cent on the net cost of the tunnel.

The contract for the use of the present Washington Street tunnel is extended from the expiration of the present lease—Nov. 30, 1933—until July 1, 1936, on a 4½ per cent basis. The contract for the use of the Dorchester tunnel is also to be for a term ending July 1, 1936, at 4½ per cent. That for the use of the Cambridge connection is to be for a term ending July 1, 1936, the rental for twenty years from the opening of the tunnel to be 4⅞ per cent on the net cost, and thereafter until 1936, 4½ per cent. The terms of lease of the East Boston extension will be the same. The Boston Elevated Railway will be the lessor of all the subways and tunnels.

The Transit Commission has instructed its engineers to begin laying out the new subway and tunnels, but before entering upon the work of construction the City Council and Mayor and the Boston Elevated Railway must accept the law. This must be done within fifteen days after the stockholders of the West End Street Railway have voted on the question of whether that company will sell its property and franchises to the Boston Elevated Railway.

The estimated cost of constructing that part of the tunnel to Dorchester from the South Station to Andrew Square, a distance of 7800 ft., including the Broadway and Andrew Square stations, is set by the Transit Commission's engineers at about $3,500,000. This is exclusive of land damages, and to this must be added the cost of the section between Park Street and South Station, which is through the heart of the business district of the city. The district tributary to this tunnel contains about 200,000 persons.

The estimated cost of the Boylston Street subway is $4,700,000, apportioned as follows:

Cost of stations and enlarging existing stations—	
Park Street, lower level	$500,000
Enlargement of present Park Street Station	100,000
New station, Boylston and Tremont, lower level	280,000
Enlargement of present Boylston and Tremont Street Station	180,000
Copley Square Station	200,000
Massachusetts Avenue Station	185,000
	$1,445,000
*Cost of constructing 9,140 feet of subway outside station limits, including land damages	$3,255,000
Total	$4,700,000
Reduction if subway is located west of Tremont Street subway on same level	$400,000

*Of the total length of route—10,350 ft.—1,210 ft. are included within limits of stations and 9,140 ft. are outside station limits.

It is estimated that the Boylston Street subway could be completed in two to two and a half years after the beginning of work, provided no legal difficulties are encountered. The district tributary comprises about 30 square miles and includes Brookline, Newton, Watertown and Waltham, as well as the Back Bay, Allston and Brighton districts of Boston. The population to be served is about 210,000.

The Boylston Street route was substituted for the proposed Riverbank subway, which was determined upon by Legislative enactment in 1907. It was estimated that this subway would cost $3,700,000. The Boylston Street route is practically parallel with the Riverbank route, but is for its greater part several blocks distant from the waterfront of the Charles River Basin, which the Riverbank subway was designed to follow closely. The route now adopted is generally agreeable to the public, the officials and legislators, and is considered more nearly to serve the interests of the city, both present and prospective.

Toledo Franchise Negotiations

The City Council of Toledo, Ohio, at a meeting on the evening of July 26, 1911, took action to require the Toledo Railways & Light Company to decide between the payment of a rental of $250 per day for the use of the streets where its franchises have expired, operate these lines at a fare of 3 cents, or remove its tracks from the streets. An ordinance providing for the rental was enacted and City Solicitor Cornell Schreiber was instructed to prepare another ordinance providing for an extension of franchise on those lines on a 3-cent fare basis to a period equal to the life of the longest unexpired franchise. He was further instructed to prepare an ordinance to authorize injunction proceedings in case the company refused to pay the rental.

M. B. Severance, city accountant, had completed a report on the earnings of the lines on which franchises have expired and the amount of rental asked was based upon his figures, which indicate that the daily rental on the basis of earnings of 19 cents per car mile would be $351.73; of 20 cents per car mile, $294.70, and 21 cents per car mile, $237.72. He estimates the company's earnings at 23 cents per car mile. It will be seen that the amount decided upon is in the nature of an average. Mr. Severance's report also indicated that the yearly increase in business of the com-

pany had been 5.79 per cent for some time. He reported the gross passenger receipts for 1909 to be $1,556,260; for 1910, $1,646,368, and estimated the receipts for 1911 at $1,741,693.04.

On July 24, 1911, the company sent a check for $9,837.15 to the city treasurer in full payment, with interest, of the 1 per cent claimed by the city to be due on the receipts from the old Robison lines. Mr. Schreiber proposed to ask Council to cause the forfeiture of the franchise on these lines because this money had not been paid. In discussing the franchise question in a letter to the committee of the whole of the Council, on July 24, 1911, Mr. Schreiber said in part:

"I have made a very careful examination of the decision in the Detroit franchise matter, and although that case was decided by one of the lower courts of Michigan, I have determined, so far as possible, to rely upon the correctness of the law as laid down in the Detroit case. It would be a proper procedure with reference to the already expired lines, for the Council to pass an ordinance calling upon the company to pay a sort of rental for the use of the streets which the company is occupying without franchises, or, rather, on which the franchises have expired.

"If the decision in the Detroit case is correct the company is a mere trespasser on the streets on which the franchises have expired. In other words, the company in order to operate its cars on those streets on which franchises have expired must comply with the terms which the city fixes or get off the streets.

"So I would suggest that an ordinance be passed requiring the Toledo Railways & Light Company to pay Toledo (if the company desires to operate its cars on the streets whereon the franchises have expired) the sum of $150 per day, beginning Nov. 10, 1910, and that this ordinance allow the company to operate on those lines only from day to day and that the permission granted be revocable at the will of Council. In case the company refuses to pay this rental that then the city solicitor be authorized to begin a suit, praying for relief in the alternative requiring the company either to pay the rental or abandon the streets."

A statement of the earnings of the company for June, 1911, and the first six months of 1911, follow:

	June, 1911.	Six Months End'g June 31
Gross receipts	$240,066.62	$1,539,472.69
Operating expenses	144,708.85	966,556.51
Net earnings	$95,557.77	$572,915.18
Miscellaneous income	432.25	4,630.36
Gross income	$95,790.02	$577,545.54
Deductions	79,008.13	475,329.06
Surplus	$16,781.89	$102,216.48

In a long letter, dated July 25, 1911, addressed to Mayor Whitlock, Albion E. Lang, president of the Toledo Railways & Light Company, reviewed the franchise negotiations and explained why the company has refused to accept Judge J. M. Killits as umpire in the valuation of the property. The letter is concluded by Mr. Lang as follows:

"In nearly all the communications we have sent to you we have urged the making of a valuation on the theory that a valuation was necessary in settling the franchise matter, and have several times expressed our ideas of how it should be undertaken, and the kind of persons who should be employed for that purpose, knowing what such appraisers would be called upon to do.

"We believe that Judge Killits, not being an engineer, nor experienced in work of this kind, is not the proper person to undertake it, and this statement cannot be construed in any manner as a reflection upon his professional and judicial ability, nor his character as a man. I yield to none in my regard for him as the possessor of all of these qualifications.

"You now say to the public, "They have 3-cent fares in Cleveland, and we will have them in Toledo if we can be firm enough,' etc., and that there is no way in which the question 'can be settled immediately unless the company be allowed to fix the valuation to suit itself and be allowed to draw the ordinance to suit itself.'

"The consideration of the franchise subject in Cleveland was prolonged for years, and was made the issue in several political campaigns, and for these reasons, taken in connection with the effort of the Mayor of that city to bring about municipal ownership and operation through the formation of a so-called Municipal Traction Company, owned by himself and friends, what was the result? The street railways there, owned largely by citizens of Cleveland, giving good service and helping to develop the resources of the city, were forced into the hands of receivers, and their owners obliged to accept a loss of several millions of dollars in the value of their property to effect a settlement and save the property from utter ruin. The adjustment of the matter there was based on a sliding scale of fares by which the car riders paid increased rates as expenses increased, and reduced rates as expenses diminished —the person wanting a transfer paying more than those who did not. The scale of fares under this arrangement has twice changed since its inception, and for the past few weeks has been on the basis of 3 cents straight, but the company claimed that the rate was unfair when it was instituted, and under it suffered a loss of over $60,000 in operating and maintenance accounts last month.

"In the meantime the citizens of Cleveland are complaining bitterly about the street railway service. Besides no new tracks are being built to meet the city's growth and necessities. The whole subject is still immersed in politics, and no real settlement of the street railway problem in Cleveland is in sight. Do we want that kind of an adjustment of the franchise question here, and would it make for the growth and development of the city? If we proceed to a valuation of our street railway conditions it matters little what burdens are imposed by an ordinance, provided there is no maximum fare, and proper provision is made to safeguard the capital invested and to be invested, but if the company assumes all of the risk of changing conditions, the burdens of an ordinance become quite material as well as the rates of fare.

"Under existing contracts our roads have been developed until lately in advance of increasing population, the rides of our patrons extended from about three miles to about twelve miles at the same price, and reduced rates have been voluntarily granted by the company to those who would buy tickets. It therefore appears that our company has demonstrated both enterprise and liberality under contracts heretofore made, and there is not much well grounded fear that all of this will be ignored in the future if new contracts are made following the lines of the old, and such as exist generally in American cities. It is for the citizens of Toledo to determine which course to pursue. I contend that whichever course is taken, it is of the utmost importance to select the one that will produce the best service and develop the property as the growth of the city requires. I believe this to be the desire of the mass of our citizens, hence my energies will be directed accordingly."

Chicago Subway Board

Brief mention was made in the Electric Railway Journal of July 29, 1911, page 199, of the appointment by Mayor Harrison of Chicago of John Ericson, E. C. Shankland and James J. Reynolds as an advisory board of engineers to recommend a plan for a passenger subway in Chicago as soon as practicable. Mr. Shankland is considered an expert on the foundations in Chicago. He is a member of the firm of E. C. and R. M. Shankland, and he has been a designing engineer, directing the steel construction and foundation work of large buildings since 1889. He built the Masonic Temple, the Ashland Block, the Great Northern Hotel, and a number of the other Chicago skyscrapers.

Mr. Reynolds has been engaged in railroad work since 1884. He was chief engineer of the Calumet Terminal Railway and completed the construction of that line, was chief engineer of the Chicago Elevated Terminal Railway and several other railroads, his last large task being that done for the Lake Shore & Michigan Central Railroad in its construction work in and near Gary, Ind.

John Ericson has been city engineer of Chicago since 1897. In that capacity he has had charge of the city's water works, bridge and harbor construction. It was under his direction that the former municipal subway bureau compiled its invaluable statistics, containing in great detail the location of public utility pipes and conduits.

In making the appointments the Mayor said: "Among

the first questions to be considered are the space to be given the subway and the depth of the subway below the street level. I personally believe in a narrow subway kept between the curb lines, and as high as possible.

"I think that the city should be grateful to receive the services of the three men who have accepted places on the commission. No man knows more than Mr. Shankland of the nature of Chicago's subsoil and its building foundations. Mr. Ericson knows more than any other man about the public utilities, and Mr. Reynolds is an operating man thoroughly competent to handle the transportation phases of the problem.

"Mr. Arnold was considered along with other engineers, but I did not appoint him because I am opposed to his idea of a double-deck subway built under the entire street. I think a subway from building line to building line, as the Arnold plans propose, would be a dangerous thing, and this was one of the first objections I made to his plans when I heard them explained at a meeting of the local transportation committee. However, I am not an engineer, and it is up to the commission to decide that and every other question."

The commission held its first session on July 28, 1911. Mr. Ericson said:

"Naturally, it is impossible at this time to estimate even approximately the length of time required before the work of the commission can be completed. Aside from the subway problem itself there are many other municipal and public utility problems which must be considered and provided for. It involves, for one thing, a new system of sewers, a problem which would have to be met, anyway, in the near future. Also there is the matter of a high-pressure water system in the downtown district, which cannot be properly passed upon except in connection with the subway plans.

"We are setting out on this work with free and open minds, ready to give honest consideration to every phase of the problem and open to conviction on all points. Out of the great amount of data already in existence we shall endeavor to utilize the best and reject the worthless. We shall proceed along scientific, practical lines, confident that when the plans are submitted they will meet with the full approval of the city and the other interests concerned."

Work Begun on Lexington Avenue Subway, New York

Work on the new Lexington Avenue subway was formally begun on the morning of July 31, 1911, when Chairman Willcox, of the Public Service Commission, dug out a spadeful of dirt from the pavement near the corner of Sixty-seventh Street and Lexington Avenue. The Bradley Contracting Company, which has the contract for the section in question, is required to finish the task in forty-eight months. The section of the subway on which work started extends from Fifty-third Street to Sixty-seventh Street. The other sections the Bradley Company is to construct extend from Twenty-sixth Street to Fortieth Street, from Seventy-ninth Street to Ninety-third Street and from Ninety-third Street to 106th Street. An effort had been made to obtain an injuncion to restrain the Bradley Company from starting the construction work, but Justice Giegerich issued a writ, returnable on Aug. 6, 1911, requiring the company to show cause why a restraining writ should not issue.

The Public Service Commission has approved forms of certificates for the third-tracking of the elevated lines of the Interborough Rapid Transit Company in Manhattan and for building extensions in the Bronx. As soon as printed they will be signed and sent to the Interborough Rapid Transit Company. One extension is to be a three-track elevated road from a connection with the Third Avenue line at or near Pelham Avenue, crossing above the right-of-way of the New York & Harlem Railroad Company to Webster Avenue, along Gun Hill Road to White Plains Road and to 241st Street. Another extension is to be from the Ninth Avenue elevated line, from 157th Street and Eighth Avenue, crossing the Harlem River on the Putnam Bridge, with a tunnel through Highbridge Hill, and along 162d Street to River Avenue; along River Avenue and Jerome Avenue to Woodlawn Cemetery. Provision is also made for a two-track elevated road, known as the Queensboro Bridge line, to connect the Second Avenue elevated between Fifty-eighth and Sixtieth Streets with the bridge and crossing to Jackson Avenue, in Queens. The third-tracking privilege is to apply to the entire length of the Second Avenue line from Chatham Square to the Harlem River, with a fourth track also north of the 125th Street station, and also from Fifty-third Street to Sixtieth Street and on the connection with the Queensboro Bridge. The Third Avenue line is to have four tracks from City Hall to Chatham Square.

The Public Service Commission has since signed the certificates for the improvements to the elevated lines. Before work can be begun the company must secure the consent of the Board of Estimate and Mayor.

Increase in Tax Values in Ohio

The increases in the announced tentative valuations fixed upon electric railways by the Ohio State Tax Commission range from 300 per cent to 1000 per cent. Many railway officials have already appeared before the commission to protest against the figures.

The Toledo Railways & Light Company is a conspicuous example of the values fixed by the commission. In this case the value of the property is placed at $14,232,000, which represents an increase of about 1000 per cent. The taxes of the company would be $300,000 annually, or about one-third of the net earnings. Attorney Barton Smith, Auditor H. S. Swift and E. R. Effler argued against the figures before the commission on July 28, 1911. Mr. Smith read an article from the Toledo *Blade*, telling about the action of the City Council in fixing a rental of $250 per day for the use of the streets where the franchises have expired, thus necessitating the payment of $69,000 since Nov. 11, 1910. A statement of the earnings, expenses and interest paid by the Toledo Railways & Light Company for the past three years follows:

Earnings—1908, $2,542,111.38; 1909, $2,733,177.58; 1910, $2,985,382.49; 1911, six months, $1,544,103.05. Total, $9,804,774.50.

Paid out in operation, maintenance and taxes—1908, $1,856,449.49; 1909, $2,286,449.49; 1910, $2,399,772.49; 1911, $1,163,710.77 (six months). Total, $7,696,135.

Interest paid—1908, $476,608.30; 1909, $578,822.80; 1910, $512,182.53; 1911, $203,940.67 (six months). Total, $1,671,554.30.

On July 26, 1911, Bion J. Arnold, representing the electric railway companies centering in Cleveland advised the commission that its tentative valuations were too high. Mr. Arnold said that electric railways could not be valued upon the same basis as steam roads. The life of electric railways averaged only about twenty years, and the companies depended upon franchise rights of various kinds which had to be frequently renewed at a loss.

Following are some of the tentative figures given out by the commission. In some cases the increases are shown, while in others merely the new value is given: Western Ohio Railroad, from $459,663 to $2,000,000; Cleveland, Southwestern & Columbus Railway, from $975,026 to $5,006,800; Cleveland & Eastern Railway, new valuation, $1,122,000; Cleveland, Youngstown & Eastern Railway, from $147,414 to $517,900; Cleveland, Painesville & Ashtabula, from $137,853 to $632,000; Cleveland, Painesville & Eastern Railroad, from $267,175 to $2,058,400; Northern Ohio Traction & Light Company, from $1,594,337 to $11,272,100; Lake Shore Electric Railway, from $922,504 to $5,300,400; Lorain Street Railway, from $167,295 to $823,400; Sandusky, Fremont & Southern Railway, from $54,485 to $491,350; Columbus Railway & Light Company, from $2,761,540 to $8,563,612; East Liverpool Railway & Light Company, new valuation, $1,143,800; East Liverpool Traction & Light Company, new valuation, $2,000,000; Midland Power & Traction Company, Cambridge, new valuation, $200,000; Dayton, Covington & Piqua Traction Company, new valuation, $500,000; Toledo Railways & Light Company, from $2,042,900 to $14,232,000; Cincinnati Traction Company, from $2,883,000 to $15,200,000; Ohio Electric Railway, from $2,899,375 to $15,000,000; Toledo, Fostoria & Findlay, from $162,771 to $794,200; Ohio River Electric & Power Company, from $39,407 to $175,000; Springfield, Troy & Piqua Traction Company, from $115,710 to $400,000; Portsmouth Railway & Light Company, from $262,746 to $900,000.

Charles Francis Adams on Commission Regulation

The Boston *Transcript* recently published the following letter addressed to John H. Carter, Boston, Mass., by Charles Francis Adams, one of the original members of the Railroad Commission of Massachusetts and for a number of years chairman of the commission:

"Without going into details, I can say that this proposed measure in no way commends itself to my judgment. I think, on the contrary, if passed and put in force, it would have a tendency to destroy the usefulness of the commission.

"The Massachusetts Railroad Commission was established forty-three years ago, on the principle of having no power, and acting only through the force of reason and public opinion. That its work, up to this time, has been unsatisfactory, I think can hardly with truth be said. On the contrary, it has generally been considered as the most efficient commission in the country.

"In conformity with the tendency of modern thought, which recognizes no force in existence except the constable's staff, supported by the bayonet of the soldier, and regards appeal to reason as an archaic proposition, the inclosed bill proposes to substitute for intelligence and reason the physical forces of the Commonwealth.

"I do not believe in it. However, I am, personally, a back number. Belonging to a generation which has now passed from the stage, I can only look with some amazement, not unmixed with amusement, at the tendency to reaction now going on. In former days recourse was had to enlightened public opinion as sure in the end to produce all necessary and desirable results. Now this is relegated to the museum of antiquities, and here, as two hundred years ago in Europe, the constable and the posse are called into play on every possible occasion. The 'big stick' is very generally substituted for argument addressed to intelligence.

"It is on this principle and conviction that the bill to which you have called my notice is based."

Accident at Riverton, Ill.—On July 22 the casing of one of the steam turbines at the power station of the Illinois Traction System at Riverton, Ill., burst, causing some damage to the plant and killing two men.

Report on Los Angeles Traffic.—It is stated that the principal recommendation of the report of Bion J. Arnold on transit conditions in Los Angeles, which will be made public very soon, will favor the construction of a four-track electric railway from the business center of Los Angeles to the harbor at San Pedro, the road to run underground through the congested district in Los Angeles.

Municipal Ownership in Winnipeg.—The announcements in connection with the proposed sale of the property of the Winnipeg (Man.) Electric Railway to the city which have been published in the daily press and credited to the Mayor of Winnipeg are misleading. The City Council of Winnipeg has, however, decided that if an audit of the books of the company shows sufficient earnings power an ordinance will be passed to submit to the voters the question of buying the company's stock at $250 a share, the asking price. If the purchase is made the city will have to raise $15,000,000 to pay for the $6,000,000 of stock and will also have to assume the indebtedness of the company, which amounts to $7,500,000.

Inspection of Stone & Webster Properties.—A party of nineteen guests of Stone & Webster has returned from a three weeks' tour of inspection of the Stone & Webster properties on Puget Sound. Among the members of the party were: Reginald Bradlee, of Chandler Hovey & Company, Boston; J. P. Bradshaw, of Clark, Dodge & Company, New York; Thomas B. Gannett, Jr., of Parkinson & Burr, Boston; Edgar Rust, of Parkinson & Burr, Boston; N. P. Hallowell, Jr., and F. L. Higginson, Jr., of Lee, Higginson & Company; Thomas Motley, of Curtis & Sanger; F. Foster Sherburne, of Estabrook & Company; Isaac Sprague, of N. W. Harris & Company; Samuel H. Wolcott, of Brown Brothers & Company. Representing Stone & Webster were: John W. Hallowell, George Higginson, Jr., Henry R. Hayes, Charles Sprague, Philip L. Warren, George O. Muhlfeld, and Charles E. Mayer.

Financial and Corporate

New York Stock and Money Markets

Aug. 2, 1911.

Weakness developed throughout the entire list in to-day's trading and declines of several points took place in the majority of active issues. Breaks in American Tobacco and Standard Oil shares led the decline. The government's report on cotton was made public and indicated a record yield. Next Wednesday the Government's crop report is due. Preparations for financing the harvests have caused a slight tightening in the rates of the money market. Quotations to-day were: Call, 2¼@2⅜ per cent; ninety days, 2½@3 per cent.

Other Markets

Chicago Railways have been the feature of the Chicago Exchange in the past few days. Prices have advanced and in to-day's market further gains were made in both Series 1 and 2. The tone of the Chicago money market is becoming stronger.

Public utilities have dominated the Philadelphia market during the week, and trading has been active in Rapid Transit and Union Traction. Philadelphia Rapid Transit, in particular, has displayed marked firmness.

To-day's market in Baltimore was quiet and price changes only fractional.

The Boston market continues steady, but trading is light with transactions not much in evidence.

Quotations of traction and manufacturing securities as compared with last week follow:

	July 26.	Aug. 5.
American Light & Traction Company (common)	a305	a304
American Light & Traction Company (preferred)	a107	a106
American Railways Company	a44¼	44½
Aurora, Elgin & Chicago Railroad (common)	a44½	*44½
Aurora, Elgin & Chicago Railroad (preferred)	a87	*87
Boston Elevated Railway	a129½	a131½
Boston Suburban Electric Companies (common)	a15	a15
Boston Suburban Electric Companies (preferred)	75	75
Boston & Worcester Electric Companies (common)	*12½	a13
Boston & Worcester Electric Companies (preferred)	a56	a56
Brooklyn Rapid Transit Company	82⅛	a80½
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	86¾	*86¾
Capital Traction Company, Washington	a132	a132¼
Chicago City Railway	a190	a190
Chicago & Oak Park Elevated Railroad (common)	3	*3
Chicago & Oak Park Elevated Railroad (preferred)	5	*5
Chicago Railways, ptcptg., ctf. 1	a95	a101
Chicago Railways, ptcptg., ctf. 2	a28¼	a33⅞
Chicago Railways, ptcptg., ctf. 3	a9¾	a13
Chicago Railways, ptcptg., ctf. 4	a6	a7½
Cincinnati Street Railway	a130¾	a130
Cleveland Railway	99⅞	*99⅞
Columbus Railway (common)	81½	81½
Columbus Railway (preferred)	a100	a100
Consolidated Traction of New Jersey	a76	a76
Consolidated Traction of N. J., 5 per cent bonds	a105	a105
Dayton Street Railway (common)	a25	a25
Dayton Street Railway (preferred)	a100	a101
Detroit United Railway	a76	a72½
General Electric Company	163½	162
Georgia Railway & Electric Company (common)	a156	154
Georgia Railway & Electric Company (preferred)	a95	92
Interborough Metropolitan Company (common)	18	17½
Interborough Metropolitan Company (preferred)	51¼	49½
Interborough Metropolitan Company (4½s)	79⅝	*79⅝
Kansas City Railway & Light Company (common)	a19	a19
Kansas City Railway & Light Company (preferred)	a44	*44
Manhattan Railway	a143	*143
Massachusetts Electric Companies (common)	a22¾	a22¾
Massachusetts Electric Companies (preferred)	a93½	a92¾
Metropolitan West Side, Chicago (common)	*27½	*27½
Metropolitan West Side, Chicago (preferred)	*75	*75
Metropolitan Street Railway, New York	15	15
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	a74⅜	74½
Northern Ohio Light & Traction Company	a51	50½
Northwestern Elevated Railroad (common)	*30	*30
Northwestern Elevated Railroad (preferred)	*70	*70
Philadelphia Company, Pittsburgh (common)	a54¼	55
Philadelphia Company, Pittsburgh (preferred)	a44¾	44⅝
Philadelphia Rapid Transit Company	a22⅝	23½
Philadelphia Traction Company	a86½	86½
Public Service Corporation, 5% col. notes (1913)	*101	a94
Public Service Corporation, ctfs.	a107	a107
Seattle Electric Company (common)	a110⅜	a110½
Seattle Electric Company (preferred)	103	103
South Side Elevated Railroad (Chicago)	*76⅞	*76⅞
Third Avenue Railroad, New York	a11	*11
Toledo Railways & Light Company	*7½	6½
Twin City Rapid Transit, Minneapolis (common)	109	107½
Union Traction Company, Philadelphia	a52¼	52
United Rys. & Electric Company, Baltimore	a19⅞	18
United Rys. Inv. Co. (common)	a38½	*38½
United Rys. Inv. Co. (preferred)	69	*69
Washington Ry. & Electric Company (common)	*42⅞	a45
Washington Ry. & Electric Company (preferred)	*89½	a92
West End Street Railway, Boston (common)	88½	89
West End Street Railway, Boston (preferred)	a103	a103
Westinghouse Elec. & Mfg. Co.	75	73
Westinghouse Elec. & Mfg. Co. (1st pref.)	a120	118¼

a Asked. *Last sale.

Organization of American Cities Company Completed

The American Cities Company was organized permanently in New Orleans on July 25, 1911, to take over the American Cities Railway & Light Company and the New Orleans Railway & Light Company, and now controls the street railway and lighting systems of New Orleans, Birmingham, Knoxville and Little Rock, the electric railway systems in Memphis and the electric lighting companies in Houston. Its capitalization is $10,000,000 in collateral trust bonds, $21,810,083 preferred stock and $16,643,416 common. The officers are: George H. Davis, of Ford, Bacon & Davis, president; George Bullock, of New York, and W. von Phul, of New Orleans, vice-presidents; M. McGrath, secretary; R. E. Slade, manager of the New Orleans Railway & Light Company, treasurer and assistant secretary; Ira Lockwood, assistant treasurer and assistant secretary; Charles K. Beekman, general counsel. The board of directors is as follows: George W. Bacon, of Ford, Bacon & Davis, New York; George Bullock, president Susquehanna Railway, Light & Power Company, New York; S. R. Bertron, member of Bertron, Griscom & Jenks, New York; E. H. Bright, member of T. & B. Beer, New Orleans; Harry Bronner, member of Halgarten & Company, New York; William B. Bonbright, of William B. Bonbright & Company, New York and London; Lynn H. Dinkins, president Interstate Trust & Banking Company, New Orleans; Marshall J. Dodge, member of Bertron, Griscom & Jenks, New York; George H. Davis, of Ford, Bacon & Davis, New Orleans; C. P. Ellis, cotton broker and banker, New Orleans; C. L. Edwards, of A. G. Edwards & Company, bankers, St. Louis; Oscar L. Gubelman, of Knauth, Nachod & Kuhne, New York; John J. Gannon, president Hibernia Bank & Trust Company, New Orleans; R. M. Gannon; Charles Godhaux, president Whitney-Central Trust & Savings Bank, New Orleans; Frank B. Hayne, cotton merchant, New Orleans; A. J. Hemphill, president Guaranty Trust Company, New York; C. J. Hardy; Charles Janvier, vice-president Canal-Louisiana Bank & Trust Company, New Orleans; Emil Loeb, capitalist, Birmingham and New York; Fernand Lepeyre, capitalist and stock broker, New Orleans; S. Z. Mitchell, president Electric Bond & Share Company, New York; J. K. Newman, of Isidore Newman & Son, New Orleans; Maurice Stern, of Lehman, Stern & Company, New Orleans; L. K. Thompson, vice-president Bank of Commerce & Trust Company, Memphis, Tenn.; William von Phul, of Ford, Bacon & Davis, New Orleans; R. M. Walmsley, president Canal-Louisiana Bank & Trust Company, New Orleans; F. B. Williams, vice-president Whitney-Central National Bank, New Orleans; A. H. Wiggin, president Chase National Bank, New York. The Whitney-Central Trust & Savings Bank, of New Orleans, was appointed transfer agent, and the Hibernia Bank & Trust Company, of New Orleans, registrar.

Bangor Railway & Electric Company, Bangor, Maine.—John R. Graham, president of the Bangor Railway & Electric Company and of the Lewiston, Augusta & Waterville Railway, has bought the property of the Bodwell Water Power Company at Old Town and Milford, on the Penobscot River, 12 miles above Bangor. The property includes a dam across the Penobscot and Stillwater Rivers more than 2000 ft. long, and a power house on the Milford side built entirely of concrete.

Boston (Mass.) Elevated Railway.—The directors of the Boston Elevated Railway have voted unanimously to recommend that stockholders of the company vote in favor of purchasing the property and franchises of the West End Street Railway as provided in Chapter 740 of the Acts of 1911. A special meeting of the stockholders of the Boston Elevated Railway has been called for Aug. 24, 1911, to vote on the question. The stockholders of the West End Street Railway will vote on the question on Sept. 15, 1911.

Brooklyn (N. Y.) Rapid Transit Company.—The Public Service Commission of the First District of New York has authorized the Nassau Electric Railroad, one of the constituent companies in the Brooklyn Rapid Transit System, to issue $52,000 of 4 per cent bonds under the first consolidated mortgage dated June 30, 1898, to refund an equal amount of 5 per cent bonds of the Brooklyn, Bath & West End Railroad under the second mortgage which matured June 1, 1911.

Central Pennsylvania Traction Company, Harrisburg, Pa.—A gain of almost 8 per cent in the gross income of the Central Pennsylvania Traction Company for the fiscal year ended July 15, 1911, was shown in the annual report submitted to the meeting of stockholders on July 25. F. B. Musser, president of the company, reported gross receipts at $851,295, a gain of $61,167, or 7.7 per cent, while operating expenses were $361,135.13, leaving net earnings of $490,159. Surplus earnings were $249,213; taxes, interest on bonds and rentals totaling $240,946. From the surplus earnings $98,235 was deducted for repairs, betterments and depreciation, leaving a net surplus of $150,978. Out of this latter amount these dividends were paid: 2 per cent on Oct. 1, 1910; 3 per cent on April 1, 1911; total, $105,000, leaving a surplus of $45,978.45. The percentage of operating expenses to gross receipts was 42½ per cent. The company's lines carried 20,576,732 passengers during the year, an increase of 1,242,658 over the preceding year, or 6.4 per cent. The company increased its trackage during the year from 71.29 miles to 72.10 miles, and is now building an extension from Second and Seneca Streets to Lewis Street, Riverside. The company has 119 cars in service. The total number of car miles operated during the year which ended June 30, 1911, was 3,311,244, an increase of 6 per cent over the preceding year. It is expected that the new 1600-kw, direct-connected steam engine and generator will be in operation at the main power plant about Dec. 1, 1911. These directors were elected for three years to succeed those whose terms expired: Edward Bailey, Harris Cohen, S. F. Dunkle, Henry A. Kelker and B. F. Meyles.

Chicago (Ill.) City Railway.—The Chicago City Railway has sold an additional block of its 5 per cent first mortgage bonds, bringing the total amount now outstanding up to $23,800,000.

Chicago (Ill.) Railways.—Marshall Sampsell, the remaining receiver of the Union Traction Company, has been discharged by Judge Peter S. Grosscup, of the Circuit Court of the United States, at Chicago. Mr. Sampsell has been the sole receiver of the Union Traction Company since the sale of the property of the company to the Chicago Railways, in 1908. The receivership was granted in April, 1903, on the petition of the Guaranty Trust Company, New York, N. Y.

Chicago & Milwaukee Electric Railroad, Chicago, Ill.—Judge Peter S. Grosscup, of the Circuit Court of the United States at Chicago, holds that the bonds issued under the mortgage of the Wisconsin division of the road are valid. The decision is expected to facilitate the reorganization of the property.

Citizens' Railway & Light Company, Ft. Worth, Tex.—Judge Buck, of the District Court at Ft. Worth, has confirmed the sale of the railway property of the Citizens' Railway & Light Company under foreclosure to G. H. Clifford, general manager of the Northern Texas Traction Company, representing Stone & Webster, Boston, Mass.

Columbia Railway, Gas & Electric Company, Columbia, S. C.—E. H. Rollins & Sons, Boston, Mass., and New York, N. Y., and Redmond & Company, New York, N. Y., offer for sale the unsold balance of an issue of $2,454,000 of Columbia Railway, Gas & Electric Company first mortgage 5 per cent sinking fund gold bonds, due July 1, 1936. The bonds are secured by a first lien upon the entire property, which comprises all the public utility enterprises in Columbia. The only exception to the first lien is upon a portion of the property where $200,000 prior liens exist. The company's franchises are either unlimited or extend beyond the maturity of the bonds. The net income for the twelve months ended May 31, 1911, was equal to considerably more than the interest charges, the company earning dividends at the rate of 6 per cent on its preferred and about 5 per cent on its common stock. The bonds are offered at 94 and interest, paying about 5.50 per cent.

Columbus Railway & Light Company, Columbus, Ohio.—The committee of stockholders of the Columbus Railway, appointed to consider whether the capital stock of the company should be increased by $3,000,000, has employed Ernst & Ernst, Cleveland, Ohio, to audit the books and accounts

of the Columbus Railway and the Columbus Railway & Light Company for the eight years since the holding company was formed and report upon the relations between the companies.

Georgia Railway & Electric Company, Atlanta, Ga.—The Railroad Commission of Georgia has authorized the Georgia Railway & Electric Company to issue $769,000 of bonds on account of recent extensions and improvements costing $1,026,000.

Louisville (Ky.) Railway.—The Louisville Railway has disposed of $750,000 of 5 per cent general mortgage bonds, the proceeds of which will be used to make improvements.

Manhattan Bridge Three-Cent Line, New York, N. Y.—The Public Service Commission of the First District of New York has authorized the Manhattan Bridge Three-Cent Line to issue $50,000 of bonds. The company has secured a certificate of public convenience and necessity for an electric railway from West Street, Manhattan, to the Flatbush Avenue station of the Long Island Railroad, Brooklyn.

Metropolitan Street Railway, New York, N. Y.—Judge Lacombe, of the United States Circuit Court, has denied the motion of Arthur H. Masten, acting for Adrian H. Joline and Douglas Robinson, receivers of the Metropolitan Street Railway, to file an amended petition and claim against William W. Ladd as receiver of the New York City Railway. The original petition was filed in February, 1910, and covered an alleged breach of agreement between the two companies. The receivers of the Metropolitan Street Railway asked to have the amount of $1,251,741 stricken from the papers. The reason for this, according to the receivers, was that that sum represented material, labor and service supplied by the New York City Railway to the Metropolitan Street Railway and should not be in the papers. The receivers also asked to have the total claim of $4,964,800 changed to $4,729,516. Judge Lacombe, in denying the motion, said that the appeal was unnecessary, because there was an apparent discrepancy between the proofs and the averments as to the amount of the balance due. He added that the court always had the power to conform pleadings and proof.

New York, Westchester & Boston Railway, New York, N. Y.—On July 27, 1911, the Public Service Commission of the Second District of New York authorized an issue of $60,000,000 of thirty-five-year first mortgage gold bonds by the New York, Westchester & Boston Railway to mature July 1, 1946, with interest at not more than 5 per cent, and to issue $20,100,000 of the bonds, $17,200,000 at once to cover 67 per cent of the cost of property to the New York, New Haven & Hartford Railroad, and $2,800,000 later for proposed additions. J. P. Morgan & Company later announced that they had sold for the account of the New York, New Haven & Hartford Railroad to Kissel, Kinnicutt & Company and Harris, Forbes & Company, New York, N. Y., all of the authorized issue. On July 31, 1911, Kissel, Kinnicutt & Company and Harris, Forbes & Company offered the bonds for subscription at 96¼ and interest, to yield more than 4.70 per cent. The purposes to which the present issue will be put follow: To refund at par all New York, West chester & Boston Railway bonds secured by the mortgage of Oct. 1, 1904, $16,200,000; to refund at par all of the bonds of the New York & Port Chester Railroad, dated June 1, 1907, $100,000; to acquire real estate and construct the branch from Mount Vernon to White Plains as previously authorized by the commission, $3,800,000. The previous authorization of the commission allowing the issue of $5,000,000 of bonds under the mortgage of October, 1904, has been revoked.

Philadelphia Company, Pittsburgh, Pa.—Holders of the $500,000 of the first-mortgage 6 per cent bonds of the Allegheny County Light Company, due on Aug. 1, 1911, have largely accepted the proposition to exchange the same, dollar for dollar, for the first mortgage and collateral trust 5 per cent bonds of the Philadelphia Company, with an adjustment of interest. Bonds not exchanged before Aug. 1, 1911, will be paid.

Portland & Brunswick Street Railway, Freeport, Me.—The Portland & Brunswick Street Railway was, on July 31, 1911, ordered sold under foreclosure at Brunswick, Me., on Sept. 25, 1911. The sale was ordered by Associate Justice Albert M. Spear, of the Supreme Court of Maine, in accordance with a peition presented by the Augusta Trust Company, trustee of the mortgage securing $500,000 of bonds. The total capital of the company amounts to $597,-087. The road is a link in the through electric railway route easterly from Portland, affording connection at Yarmouth with the Portland Railroad, and at Brunswick with the Lewiston, Augusta & Waterville Electric Railway. E. M. Thompson, Augusta, Me., has been appointed the master in chancery to investigate claims against the road and report to the court.

Puebla Tramway, Light & Power Company, Pueblo, Mexico.—The Puebla Tramway, Light & Power Company proposes to issue $3,000,000 of 5 per cent prior lien bonds, with the right to increase the same when required to not exceeding $6,000,000, in order to provide funds for the development of the Tuxpango Falls. The principal holders of the outstanding first mortgage bonds are reported to have assented to the suggestion, and negotiations to that end are said to be practically completed.

Railway & Light Securities Company, Boston, Mass.—The Railway & Light Securities Company has filed at Augusta, Maine, a certificate showing an increase in the authorized capital stock of the company from $2,200,000 to $3,200,000 by raising the limit of the issue of preferred stock from $1,000,000 to $2,000,000.

Tampa & Sulphur Springs Traction Company, Tampa, Fla.—P. O. Knight, Tampa, has been appointed receiver of the Tampa & Sulphur Springs Traction Company.

Winona Railway & Light Company, Winona, Minn.—The Old Colony Trust Company, Boston, Mass., trustee for the bondholders, has brought suit in Minnesota for the foreclosure of the $500,000 mortgage of the Winona Railway & Light Company, interest on which is in default, and for the appointment of a receiver for the company.

Dividends

Boston & Northern Street Railway, Boston, Mass., 3 per cent, first preferred; 3 per cent, old preferred.

Connecticut Railway & Lighting Company, Bridgeport, Conn., quarterly, 1 per cent, preferred; quarterly, 1 per cent, common.

Old Colony Street Railway, Boston, Mass., 3 per cent, preferred.

Toledo, Bowling Green & Southern Traction Company, Toledo, Ohio, quarterly, 1½ per cent, preferred.

MONTHLY ELECTRIC RAILWAY EARNINGS

Period.			Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
BINGHAMTON RAILWAY COMPANY.							
12m.,	June,	'11	$349,186	$200,254	$148,933	$108,428	$40,505
12 "	"	'10	372,211	212,527	159,684	110,781	48,904
CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY.							
1m.,	June,	'11	$100,243	$54,879	$45,364	$30,181	$15,183
1 "	"	'10	92,050	50,606	41,443	29,794	11,649
6 "	"	'11	524,270	302,231	222,040	180,276	41,763
6 "	"	'10	478,331	289,364	188,968	178,764	10,205
DETROIT UNITED RAILWAY.							
1m.,	June,	'11	$893,250	$563,512	$346,216	$177,179	$169,037
1 "	"	'10	831,472	512,996	330,912	168,530	162,382
6 "	"	'11	4,768,049	3,026,290	1,827,210	1,057,278	769,932
6 "	"	'10	4,344,067	2,770,785	1,647,351	973,058	674,293
FAIRMONT & CLARKSBURG TRACTION COMPANY.							
1m.,	June,	'11	$64,512	$23,066	$41,446	$17,021	$24,425
1 "	"	'10	51,057	18,078	32,979	12,611	20,368
6 "	"	'11	336,325	117,668	218,657	95,064	123,593
6 "	"	'10	269,776	100,866	168,909	75,295	93,614
MINNEAPOLIS & ST. PAUL SUBURBAN RAILWAY.							
1m.,	June,	'11	$681,503	$326,349	$355,154	$140,079	$215,074
1 "	"	'10	650,605	301,678	348,927	140,112	208,815
6 "	"	'11	3,781,952	1,928,194	1,853,158	840,475	1,012,683
6 "	"	'10	3,582,248	1,748,128	1,834,126	841,142	992,978
MONTREAL STREET RAILWAY.							
1m.,	June,	'11	$432,027	$227,218	$204,809	$63,996	$140,813
1 "	"	'10	384,564	198,849	185,716	54,940	130,776
9 "	"	'11	3,438,940	2,015,139	1,423,801	403,886	1,019,915
9 "	"	'10	3,091,800	1,806,292	1,285,508	361,087	95,495
NORTHERN OHIO TRACTION & LIGHT COMPANY.							
1m.,	June	'11	$245,097	$134,983	$110,115	$44,334	$65,781
1 "	"	'10	221,673	123,673	98,548	43,375	55,173
6 "	"	'11	1,222,676	697,023	525,653	266,107	259,546
6 "	"	'10	1,087,335	624,230	463,105	259,917	203,188
TOLEDO RAILWAYS & LIGHT COMPANY.							
1m.,	June,	'11	$240,499	$144,709	$95,790	$79,008	$16,782
6 "	"	'11	1,544,103	966,557	577,546	475,329	102,217

Traffic and Transportation

Ventilating the New York Subway

The following is an extract from an article in the current issue of the *Interborough Bulletin*, published by the Interborough Rapid Transit Company, New York, N. Y., telling what the company has done to improve atmospheric conditions in the subway in summer:

"It was, of course, anticipated that subway temperatures would be representative of the amount of energy dissipated in electrical train operation, but it was hardly expected that the problem would be so difficult to overcome.

"Experimental exhaust fans, having a capacity of 24,000 cu. ft. per minute, were installed for trial purposes at the Brooklyn Bridge, and the air throughout this portion of the subway replenished every hour. They failed, however, to reduce the temperature even one single degree.

"Ventilating louvers and numerous openings have been placed at frequent points along the subway route, thus providing for constantly circulating the air between the subway and street levels, but they have also failed to produce any perceptible effect.

"It has been suggested that if the tracks were divided by partitions the piston effect of moving trains would provide for a sufficient replenishment of air to produce the desired results. Physical limitations in the present subway construction with respect to clearance between the tracks prohibit this plan. Even if this were possible it is doubtful if any material reduction in temperature could be obtained because of the great quantity of electrical energy converted into heat owing to the movement of unprecedentedly large and heavy trains.

"Subways located below rivers or large bodies of water have been found, of course, to be cooler than subways designed to be immediately below the surface of city streets. The reason for this fact is that the moisture contained in the river bottoms is a rapid absorber of heat.

"Having failed to produce the results sought for in the many different experiments thus far conducted, relief was attempted through the medium of electric fans installed within cars. At the outset it was known, of course, that electrical fans have no effect in reducing temperatures, but the physical effect produced upon passengers, it was believed, would be greatly improved through increasing the rate of physical evaporation.

"Extensive experiments were conducted along this line to determine the type of fan most suitable and it was found that electrical ceiling fans were most satisfactory because the circulation of air thus provided covers the greatest area and is least objectionable to passengers compelled to stand immediately below the fans during rush hours.

"Test trains were equipped with these devices and observations demonstrated that the subway patrons unanimously approved of the electrical ceiling fans, whereupon it was decided to install the fans in subway cars. Orders were placed and the apparatus is being manufactured and installed as rapidly as possible and a considerable measure of relief will very soon be realized."

Decision by I. C. C. on Commutation Fares

The Interstate Commerce Commission on July 31, 1911, ordered the Pennsylvania Railroad to make a general readjustment of its commutation rates in the New York commutation zone. The monthly rate of $12 for sixty trips to New Brunswick, N. J., was ordered reduced to $10. All other rates are to be rebuilt on this ratio. The commission also decided that the fifty-trip tickets of the Erie Railroad, Delaware, Lackawanna & Western Railroad, Pennsylvania Railroad and West Shore Railroad are higher than they should be, and the companies were notified to readjust these rates on a reasonable basis. The new rates are to be presented to the commission for final judgment. The complaints against the New York, New Haven & Hartford Railroad in Connecticut were held under advisement.

The general commutation charges of the Lehigh Valley Railroad and the Central Railroad of New Jersey were held to be reasonable "looking at them from a broad standpoint and considering the interests of the commuters and the companies under complaint."

The companies involved in the cases argued that the commission had no authority over the rates charged for commutation service, provided such charges were not higher than the general through rates. In deciding against their conteintions on this point Commissioner Harlan stated:

"Suburban communities have grown into existence on the theory voluntarily accepted by the carriers as well as by the public that one who makes daily use of an agency of transportation between his place of business and his home must necessarily be accorded a special and a low rate. This theory is firmly fixed in the history and traditions of transportation by rail, and must therefore be regarded as embraced in the law under which such transportation is regulated."

Accidents in New York in May

The Public Service Commission of the First District of New York has made public the following comparative summary of accidents during May, 1909, 1910 and 1911, on the street railways and railroads in Greater New York, which come within its jurisdiction:

May.	1909	1910	1911
Car collisions	144	84	113
Persons and vehicles struck by cars	822	982	1417
Boarding	647	683	760
Alighting	830	933	1086
Contact electricity	21	35	31
Other accidents	2048	2082	2398
Totals	4512	4799	5805
Injuries:			
Passengers	1962	2063	2412
Not passengers	559	487	544
Employees	459	640	590
Totals	2980	3190	3546
Serious (included in above):			
Killed	32	32	29
Fractured skulls	8	3	7
Amputated limbs	5	4	3
Broken limbs	26	32	37
Other serious	132	154	138
Totals	203	225	214

The number of revenue passengers on street surface, elevated and subway railroads follows: 1909, 127,543,788; 1910, 135,660,301; 1911, 145,131,790. The revenue car miles for the same periods were: 1909, 23,676,411; 1910, 24,976,082; 1911, 27,070,070. On the street, elevated and subway railways the number of accidents for 1909 was 4,476; for 1910, 4,513, and for 1911, 5,533. The number of people killed on these railroads during the same month in each year follows: 1909, 24; 1910, 24; 1911, 21.

Heavy Traffic on Indianapolis Lines.—Owing to the heavy excursion business out of Indianapolis during the summer months some of the electric railways centering at that point are running trail cars on their excursion trains and also on their regular trains.

Increase in Service Ordered in Queens County.—The Public Service Commission of the First District of New York has ordered the New York & Queens County Railway, Long Island City, N. Y., to increase the service on its lines as a result of the hearings which have been held recently before Commisisoner Eustis.

Fare Question Between Chicago and Cicero.—At a recent meeting of the local transportation committee of the City Council of Chicago a sub-committee was appointed to arrange if possible for an operating agreement between the Chicago (Ill.) Railways and the County Traction Company by which residents of Cicero would obtain a 5-cent fare to Chicago.

Surface-Elevated Transfers in Boston.—The Railroad Commission has approved the establishing by the Boston Elevated Railway of a transfer point at the South Station, in Boston, to permit passengers on south-bound elevated trains to transfer to Summer Street Extension surface lines and passengers on that line from South Boston to transfer to north-bound elevated trains.

Train Order Duplicating Machines.—The Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., has distributed a number of the new train order duplicating machines which were recommended by the Railroad

Commission of Indiana last fall. The machines are designed to increase the safety of transmission of train orders between the crew and the dispatcher.

Freight Petition Granted in Massachusetts.—On petition of the Boston & Northern Street Railway Company and the Union Street Railway for authority to act as common carriers of baggage and freight in New Bedford, Mass., the Massachusetts Railroad Commission has certified that public necessity and convenience require that the companies act as common carriers subject to the authority of the commission.

Study of Traffic Conditions in Boston.—By an act of the Massachusetts Legislature the Railroad Commission is authorized to employ experts to investigate traffic conditions on the Boston Elevated Railway, particularly with a view to prevent the overcrowding of cars in the subway. Ten thousand dollars has been appropriated for the purpose, the expense incurred up to that amount to be assessed upon the company.

Fare Over the Syracuse & South Bay Electric Railroad.—The Public Service Commission of the Second District of New York fixed Aug. 3, 1911, for a hearing at Albany on the application of the Syracuse & South Bay Electric Railroad, Syracuse, N. Y., on its application for a rehearing in connection with an order made recently by the commission reducing the fare between Stop 5 and the Syracuse City Line from 10 cents to 6 cents.

Special Round-Trip Fare to Coney Island.—The Coney Island & Brooklyn Railroad has agreed to operate to Coney Island for a round-trip fare of 10 cents, at certain times of the day, under the same conditions mentioned by President Williams, of the Brooklyn Rapid Transit Company, in his communication to the Public Service Commission of New York, mention of which was made in the Electric Railway Journal of July 29, 1911, page 198.

Accidents on Interstate Electric Railways.—Accident bulletin No. 39, of the Interstate Commerce Commission for January, February and March, 1911, shows that sixty-one persons were killed and six hundred and ninety-six injured during the period covered by the report on electric railways on which interstate traffic is carried. This is a decrease over the same period of 1910 of fifty-three in the number killed and three hundred and thirty-five in the number injured.

Rockford & Interurban Railway Arranges Aviation Meet.—The Rockford & Interurban Railway, Rockford, Ill., has arranged for an aviation meet on its line to be conducted by the Curtiss Exhibition Company. The aviators will be James J. Ward and Beckwith Havens, two of the Curtiss staff of aviators. The Curtiss Exhibition Company is giving special attention to aviation meets for railway companies and maintains a complete organization to handle the business end of the meets.

Complaint Against Buffalo & Lake Erie Traction Company.—The Public Service Commission of the Second District of New York has been asked by William Schuler, Fredonia, N. Y., to require the Buffalo & Lake Erie Traction Company to operate a baggage car between Fredonia and Westfield about 8 o'clock in the morning of each day except Sunday. Mr. Schuler asserts that for a long time this car was run and proved a great accommodation to merchants in either place for the transportation of purchases to their customers.

Objection to Near-Side Stops in Minneapolis.—Several thousand taxpayers of Minneapolis, Minn., have petitioned the City Council to require the Twin City Rapid Transit Company to return to the custom of stopping its cars at the far side of the street. All cars run on paved streets were recently ordered to stop at the near side. W. J. Hield, vice-president and general manager of the company, told the committee that many accidents are avoided by the present system. He was upheld in this contention by Lieutenant Michael Daily, of the police traffic squad.

Through Line Between Cleveland and Lima.—A party of electric railway men of Cleveland met the special car over the new through Cleveland-Lima line at Lorain at noon, on July 31, 1911, to celebrate the inauguration of the service. The tracks of the Lake Shore Electric Railway will be used from Cleveland to Fremont and the cars will operate over the new Fostoria & Fremont line, between Fremont and Fostoria; over the Toledo, Fostoria & Findlay Railway to Findlay, and over the Western Ohio Railway to Lima. Four new cars are to be used in this service.

Complaints Before the Pennsylvania Commission.—The Railroad Commission of Pennsylvania has ruled that it is without jurisdiction to make an order prescribing the hours for the use of special coupon books on the Lewisburg, Milton & Watsontown Electric Railway. Henry Hileman, of Pittsburgh, has complained to the commission that the Pittsburgh, Harmony, Butler & New Castle Railway has assessed an unreasonable charge of 85 cents per ton against him for transporting limestone from Harmony Junction to Warrendale, a distance of 11 miles. James J. Geisinger, of Centre Valley, has filed a complaint against the Lehigh Valley Transit Company regarding fare zones.

Developing Freight Business in Philadelphia.—Interchange of freight over the various electric railways between Harrisburg and Philadelphia will come with the completion of one or two short gaps between the different systems. On Aug. 1, 1911, the Philadelphia & West Chester Traction Company inaugurated freight service between West Chester and Sixty-third and Market Streets, Philadelphia, interchanging with the lines of the Philadelphia Rapid Transit Company. The stations for freight opened by the Philadelpia & West Chester Company are at Sixty-third Street and Market Street, Upper Darby, Llanerch, Manoa, Newton Square and West Chester. Branch line stations have likewise been opened at Ardmore and Clifton Heights. Three cars were put into service at the start. As soon as the projected new line between Middletown and Elizabethtown is built, the freight service will be extended.

Developing the Piedmont Section.—The activity of the Southern Power Company, the Piedmont Traction Company and the Greenville, Spartansburg & Anderson Traction Company, all controlled by the same interests, in perfecting their plans for completing the electric railway to connect Greenwood, S. C., and Durham, N. C., 300 miles distant, prompted the Charlotte *Observer* to make its issue of July 26, 1911, a special interurban edition, devoted to recording the work which the companies have in hand and to summarizing the economic, social and civic features of the territory through which the electric railway lines will extend. As previously stated in the Electric Railway Journal, the new electric railway will use 1500-volt direct current. Power for operating the system will be secured from the plants of the Southern Power Company on the Catawba River, which develop 134,000 hp and supply forty-five cities and towns in North Carolina and South Carolina. The developments which the companies are carrying out are by far the most important of their kind in the United States, and the *Observer* shows plainly in its account of the progress of the territory to be served that the vast expenditures to be made are fully justified.

Medals for Conductors.—W. O. Johnson, receiver of the Chicago & Milwaukee Electric Railroad, has decided to award a gold medal each month to the conductor who is regarded as the most efficient. E. H. Igou has received the first medal. In explaining the purpose of the company, Mr. Johnson said: "If the railroad companies would take more pains in dealing with their passengers they would have less trouble getting favors when they need them. In offering gold medals for politeness I feel that I am only carrying out what will eventually be the policy of every common carrying company in the United States. The medal we are giving is not for politeness alone. It is also a reward for cleanly kept accounts. Mr. Igou's were the cleanest and best kept on the road, according to the report of E. J. Bock, the superintendent." Mr. Igou's maxims follow: "Passengers are patrons of your employer. Treat them as such. Help old women and women with babies or bundles on and off the car. Remember where your regular passengers get off and don't haul them by. If old women or women with babies have no seat, ask some man to give them a seat. In rainy days open umbrellas for women as they get off. It saves accidents. Never give curt answers. If you're busy, wait to answer until you're through. Be as polite to homely women as to pretty women. Wait for passengers who are trying to catch the car. Keep your car clean and your patrons will help you."

Personal Mention

Mr. E. R. Cunningham has resigned as electrical engineer of the Des Moines (Ia.) City Railway and the Inter-Urban Railway, Des Moines.

Mr. J. B. Hughey has been appointed superintendent of sleeping and parlor cars by the Illinois Traction System, with headquarters at Peoria, Ill.

Mr. Eugene N. Lund has been appointed city car inspector by the Council of Minneapolis. Mr. Lund is a graduate of Hamline University.

Mr. H. C. Patterson has resigned as mechanical and electrical engineer of the Illinois Traction System, Peoria, Ill., and will engage in other work.

Mr. D. Y. Husselman, formerly connected with the Ohio Electric Railway and other electric railways of the Middle West, has entered the employ of the Ohio Tax Commission, Columbus.

Mr. Robert R. Hertzog has resigned as general superintendent of the Chicago (Ill.) Railways Company, after twenty years' service in the transportation department of the company.

Mr. D. C. Ward, trainmaster of the Indianapolis & Louisville Traction Company, Scottsburg, Ind., has been appointed superintendent of the company to succeed Mr. H. D. Murdock, resigned.

Mr. J. H. Lytle has been elected secretary of the City Railway, Dayton, Ohio, to succeed Mr. R. R. Dickey. This is Mr. Lytle's first experience in railroading. His previous activities were in the advertising field.

Mr. Frank Hedley, vice-president and general manager Interborough Rapid Transit Company, New York, N. Y., will make quite an extended tour in Europe and will visit London, Paris, Berlin, Vienna and other important cities. He expects to sail on Aug. 5, and will go first to London.

Mr. J. B. Hogarth of the Chicago (Ill.) Railways Company's auditing department and formerly with the Chicago (Ill.) City Railway, and before that with the Denver (Col.) City Tramway, has been appointed general superintendent of the Chicago Railways Company to succeed Mr. Robt. R. Hertzog, resigned.

Mr. Calvert Townley, whose resignation as vice-president of the Connecticut Company, New Haven, Conn., to become connected with the Westinghouse Electric & Manufacturing Company, was noted in the ELECTRIC RAILWAY JOURNAL of July 1, 1911, has been given the title of assistant to the president of that company.

Mr. C. A. Henderson, secretary and auditor of the Los Angeles Railway Corporation, Los Angeles, Cal., has been appointed assistant general manager of the company. Mr. Henderson will retain his title as secretary and auditor. He became connected with the company in 1895 as auditor. He was previously connected with the Wabash Railroad.

Mr. J. P. Peurrung has resigned as vice-president and general manager of the Cincinnati, Milford & Loveland Traction Company, Cincinnati, Ohio, on account of ill health. It is announced that the management of the property will for the present be in the hands of Mr. B. H. Kroger, president, and Mr. August Beidenbender, superintendent.

Mr. Hugh Pattison, who has been appointed electrical engineer for the Chicago Electrification Commission, was tendered a dinner at the Engineers' Club, New York, N. Y., on July 22, 1911, by about sixty of his former associates in the engineering offices of the Pennsylvania Tunnel & Terminal Railroad. A gold watch was presented to Mr. Pattison as a token of esteem and some appropriate remarks were made by Mr. E. R. Hill.

Mr. H. D. Murdock has resigned as superintendent of the Indianapolis & Louisville Traction Company, Scottsburg, Ind. Mr. Murdock was formerly mechanical and electrical engineer of the company. Before that he was superintendent of the Fifty-second Street shops of the Brooklyn Rapid Transit Company. Mr. Murdock entered the electric field in 1892, when he became connected with the construction department of the Westinghouse Electric & Manufacturing Company.

Mr. C. O. Mailloux will present two papers at the International Electrical Congress which is to meet in Turin, Italy, during the week beginning Sept. 11. One of these papers is on "Electrification of Railroads," the other is upon "Method of Determining the Equivalent Heating Current in Electrical Circuits." This latter paper will describe a simple method constituting an important extension and generalization of the Fleming method, developed by Mr. Mailloux, for calculating the root mean square values of alternating or varying currents.

Mr. Sherman W. Dunn has been appointed superintendent of the Augusta division of the Lewiston, Augusta & Waterville Electric Railway, Lewiston, Maine, to succeed Leander F. Taylor, deceased. Mr. Dunn is forty-three years old. He began his railroad career on a steam railroad. Eighteen years ago he entered electric railway work as a mechanic on repair work. Mr. Dunn was assistant to the late Mr. Taylor for ten years, first with the Augusta, Hallowell & Gardiner Street Railway and, after the consolidation, with the Augusta division of the Lewiston, Augusta & Waterville Electric Railway. The Augusta division includes 68 miles of line.

Mr. Thomas F. Miley has been appointed general superintendent of the New Jersey & Pennsylvania Traction Company, Trenton, N. J., a newly created office, Mr. C. M. Bates, president of the company, having previously directed the operation of the road himself. Mr. Miley began railroading with the Atlantic Avenue Railroad, Brooklyn, in 1892. He was with the Nassau Railroad, Brooklyn, from 1895 to 1899, and acted as master mechanic of the Eastern Division of the Lehigh Valley Traction Company, Allentown, Pa., from 1899 to 1904. In the latter year he returned to Brooklyn as foreman of the Smith Street and Franklin Avenue divisions of the Coney Island & Brooklyn Railroad, remaining with that company until February, 1910, when he was appointed master mechanic of the New Jersey & Pennsylvania Traction Company.

Mr. James Anderson, who was elected president of the Canadian Street Railway Association at the recent meeting of the association, is general manager of the Sandwich, Windsor & Amherstburg Railway, Windsor, Ont. He was born near Ayr, Ont., on June 20, 1851. At the age of nineteen he entered the employ of the Great Western Railway, and after serving a few years was appointed a conductor, which position he held until November, 1883, when he resigned and went into the grocery business as a member of the firm of Robinson & Anderson. In June, 1893, Mr. Anderson sold his interest in the firm to his partner, and with Mr. John Davis, Mr. W. J. Tucker, Dr. Coventry, Mr. W. J. Pulling, Windsor, Ont., and the late Robert Thomson and Mr. William Hendrie, Hamilton, Ont., he purchased the Sandwich, Windsor & Amherstburg Railway, which was operated under that ownership for eight years. When the Sandwich, Windsor & Amherstburg Railway passed into the hands of the present owners, the Detroit United Railway, in 1901, Mr. Anderson was appointed general manager of the company. The company's line has since been extended to Amherstburg and Tecumseh, and 35 miles of line are now in operation.



J. Anderson

Mr. D. A. Hegarty, whose resignation as vice-president, general manager, treasurer and director of the Little Rock Railway & Electric Company, Little Rock, Ark., to become connected with the New Orleans Railway & Light Company, New Orleans, La., was announced in the ELECTRIC RAILWAY JOURNAL of July 22, was tendered a banquet at the Hotel Marion, Little Rock, by the business men of Little Rock on his departure for New Orleans. Mr. W. M. Kavanaugh, president of the Little Rock Railway & Electric Company, acted as toastmaster. Among the speakers were

Mr. J. N. Heiskell, editor of the Little Rock *Gazette;* Mayor C. E. Taylor, of Little Rock; Dr. W. H. Frost, of Washington, D. C., and Mr. D. H. Cantrell. Mr. Hegarty said that the work done in Little Rock could not have been accomplished had it not been for the hearty co-operation of the other officers of the company and the employees. As a token of their esteem the directors and employees of the company presented Mr. Hegarty with a handsome chest of silver.

Mr. R. B. Stearns, of Chicago, has been appointed assistant general manager of The Milwaukee Electric Railway & Light Company and the Milwaukee Light, Heat & Traction Company, Milwaukee, Wis., in charge of the railway departments of those companies. Mr. Stearns was educated at Purdue University, class of 1889. He was engineer in connection with the Columbian Exposition at Chicago, in 1893. Subsequently he was engaged in the United States engineer service on the Chicago Drainage Canal and the Hennepin Canal during the early history of that work. He was also engaged from their inception in the construction of the Northwestern Elevated Railroad, the Union Loop and the extensions to the Lake Street Elevated Railroad, Chicago, now the Chicago & Oak Park Elevated Railway, as assistant chief engineer and superintendent of construction. Later he was appointed chief engineer and superintendent in charge of the operation of the Northwestern Elevated Railroad. Mr. Stearns was general manager of the Chicago & Milwaukee Electric Railroad for a short time before that road was placed in the hands of receivers and continued in that capacity under the receivers.

Mr. George W. Knox, president of the Knox Engineering Company, Chicago, Ill., has been elected second vice-president and general manager of the Oklahoma Railway Company, Oklahoma City, Okla. While he will devote the greater part of his time to working out the operating problems of the Oklahoma Railway Company, Mr. Knox will retain his interest in the Knox Engineering Company, as in the past. Mr. Knox has long been connected with electric railway work. Originally he was in the employ of the Sprague Electric Company, and later was with the General Electric Company, acting as superintendent of construction and as an electrical engineer. Then he became electrical engineer of the Chicago (Ill.) City Railway, and built the first electric line in Chicago—that on Forty-seventh Street. In 1900 Mr. Knox resigned from the Chicago City Railway and organized the Knox Engineering Company. Some of the railways which his company has acted for as engineer and has constructed follow: Rockford, Beloit & Janesville, Beloit, Wis.; People's Traction Company, Galesburg, Ill.; Stark Electric Company, Alliance, Ohio; Guthrie (Okla.) Railway, Green Bay (Wis.) Traction Company, reconstruction of the Choctaw (Okla.) Railway & Light Company, design and construction of the Wausau (Wis.) Street Railroad, Grand Rapids (Wis.) Street Railroad, Mankato (Minn.) Traction Company, and power plant of the Rock Island Southern Railway. Work in which Mr. Knox is now interested includes the construction of the new interurban road in Ohio, known as the Cleveland, Alliance & Mahoning Valley Railway, extensions of the Wausau (Wis.) Street Railroad and the rehabilitation of the Freeport Railway & Light Company, Freeport, Ill. Mr. Knox has also reported on many propositions for bond houses and individuals. He made the original report on the Oklahoma Railway in 1901, and he has been connected with the company ever since in the capacity of consulting engineer. He is the patentee of the automatoneer and a number of other railway devices. Mr. Knox is an associate member of the A. I. E. E.



G. W. Knox

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Colorado Interurban Railway, Denver, Col.—Incorporated in Colorado to build an electric railway from Denver to Ft. Lupton; also from Ft. Lupton to Greeley and Longmont. Capital stock, $6,000,000. Irving Hale, president.

Gary-Hobart & Eastern Traction Company, Hobart, Ind.—Incorporated in Indiana to build an electric railway between Gary, Hobart and Valparaiso. Capital stock, $125,000. Directors: W. H. Clinton, A. Z. Olson, A. J. Smith, J. H. Earle, E. H. Guyer, J. C. Cavender and Grant Crumpacker. [E. R. J., May 13, '11.]

***New Castle (Pa.) Connecting Street Railway.**—Incorporated in Pennsylvania to build an electric railway in New Castle. Incorporators: W. G. Weimer, I. K. Norris, J. H. Corbett, J. E. White and Roy M. Jameson.

***Ft. Worth Power & Light Company, Ft. Worth, Tex.**—Incorporated in Texas to operate an electric railway in Ft. Worth. Capital stock, $3,500,000. Directors: J. R. Nutt, Cleveland, Ohio; George T. Reynolds, W. C. Stripling, A. J. Duncan, T. B. Yarbrough and John P. King, of Ft. Worth.

FRANCHISES

***Phoenix, Ariz.**—The Salt River Electric Railway has asked the City Council for a franchise to build its lines in Phoenix. Jacob K. Kleck is interested.

Burlingame, Cal.—Ansel M. Easton has received a franchise from the Board of Trustees to operate an electric railway from the United Railroads, westerly, through the streets of Easton. [E. R. J., July 8, '11.]

Rockvale, Cal.—The Florence Interurban Electric Company has received a franchise in Rockvale. [E. R. J., July 22, '11.]

Woodland, Cal.—The Vallejo & Northern Railway, Sacramento, has received a franchise from the City Trustees to build its tracks over Main Street in Woodland. [E. R. J., July 29, '11.]

Cicero, Ill.—The Cicero & Southwestern Railway has asked the Town Board for a franchise to build its tracks in Cicero. The franchise calls for a 2½-cent fare to all parts of Cicero. [E. R. J., July 15, '11.]

Bedford, Mass.—The Lexington & Boston Street Railway, Newtonville, has asked the Council for a renewal of its franchise in Bedford.

Erving, Mass.—The Miller's River Street Railway, Miller's Falls, has asked the Selectmen for a franchise to build its tracks over the city streets of Erving. Frederick L. Greene represented the company. [E. R. J., July 1, '11.]

Holyoke, Mass.—The Holyoke Street Railway has been granted authority by the Massachusetts Railroad Commission to construct its line on private land in that city, near the Holyoke Country Club.

Eveleth, Minn.—The Range Electric Railway has received a franchise from the City Council to build its tracks over the city streets. The railway will connect Gilbert, Eveleth and Virginia. Oscar Michell, Duluth, is interested. [E. R. J., Jan. 7, '11.]

Solvay, N. Y.—The Syracuse Rapid Transit Company has asked the Board of Trustees for a franchise to build an electric railway over certain streets of Solvay.

Utica, N. Y.—The Utica & Mohawk Valley Railway has received a franchise from the Common Council to extend its tracks over East Dominick Street and West Dominick Street.

Durham, N. C.—The Durham Traction Company has received a franchise from the County Commissioners to build an extension to Watts Hospital.

Akron, Ohio.—The Alliance-Akron Railroad, Alliance, has asked the County Commissioners for a franchise to build its track, over 2 miles of the public highway from Mogadore to Akron. [E. R. J., July 15, '11.]

Defiance, Ohio.—The Defiance Interurban Railway has

received a franchise from the Council to build an electric railway in Defiance to the part of its line from Defiance to Ft. Wayne. [E. R. J., Nov. 26, '11.]

*Steubenville, Ohio.—The Steubenville, Wellsburg & Weirton Railway will apply for a franchise to build an electric railway in Steubenville. Edward McDonnell, vice-president.

Cambridge Springs, Pa.—The Erie Traction Company has received a franchise from the Borough Council to build its tracks on Railroad Street from Grant Street to the borough limits.

Lebanon, Pa.—The Lebanon & Campbelltown Street Railway has received a franchise from the City Council in Lebanon. S. M. Hirshey is interested. [E. R. J., July 29, '11.]

*Watertown, S. D.—S. D. Ferris has asked the Council for a franchise to build an electric railway in this city.

Brownsville, Tex.—The San Benito Interurban Railway has asked the City Council for a franchise to build its tracks over the city streets. Sam Robertson, San Benito, represented the company.

*Mount Vernon, Wash.—The Bellingham & Skagit Railway has asked the City Council for a perpetual franchise to build an electric railway in Mount Vernon.

TRACK AND ROADWAY

Salt River Electric Company, Phoenix, Ariz.—This company plans to build three electric railways out of Phoenix. The first will extend 15 miles northwest to Peoria, the second to Scottsdale, 11 miles northwest of Phoenix, and the third 18 miles southeast to Mesa. A spur track will run 3½ miles east to where an amusement park will be established. F. M. Winter, Jacob K. Leck, W. S. Furman, J. M. Wivetnam and C, C. Lewis are interested.

Ft. Smith Light & Traction Company, Ft. Smith, Ark.—About 10 miles of new track will be built by this company on the South Side in Ft. Smith, in the near future.

Arkansas Valley Interurban Railway, Little Rock, Ark.—Work is almost completed by this company on its electric railway from Wichita to Newton. Work will soon begin on the extension to Goessee, 14 miles north of Newton. [E. R. J., May 20, '11.]

Fresno, Hanford & Summit Lake Interurban Railway, Fresno, Cal.—This company plans to build a 23-mile extension of its line to connect Fowler and Hanford.

Los Angeles (Cal.) Railway.—This company is completing the laying of 1½ miles of concrete railway ties in Los Angeles.

Santa Rosa & Clear Lake Railroad, Santa Rosa, Cal.—Work will be begun by this company within the next few days on its 56-mile electric railway to connect Santa Rosa and Clear Lake, via Burke, Markwest, Kellogg and Mount St. Helena. The line is to be a narrow-gage and either gasoline motors or electricity will be used as motive power. [E. R. J., Dec. 3, '10.]

*Bridgeport, Conn.—O. G. Beard, Jr., L. E. Moulthrop and B. N. Beard are said to be considering plans to build an electric railway to connect Shelton and Bridgeport, via Huntington Centre.

Connecticut Company, New Haven, Conn.—Work has been begun by this company on two concrete bridges, one over the neck of Whitney Lake and the other over a creek at Centerville.

Wilmington, Del.—Plans have been made and estimates secured for an electric railway along the Delaware River to connect the system of the Wilmington & Philadelphia Traction Company with the New Castle & Delaware City line at New Castle.

Pensacola (Fla.) Electric Company.—This company will soon build an extension to the new baseball park in the western section of Pensacola.

St. Louis-Rock Island Railway, Keokuk, Ia.—The Mississippi River Power Company is surveying the line to be built by the St. Louis-Rock Island Railway to connect Hamilton, Washaw and Keokuk. [E. R. J., July 22, '11.]

Mattoon-Charleston Traction Company, Mattoon, Ill.—Marshall Sampsell, president of this company, states that work on the line from Charleston to Paris and Christman cannot be started as early as intended because of the failure to float the bonds in the East. He has not abandoned the enterprise and expects to complete the work of construction next year. The company bought the lighting plant at Kansas, Ill., which would be on the route, to use as a power station. [E. R. J., June 11, '10.]

Chicago, Ottawa & Peoria Railway, Ottawa, Ill.—This company has recently purchased a private right-of-way through the town of Utica, and is moving its line onto the new roadbed, which is about a mile long. Grading and pole setting on the 22-mile extension from Morris to Joliet is nearly finished.

Illinois Traction System, Peoria, Ill.—This company recently purchased 25 miles of new 70-lb. rails for renewal and extension work. A considerable portion of this rail will be used in renewing rails of similar weight on the main-line tracks. The rail to be taken up is used in lengthening sidings and building industrial tracks and terminal yards.

*Quincy & Peoria Traction Company, Peoria, Ill.—Robert H. Baldwin, locating and constructing engineer, 1243 Monadnock Building, Chicago, has prepared a preliminary report for the Quincy & Peoria Traction Company, a line 141 miles, traversing the west side of the Illinois River Valley, between Quincy and Peoria, Ill., with branches to Canton, Pekin and Rushville. A maximum grade of 0.4 per cent, and a curvature of not more than 4 deg., will be obtained on the final location surveys, which are to follow. It is estimated the line can be built for less than $22,000 per mile. Terminal agreements have been signed by the Peoria Railway Terminal and the Illinois Central Electric Railway, and arrangements have been made with the Illinois Traction System at Peoria to furnish energy. The report has been turned over to M. H. Myers, Chicago, one of the principals, who is interested in the financing.

*Fox & Illinois Union Railway, Yorkville, Ill.—H .H. Evans has deposited $50,000 in banks at Yorkville and Morris to guarantee that this proposed interurban railway connecting Yorkville and Morris will be built. The right-of-way has been secured.

Gary & Southern Traction Company, Crownpoint, Ind.—The Ahlbom Construction Company, Hammond, has been awarded the contract by this company to complete the line from Ridge Row to Forty-third Avenue, and work has been begun. An effort will be made to have cars running between Gary and Crownpoint by Dec. 1.

Gary-Hobart Railway, Gary, Ind.—Surveying has begun on this company's line from Gary to Hobart, and the contract for construction has been let. [E. R. J., April 1, '11.]

Indianapolis, Nashville & Southern Traction Company, Indianapolis, Ind.—Survey is now under way by this company and work has been begun on track construction in the southern part of Indiana. It is planned to touch French Lick Springs and to go by way of Bloomington, Oolitic and Bedford.

Kokomo, Frankfort & Western Traction Company, Kokomo, Ind.—Work has begun on the construction of this line between Kokomo and Frankfort. T. C. McReynolds is general manager. [E. R. J., July 15, '11.]

*Lawrenceburg, Ind.—A survey has been made between Osgood and Versailles, and nearly all of the right-of-way obtained, with the intention of the immediate construction of an electric railway. J. L. Phillips, Clinton, Mo., and Julius E. Wayland, Gerard, Kan., are interestd.

Vincennes, Washington & Eastern Traction Company, Vincennes, Ind.—This company has begun work on the interurban line from Vincennes to Washington. Arrangements may be made with the Vincennes Traction Company whereby the cars will enter Vincennes over the lines of the former company. [E. R. J., June 8, 1911.]

*Manhattan (Kan.) Interurban Railway.—This company plans to build an electric railway from Manhattan to Ft. Riley, at which point it will connect with the line which now connects Ft. Riley and Junction City, making a continuous line from Manhattan to Junction City, a distance of 24 miles.

Shelbyville, Ky.—R. D. Armstrong, Frankfort, Ky., one of those interested in a project to build an electric line from Shelbyville to Frankfort, Ky., states that following the

securing of rights-of-way Eastern capital can be secured for the construction of this line, which would be about 25 miles long. [E. R. J., Apr. 22, '11.]

Boston (Mass.) Elevated Railway.—Plans and surveys are being made for the Dorchester tunnel, the Boylston Street subway and the East Boston tunnel extension. Work will be begun as soon as the company and the city accept the act providing for these improvements.

Detroit (Mich.) United Railway.—Track laying has been begun by this company on its extension on Hamilton Boulevard, in Detroit.

Mankato (Minn.) Electric Traction Company.—This company will extend the line to Wilmar.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y.—This company plans to rebuild a large part of its line from North East to Erie, a distance of about 12 miles.

Penn Yan (N. Y.) Keuka Park & Branchport Railway.—Plans are being made for the extension of this company's lines to Corning. The line now stops at Branchport, 8 miles distant from Corning, and it is proposed to extend it along the west shore of the west arm of the lake to Pulteney Landing and thence eventually on toward Hammondsport.

Syracuse (N. Y.) Rapid Transit Company.—This company has completed and will soon place in operation its Willow Street extension.

Black River Traction Company, Watertown, N. Y.—This company will double-track its Court Street line and place heavier rails on its State Street line, in Watertown.

Springfield, Wilmington & Cincinnati Railway, Cincinnati, Ohio.—G. H. Frey, Springfield, is negotiating with several Eastern stockholders of the company in New York for the construction of this railway to connect Springfield, Cincinnati, Wilmington and Norwood. [E. R. J., April 17, '09.]

Cleveland, Ohio.—The Deming Brothers Realty Company has begun grading on its 1-mile double-track street railway which will connect Forest Hill with the lines of the Cleveland Railway. The Cleveland Railway is constructing the line.

***Fremont, Ohio.**—C. C. Anderson, Fostoria; A. H. Jackson, Fremont, and A. S. Close, Toledo, are interested in a plan to build an electric railway between Tiffin and Fremont. They are now securing rights-of-way. The old Bunn route, which will be followed most of the way, was graded about six years ago and is in good shape. The proposed line will connect with the new Fostoria & Fremont line near Ballville.

Wapakoneta & Kenton Traction Company, Kenton, Ohio.—Work has been begun by this company on its electric railway from Wapakoneta to Kenton. Alonzo S. Roberts is interested. [E. J. R., June 17, '11.]

Hocking-Sunday Creek Traction Company, Nelsonville, Ohio.—Twibill Powers, Kimberly, has been awarded the contract by this company for grading the second section of its line from Sunday Creek to the switch at Sugar Creek. Work has been begun. Juniper & Nixon Company has been awarded the contract for the grading from Greenlawn to Sunday Creek, below Chauncey. About 1½ miles of this work has been done.

Mahoning & Shenango Valley Railway, New Castle, Pa.—This company will improve and extend its tracks in and around Sharon.

***Rogersville, Tenn.**—McDonald Brothers, Rogersville, Tenn., have a plan to develop water power on the Holston River, near McMinnville, Tenn., and to operate an electric railway between Rogersville and Hale Springs.

Texas Traction Company, Dallas, Tex.—This company advises that construction has been begun on 2½ miles of track in McKinney and not in Dallas as was stated in the Electric Railway Journal of July 15, 1911.

***San Antonio, Tex.**—The Medina Irrigation Company plans to build an electric railway from San Antonio to its reservoir and from thence down the valley of the Medina River.

***Bellingham, Mount Baker & Spokane Interurban Railroad, Spokane, Wash.**—This company has been organized to build an electric railway from Spokane to Bellingham, Wash., 288 miles. It is announced that London capital is interested in the project. The engineer's estimate places the cost at from $20,000,000 to $25,000,000. The road will traverse Spokane, Stevens, Ferry, Okanogan and Whatcom Counties to Tidewater. Among the incorporators are: Joseph Morrison, president of the Morrison Mill Company; J. E. Morrison, superintendent of the Nooksack Valley Traction Company; A. E. Mead, Bellingham; W. L. Hart, Blaine; F. Peace, Vancouver, B. C.; A. C. McLean, Seattle; Z. E. Hawkins, Nome, Alaska, and C. E. Wingate, Tilden, Wash. The capital stock is $22,500,000.

Charleston-Dunbar Traction Company, Charleston, W. Va.—The Standard Contracting Company, Charleston, has been awarded the contract and work has been begun by this company to build a 4-mile electric railway to connect Charleston and Dunbar. Officers: F. P. Grosscup, president; W. C. Davidson, vice-president; H. Gluck, treasurer, and J. F. McAndrew, secretary. [E. R. J., June 24, '11.]

Clarksburg (W. Va.) Northern Railway.—Grading has been begun by Joseph Fuccy on the line from Middlebourne to New Martinsville. T. Moore Jackson is promoting the line. [E. R. J., July 22, '11.]

Clarksburg & Western Electric Railway, Clarksburg, W. Va.—Grading has been completed from Clarksburg to Mount Clare and the track and trolley wire have been placed from Clarksburg to the Hoff farm.

Mount Morris-Morgantown Traction Company, Morgantown, W. Va.—Bids for the construction of this line will be asked for in a few days. Nearly $60,000 in stock subscriptions has been obtained, and most of the right-of-way has been secured. [E. R. J., June 24, '11.]

SHOPS AND BUILDINGS

Los Angeles Railway, Los Angeles, Cal.—This company will let a contract for a carhouse to be built on its property at Fifty-fourth Street and Arlington Street. The building will be 624 ft. x 355 ft., and will be of concrete and steel construction throughout.

Ontario & San Antonio Heights Railway, Ontario, Col.—This company will build frame passenger depots at San Antonio Avenue, between Ninth Street and Tenth Street, and at Euclid Avenue at the junction of the branch line to Claremont.

Keokuk (Ia.) Electric Railway & Power Company.—Stone & Webster Engineering Corporation, Boston, Mass., will prepare plans for the construction of the carhouse and the track of this company. Work on the reconstruction of the system will be commenced immediately upon the consummation of the negotiations by which the Stone & Webster company is to obtain title to the Keokuk franchise, plant and equipment.

Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind.—This company will let the contract within thirty days to build a carhouse.

Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.—This company has just awarded a contract for a new passenger station at Lebanon. The station will be built of Indiana limestone and will be ready for occupancy on Dec. 1, 1911.

Amherst & Southerland Railway, Amherst, Mass.—Work has been begun on this company's passenger station in the campus of Amherst College. The building is of brick and stucco and was designed by Arthur H. Sharp and is being built by C. A. Jewett.

Boston & Eastern Electric Railway, Boston, Mass.—This company is considering plans to build a new station on Broadway and a terminal at Wallis Street in Beverly.

Syracuse, Lake Shore & Northern Railroad, Syracuse, N. Y.—This company is considering plans for the purchase of property in West First Street upon which to build a new carhouse.

Scioto Valley Traction Company, Columbus, Ohio.—Plans have been completed by this company for its new repair shops at Obetz and a new passenger station at Chillicothe.

Portland Railway, Light & Power Company, Portland, Ore.—Work has been begun by this company on its combination warehouse and clubhouse for employees. The building will be 100 ft. x 200 ft., four stories high and of reinforced concrete construction.

Fairmont & Clarksburg Traction Company, Clarksburg, W. Va.—Plans have been completed and the contract will soon be let by this company for its freight depot on Fairmont Avenue and First Street.

POWER HOUSES AND SUBSTATIONS

Connecticut Company, Waterbury, Conn.—This company will dispense with its old steam power plant on Bank Street as soon as its 5000-hp steam turbine is installed in its plant at West End.

St. Louis-Rock Island Railway, Keokuk, Ia.—This company will build a power house at Hamilton.

Chicago, Ottawa & Peoria Railway, Ottawa, Ill.—A substation building on the new shop property just west of Ottawa is being reconstructed for a trainmaster's and dispatcher's office. The rotary converter from this substation has been reinstalled in the Ottawa power house, which receives energy from the Marseilles water-power plant.

Kentucky Traction & Terminal Company, Lexington, Ky.—Sargent & Lundy, Chicago, are completing plans for the new power house of the Kentucky Traction & Terminal Company, which recently took over the traction properties in and around Lexington. It is stated that a contract will be awarded for the erection of the building and the installation of machinery in the next two weeks.

Bangor Railway & Electric Company, Bangor, Maine.—This company has purchased the hydroelectric plant of the Bodwell Water Power Company at Old Tower and Milford, on the Penobscot River. Plans are being made to build a 2000-ft. dam across the Stillwater branch of the river, as was originally proposed.

United Railways & Electric Company, Baltimore, Md.—The Pennsylvania Water & Power Company has begun to furnish current to the Pratt Street power station of the United Railways & Electric Company.

Metropolitan Street Railway, Kansas City, Mo.—This company will remove a 1000-kw generator from its Fifteenth Street substation to its Fortieth Street substation and install in its place a 3000-kw generator.

Public Service Railway, Newark, N. J.—E. M. Waldron & Company have been awarded the contract by this company to build a power house in Marion. The building will be 100 ft. x 100 ft., two stories high and of brick and steel construction.

Cleveland, Painesville & Eastern Traction Company, Cleveland, Ohio.—Plans have been completed by this company for consolidating its two power houses at Painesville and Willoughby. Its principal source of energy will be at Painesville. This company now operates both the Cleveland-Painesville and the Cleveland-Ashtabula lines.

Northwestern Pennsylvania Railway, Meadville, Pa.—This company has let contracts to the General Electric Company for one 300-kw motor generator set, one 200-kw generator set for its Main Street station at Meadville, and one 300-kw rotary converter for its substation at Harmonsburg.

Trenton, Bristol & Philadelphia Street Railway, Bristol, Pa.—During the next four weeks this company will purchase a 500-kw engine or turbine with generator.

Philadelphia (Pa.) Rapid Transit Company.—This company will soon award a contract for a $25,000 addition to its power plant on Delaware Avenue.

Mahoning & Shenango Valley Railway, New Castle, Pa.—This company will enlarge its power house and install new equipment at Sharon.

Charleston Consolidated Railway & Light Company, Charleston, S. C.—J. W. Lindsay, Philadelphia, has been awarded the contract by this company to build the superstructure of its new power house. A battery of boilers rated at 2640 hp has been installed by the Franklin Boiler Works.

Winchester & Washington City Railway, Winchester, Va.—This company is building a new tailrace for its power house at Millville.

Charleston-Dunbar Traction Company, Charleston, W. Va.—This company will build a power house at Dunbar for its line from Charleston to Dunbar.

Manufactures & Supplies

ROLLING STOCK

Maysville (Ky.) Public Service Company is receiving bids for several new cars.

Central Pennsylvania Traction Company, Harrisburg, Pa., is understood to be considering the purchase of additional prepayment cars.

Trenton, Bristol & Philadelphia Street Railway, Bristol, Pa., has ordered two 30-ft. 8-in. closed motor cars mounted on Brill 27-G-1 trucks, from The J. G. Brill Company.

Charleston (S. C.) Railway & Lighting Company has ordered six single-truck car bodies from the Cincinnati Car Company. They will be mounted on Brill 21-E trucks.

Mount Hood Railway & Power Company, Portland, Ore., has ordered four 38-ft. interurban cars mounted on Brill 27-MCB-3 trucks, from the G. C. Kuhlman Car Company.

Bluestone Traction Company, Bluefield, W. Va., has ordered one 20-ft. 8-in. semi-convertible motor car body mounted on a Brill 21-E truck, from the G. C. Kuhlman Car Company.

Savannah (Ga.) Electric Railway has ordered, through Stone & Webster Engineering Corporation, six Brill 39-E trucks, for use on the three cars being built by the St. Louis Car Company.

Dallas (Tex.) Electric Corporation has purchased, through Stone & Webster Engineering Corporation, twenty Brill 30-E trucks for the ten double-truck car bodies being built by the Cincinnati Car Company.

Geary Street Municipal Railway, San Francisco, Cal., noted in the ELECTRIC RAILWAY JOURNAL of Jan. 28, 1911, as being in the market for twenty cars, will soon issue specifications for forty-three steel pay-as-you-enter cars. They will be 47 ft. long and equipped with four 50-hp motors each.

TRADE NOTES

Grip Nut Company, Chicago, Ill., has appointed W. G. Wilcoxson sales manager.

Ackley Brake Company, New York, N. Y., reports the receipt of an order for a large number of Ackley adjustable brakes from the Rosario (Argentina) Tramway.

Dossert & Company, New York, N. Y., have elected John J. Deck vice-president to succeed Charles A. Flynn, resigned. D. J. Fitch has been elected secretary and treasurer of the company.

Pittsburgh Steel Products Company, Pittsburgh, Pa., has appointed Jason Paige contracting engineer with headquarters in Chicago. Mr. Paige was formerly connected with the Inter-Ocean Steel Company, Chicago, Ill.

Pressed Steel Car Company, Pittsburgh, Pa., has elected N. S. Reeder second vice-president of the company. Mr. Reeder is also vice-president of the Western Steel Car & Foundry Company, Chicago, Ill., and will continue to have his office in Chicago.

Pittsburgh Forge & Iron Company, Pittsburgh, Pa., has appointed F. R. Cooper Western sales agent with headquarters in the McCormick Building, Chicago, Ill. Mr. Cooper was formerly superintendent of motive power of the Kansas City Southern Railroad.

Standard Coupler Company, New York, N. Y., has elected Edward F. Pride secretary and assistant treasurer to succeed the late Alexander W. Taylor. Mr. Pride has been connected with the Standard Coupler Company for fourteen years, having been for several years assistant superintendent of its works at Bridgeport, Conn.

Wonham, Sanger & Bates, New York, N. Y., report the receipt of an order from the International Railway, Buffalo, N. Y., for sixty H-B wheelguards to equip the sixty new near-side cars recently ordered, as reported in the ELECTRIC RAILWAY JOURNAL of July 15 and 29, 1911.

McKeen Motor Car Company, Omaha, Neb., on July 22 shipped one of its standard 55-ft. motor cars to the Woodstock & Sycamore Traction Company, Woodstock, Ill. This is the third car of this type in service on that line. The company has also shipped a 70-ft. motor car to the Oregon

Short Line Railroad and a 70-ft. car to the Ann Arbor Railroad.

Nova Scotia Car Works, Halifax, N. S., expects to complete its new steel car plant by Oct. 1, 1911. The erecting shop will be a steel structure, 300 ft. x 100 ft., equipped with electric overhead traveling cranes and electrically driven tools and air tools. The new plant will be capable of turning out ten steel cars daily. With numerous other improvements being made to the plant the company expects that its former output of six wooden cars will be increased to twelve cars a day, making a total capacity of twenty-two cars a day.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.—At a meeting of the board of directors of the Westinghouse Electric & Manufacturing Company held in New York on Aug. 1 the following officers were elected: Chairman of the board of directors, Robert Mather; president, Edwin M. Herr; vice-presidents, Loyall A. Osborne, Charles A. Terry, Harry P. Davis; acting vice-presidents, Henry D. Shute, George P. Hebard; comptroller and secretary, James C. Bennett; treasurer, T. W. Siemon; auditor, F. E. Craig. Mr. Herr was elected to succeed Edwin F. Atkins, who had been president of the company since June, 1910, and declined re-election. Mr. Herr, the new president, was born at Lancaster, Pa., May 3, 1860. After a common school education he studied telegraphy and then began his railroad career as station master and operator at Deer Trail, Col., on the Union Pacific Railway. While in this service he prepared for college and was graduated as a mechanical engineer from the Sheffield Scientific School of Yale College in 1884. After graduation he became a special apprentice of the Chicago, Milwaukee & St. Paul Railway in the motive power department at West Milwaukee, and later entered the motive power department of the Chicago, Burlington & Quincy Railroad as mechanical draftsman and test engineer. Owing to his former experience he was finally made superintendent of telegraphs of the Chicago, Burlington & Quincy system, and his work in this department, especially during the Burlington strike, brought him to the attention of the operating department and led to his appointment as division superintendent of the Galesburg division. In 1889 he went with the Chicago, Milwaukee & St. Paul Railroad as master mechanic, which position he held until 1892, when he was called to the superintendency of the Grant Locomotive Works at Chicago. In 1895 he was sent to Europe by financial interests to report upon and establish locomotive works in Russia, upon the completion of which mission he became, in 1896, general manager of the Gibbs Electric Company, of Milwaukee, and shortly after accepted the position of assistant superintendent of the motive power department of the Chicago & Northwestern Railroad. In 1897 Mr. Herr went to St. Paul as superintendent of the motive power department of the Northern Pacific Railroad. He filled this post until 1899, when he went to Pittsburgh to take the position of assistant general manager of the Westinghouse Air Brake Company, later becoming general manager of that company. In 1905 he was appointed first vice-president of the Westinghouse Electric & Manufacturing Company, which position he has occupied continuously up to the present, having had direct charge during this period of all manufacturing and commercial operations of the company. President Herr has appointed Calvert Townley as his assistant. Mr. Townley was for many years connected with the Westinghouse Electric & Manufacturing Company, at first in Pittsburgh and later as manager of its Boston office, and as special representative in New York City. A portrait and biographical sketch of Mr. Townley were published in the Electric Railway Journal for July 1, 1911. Mr. Townley goes to the Westinghouse company directly from the New York, New Haven & Hartford Railroad, with which he has been connected for the past seven years. Mr. Davis, who has been elected one of the vice-presidents of the company, has been with the company for twenty years. For the last few years he has held the position of assistant to the first vice-president and manager of engineering at the East Pittsburgh works.



E. M. Herr

Hayes Track Appliance Company, Richmond, Ind., has placed on the market a new style of derail for use in connection with interlocking work called model CP. This derail is similar in form and size to model C, but has a reversible central eyebolt like model AP. This permits of three connections to the derail. The operating rod is attached to the eyebolt while the facing point lock and wire bolt lock are attached to the cast lugs. The eyebolt is drop forged and passed through two webs of the derail block. It is reversible and is held in place by double jam nuts.

Yard, Otis & Taylor, Chicago, Ill., is a new firm formed by Fred A. Yard and Benjamin F. Taylor, formerly of the bond department of Finley Barrell & Company, Chicago, and Henry B. Otis, of Evanston, to deal in railroad, municipal and corporation bonds. The new firm has acquired the good will and the business of the bond department of the older banking house, Finley Barrell & Company, while discontinuing their bond department, will continue as brokers to execute orders for listed bonds on the exchange. The headquarters of the new company will be in the Borland Building, Chicago.

Pullman Automatic Ventilator Manufacturing Company, York, Pa., the Consolidated Ventilating Company, Rochester, N. Y., and the National Ventilator Company, New York, N. Y., are to be merged. The new company will be capitalized at $800,000, of which $275,000 will be 7 per cent cumulative preferred stock and $525,000 common stock. The president of the consolidated company will be Freeman Allen, of Rochester. C. C. Frick, president of the Pullman Automatic Ventilator Manufacturing Company, will remain with the consolidated company for the present at least. The constituent companies have a number of plants in operation at the present time, but it is probable that the work of the company will be concentrated at either York, Pa., or Rochester, N. Y.

ADVERTISING LITERATURE

Ackley Brake Company, New York, N. Y., has issued a folder describing and illustrating the Ackley adjustable brake.

Phillips Manufacturing Company, New York, N. Y., describes and illustrates the Phillips automatic commutator grinder in a booklet recently issued.

Bridgeport Brass Company, Bridgeport, Conn., has issued a folder calling attention to the merits of phono-electric trolley wire which the company manufactures.

W. H. Zimmerman Company, Chicago, Ill., engineer and constructor, is mailing a post card showing views taken during the construction of the Lansing, Grand Ledge & Western Railway, Lansing, Mich.

Chisholm & Moore Manufacturing Company, Cleveland, Ohio, has issued a sixty-six-page catalog which describes and illustrates its various types of chain and trolley hoists. Several pages of the catalog are devoted to the Moore antifriction baggage car door and elevator door hangers.

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 4855, which is devoted to a detailed description of its double-truck type of gas-electric car. The publication is elaborately illustrated, and contains considerable data relative to the subject. It includes plans and elevations of cars of various sizes.

Cambria Steel Company, Johnstown, Pa., has published the fourth revised edition of its handbook on steel axles and forgings. It contains the standard specifications for steel axles and forgings of the American Society for Testing Materials, the standard M.C.B. axle specifications and an abstract of the Interborough Rapid Transit Company's specifications for heat-treated axles of high strength made by the Coffin process, which is controlled exclusively by the Cambria Steel Company. The handbook also contains drawings of all standard sizes of axles, including motor axles, tables of weights of iron bars, conversion tables and many other useful data.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVIII NEW YORK, SATURDAY, AUGUST 12, 1911 No. 7

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.
HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.
CURTIS E. WHITTLESEY, Secretary and Treasurer.
TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

HENRY W. BLAKE, Editor.
L. E. GOULD, Western Editor.
Associate Editors:
RODNEY HITT, FREDERIC NICHOLAS, WALTER JACKSON.
News Editors:
G. J. MACMURRAY, FRANK J. ARMEIT.

CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1021 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Thursday, 9 A. M., of the week of issue.

Copyright, 1911, by MCGRAW PUBLISHING COMPANY.

Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, AUGUST 12, 1911.

CONTENTS.

The Cedar Point Meeting..... 265
Advertising Car Construction..... 265
Proposed Universal Transfers in New York..... 266
Railway Electrification in Switzerland..... 266
Arbitration in Strikes..... 267
Power Generation and Distribution System of the Aurora, Elgin & Chicago Railroad..... 268
Connecticut Utilities Law..... 273
Steel Cars for the Newark Extension of the Hudson Tunnels..... 274
Combined Suction and Pressure Apparatus for Car Cleaning..... 276
Sprinkler System in Open Yard of Manhattan Elevated Railway..... 277
Proposed Rates for Through Routes in New York..... 279
Treatment of Depreciation Accounts by Interborough Rapid Transit Company..... 280
Babbitt-Bearing for Door Rollers..... 281
Notes on Interurban Freight and Express Traffic in New York State 281
Strike on Coney Island & Brooklyn Railroad..... 284
Conditions Surrounding Des Moines Labor Troubles..... 284
The Largest Cable Order..... 286
Gas-Electric Car for San Francisco Railroad..... 287
Telephone Protection for Outdoor Service..... 288
New Milwaukee Sprinkling Cars..... 289
Experiments with the Briquetting of Lignite..... 289
Electric Railway Legal Decisions..... 290
News of Electric Railways..... 292
Financial and Corporate..... 294
Traffic and Transportation..... 295
Personal Mention..... 297
Construction News..... 299
Manufactures and Supplies..... 301

The Cedar Point Meeting

The Central Electric Railway Association has chosen a very appropriate time for its first fall meeting, which will be held at Cedar Point, near Sandusky, Ohio, on Wednesday and Thursday of the fourth week of this month. Heretofore it has been customary for this representative organization to have but one outing meeting each year, and that has been held just previous to the summer vacation season. The new plan of two outing meetings, one at the beginning and one at the end of the summer vacation season, has received widespread approval. As a class, electric railway men have very little opportunity during the summer months for either recreation or technical discussions of electric railway subjects such as occur at conventions. But by the latter part of August the summer schedules should be running smoothly, and there are usually a few days before Labor Day when the pressure of local work lightens up sufficiently to allow a short absence from home. Hence the days selected for the Cedar Point meeting should be convenient to most of the members. The Central Electric Railway Association holds meetings every two months, and the August meeting is so timed that neither it nor the October meeting, two months later, will conflict with the Atlantic City convention of the American Association. The program announced for Cedar Point is an excellent one and the attendance should be large.

Advertising Car Construction

A series of novel advertisements recently published in the Chicago daily papers by one of the large steam railroads offers a suggestion to electric railway companies. Many railroad advertisements in the past have called attention in general terms to the safety of travel on the lines advertised, but in this series people are told of the means taken for safeguarding them in the event of car derailment. Attention is called to the company's new all-steel cars, with their rugged framework and cast-steel members, which extend from the ends of the platforms to points well inside of the king pins. These cast substructures are connected by heavy steel sills, and the combination underframe supports a steel plate body of heavy design. This construction is made clear to the untechnical public by the use of cut-away or X-ray views of the cars, and, in general, greater stress is laid upon the security from injury which the passengers enjoy than upon the riding qualities of the car. The advertising campaign mentioned suggests the thought that the public as a whole probably has little conception of the attention which has also been given in electric car construction to increasing the safety of passengers. This topic has been foremost in all technical discussions on car design, but while those

in close touch with the subject are conversant with the progress made, this is not true of those not well acquainted with railway matters. It might not be advisable for the electric railway company to go so far as to show views of car bodies that had proved their strength in derailments, but those roads which have designed cars for withstanding heavy buffing strains could present strong arguments based on this safety feature. Another argument that might properly be introduced in such a series of advertisements would be to refer to the benefits from the safety standpoint which are obtained by the high braking power used on electric cars and the possibility of stopping electric cars in much shorter distances than steam trains are stopped.

Proposed Universal Transfers in New York

The replies of the principal railway companies in New York to the request of the Public Service Commission asking them to state the rates upon which they would establish through routes are published elsewhere in this issue, and outline an interesting departure in electric railway operation. Heretofore the idea of through routes on the lines of one or more companies within a city has been so closely associated with the idea of free transfers that it has seemed impossible to divorce them in the minds of the public or even of railway operators. It is true that in a few instances an extra charge has been made for transfers, notably in Philadelphia, where for many years a charge of 3 cents was made, almost without exception, for transferring from one car to another. The plan now proposed by the railway companies in New York is similar to that adopted a few months ago to cover the special case of the Fifty-ninth Street line, and probably the same general type of ticket will be used. The question of the division of the receipts will be taken up later, presumably after some data are obtained as to the average length of ride on each system by transfer passengers. It is satisfactory that a solution of this problem has at last been proposed. We admit that there is an apparent injustice, we are not prepared to say a real injustice, in a rule which compels one man to pay 10 cents or 15 cents for a ride on the surface railways within a city which is shorter than that which a man going in another direction can purchase for 5 cents, where each route is to an equal extent a natural artery of travel, simply because, many years ago, the franchise for the first route was awarded to several companies which have not consolidated, and that of the second route to several companies which have consolidated. There is no doubt also that such a condition of affairs is detrimental to the real estate values of certain districts within the city, and that it unduly favors other districts. At the same time the establishment of the same rate of fare for both distances is not within the power of the railway companies, unless they equalize the conditions by increasing the fare on the cheaper route. The proposed plan is necessarily a compromise. It is proposed for tentative use only by at least several of the companies and has not yet been accepted by the Public Service Commission. But it is worth a trial, and if successful it may offer a solution for a similar condition of affairs in other cities where there is a demand for through transportation but where the issue of free transfers has become too costly.

RAILWAY ELECTRIFICATION IN SWITZERLAND

An important and valuable paper on this topic was presented last month before the Institution of Mechanical Engineers by E. Huber-Stockar, of Zurich, better known in this country as E. Huber, who, from his long experience in the Oerlikon Company and in directing no meager part of this work, is qualified to speak with more than usual authority. The discussion is confined chiefly to the electrical equipment of roads once operated by steam, or roads which on account of their general character might properly enough be operated by steam so far as topographic and engineering conditions are concerned. In other words, the author bars out from consideration street railways, urban and interurban, rack and funicular roads, and all service of a purely local character. He does not, however, consider that the gage is a feature that has any bearing on the classification of railways for this purpose, since there are in Switzerland important narrow-gage steam lines which bear a traffic and run trains as heavy as are found on ordinary standard-gage lines. In point of fact the work of electrification in Switzerland has progressed rather slowly, extraordinarily slowly considering the fact that all the coal for the Swiss railways has to be imported and that the country is rich in water-powers. On the other hand, the traffic, although in places liberal, is not dense from the standpoint of ordinary railway operation, and therefore the burden of fixed charges would be heavily felt in a change of motive power.

More electrical work has been done on privately owned railroads than on the Swiss federal system, and all told the showing for railway electrification is better than appears from a first glance at the figures. In the proportion of railroads electrified, on a mileage basis, Switzerland indeed is easily first, for the total mileage is nearly 400, being a little over 14 per cent of the full mileage of the country. Of the narrow-gage lines, 1 m being the usual standard for this class of construction, almost exactly one-half the total mileage is electric.

The first attempt of serious importance in the way of electrification was the Burgdorf-Thun line, a branch of a privately owned standard-gage railway some 25 miles in length. This line was equipped on the three-phase system, at 40 cycles and with 750 volts to 800 volts on the working conductor, and has now been in operation for a dozen years. It has proved successful from both an engineering and an operative standpoint.

A little later the Freiberg-Murten line, originally operated by steam and about 25 miles in length, was electrified on the third-rail system with direct-current motors worked at 750 volts to 800 volts. It was a comparatively small installation, utilizing but four motor cars, but has proved thoroughly operative, useful and generally satisfactory. This was the first instance of direct-current operation in a general electrification to be found in Switzerland and still remains the only example of third-rail practice. There have been several very successful long electric lines in the Alpine country built since and operated by high-voltage continuous current, 750 volts to 1000 volts, on the overhead trolley. One line, indeed, about 20 miles in length, has carried the direct-current voltage to 1500 with excellent results. The only three-phase electrification following the

Burgdorf-Thun line was the beautiful installation in the Simplon tunnel. This has been so often described that there is little need here for more than a brief statement that the line itself is little in excess of the length of the tunnel, slightly over 12 miles, that the contact voltage is 3000 and the locomotives, of which the recent ones are of rated horse-power as high as 1700, are gearless and operate at 15 cycles per second. The installation has been a highly successful one from every point of view. The most recent important Swiss railways have generally been of the single-phase type, working at from 25 cycles down to 15 cycles, which seems to be the favorite frequency, and with contact voltages as high as 15,000.

In fact, Mr. Huber-Stockar was one of the early sponsors for the single-phase system and has done, as his modest report indicates, sterling work in the development of the system. The first line so equipped was between Seebach and Wettingen. Two locomotives from the Oerlikon Company were put in service on this line in 1905 and a Siemens-Schuckert locomotive was added a little later. All had geared motors wound for about 300 volts, and while the two former locomotives were rated at 500 hp, the third was of nearly double that power. Though somewhat experimental in its character, this was a genuine electrification of a section of the federal railways and from an operative standpoint proved highly successful. The line was operated at 15 cycles with 15,000 volts on the working conductor, and the results gained demonstrated once and for all the thorough applicability of the system to large railway work. The success of this installation was so notable as to encourage the adoption of the same system for the Spiez-Frutigen line, the initial section of the important Lötschberg tunnel line, which will eventually form a section of the very important main line of traffic running from Milan up through the Simplon Tunnel into and through central Switzerland. This line has been so recently described in our columns as to call for little comment here, except to direct attention to the fact that the single-phase system has been selected here, although the Lötschberg line is to be essentially an extension of the Simplon railway, now equipped with the three-phase system. Evidently the difficulties of having different electric systems on two distinct sections or locomotive divisions of the same through line do not possess the terrors for Swiss engineers that they have for many people in this country.

A still more important project than the Lötschberg line to be put through doubtless within a comparatively brief period is the electrification of the St. Gotthard Railway, now operated by steam. This road is 170 miles long and carries a traffic which is limited only by the difficulties of operating over the enormously heavy grades with steam locomotives. The time has come when a change to electric traction is greatly to be desired. There is ample water-power along the line to run the whole system. At the present time the electrical problems have already been solved, so that the question becomes practically one of costs. Sufficient studies have been made on this side of the matter to make it clear that the time is very near, and perhaps has now arrived, when the volume of traffic justifies the change to electric traction. We hope within a short period to be able to report the initiation of this notable project. From present indications when attempted it will be a straightforward case of traction by alternating current. The tendency would indicate the use of single phase at low periodicity and with something like 15,000 volts working pressure.

ARBITRATION IN STRIKES

The declaration of a strike is nearly always immediately followed by a demand on the part of the strikers for arbitration, and this demand is usually echoed by the public if the strike is long or if the community is put to any serious inconvenience on account of it. The word "arbitration" is popular at present, and deservedly so because of the general approbation of the treaties of arbitration between the United States and Great Britain and the United States and France. With this meaning of the word in mind a great many people have difficulty in understanding why a proposition which seems very reasonable when applied to the settlement of the disputes of nations and of individuals in the law courts should not be equally effective and equitable in industrial conflicts. Hence, when a railway company declines to arbitrate its labor troubles or declares that there is nothing to arbitrate, as the Coney Island & Brooklyn Railroad did this week, a considerable number of well-meaning citizens undoubtedly consider this attitude as open to criticism.

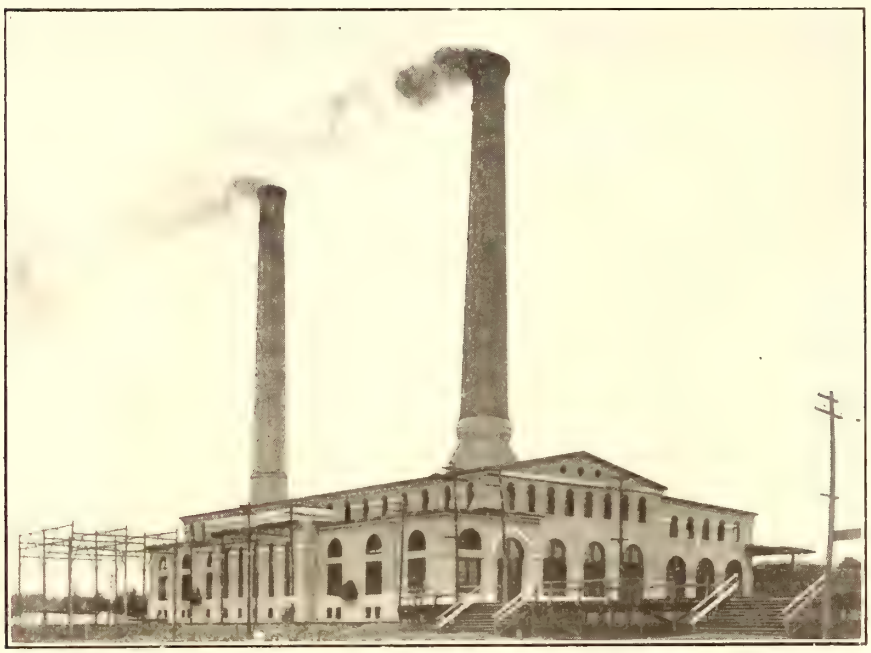
But arbitration between two nations or between two individuals engaged in a lawsuit and arbitration as usually understood in labor troubles mean two entirely different things. In the former case it presupposes a condition of equality between the contestants so far as responsibility and a readiness to carry out the decision of the arbitrators are concerned. In a labor dispute, however, where it is impossible to assess damages against the employees if they have been found to be wrong, or even to require a specific performance of their duties from the individual employees, arbitration is usually a farce. Since there is only one responsible party, the arbitrators are practically prevented from judging the question before them on its merits. Instead, they must almost necessarily devote their energies to endeavoring to secure as large a concession as possible from the employer, whether any concession is warranted by the facts or not. It is no wonder under these circumstances that in labor disputes in this country the term is looked upon as a misnomer and the plan to arbitrate is so frequently rejected. Until some method is devised by which a ruling based on the merits of the question involved may be made enforcible against both sides there is little chance of creating much enthusiasm among employers over the principle of arbitration.

According to the reports from Des Moines, a still different method of settling disputes of this character has been initiated there. The accounts received as yet in regard to the legal points involved are so meager that it is difficult to render a decision upon them. It would seem strange, however, if the courts, after a careful investigation, should uphold a condition which existed temporarily because municipal authorities charged with the maintenance of public order failed to discharge this duty, or would require an employer to keep men in his service against his will.

Power Generation and Distribution System of the Aurora, Elgin & Chicago Railroad

This Article Also Includes Notes About a New Exhaust Steam Turbine, a New and Reconstructed Boiler Plant, Transmission-Line Reconstruction and the Supply of Energy for Lighting to Municipalities and Farmers.

An account was published last week of the development of the Aurora, Elgin & Chicago Railroad and of the service given by that company. A description follows of the company's power station and distribution system.



Aurora, Elgin & Chicago—Main Power Station

All of the energy for operating the Aurora, Elgin & Chicago Railroad system and three connecting trolley lines, as well as lighting several cities, is generated in a large plant located near the Batavia terminal on the Fox River. At this point coal is obtainable over a nearby steam road and condensing water is taken from the river. The power plant includes several interesting additions made since it was described in the Street Railway Review for August, 1902. It now has a daily average summer load of 115,000 kw-hours.

The station building as originally constructed included an engine room, 198 ft. x 94 ft. in plan, and a boiler room, 198 ft. x 47 ft. in plan. The boiler room section has been lengthened 66 ft. to house additional equipment installed during the past year. The generating equipment as first installed included three 1500-kw, 2300-volt, three-phase, 25-cycle, revolving-field General Electric alternators driven by Cooper-Corliss horizontal cross-compound engines supplied with steam from eight boilers. As the load grew it became necessary to install a fourth engine unit and two additional boilers, thus completing the station as originally planned. All of the horizontal engine-driven units are still in active service and in addition a 3700-kw low-pressure turbine is operated.

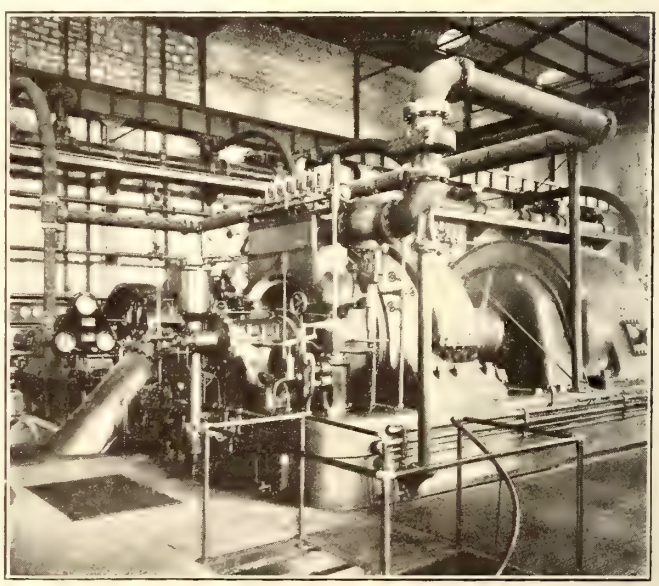
The original boiler equipment with the additions for the fourth engine unit consists of ten Edge Moor boilers, each of 500-hp capacity, designed to operate at 180 lb. gage pressure. Each boiler has a 200-tube Green fuel economizer of 2700 sq. ft. heating surface located between the boiler and the main flue. Green chain grates with an area of 95 ft. each were installed with the boilers.

In 1909 the load had reached the capacity of the station, and as the result of a study of various plans for obtaining additional capacity, an order was placed with the General Electric Company for a low-pressure turbo-generating set. A high-vacuum surface condenser outfit of the Worthington type and additional boilers were also purchased.

LOW-PRESSURE TURBINE

The new turbine is of the mixed-pressure type so connected that a supply of steam at boiler pressure is available for immediate use by means of a special governor and set of valves. This system, when required, makes up deficiencies that may occur in the amount of exhaust steam from the engine-driven units which ordinarily operate the turbine. In case of emergency it is possible to operate the turbine entirely by the high-pressure supply and at an economy slightly less than that obtained with the condensing engines alone. At present the high-pressure system is used only for starting, and as soon as the turbo-generator has been synchronized with the engine-driven units the high-pressure steam supply is cut off and the unit is run on the exhaust from any two of the four reciprocating-engine sets.

The low-pressure turbine is located in the center of the engine room and takes its supply of steam from a 22-in. exhaust header which extends the full length of the plant and into which all four engines exhaust. By means of suitable motor-driven sectionalizing valves in this exhaust header it is possible to obtain any combination of two engines supplying steam to the

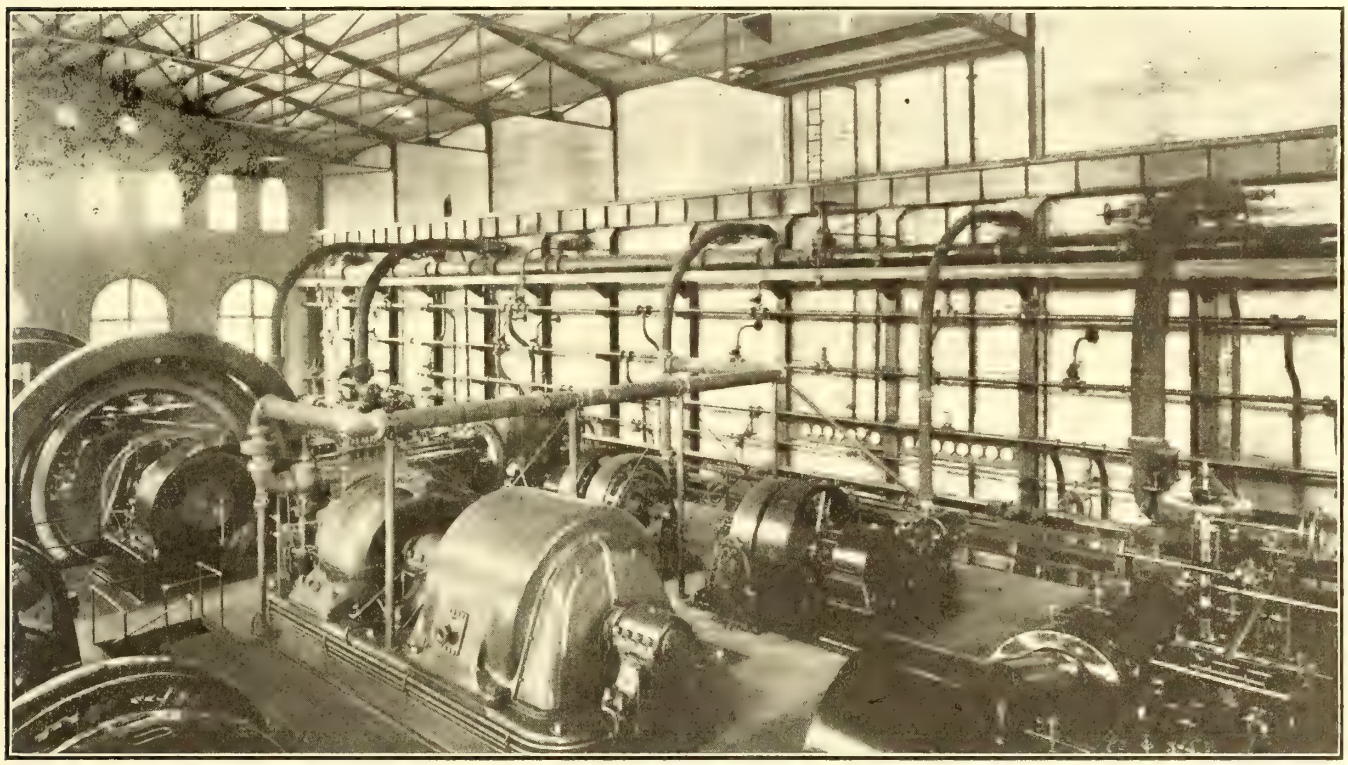


Aurora, Elgin & Chicago—Low-Pressure Turbine in Main Station

turbine, allowing the other two to operate independently on their own condensers. The turbine was selected of such a capacity as to be able to handle all of the exhaust steam from two of the reciprocating engines. Preliminary tests

which have been made up to date would indicate that there is approximately an 18 per cent saving in the operation of the low-pressure turbine in connection with reciprocating engines over the same amount of output by the reciprocating engines alone. The company's engineers contemplate making exhaustive tests of this power installation in the near future and these will be made the subject of a separate article.

The new low-pressure turbo-generator was purchased as a 2500-kw machine on the old railway rating of a 35-deg. C. rise for continuous operation. This corresponds to approximately 3700-kw rating on the basis of the so-called "maximum continuous load." This machine has carried the latter load for considerable periods and more than 4000 kw for short intervals. When operating normally all speed regulation for the system is done by means of the engine governors, but it is an interesting fact that with the turbine floating on the system the fluctuations in speed are very much decreased and the voltage regulation correspondingly improved. This seems to be due to the fact that the turbine absorbs most of the load fluctuations and thus allows the engines to run at approximately uniform loading.



Aurora, Elgin & Chicago—Main Generating Station, Showing Low-Pressure Turbine in the Foreground

BOILER PLANT IMPROVEMENTS

At the time the low-pressure turbine was installed the boiler house of the plant was extended to permit the installation of an additional equipment of four 500-hp boilers of the same manufacture as the original boilers. The new boilers were all equipped with Green chain-grate stokers, each having a 6-ft. flat arch and a grate area of 106 ft. This is an increase in grate area of approximately 11.6 per cent over that of the earlier installation of boilers of the same horse-power rating. The new boilers are fifteen tubes high instead of twelve, and are installed without economizer equipment. Instead a Hoppes open feed-water heater was installed to utilize the exhaust steam from certain auxiliaries which formerly were electrically driven or exhausted to atmosphere.

The installation of the new boilers necessitated the construction of a second stack, which was built at the end of the new boiler-house extension and has sufficient capacity for handling the exhaust gases from four more boilers when installed. The new stack was built of common hard-burned brick, exactly duplicating in design the original stack, and was made by the Heine Chimney Company. It has a height of 225 ft. above the boiler-room floor and its flue has a diameter of 11 ft. at the top. The power-plant equipment includes a Schaeffer & Budenberg stack-draft recording gage installed in the chief engineer's office.

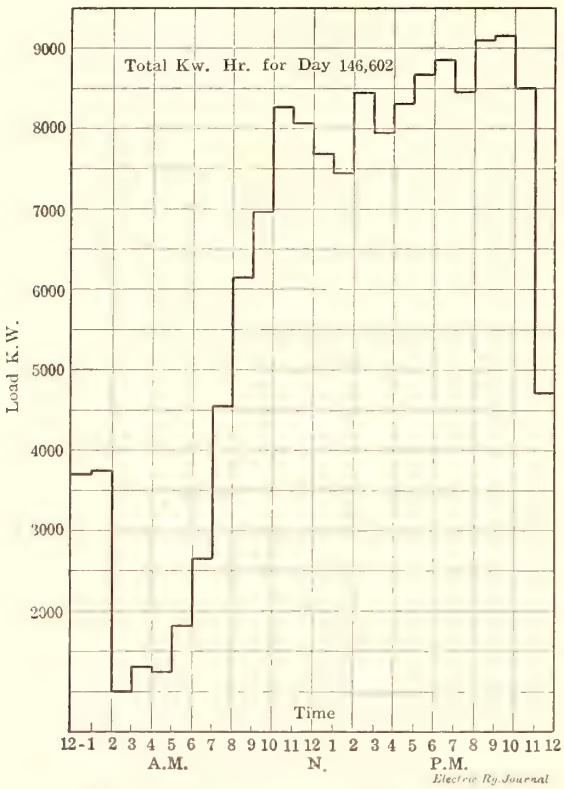
BOILER PLANT CHANGES

In order to obtain the highest possible capacity from the older boiler plant several successful changes have been made in the installation. The stokers on the first eight boilers are being replaced by others of the chain-grate type, but having a larger grate area and being standard with those earlier mentioned for the new boilers. Suspended igniting arches 6 ft. long have also been installed. Another change which brought about improved combustion conditions was the lowering of the grates about 18 in. to increase the height between the grates and the lower tubes to 5.5 ft. In this way the combustion chamber was considerably enlarged. This reconstruction work, however, required a lowering of the boiler-house floor, and this work was carried forward at the time the new stokers were installed. When the new stokers were installed the fireboxes were extended forward to form a half Dutch oven and at the same time new steel bunkers were erected to give additional coal storage capacity inside the plant. These improvements, together with better draft conditions, due to the addition of the second large stack, make it possible easily to obtain 75 per cent over-rating from the boilers.

The new boilers have been equipped with water backs which supply water to the feed-water heater at about the boiling point. In installing the new chain grates coal pockets were provided in the floor in front of the boiler settings so that fine coal which leaks through the chain grates may be reclaimed into cars in the basement and thus save handling with shovels in the boiler room.

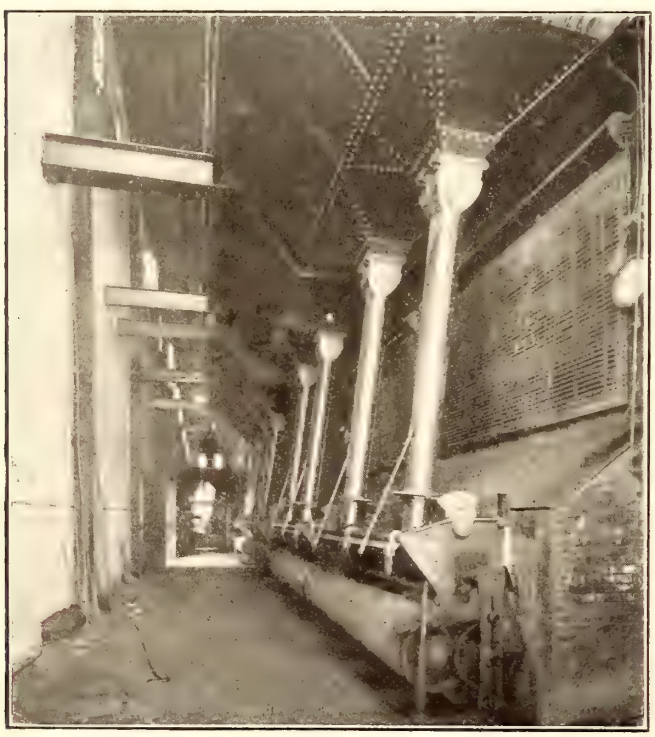
Owing to the growth of the load it has been necessary to discard the original motor-driven triplex boiler-feed pumps and in their places have been installed a steam-

driven duplex boiler-feed pump of the pot-valve type and an Alberger steam turbine-driven 6-in. centrifugal, four-stage boiler-feed pump, either one of which has sufficient capacity to handle the entire boiler feed-water requirements for some time to come.



Aurora, Elgin & Chicago—Load Curve for July 4

Other miscellaneous improvements in the power plant included the installation of motor-operated valves with remote control for the high and low-pressure steam lines.



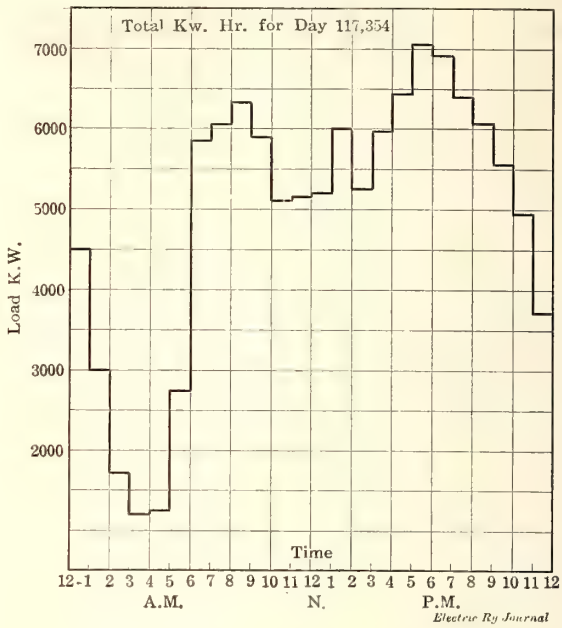
Aurora, Elgin & Chicago—New Boilers, Bunkers and Dutch Ovens

By the use of these valves it is possible to shift the turbine steam supply conveniently and quickly from one group of reciprocating engines to another.

But few changes have been made in the electrical equipment other than the addition of control panels for the new turbo-generator and the installation of a 2400-amp, 125-volt exciter driven by a 450-hp, 2300-volt General Electric induction motor.

A small machine shop has been added on the gallery at one end of the engine room so that most of the repair work on the engines and power-plant equipment can be done by the station employees.

This power house is now feeding 175 miles of track for the Aurora, Elgin & Chicago line, 28 miles for the Aurora & DeKalb line, 34 miles for the Elgin-Belvidere line and 11 miles for the Aurora-Joliet line. In addition it supplies current for all the lighting in the city of Elgin, for seven smaller municipalities and for a number of small motor installations fed from the 600-volt distribution lines, as described later. The accompanying diagram shows the growth of the total output of the generating station since 1904. During that year the output of the plant was 18,667,000 kw-hours. Last year the output was 38,764,000 kw-hours.

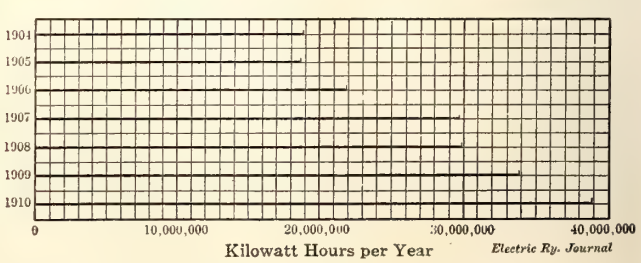


Aurora, Elgin & Chicago—Typical Weekday Load Curve for Generating Station

Accompanying load charts show the typical power-station loading for a weekday and also show the load for the Fourth of July this year. The shape of the curve is controlled very largely by the service on the third-rail divisions, but the lighting and street railway service assist materially in increasing the daily load-factor.

POWER DISTRIBUTION

Energy is distributed from the main generating station of the Aurora, Elgin & Chicago Railroad at 26,400 volts. It is transmitted over three aluminum-cable, high-tension transmission circuits extending one each to the north, east and south. The general arrangement of the transmission system is in the form of a triangle with an extension from each corner. Any side of this triangle may be opened



Aurora, Elgin & Chicago—Diagram Showing Total Output of Generating Station by Years

and yet all substations receive current. One line extending north runs across country to connect with the Geneva branch near West Chicago, and the Elgin branch at Ingalton, from which point it branches in both directions following the right-of-way to Elgin and through Wheaton to Lombard. A second transmission line extends across country south from the power plant to Aurora. The third line extends eastward along the interurban right-of-way through Wheaton to Lombard, where it is joined by the line which follows the Elgin branch from Ingalton. The duplicate lines are carried on the same poles between Wheaton and Lombard. From Lombard a single transmission line extends east to Maywood.

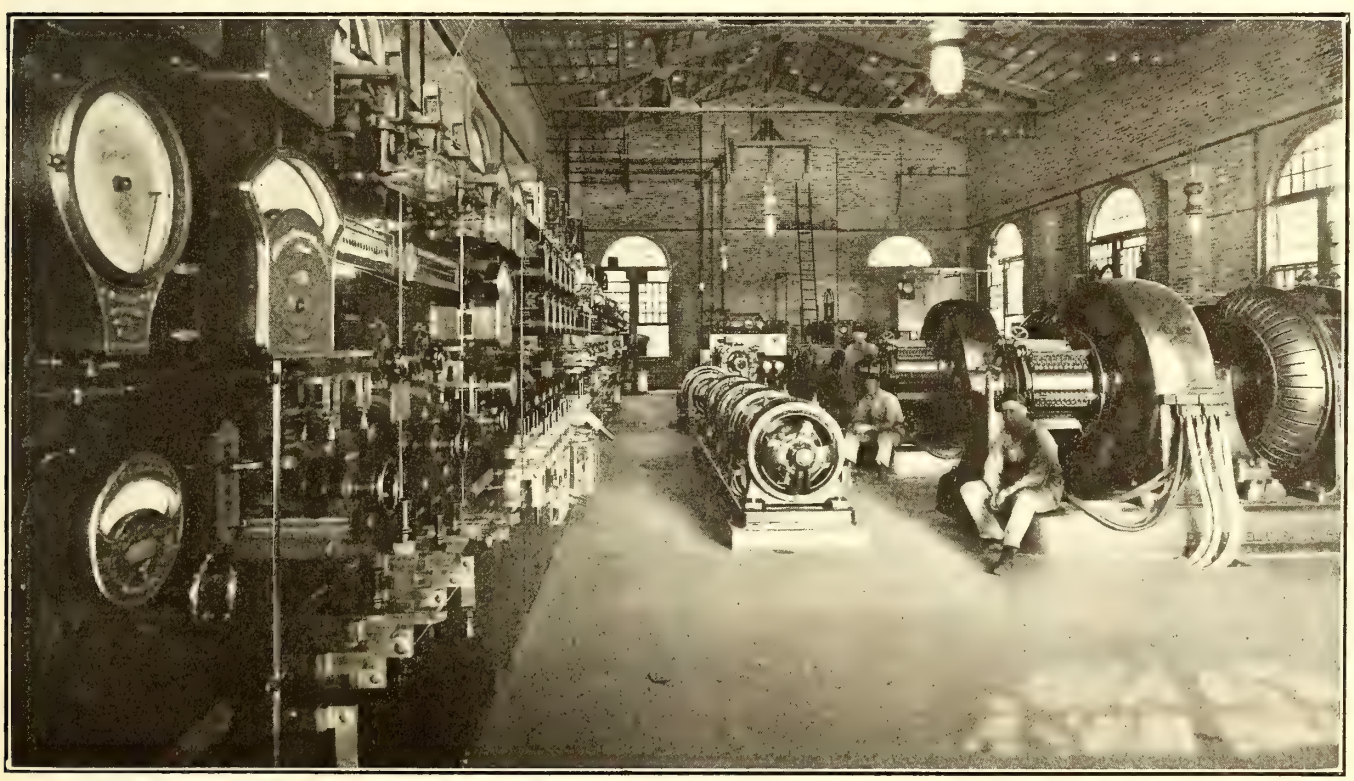
The company plans to build during the coming year a duplicate pole and transmission line from Ingalton to Elgin. This will insure, when completed, a continuity of supply for the lighting substation at Elgin, which now is fed over the present single line and consequently has been subject to temporary interruptions. It will also be of assistance in maintaining continuous power supply for the Clintonville railway substation, which supplies power for the Elgin city lines and interurban lines in that vicinity.

As originally installed the high-tension transmission line had a 30-in. equilateral triangular spacing, but this has been increased to 65-in. spacing. It was found with the smaller spacing that the line wires could be easily short-circuited from accidental causes or by maliciously inclined persons, and the 26,400-volt arcs in many cases would hold long enough to burn in two the wires or to blister them so that the first cold snap would part them. Since the reconstruction of the line very few interruptions have taken place.

The high-tension line was reconstructed without impairment to the service. On the triangular loop, which has earlier been described, the work of reconstructing the line was carried on in the daytime. One side of the loop can be cut off at any time and still all substations be supplied.



Aurora, Elgin & Chicago—Elgin Substation



Aurora, Elgin & Chicago—Substation at Elgin

The reconstruction work on the extensions from the corners of the loop was done by working three hours each night when car service was lightest.

The insulators installed at the time of reconstruction were the Locke No. 307, a three-part porcelain type which now is obsolete. For present maintenance and extension work on the 26,400-volt lines the Ohio brass No. 9413 insulator is used. This also is a three-part insulator weighing 8¼ lb., designed for 35,000-volt line voltage and 90,000-volt test voltage.

ROTARY CONVERTER SUBSTATIONS

The third-rail division of the Aurora, Elgin & Chicago is supplied with 600-volt current by seven rotary converter substations, two of which—those at Clintonville and Aurora—also feed the Fox River trolley line and the local street railway systems. The power-plant installation in-

cludes a rotary converter substation equipment for feeding both the third-rail division and the Fox River line. The total rotary converter capacity is 8500 kw.

No new railway substations have been added to those originally built, but it has been necessary from time to time to increase the equipment in each substation as demanded by the increased train service. The original



Aurora, Elgin & Chicago—Substation, Depot and Portable Substation at Maywood

equipment of each substation included two 500-kw General Electric rotary converters with accessory apparatus. A third 500-kw unit has been installed in each of three of the substations, while in another—that at Lombard—one 500-kw rotary has been replaced by a 1000-kw rotary. The Maywood substation carries the largest load, and this has three 500-kw rotaries and is assisted by a portable substation having one 500-kw rotary. The company has standardized on 1000-kw rotaries for future additions.

The only other substation changes of note have been the substitution of inverse time-element relays on all high-tension feeders and the replacement of the original 26,000-volt lightning arresters with the multi-gap type arresters made by the General Electric Company. These changes have been important in reducing interruptions to service.

THIRD-RAIL DETAILS

Some of the standards of construction on the 600-volt distribution system may be of interest. The type of third-rail was described in the issue of this paper for Aug. 5. The third-rail, of 100-lb. section of soft steel, is electrically continuous throughout the length of the road and is subdivided at the switchboard feeder panels only. On the Wheaton-Chicago double-track section the two third-rails are operated in multiple and thus furnish a carrying capacity approximately equivalent to 4,000,000 circ. mil cross-section of copper. No supplementary feeders are used on the third-rail division, and this road, by reason of the large carrying capacity of its third-rail, is particularly fortunate in being thus able to maintain high average voltage conditions. Tests made over considerable sections of tracks, including numerous highway crossing cables, show the third-rail leakage to average 0.6 amp per mile of track on 600 volts. This leakage is practically the same in wet and dry weather. All new work and replacements are being done with the Ohio Brass Company's porcelain insulators.

THIRD-RAIL HIGHWAY CROSSING CABLES

On the third-rail division it is necessary, of course, at all street and highway intersections to break the third-rail and carry the current underground. The connecting cables spanning these highway gaps as originally installed consisted of paper and rubber-insulated copper cables of 1,500,000 circ. mil and 2,000,000 circ. mil cross-sectional area, sheathed with lead and protected by jute. These were installed underground and protected only by having 1-in. boards placed above them. Insulating terminal heads furnish weatherproof outlets of large cross-section. The terminal heads are connected with the base of the third-rail by compressed terminal stranded bonds of Electric Service Supplies Company manufacture. So much trouble was experienced by the burning out of these highway crossing cables that a special construction was developed.

As installed in the new way the cables give excellent service. Ordinary rubber-covered cable is used in place of



Aurora, Elgin & Chicago—Combination Depot and Substation

the expensive lead-covered, paper or rubber-insulated cable. The cable is pulled into a 3-in. bituminized fiber conduit entirely incased in concrete. The sections of conduit are carefully joined and at each end of the cable a right-angle bend serves to bring the cable above ground at the proper location. The terminals of the cables are protected from the weather by concrete or porcelain caps. The original method of connecting to the rail is still followed.

The maintenance cost of the third-rail and its highway crossing cables is $55 per mile of rail per year. The maintenance crew for the third-rail division, which cares for approximately 100 miles of third-rail and transmission line, consists of one electrical man, a foreman and five repair men. This crew also has charge of the highway crossing cables.

During the past year the company has rebuilt a considerable portion of its city overhead system with No. 00 trolley wire and its interurban trolley lines with No. 000 wire, and also has installed considerable additional 500,000-circ. mil feeder cables on the trolley lines.

CONNECTICUT UTILITIES LAW

The law passed by the recent General Assembly of Connecticut creating a public utilities commission in that State provides for the appointment to the commission of three electors of the State by the General Assembly upon nomination by the Governor. The first commissioners, who have already been appointed, as noted previously in the ELECTRIC RAILWAY JOURNAL, are to serve respectively until July 1, 1913, July 1, 1915, and July 1, 1917. Thereafter the appointees to the commission are to serve for six years. If a vacancy should occur when the Assembly is not in session the Governor is to appoint a commissioner to sit until the next session of the Assembly. No officer or employee of any public service corporation is to be appointed to the commission. Each commissioner is to receive a salary of $5,000 a year and expenses. Removals can be made only after judgment rendered by the Superior Court upon written complaint of the Attorney-General.

The office of the commission is to be at the State Capitol, and is to be open during the usual business hours, and here all records and other documents of the commission are to be filed. The commission is to appoint a secretary and such accountants, experts and clerks as it may require and is to fix their compensation. The expenditures of the commission, however, are not to exceed the specific appropriations made from time to time for its use by the General Assembly.

The commission is empowered to delegate its authority to one or more of its members. The commission is to have access to all books and records of the companies which come within its jurisdiction, and may summon and examine under oath such witnesses as it deems necessary to obtain facts for its guidance. Fees of witnesses summoned by the commission are to be the same as in the Superior Court.

Written notice of all orders, decisions and authorizations by the commission is to be served in person or by registered mail. The Superior Court is empowered to enforce "by appropriate decree or process any provision of this act or any proper order of the commission rendered in pursuance of any such provision." The new commission abolished the Railroad Commission, but the records and orders of that commission continue in force as the property of the Public Utilities Commission.

Any person or any town, city or borough may complain to the commission about any defect in the physical plant of any company within the jurisdiction of the commission or about the manner of operating such plant. Any town, city or borough or any ten patrons of a company within the jurisdiction of the commission may complain in regard to the service furnished or the rates charged for services. After a hearing following such complaint the commission is empowered to fix rates or prescribe service, and every company which fails to comply immediately with any order of the commission is liable to a fine of not more than $1,000 for each offense and is liable to double damages for any injury resulting to any person from such failure. All accidents "attended with personal injury or involving public safety" are to be reported to the commission as soon as may be reasonably possible after the occurrence, under penalty of a fine of $500 for each failure so to report, and the commission is authorized after it has investigated an accident to suggest means for preventing similar occurrences.

In regard to through rates the law says:

"If any lines of any two or more common carriers or railroad or street railway companies form, or by the construction and maintenance of a switch or other suitable connection could be made to form, a continuous line of transportation, the commission, upon hearing, after due public notice, may authorize or require the establishment by such companies, at joint rates, of through routes or transportation for passengers or for such freight or other property as the commission may designate; and the commission may, after due hearing, require any of such companies to operate, over its lines, cars or other equipment delivered by any other of such companies. If such companies cannot agree as to the division of rates or the conditions under which such through routes of transportation shall be established or such cars or other equipment operated, the commission shall have power, after due hearing, to determine and prescribe the proportionate portions of such through rates payable to each of such companies necessary to the establishment of such through routes or transportation or to the operation of such cars or other equipment."

All reports of operations of the companies are to be for the year ending on June 30, and are to be furnished the commission on or before Sept. 15 next following on the blanks furnished by the commission. A fine of $25 a day is prescribed for failure to comply with this provision. The reports are to be sworn to by the president or the vice-president and treasurer of the company. Persons wilfully making a false report or certifying a false report are liable to a fine of $5,000, or imprisonment for not more than five years, or both.

Appeal from any decision or order of the commission may be made to the Superior Court. The Attorney-General is to appear for and represent the commission in all proceedings following such appeal.

ACCIDENT PREVENTION

F. W. Johnson, superintendent bureau for the prevention of accidents of the Philadelphia Rapid Transit Company, has just issued two pamphlets relating to the value of educational work in the reduction of accident damages. Both pamphlets lay stress upon the desirability of instructing the employees of a company so that they will take special precautions to avoid accidents, and the author presents some very striking examples of what may be done in this way. He recognizes the value of improved car construction and of safety appliances, but believes that they constitute only part of the solution of the problem. The work upon which Mr. Johnson has been engaged in Philadelphia has been along these educational lines.

During 1910 the tramway company of Cairo, Egypt, extended its system along different lines branching in all quarters of the capital, their total length now amounting to 139 miles. The company carried 53,492,219 passengers in 1910, an increase of 4,000,000 over the previous year. In 1910 the receipts amounted to $1,384,330.

Steel Cars for the Newark Extension of the Hudson Tunnels

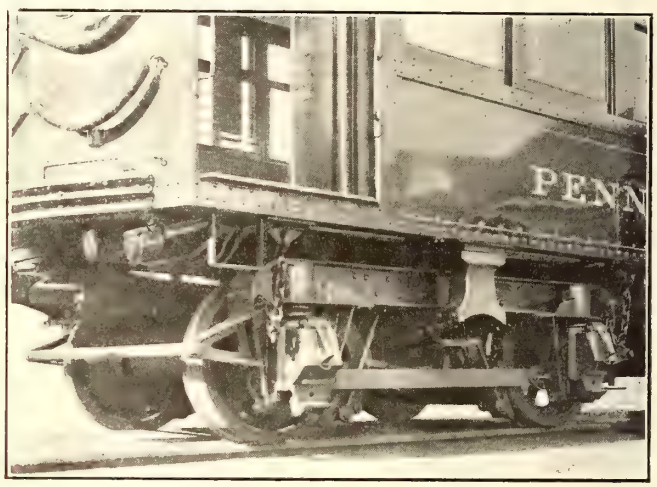
These Cars Are Similar in General Design to the Steel Motor Cars of the Long Island Railroad, but Have a Seating Arrangement Like Those of the Hudson & Manhattan Railroad. They Will Be Operated Jointly by the Pennsylvania Railroad and the Hudson & Manhattan Railroad on the Newark Extension.

The Pennsylvania Railroad and the Hudson & Manhattan Railroad are preparing to operate a joint through service of multiple-unit electric trains between Newark, N. J., and the Hudson Terminal in New York City. The Hudson & Manhattan Railroad is extending its tunnels west under Jersey City to a point just east of Bergen Hill, where they come up on the right-of-way of the Pennsylvania Railroad. From this point the Pennsylvania Railroad is equipping with third rail its old main line tracks across the meadows to Manhattan Transfer, where the new electric division to the Thirty-third Street Station branches off. Beyond Manhattan Transfer a two-track steel elevated structure is being built through Harrison, over a new bridge across the Passaic River, and through Newark to a new terminal station, near Market and Broad Streets, in the center of the city. For operating this service the Pennsylvania Railroad has purchased sixty new steel motor cars and the Hudson & Manhattan Railroad has purchased thirty-six cars. The sixty cars ordered by the Pennsylvania Railroad are being built by the American Car & Foundry Company, and the thirty-six cars ordered by the Hudson & Manhattan Railroad are being built by the Pressed Steel Car Company. The cars of the two companies are alike, having been built from designs prepared by the Pennsylvania Railroad. They can be operated in the same trains with the standard cars of the Hudson & Manhattan Railroad.



Newark Extension Cars—Interior View

In the general principle of design of the underframing and side construction the new cars are similar to the steel motor cars of the Long Island Railroad, which were illustrated and described in the Electric Railway Journal of June 17, 1911, page 1054. As they are to be operated through the Hudson tunnels, however, their over-all dimensions are less, owing to the limited clearances and sharp curves. The length over platforms is 48 ft. and the height from top of rail to top of roof is only 11 ft. 8½ in. The maximum width over the side-door threshold plates is 8 ft. 10½ in., and the width at the eaves is 8 ft. 7 13-16 in. The cars have longitudinal seats with steel partitions and vertical and horizontal grab-handles, as in the standard cars of the Hudson & Manhattan Railroad. Three doors are provided in each side, the end doors being 3 ft. 2 in. wide, and the center doors 3 ft. 6 in. wide.



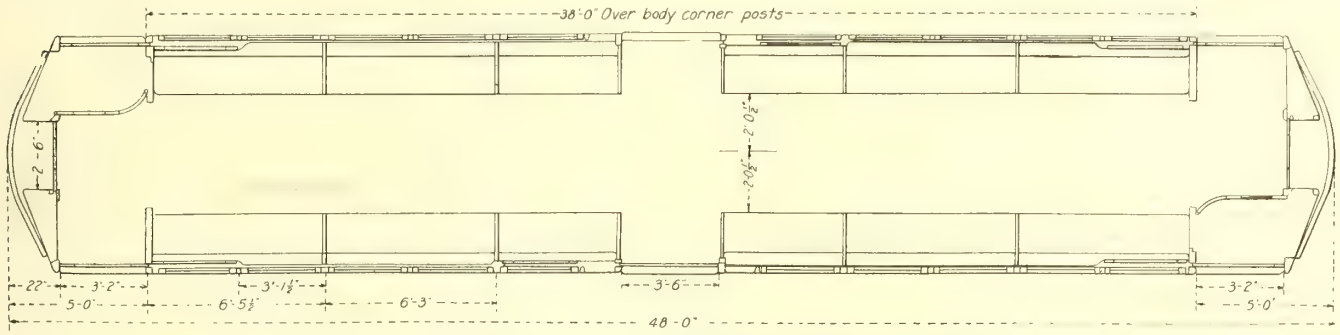
Newark Extension Cars—Truck



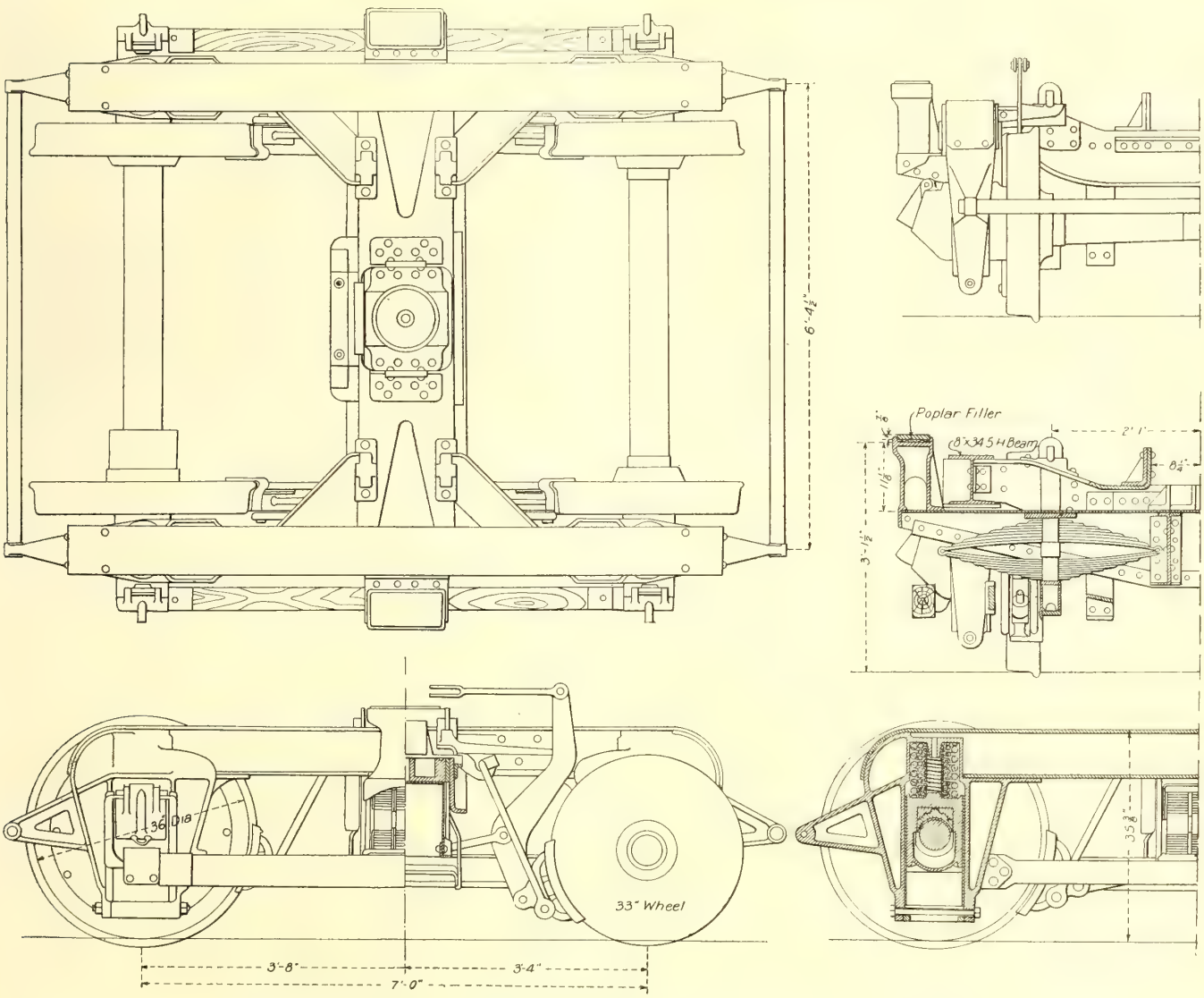
Newark Extension Cars—Side View

The principal member of the underframing consists of a

box girder center sill formed of two 9-in. channels, with top and bottom cover plates between the cantilever cross-bearers and two 6-in. channels, with cover plates beyond the cross-bearers. The webs of the 6-in. channels are split at the ends next to the cross-bearers, and the bottom flanges are bent down 3 in. to join the bottom flanges of the 9-in. I-beams, where the splices are made at the cross-bearers. carried by the plate girder thus formed is transmitted to the center sill through the end sills and the two cantilever cross-bearers. The cross-bearers are built up of two pressed steel diaphragms, ¼ in. thick, and top and bottom cover plates respectively 5/16 in. and ⅛ in. thick. The platform end sills are curved channels reinforced with two platform floor plates, each ¼ in. thick. These plates extend in



Newark Extension Cars—Plan Showing Seating Arrangement



Newark Extension Cars—Plan, Elevation and Half Sections of Truck

The body center plates are attached directly to the center sill and no body bolsters are used. The cross-sectional area of the center sill between cross-bearers is 25 sq. in., which is ample to resist any compressive stresses encountered in multiple-unit train service.

The side framing consists of a bottom angle 5 in. x 3½ in. x 5-16 in., the sheathing plates, which are 3-32 in. thick, and a rectangular belt rail, 4 in. x ⅜ in. All of the load toward the center of the car for a distance of 5 ft. 6 in., and they are stiffened by pressed-steel corner braces extending inward toward the center sill on each side.

The floor of the car body is magnesite composition, in which is embedded a layer of expanded metal riveted on the top surface of the smooth steel floor plates. The roof is of the monitor deck type. The lower deck has no headlining on the inside, but the upper deck is lined with fiber

board. The windows have a fixed lower sash and an upper sash which is arranged to drop for ventilation. The upper deck sash also may be opened for ventilation.

The new cars are fitted with Van Dorn couplers and radial attachments, so as to be interchangeable with the standard equipment of the Hudson & Manhattan cars. Other special equipment includes Consolidated Car Heating Company's electrically controlled, pneumatic door-operating devices and train-signal system. The doors are controlled by push buttons on the vestibule center posts. The center side door on each side may be opened or closed from either end of the car, and a push button is also provided on the outside of the car on one of the door posts, by means of which a platform man can close the door independently of the trainmen. Electric heaters are inserted in the seat risers. The cars are painted Tuscan red, which is the standard passenger car body color of the Pennsylvania Railroad.

The trucks used under these cars are a modification of



Newark Extension Cars—End View

the type of trucks used under the Long Island Railroad cars. Each truck will carry one GE-212 commutating-pole motor rated at 225 hp at 600 volts. The motor axle wheels are 36 in. in diameter, and the trailer axle wheels are 33 in. in diameter. The extra weight of the motor on the motor axle is compensated for by mounting the bolster off center 2 in. nearer the trailer axle than the motor axle, so as to equalize the weight on both axles. The truck side-frames are 8-in.-wide flange I-beams, to which are riveted the cast-steel pedestals. Pieces of steel tubing are used for the end frames of the truck. The transom is made of pressed steel in one piece and surrounds the bolster. It has a large opening cut in the top, through which the body center plate passes. The bolster is supported on triple elliptic springs suspended by link carriers from the transom and corner gusset castings. The side bearings are mounted on the ends of the bolster outside of the truck frame. No brake beams are used, as the live brake-lever on each side of the truck is attached to an equalizing lever which passes through the center sills above the center plate. The cars are equipped with Westinghouse electro-pneumatic brakes and 12-in. cylinders.

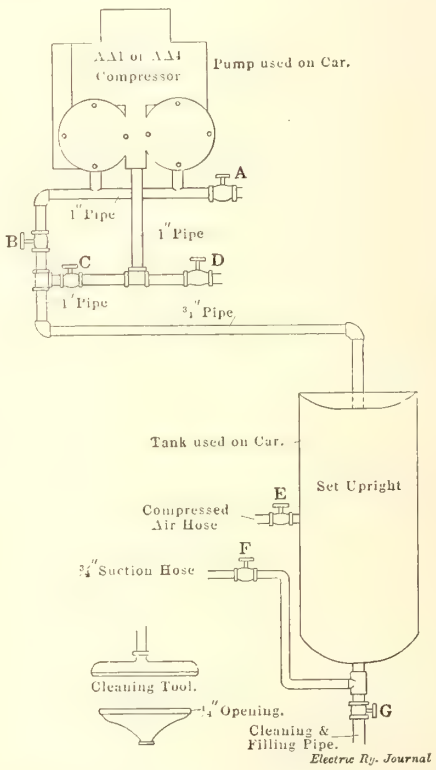
The weight of a car and trucks, complete with electrical equipment, is 72,500 lb.

COMBINED SUCTION AND PRESSURE APPARATUS FOR CAR CLEANING

BY C. H. COPLEY, SUPERINTENDENT AND MASTER MECHANIC NORWALK DIVISION, CONNECTICUT COMPANY

The writer has been using for some time a combination vacuum and pressure car-cleaning outfit, the design of which may be of interest to others who have a compressor available. The piping connections which are shown in the accompanying sketch are manipulated as follows:

To use as a vacuum or seat cleaner, close *A* and *C* and open the valves *B* and *F*. About two pails of water are used in the tank to prevent the entrance of dirt and dust into the pump. Upon starting the machine with the valves set as above, close the tank connections *E* and *F* and open *G*, upon which the water will be sucked into the tank.



Piping for Combined Pressure and Vacuum System

Close *G* after the water is in the tank and then with the suction hose hitched on at *F* open *F* and the apparatus is ready for service. It is desirable to change the water for every third car. To clean the tank stop the machine and open *F* and *G*, whereupon the dirt and water will run out.

To use this equipment for the compressed-air cleaning of controllers, motor shells, armatures, etc., close valves *D* and *B*, open valves *C* and *A*, close the tank valves *F* and *G*, attach hose to *E* and open ready for service.

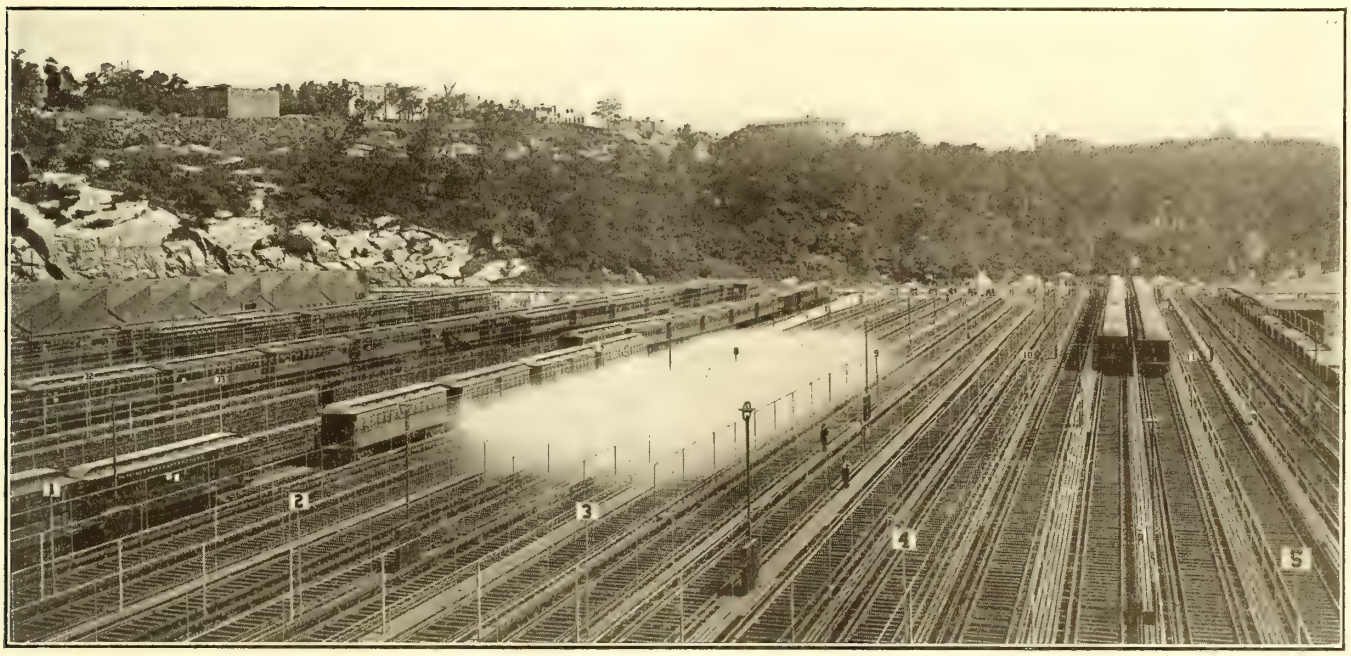
In this way a 20-ft. closed car can be thoroughly cleaned in 15 minutes and a 33-ft. car in 30 minutes.

The Swiss government has just granted a concession for the construction of a narrow-gage electric railway, about 19 miles long, from Meiringen to Engelberg, over the Joch Pass. The new line is to be built by the same company that constructed the electric railway from Stansstad to Engelberg.

Sprinkler System in Open Yard of Manhattan Elevated Railway

A Description of the Sprinkler System Installed by the Interborough Rapid Transit Company for Yard Protection. Owing to the Exposed Condition of the Yard, Distant Control and Open Heads Are Used.

The Interborough Rapid Transit Company has recently completed the installation of a complete sprinkler system in the Harlem River yard of the Sixth Avenue division of the Manhattan Elevated Railway at 159th Street and Eighth Avenue, New York City. This yard is in the open air and has a capacity for storing about 560 elevated cars. It contains thirty-three tracks with a total length of 26,510 ft. About 75 per cent of the tracks are on an elevated structure and the remainder are on an ash fill. As practically all the rolling stock of the Sixth Avenue and Ninth Avenue divisions is stored in this yard at night, a bad fire would cripple the service of these two divisions. The sprinkler system which has been installed is designed to confine an incipient fire to the car in which it originated or until fire hose and hand extinguishers can be brought into action.



Manhattan Elevated Sprinklers—View of Harlem River Yard from Watch Tower Showing One Section of Sprinklers in Operation

As the sprinkler piping and heads are all exposed to freezing temperatures in the winter, it was not thought feasible to install an automatic system of either the dry or wet pipe type, because closed sprinkler heads cannot be depended upon to fuse off in the open air. The sprinkler piping was therefore arranged to be divided into forty-five sections covering the entire yard and water is turned on in any section when required by a motor-driven hydrant valve controlled from a watch tower 50 ft. high which overlooks the entire yard. A watchman is on duty in this tower at all hours of the day and night, and he has no other duties except to look for indications of a fire in the cars. As soon as the pressure is shut off from a sprinkler section it is drained automatically of all water, so that there is no danger of freezing.

SPRINKLERS

A line of aisle sprinklers is placed between each pair of tracks. The heads, which were furnished by the General Fire Extinguisher Company, are of the open type with ½-in. nozzles. They are spaced about 10 ft. apart and are located about 4 in. below the bottom of the top sash rail of the car windows. A total of 2804 heads was installed in the yard. Each of the forty-five sections into which the yard is divided contains on an average eighty-four heads to protect three tracks for a length of 200 ft.

WATER SUPPLY

The sprinkler system is supplied with water from an elevated storage tank and from two motor-driven pumps taking their supply from the Harlem River. The storage tank is of steel with a semi-spherical bottom and has a capacity of 75,000 gal. It is mounted on a steel tower at the southwest corner of the yard at an elevation of 170 ft. above the rail. This tank ordinarily will be kept full of fresh water taken through a meter from the city main and pumped into the tank by one of the motor-driven pressure pumps.

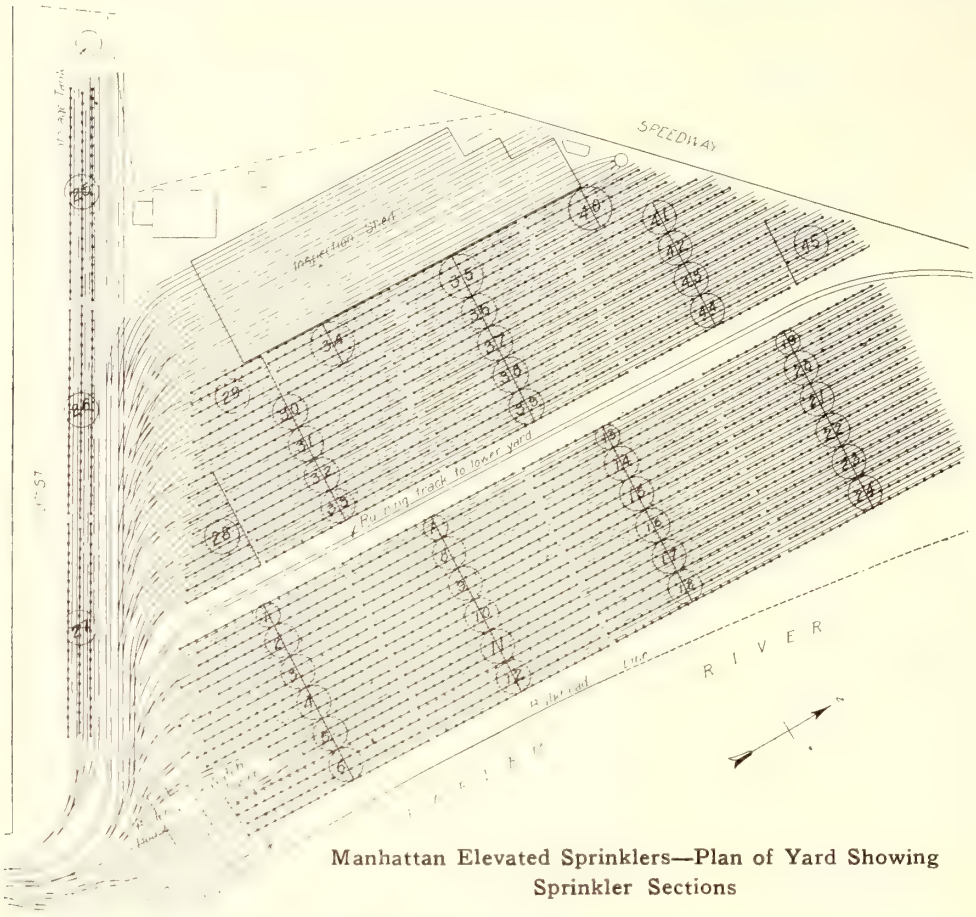
The two motor-driven pressure pumps are located in a pump house near the bulkhead line of the Harlem River. The pumps are placed at the bottom of a well which is deep enough to provide a positive head on the intake side at any stage of the tide. They are of the three-stage turbine type with vertical shafts and each has a capacity of 1500 gal. against a head of 150 lb. They were furnished by the H. R. Worthington Pump Company. Each pump is driven by a 200-hp Garwood direct-current motor coupled directly to the pump shaft at the level of the pump-house floor. Two independent sources of current supply for the motors have been provided, one from the subway and one from the elevated division. The pumps are started and stopped by an attendant in the pump house on signal from the watch tower.

PIPING

A 12-in. main runs from the pump house to the elevated storage tank. A 10-in. loop is connected to this main and

encircles the yard. From this loop the 8-in. risers to feed the sprinkler sections are taken off. The 12-in. and 10-in. pipes are cast iron and are laid entirely underground below the frost line. The pumps and the storage tank can be used to supply the sprinkler system simultaneously, but a check valve in the 12-in. main just below the storage tank prevents the tank from filling while the pumps are running. When it is desired to fill the tank a 4-in. by-pass connection around the check valve is opened.

The risers which supply the sections of sprinklers are 8 in. in diameter. This large size was selected to insure minimum loss of pressure at the sprinkler heads. In each riser is placed an electrically operated gate valve furnished by the Nelson Valve Company. These valves are operated by a ½-hp, three-phase induction motor suitably geared to the spindle. They may be operated also by a hand wheel on the spindle and a disengaging device is inserted in the motor gearing so that the motor may be operated for testing purposes without moving the valve spindle. Energy for operating these motors is purchased from the United Electric Light & Power Company in the form of three-phase current at 220 volts and 60 cycles. This type of induction motor was selected on account of freedom from trouble when operating in a heavy spray of water to which the motors are subjected when the sprinklers are opened. On test the motors have been operated while completely immersed in water.



Manhattan Elevated Sprinklers—Plan of Yard Showing Sprinkler Sections



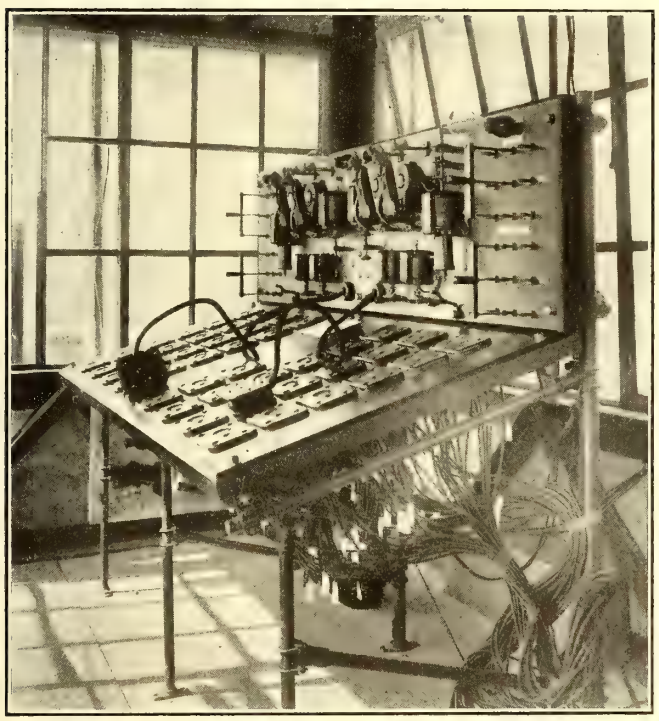
Manhattan Elevated Sprinklers—Motor-Operated Hydrant Valve



Manhattan Elevated Sprinklers—South End of Yard Showing Storage Tank and Inspection Shed

ELECTRICAL CONTROL

The sprinkler valves are controlled from a switchboard in the watch tower. This board consists of forty-five five-point sockets corresponding to the same number of sprinkler valves and two connection plugs. On the top of the board are the motor starting relays and contactors, main switches and pilot lights, all of which are in duplicate. The two plugs have cables which are long enough to permit inserting either plug in any socket on the board. Three of the points on the plugs are required for the three phases of the motor current and the other two are for making the pilot light connections. To start the motor on any valve the plug is inserted in the proper socket and the two-way three-point knife switch on the top of the board is thrown to the "open" position. A limit switch on the valve stem opens the motor circuit at the switchboard when the valve is fully open and similarly when the valve is fully closed. A telephone connection is included in the control cable carried to each sprinkler valve so that the valve tester who makes the round of the system once each week can communicate with the switchboard operator in the tower



Manhattan Elevated Sprinklers—Control Switchboard in Watch Tower

and instruct him how to manipulate the motor for test purposes. The switchboard was furnished by the Fort Wayne Electric Works of the General Electric Company.

AUXILIARY PROTECTION

The inspection shed on the west side of the yard, the storehouse under the yard and the boiler room are equipped with automatic sprinklers. The yard also has a complete equipment of hose lines and on every post in the yard which supports a lighting cluster is mounted a push-button fire-alarm signal which rings an annunciator in the watch tower where the third-rail disconnecting switches are located and also in the interlocking tower at the south end of the yard. When a fire is discovered the watch tower attendant turns the water into the sprinkler section in which the fire has started and blows a fire whistle on the roof of the watch tower, the number of blasts corresponding with the number of the sprinkler section in which the fire is located. To assist the watch tower attendant and other employees in fixing the location of a fire in the yard each sprinkler section is marked with large figures painted on a square board supported on a post above the roofs of the cars. The shop force in the inspection shed is trained to use the hose lines and responds promptly when the alarm signal is blown. As a further precaution against the spread of a fire throughout the whole yard, the storage tracks are divided in the center by a running track to the surface yard below, and the track on each side of this running track is omitted so that an open space equivalent to the width of three tracks separates the two halves of the yard.

TEST OF THE SYSTEM

On the afternoon of Aug. 4 a test of the system was made in the presence of officers of the Interborough Rapid Transit Company, representatives of the Fire Department and insurance companies and several other invited guests. Nine old cars formerly used in steam train service on the Manhattan Elevated were made up into three trains of three cars each and placed on adjoining tracks. The middle car of the middle train was set on fire by a specially devised electric arc, and after it was completely ablaze on the inside and the flames had broken through the roof and side windows the sprinklers were turned on by sending in an alarm with one of the push-button signals. In twenty seconds after the alarm had been sent in the sprinklers in the danger zone were in full operation. The pumps were started up and the sprinklers were kept in operation for eleven minutes. The spread of the fire was checked immediately after the water was turned on and the car on one side of the burning car which had caught on fire before the sprinklers started was saved from any further damage. The car on the other side was damaged only to the extent of a few broken windows and scorched paint. Neither of the two cars in the same train as the car that was set on fire was injured in any way. When the sprinklers were turned off the alarm signal was blown and four hose streams manned by shop employees were turned into the car in less than two minutes. The fire which remained on the inside of the car was quickly extinguished by these streams. The test proved conclusively that the sprinklers could be relied upon to check effectively the spread of a fire originating in a car and permit the other cars stored in the yard to be pulled out of the danger zone.

PROPOSED RATES FOR THROUGH ROUTES IN NEW YORK

The answers of the railway companies of Manhattan to the order of the Public Service Commission, First District, issued July 11, ordering them to establish through routes and joint rates, or, in other words, to transfer passengers at a large number of specified points in the city, and to notify the commission on or before Aug. 10 of the rates which have been established for these routes, were filed with the commission on that date. A letter of Adrian H. Joline and Douglas Robinson, receivers of the Metropolitan Street Railway Company, follows:

"We have conferred with representatives of the receiver of the Third Avenue Railroad Company and allied companies, with the receiver of the Second Avenue Railroad Company and with the general manager of the Central Park, North & East River Railroad Company regarding your order in Case No. 1364, dated July 11, 1911.

"The representatives of the joint committee on reorganization of the Metropolitan Street Railway Company were also brought into these conferences, as this seemed fitting in view of the expected transfer to them at an early day of the property in our charge. We have consented, at their suggestion, to enter into an agreement proposed by the various other companies concerned which provides for joint rates of fare similar in character to those covered by the arrangement between us as receivers of the Metropolitan Street Railway Company and the Central Park, North & East River Railroad Company, namely, that a so-called

'L' ride may be made for an 8-cent fare and a so-called 'Z' ride may be made for a 10-cent fare, subject to the condition that joint-rate tickets are to be sold only upon request of the passengers at the time when cash fare is paid; that joint-rate tickets are not to be sold to persons who tender a transfer in payment of fare, and that persons are not to be given transfers who purchase a joint-rate ticket or who tender a coupon of a joint-rate ticket in payment of fare.

"We are prepared to put this arrangement into effect as soon as the details of the plan may be perfected with the other lines involved."

A letter of similar tenor was received from F. W. Whitridge as receiver of the Third Avenue Railroad Company, the Forty-second Street, Manhattanville & St. Nicholas Avenue Railway Company and the Dry Dock, East Broadway & Battery Railroad Company; from the Kingsbridge Railway Company from Edward W. Maher, general manager, and from the Second Avenue Railroad Company from George W. Linch, receiver.

In his letter Mr. Whitridge specified that transfers were to entitle a passenger only to a continuous trip in one general direction by the most reasonably direct route. He also stated it to be his understanding that after the system had been in operation for a period of one month the division of fares should be agreed upon, but that if no agreement should be reached, then the portion of the fare which each line should receive would be determined by arbitration.

Mr. Whitridge also takes issue with the right of the commission to order the restoration of transfers as follows:

"I am advised, however, that notwithstanding any such agreement, it is my duty to reserve the right to challenge your legal power to require independent and competitive street railroad companies to interchange transfers with one another. According to the judgment of all engaged in the practical operation of the Third Avenue system, it is probable that the joint fares now proposed to be established will not afford reasonable and just compensation for the service rendered."

He adds that universal transfers will tend to restore conditions existing in New York when there was a monopoly in the surface lines, since the lines will be crowded by the passengers of their competitors at lower rates, removing the incentive to attract custom by better service. He says that the present earnings of his company are insufficient to pay a reasonable return on the investment and any additional unremunerative burdens will result in practical confiscation.

The South Shore Traction Company wrote asking for an extension of time and the receiver for the Twenty-eighth and Twenty-ninth Cross-town Railroad urged the commission to give special attention to the poverty-stricken condition of that company before insisting that the order be carried out.

In an interview Aug. 11 Charles H. Strong, counsel for the Central Park, North & East River Railroad, stated that this company at present was receiving only 3½ cents out of each 8-cent fare now in force between it and the Metropolitan Street Railway. He said that this line was the only one in Manhattan that is not now in the hands of a receiver and that the company believed that it should receive 4 cents of the joint fare instead of 3½ cents to make the traffic profitable.

The Public Service Commission will consider the replies of the companies next week.

The Mexico Electric Tramway Company has decided to spend $500,000 on the construction of new lines in Mexico City. Among the work undertaken is the completion of the Atzcapotzalco-Tlalnepantla line, the construction of the Peralvillo-Valbuena line and the electrification of several horse-car lines.

TREATMENT OF DEPRECIATION ACCOUNTS BY INTERBOROUGH RAPID TRANSIT COMPANY

The treatment by the Interborough Rapid Transit Company, of New York, of the depreciation accounts in the uniform system of accounting prescribed by the New York Public Service Commission, First District, has been the subject of hearings before the commission. The municipal testimony was offered on July 6 and consisted of a recital by Charles Frank, an accountant in the bureau of statistics and accounts of the commission, of the communications and records relating to the position of the company in this matter.

Mr. Frank testified that on or about July 1, 1909, the Interborough Rapid Transit Company filed with the commission a rule for combined maintenance and depreciation charges per car mile, as follows: Subway way and structures, 1.3 cents; subway equipment, 1.76 cents; elevated way and structures, 1.33 cents; elevated equipment, 1.38 cents. The reports of the company for July and August, 1909, showed charges not in accord with these figures. A letter calling attention to this discrepancy in the August, 1909, report was addressed by Travis H. Whitney, secretary of the commission, to E. F. J. Gaynor, auditor of the company.

On June 20, 1910, the company filed an amended rule relating to depreciation. On July 20, 1910, Frank Hedley, vice-president and general manager, was informed that the commission disapproved of the rule relating to depreciation of equipment on the ground that the modification was retroactive. On Sept. 7, 1910, a letter was written by the commission to Mr. Hedley calling attention to the accounting requirements of the commission relative to the treatment of depreciation and asking him to advise the commission what rate of depreciation would be used by his company during the year ending June, 1911, and to file with the rule supporting statements of experts. No replies were received to the two letters. On Feb. 25, 1911, the company filed an amended rule for the year ending June 30, 1911, as follows: For depreciation of equipment, 2.7 cents per car mile on the subway division and 1.5 cents per car mile on the elevated division; for depreciation of way and structures, 1.2 cents per car mile on the subway division and 1.33 cents per car mile on the elevated division.

The commission in a letter addressed to the company on March 8, 1911, objected to the amended schedule, stating that all amendments must apply to the fiscal period subsequent to the filing of the amendment and must not attempt to change the rule with respect to a fiscal period prior to the filing of the report.

POSITION OF THE COMPANY

On March 20, 1911, a letter was addressed to Mr. Whitney, secretary of the commission, by Mr. Gaynor, auditor of the company, which stated:

"We cannot agree with your interpretation of the accounting order to the effect that our practice in filing the amended rule does not comply therewith. The submitted reasons in this instance seem to indicate the wisdom and reasonableness of the part of the accounting order concerned in this matter.

"The company has departed from the rate provided by the rule heretofore filed for depreciation of subway equipment and now substitutes 2.70 cents per car mile in order that an extraordinary condition of car maintenance expenditures quite impossible to forecast when previous rules were filed—being the outgrowth of demands and requirements incidental to inauguration of ten-car express and six-car local trains in the subway—may be fully allowed for and an adverse balance now temporarily existing in the account 'accrued amortization of capital' be eliminated and the equilibrium of that account restored prior to June

30, 1911. The abnormal maintenance expenditures to which reference is made consist principally of alterations in draw-gear of cars, including installation of new type of drawbar and reinforcing underframes of certain types of cars; also revising, remodeling and improving the air-brake apparatus, overcoming the physical limitations heretofore existing in the pneumatic brake and installing the electro-pneumatic air brake deemed most satisfactory for ten-car subway operation.

"The reason which most readily occurs to us why a rule cannot be filed that may apply to the subway for the next five years is the almost universal admission that the specific information so necessary to the establishment of permanent depreciation allowances as part of operating expense accounts is not yet attainable."

DETAILS OF MONTHLY CHARGES

The accompanying statement, showing the actual monthly charge of the company in monthly reports to the commission and the different rules adopted, was presented by Mr. Frank:

COMBINED MAINTENANCE AND DEPRECIATION CHARGES PER CAR MILE

	Subway		Elevated	
1909.	Way and Structures.	Equipment.	Way and Structures.	Equipment.
July	$0.0161	$0.0136	$0.0134	$0.0103
August	.0143	.0142	.0137	.0117
September	.0151	.0149	.0119	.0125
October	.0144	.0153	.0120	.0117
November	.0138	.0138	.0109	.0148
December	.0063	.0269	.0180	.0216
1910.				
January	.0132	.0167	.0133	.0139
February	.0132	.0167	.0134	.0139
March	.0132	.0167	.0134	.0139
April	.0132	.0130	.0133	.0138
May	.0132	.0113	.0133	.0139
June	.0133	.0158	.0133	.0138
July	.0132	.0179	.0133	.0138
August	.0133	.0179	.0133	.0139
September	.0131	.0242	.0134	.0139
October	.0132	.0242	.0134	.0139
November	.0132	.0242	.0134	.0139
December	.0132	.0460	.0134	.0208
1911.				
January	.0069	.0326	.0134	.0151
February	.0122	.0274	.0134	.0151
March	.0121	.0273	.0134	.0151
Rule, July 1, '09	.0130	.0176	.0133	.0138
Rule, June 24, '10	....	.0155	....	.0138
Rule, Feb. 25, '11	.0120	.0270	.0133	.0150

BABBITT BEARING FOR DOOR ROLLERS

Most door rollers are equipped with brass bushings *A*, as shown in Fig. 1, which can be renewed when worn out. The stud *B* on the casting is made with a flat place, so that the bushing will not turn. Any lost motion on the stud or the bushing, or when the door rides on the bottom, causes a great deal of trouble.

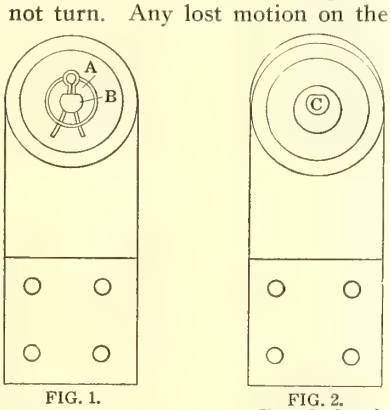


FIG. 1. FIG. 2. *Electric Ry. Journal*

Scheme for Replacing the Brass Bushings of Door Rollers with Babbitt Bearings

To remedy this, first remove the bushings, then tin the cast-iron stud to permit the melted babbitt to adhere to it. If the door rides on the bottom and is to be lifted up draw the wheel down off center as much as the door is to be lifted (see illustration "C").

Oil the bearings of the wheel so that the melted babbitt will not stick. Then pour in enough babbitt to make it flush with the wheel. The surplus babbitt can then be chipped off and and the washer and cotter pin replaced. A repair shop man, who is connected with a medium-size electric railway, says that he has tried this method and by its use a pair of bearings can be repaired in a very short time, and when once repaired in this way they will give much better service than with brass bushings.

NOTES ON INTERURBAN FREIGHT AND EXPRESS TRAFFIC IN NEW YORK STATE

Most of the interurban roads in New York State conduct a package freight business with or without wagon collection and delivery service, but only a few companies handle freight in carload lots on the basis of a switching charge. The following notes give some particulars of the service, rates and methods of soliciting freight and express business of a number of representative companies.

NEW YORK STATE RAILWAYS—ROCHESTER LINES

The New York State Railways, Rochester & Sodus Bay and Rochester & Eastern lines, operate an express business in and out of Rochester, but the business is not growing very rapidly on account of limited terminal facilities in Rochester and because a city ordinance prohibits the operation of freight and express cars through the streets of Rochester during the daytime. On the Rochester & Sodus Bay line the inbound shipments consist principally of eggs, dressed meat, fresh fruit, milk and other provisions, while the outbound shipments are confined to bread, ice cream, produce and merchandise consigned to small stores in the nearby towns. The Rochester & Eastern line handles only a small amount of inbound express but handles a good



Electric Delivery Wagon in Rochester

volume of outbound merchandise to points as far as Geneva. It also does a carload switching business in connection with the steam roads in its territory for which it receives a flat rate per car. No less-than-carload freight is interchanged with the steam roads nor is the electric line a party to any joint freight tariffs with other steam or electric roads.

Two classes of service are given: Class A, which includes wagon collection and delivery in Rochester, Geneva, Canandaigua and Victor, and Class B, which covers transportation between stations only. There are no large towns on the Rochester & Sodus Bay line, and Class A service at these points includes pick-up and delivery from and to the sidewalk.

The Class A rates are approximately the same as those charged by the old-line express companies, while the Class B rates are from 3 cents to 5 cents per 100 lb. higher than those of competing steam roads. All Class A express is carried on passenger cars, while Class B express is shipped in motor express cars which are moved through Rochester at night.

The Class A express terminal in Rochester is located in the rear of the carhouse at Court and Exchange Streets,

very close to the center of the business district of the city. The wagon collection and delivery service in Rochester is done by contract by the Independent Messenger & Delivery Service Company, which handles the deliveries of a large number of small merchants in Rochester. This company furnishes two electric automobile delivery wagons for the exclusive use of the railway companies within the business district and makes collections and deliveries in the outlying sections with its regular wagons as required. The automobiles make collections and deliveries over regular routes in the business district at 8 a. m., 12 noon and 4 p. m. daily, except Sunday. The railway pays a flat rate for the wagon service and finds the arrangement to be satisfactory in every respect. It is enabled to give collection and delivery service throughout the city without the trouble or expense of maintaining its own drivers and teams. From ten to twenty wagons would be required to cover the same territory and the cost of these would be prohibitive if only the railway business were handled.

In Geneva, Canandaigua and Victor arrangements are made on a commission basis with local cartmen for the

The Rochester and Eastern Rapid Ry. Co.

Electric Express Purchasing Department.

____ 190

Please request your Company at _____

to call at _____

for the following articles to be forwarded by return express

_____

Signed _____

Address _____

Destination _____

I hereby acknowledge receipt

of above order _____ *Agent*

Time _____ *Date* _____

Rochester & Eastern—Agent's Order Blank

delivery and pick-up service. They receive 20 per cent of the revenue on all inbound and outbound Class A express.

The express business is in charge of a general passenger and express agent, who has an assistant general express agent as an outside solicitor. New business is solicited by him personally in Rochester, but the local agents in the smaller towns are depended upon to get business from their territory. To assist the merchants in the small towns in getting shipments promptly from jobbers in Rochester the express department supplies its agents with order blanks, one of which is reproduced. The merchant fills out one of these blanks in the agent's office and it is forwarded by train mail to the agent in Rochester, who telephones the order to the jobber and has the wagon call for the shipment when it is ready. This saves the consignee the expense of a long-distance telephone call or telegram and is much quicker than sending the order through the mail. No charge is made for this service, but the railway company assumes no responsibility for payment for the shipment or for the accuracy of transmittal of the order.

UTICA & MOHAWK VALLEY RAILWAY—ONEIDA RAILWAY

The freight and express business of these two roads, which are under one management, is in charge of a general express agent, with offices in Utica. In order to accommodate all classes of shippers and charge accordingly three classes of service are given between Syracuse, Utica, Rome and Little Falls. Class A includes wagon collection and delivery, Class B includes wagon collection or delivery, and Class C no wagon service. Merchandise and special commodity rates are quoted in the tariffs of the two companies, but the minimum charge on any shipment of any class is 25 cents. On both merchandise and commodity rates the charge per 100 lb. for any distance is 5 cents higher for Class B service than for Class C service, and 5 cents higher for Class A service than for Class B service. The Class A rates are about the same as those of the old-line express companies operating on the parallel New York Central lines.

Wagon service is given in nearly all the towns reached. The two companies keep about twenty horses, wagons and drivers in daily service. In Utica and Syracuse the wagons cover regular routes and shippers are supplied with call signs bearing a distinctive symbol. One of these signs is reproduced. Outside of the business district of Utica the railway companies' wagons make calls for collection of freight and express on notification, and as many as 150 such calls have been made in one day. The horses and wagons used for delivery service in Utica are housed in a stable adjoining the freight house. This stable and freight house were illustrated and described in the Electric Railway Journal for Sept. 4, 1909.



Wagon Call Sign of Utica & Mohawk Valley

A fast freight service is maintained out of Utica to all points on the Otsego & Herkimer Railroad. A motor express car leaves the terminal in Utica at 8 a. m. daily except Sunday. Express cars also leave the terminal in Utica daily except Sunday for points on the Utica & Mohawk Valley east at 7:15 a. m., 11:30 a. m. and 2:30 p. m., and for points west at 7:30 a. m., 11 a. m. and 4 p. m. For points south a car leaves at 8 a. m. and for points on the Oneida Railway cars leave at 7:15 a. m. and 1:15 p. m. As an indication of the volume of the express business of these two companies it may be noted that in the year ended Dec. 31, 1910, approximately 45,012,627 lb. of express and freight were handled in and out of the freight station in Utica.

OTSEGO & HERKIMER RAILROAD

This road is equipped to handle all kinds of freight and interchanges freight cars with connecting steam roads at Mohawk and Oneonta. The freight equipment consists of one electric locomotive able to haul a train of fifteen loaded cars; four motor freight cars with a carrying capacity of 20 tons each and capable of hauling two or three loaded box cars as trailers, and twenty box, flat and gondola cars. Through freight service is given from Oneonta to Utica in connection with the Utica & Mohawk Valley Railway. A motor freight car leaves each terminal daily except Sunday at 8 a. m. and makes the run of 70 miles in about eight hours, returning the next day. These cars haul trailers in both directions between Oneonta and Hartwick, a distance of 18 miles. A local freight train which handles both package and carload shipments runs between Hartwick and Oneonta and between Hartwick and Mohawk three times a week to interchange shipments with steam road connections.

Thirteen freight stations with agents are maintained. At

four of the larger towns separate freight houses about 30 ft. x 60 ft. are provided, and at the other stations the freight rooms in the combination station buildings are about 20 ft. x 20 ft. In Utica the through cars of the Otsego & Herkimer Railroad use the freight terminal of the Utica & Mohawk Valley Railway, but the loading and unloading is done by the car crews. At Mohawk the West Shore Railroad has a spur track connecting with the electric line, and in Oneonta two yard tracks of the Delaware & Hudson have been equipped with overhead trolley wires to facilitate switching of interchanged cars.

Permanent and temporary sidings are furnished by the railroad company for farms and industries. The former are built and maintained by the railroad at places where permanent traffic is assured; the latter are put in to serve portable sawmills, etc. The person to whom is furnished a temporary siding must do the necessary grading and furnish the ties, but the railroad furnishes and lays the rails without charge. Stock pens and loading chutes have been built at most of the stations. The chutes are made of six 6-in. posts set in two rows 4 ft. apart with cross pieces spiked to them at the proper height to form a slope for the floor boards from the ground to the height of a car floor. Boards are nailed on the posts to form sides and a small pen is built at the bottom. The cost of these pens and chutes is less than $35 each.

The freight and express business is in charge of a general freight and passenger agent, who has an assistant to do most of the soliciting and outside work. All local agents receive a straight salary and are expected to do soliciting in their territory. The assistant general passenger and freight agent makes frequent calls on all jobbers, merchants and industries on the company's own line and on connecting lines where business may originate. Receivers of freight are asked to sign routing orders to be delivered to shippers by the solicitor. One of the most important increases in traffic has been accomplished through an educational campaign conducted among the farmers to show them the profit in raising marketable crops, especially vegetables, for the New York market. A mailing list of the names of all farmers living within 5 miles of the road was secured and a circular letter was sent to each, suggesting some of the crops which might be profitably grown in that section of the State. Later, in co-operation with the State Agricultural Department, several meetings of farmers were held at which the methods and results of growing new crops were discussed. An effort was made to place the farmers in touch with the best markets. This educational work has produced very gratifying results in increased shipments of produce. In 1908, before the farmers' meetings were held, no peas were grown for shipment, but in 1909 a total of 40 acres was cultivated and in 1910 about 60 acres were planted, which produced shipments of several hundred bags a day during the season. In the potato shipping season of 1907-1908 only twenty cars of potatoes were loaded on the road, but in the season of 1909-1910 more than eighty carloads were shipped. Grain, coal, hay and lumber constitute the principal carload shipments.

The United States Express Company operates over the Otsego & Herkimer Railroad and the business has shown a very satisfactory growth for the last two years.

ELECTRIC EXPRESS

The Hudson Valley Railway and the United Traction Company of Albany formerly operated their own express and freight service and the Schenectady Railway operated the "Electric Express" as an independent business. In February, 1909, the three railways decided to consolidate and pool their express freight business under the name "Electric Express." Each company rents its cars and freight stations to the Electric Express for a fixed sum per year and furnishes the car crews and power, for which a charge of from 20 cents to 25 cents per car mile, empty or loaded, is made. The Electric Express employs its own agents, who are paid a salary, and supplies the necessary platform labor in the freight houses. The agents report to the manager of the Electric Express, C. H. Armitage, who is also traffic manager of the Hudson Valley Railway and the United Traction Company.

Two regularly scheduled freight cars are operated daily in each direction between Albany and Troy, Albany and Schenectady, Troy and Glens Falls, and Troy and Stillwater. All through freight from Albany to points north of Troy is transferred in Troy. When extra car movements are required the agent at the originating point arranges with the railway superintendent for an extra crew and the necessary orders are given for moving the car.

On the Hudson Valley Railroad a considerable carload business is done and the charges are based on a distance tariff to which the official steam railroad classification is applied. The electric road has switching connections with the Boston & Maine at Stillwater and Thomson and with the Delaware & Hudson at Mechanicville, where cars are received and delivered, but no joint rates on through shipments are in force and the tariffs of the electric road are in the nature of a switching charge. Industrial and farmers' sidings are paid for by the shipper, but in case a car is consigned to a point where there is no siding it may be unloaded from the main line at such times as will not interfere with regular traffic. A charge of $2 per hour is made for this to cover the waiting time of the motor car. Owing to franchise restrictions steam railroad cars cannot be hauled through Saratoga Springs or Glens Falls and no carload shipments are accepted for transportation where the routing involves a movement through these two towns. The principal carload business consists of shipments of pulp wood, pulp and paper and coal.

Prior to Oct. 1, 1909, the Electric Express gave a wagon collection and delivery service in Albany, Troy and Schenectady, but it was conducted at a loss and was discontinued on that date. Shipments fell off slightly at first but gradually increased again, and the business, which formerly showed a deficit, is now a source of profit.

ALBANY SOUTHERN RAILROAD

The Albany Southern Railroad is an electrified steam road 36 miles long which reaches a number of small towns not served by other steam or electric railroads. The American Express Company, which operates over this line, handles most of the package freight shipments, but the railroad also does a large carload and l.c.l. business. Cars are switched to and from the New York Central at Rensselaer and Hudson and to and from the Boston & Albany at Niverville, but no through rates are in force. The Albany Southern applies its local rates from the junction point with the steam railroad receiving or delivering a car. During the navigation season the Albany Southern interchanges carload and l.c.l. freight with the Hudson River night boats at Albany and Hudson, and joint rates are in force covering this traffic. The freight is carted from the boat dock in Albany to the railroad freight house in Rensselaer across the river. The minimum first-class rate is 20 cents per 100 lb., of which the railroad receives 10 cents and absorbs the trucking charge of 3 cents.

Wooden freight houses and team tracks are provided in most of the towns reached, and sidings have been built to serve a number of industries along the line. At Nassau a large piano action factory has been erected recently, and all of its inbound and outbound shipments, amounting to several cars a week, are handled by the Albany Southern. In Rensselaer and Valatie are large knitting and finishing mills, which are served only by sidings from the electric line. Two large dairies ship milk to New York City by way of Rensselaer, and at East Shodack there are a cider mill and a hay and grain warehouse which furnish large shipments during the summer months. Milk is shipped in car-

loads to New York and in smaller quantities to Albany and Hudson. Two express cars are shipped to New York each day, and the Albany Southern receives 25 per cent of the through rate. The revenue from this source is about $450 a month, and between $300 to $350 is received from milk carried in cans in passenger cars. The earnings from other freight are about $3,000 per month, mail, $145 per month, and express, $250 per month.

STRIKE ON CONEY ISLAND & BROOKLYN RAILROAD

The conductors and motormen of the Franklin Avenue, Smith Street and Hamilton Avenue lines of the Coney Island & Brooklyn Railroad, Brooklyn, N. Y., went on strike on Saturday morning, Aug. 5, 1911, to enforce their demands for an increase in wages and for changes in the agreement between the company and the employees which expired on July 1, 1911. The employees of the DeKalb Avenue line of the company, however, previously expressed themselves as satisfied with the separate agreement between them and the company and remained at work.

The employees who went on strike demanded a flat wage of 25 cents an hour for the first ten hours and all straight runs, with all time over ten hours at pay and a half and no swing run to pay less than $2, the run to be completed within thirteen hours, the excess time over thirteen hours to be paid for at the rate of time and a half. Under the agreement which expired on July 1 the men received 23 cents an hour for the first ten hours with pay at time and a half for overtime and with pay for swing runs at the rate of $1.75. The men proposed, however, that the regular tables should continue to be composed of two-thirds straight runs. The agreement which expired provided for a full and impartial hearing in all cases where men were arraigned for infractions of the rules, but this the men wanted modified so as to provide that "all complaints be investigated before motormen and conductors are suspended." In one of the sections of the agreement which expired the company agreed not to object to any motorman or conductor belonging to any labor organization, but the men wished this changed so that any employee not in good standing with the union would be discharged. This change the company declined to make. Among the minor demands the men desired that motormen or conductors instructing new men should be paid 25 cents a day extra.

In all about 390 men are employed on the Franklin Avenue, Smith Street and Hamilton Avenue lines of the company, this number including about ten men members of the organization to which men on the DeKalb Avenue line belong. The Franklin Avenue and the Smith Street cars operate to Coney Island, as do also the DeKalb Avenue cars. The Smith Street line is operated from New York by way of the Brooklyn Bridge through the Gowanus section, while the Franklin Avenue line is operated from New York by way of the Williamsburg Bridge through the Wallabout Canal section.

The company manned cars of the Smith Street and Franklin Avenue lines with men who had been secured by its own employees, but discontinued this service at 6 p. m. On Sunday, Aug. 6, cars were run on both the Smith Street and Franklin Avenue lines on a one-third schedule all day, the service being discontinued about 8 p. m. On Aug. 7 the company operated a five-minute service on Smith Street all day and a ten-minute service on Franklin Avenue, but at night it operated cars only as far as the Park Circle, 5 miles from Coney Island. On Aug. 8 the regular day service was resumed on these lines with cars to Coney Island until 10 p. m. On Aug. 9 the same conditions prevailed, with cars in operation all night in the city and to Coney Island. On Aug. 10 the regular schedule was resumed on all lines.

The company requested the men formerly in its employ to report for their pay on Aug. 8 and turn in the property of the company still in their possession, but very few of them did this.

On. Aug. 10 S. W. Hoff, president of the company, announced that the operation over all lines of the company being normal the company was signing up for regular runs those of its present employees who wished to stay with the company and that on Aug. 11 employment of outside men would be begun to fill such vacancies as existed.

On the first two days of the strike there was considerable lawlessness, but with additional police protection and the speedy punishment by the courts of those who were arrested the rioting subsided. In the city proper a policeman was stationed at every corner of the lines affected and in the middle of each block, and to Coney Island Avenue, between the Park Circle and Coney Island, which is sparsely settled, fifty mounted police and forty patrolmen were assigned to preserve order.

CONDITIONS SURROUNDING DES MOINES LABOR TROUBLES

A strike of the car men on the Des Moines (Ia.) City Railway which threatened to become serious was quickly brought to a pause on Aug. 5 by an injunction granted by the judge of the District Court of Polk County, of which Des Moines is the capital.

The strike followed the discharge of Conductor B. L. Hiatt and the refusal of the company to reinstate him. The reasons for the dismissal of this conductor were stated to be about as follows: On July 20, 1911, an inspector boarded Conductor Hiatt's car and noted that there were several more passengers on the car than indicated by the register. The inspector called the conductor's attention to the condition of his register and it is stated that the conductor became abusive and used foul language in the presence of passengers when denying that he had failed to ring up collected fares. The conductor was discharged. He stood accused of having violated two rules of the company —one by failing to ring up fares, which he denied, and the other by using profane language in the presence of passengers, which it is said that he admitted. On this basis the company refused to reinstate him on application of the union, which is a local of the Amalgamated Association. The company maintained that the contract with the union did not require the company to submit to arbitration the question of whether the management had the right to discharge an employee who confessed that he had violated rules. The management also stated that the outcome of previous cases of this sort had confirmed the present interpretation of the contract, and that any other construction put upon the wording of the contract between the company and the union would immediately destroy discipline.

The agreement of the company with the local union was dated Oct. 11, 1906, and covered a period of five years. It was a so-called "open shop" contract, the railway agreeing that it would not oppose men joining the union and the union, in turn, agreeing that it would not use undue influence to compel employees to join it. Another feature of the contract said that there should be no cessation of work during the adjustment of grievances. The wording of this section of the contract is as follows:

"The employees of the railway company governed by this agreement agree that there shall be no cessation of work on their part for any outside cause or grievance, nor shall there be any cessation of work on their part from any cause whatsoever by the motormen and conductors of the railway company belonging to the Amalgamated Association during the period covered by this agreement; and it is understood and agreed by the parties to this agreement that all motormen and conductors belonging to the Amalgamated Association shall comply with all rules and regula-

tions now in force, or that may hereafter be made and adopted by the railway company, that do not conflict with the terms of this agreement."

The strike began at 1:15 a. m. on Aug. 5 and during Saturday the streets of the city were scenes of disgraceful rioting which the city authorities seemed unwilling or powerless to check. Mobs roamed in all directions, stoned the few cars which were operated and savagely attacked the motormen and conductors in charge of these cars. Three non-union men were arrested on the charge of carrying concealed weapons. Under the law the superintendent of the Department of Public Safety has charge of the duty of suppressing disorderly conduct, but this duty seemed to have been entirely neglected, and J. R. Harrigan, vice-president and general manager of the company, entered a formal complaint that the department had been delinquent in this duty.

THE INJUNCTION

On Aug. 5 Judge Lawrence De Graff, at the request of the executives of the city of Des Moines, granted a mandatory writ of injunction and car service was resumed on the morning of Aug. 6. This injunction was issued as the result of a bill filed by the city executives. Des Moines for the last few years has had the commission form of government and it is quite generally known that the political situation under this form of government has not been such as to assist the railway company in rehabilitating its property and improving its service. The city officials filed with the court a bill, making the Des Moines City Railway Company, with its officers, and the labor union, with its officers, the defendants.

The bill alleged that the controversy between the company and the union over the discharge of Conductor Hiatt had resulted in a strike which caused disorder in the city and which the city was unable to control, causing inconvenience to the public, paralyzing business and endangering life and property. The bill also alleged that a contract existed between the company and the union under which the union claimed and the company denied the right to arbitrate the Hiatt controversy, and that by reason of the public character of the controversy the city and the public were interested in this contract, also that cars standing on the streets were a nuisance. As a result of this bill it is reported that without notice the court granted a preliminary injunction, effective until further order of the court, requiring the company to reinstate Hiatt, requiring the union to rescind its strike order and end the strike and requiring the company and the union to continue the operation of the cars. The company and the union both acceded to the order under penalty of contempt of court.

The notice of the injunction as issued to the Des Moines City Railway on Aug. 5 by the clerk of the court contained the following:

"WHEREAS, the city of Des Moines as plaintiff has this day filed in the office of the clerk of the District Court of the State of Iowa, in and for Polk County, a petition duly sworn to, making the above-named parties defendant therein, and praying for the allowance of a writ of injunction against said defendant: and,

"WHEREAS, the Hon. Lawrence De Graff, one of the judges of the District Court of said county, has made an order allowing said writ of injunction to issue, upon the filing of a bond, with sureties, pursuant to said order; and, whereas, said order has been complied with, and such bond filed and approved; now, therefore, you, the said Des Moines City Railway Company et al., defendants, as aforesaid, in the name and by the authority of the State of Iowa, are hereby strictly enjoined and commanded to forthwith reinstate B. J. Hiatt in the service of said street railway service.

"Commanding the Amalgamated Association of Street and Electric Railway Employees of America (Div. 441) and the officers and executive board thereof above named to forthwith revoke and rescind strike order heretofore issued and all of the members of said association to return to their respective employment or places.

"Commanding said defendants above named to operate the street railway referred to in petition as the same was operated prior to Aug. 5, 1911, all of said acts so enjoined and commanded to be forthwith done and performed until the further order of our said court in the premises."

After the writ of injunction had been presented to the meeting of the union the car men notified the management of the railway that the strike order had been rescinded, and in turn the car men were notified that the railway would carry out the order of the court as laid down by the judge.

The injunction as issued did not set a date for a final hearing and the attorneys for the street railway company have stated that they will ask an immediate hearing. Meanwhile it is expected that the attorneys for the city will attempt to secure a continuance and keep the temporary order in effect as long as possible or at least until after the State fair. The press reports N. T. Guernsey, attorney for the railway company, as declaring the court to be without jurisdiction in the matter and expressing the belief that the injunction will be dissolved. In that event the conditions would be as they were previously; that is to say, the company no doubt would refuse to employ the discharged conductor and the union would again call a strike.

A statement credited to the railway company and published in the Des Moines papers of Aug. 7 is as follows:

POSITION OF COMPANY

"The order in the suit brought by the city last night was signed and filed without any notice to the company that it was proposed to bring this suit. We have obtained a copy of the petition and have had a conference over the matter, which has resulted in the following conclusions:

"First—The company is a law-abiding citizen, and while it believes that the order in question is clearly erroneous it will obey this order so long as it continues in force.

"Second—The company will, with the least possible delay, in the proper way, bring up for determination and have determined the question whether this order was properly entered and, if it was not so entered, will have it set aside.

"This disposes of the existing situation. What the company will do when the situation changes it will determine at that time.

"We hope that we are wrong and that the city is right with reference to this order. If this order stands it means that a public service corporation having a contract with a labor union has a right to go into court and secure a mandatory injunction prohibiting the labor union from striking and requiring it, in case a strike has been called, to rescind the order calling the strike. It is obvious that if this is the law a way has been pointed out for handling these labor difficulties which will be more economical and efficient than any method that has yet been suggested."

On Aug. 9 the Des Moines Railway filed its answer and a motion with the court to dissolve the injunction. The principal feature of the answer is the charge that the company was unable to operate its cars during the strike on account of the failure of the city police to furnish the necessary protection. In its motion for dissolution the company alleges lack of jurisdiction on the part of the court and also a failure on the part of the court to give notice that the order was to be granted. The company alleges that the city brought its suit in collusion with the union for the purpose of compelling the reinstatement of Hiatt; that it is void because the city failed to suppress the disorder but instead arrested employees of the company while endeavoring to move the cars, and that the court is without power to compel the company to employ men against its will.

H. W. Byers, corporation counsel of the city of Des Moines, is reported to have made the following statement in reply to a published statement of Samuel Gompers, who declared that the city's action in settling the street-car strike was a blow to organized labor. Attorney Byers says that if the injunction is sustained the relation of employer to employee will be in no wise affected. Attorney Byer's statement in part is as follows:

"In view of Samuel Gompers' comment on the meaning of Judge De Graff's order on the street railway matter, I have been requested to state through the press the basis of Judge De Graff's jurisdiction and powers in the matter as I understand them and the probable effect of the principles involved, if sustained, upon labor unions and their members.

"In preparing and presenting the petition in the case to Judge De Graff, the city rested its right to a mandatory writ of injunction upon the following, among other grounds:

"First.—Street railway service is a public necessity in the city of Des Moines. The Des Moines Street Railway Company and the employees involved in Judge DeGraff's order voluntarily assumed the obligation to perform that public service and are bound to meet the duty and obligation thus assumed in a manner that will not be harmful to the public, either in injury to the citizen or destruction to his property.

"Second.—The city and the public are, in one sense, beneficiaries under the working agreement existing between the Des Moines City Railway Company and its employees, and the law will not permit such a violation or breach of the contract as will necessarily result in injury to either the city or the public.

"Third.—Under the law in this State the city is not only given the control and supervision of the streets, avenues and alleys of the city, but it is made its duty to keep them free from obstruction and to maintain them in a safe condition for public travel and use. To fully and completely exercise its power over its streets and to meet the duty and obligation enjoined upon it by law it may properly invoke the aid of a court of equity and especially so when the basis of relief asked is the threatened interference with the free and unobstructed use of the streets by the people and the threatened destruction of property.

"The above were the principal grounds relied upon by the city in the proceedings before Judge De Graff, and, while it may be that the case is an unusual one, the principle involved is as old as civilization. The situation was unusual and demanded the exercise of extraordinary powers. If Judge De Graff's order is sustained, as we hope and firmly believe it will be, it will not result in enslaving labor as suggested, nor in any manner changing or affecting the relation of employer and employee. Their difficulties will have to be settled and adjusted between themselves under well-established rules of law. It will, however, be a vindication of the principle recognized in every country where obedience to law is the test of good citizenship that in case of conflict the rights and interest of the individual and the corporation must give way to the larger and more important interest of the public."

EXHIBIT ARRANGEMENTS

The exhibit committee of the American Electric Railway Manufacturers' Association announces that it has made special contracts in connection with the Atlantic City convention with the Ingalls Construction Company for all electric signs, power connections and special lighting, with C. M. Koury for all Oriental rugs and carpets, Edwards' Floral Exchange for all plants and flowers and floral decorations, and with Shoemaker & Company for furniture. In consideration of these contracts, these dealers have agreed to have everything ready in space of an exhibitor by Oct. 7, provided orders are placed at once.

COMMUNICATION

THE LARGEST CABLE ORDER

BERLINER ELEKTRICITATS-WERKE

BERLIN, July 22, 1911.

To the Editors:

An article appears on page 1028 of your issue of June 10 regarding an order for cables recently placed by the Boston (Mass.) Elevated Railway Company in which you say that this order is said to be the largest ever given for underground cables. We take the liberty of calling your attention to the fact that we have placed an order with the Allgemeine Elektricitäts-Gesellschaft at Berlin, Germany, for this year's extension of our distribution system from our Oberspree power station for the following underground cables:

One hundred and fifty-five miles three-conductor, paper-insulated, lead-incased, iron-armored cables, with a cross-section of 3 x 50 mm² (3 x 100,000 circ. mil) copper and for 30,000 volts working pressure. The manufacture of this order calls for about 749,000 lb. of copper, 1,156,575 lb. of paper (578 tons), 4,846,600 lb. of lead, 1,762,400 lb. of hoop iron and 1,321,800 lb. of jute, tar, etc.

Five hundred and fifty-five cars were required to transport the finished cables.

In addition to the above the following cables have also been required this year for the extension of the company's distribution system:

Ninety-three miles of three-conductor, paper-insulated, lead-incased, iron-armored cables, with a cross-section of 3 x 10 mm² (3 x 20,000 circ. mil) copper and for 6000 volts working pressure;

Forty-seven miles of cables of like pattern with a cross-section of 3 x 50 mm² (3 x 100,000 circ. mil) copper and for 1000 volts working pressure, and

Five hundred and ninety miles of testing and telephone cables.

The figures given above do not include those necessary for this year's extension of the network of the city of Berlin and those suburbs which are being supplied with electricity by our works.

BERLINER ELEKTRICITATS-WERKE.

A FIELD COIL REPAIR ECONOMY

The Toledo Railways & Light Company has in service a number of motors equipped with spool-wound-type field coils. Grounds on such coils generally occur between the inside layer of the winding and the shell on which the coil is wound, with the result that the defective coil must be stripped and rewound. In the Toledo shops, as fast as grounded coils of the spool-wound type develop, the spools have been split by taking a cut about ¼ in. wide out of the center of the spool. The two separate flanges are then applied to the coil after it has been wound on a wooden form.

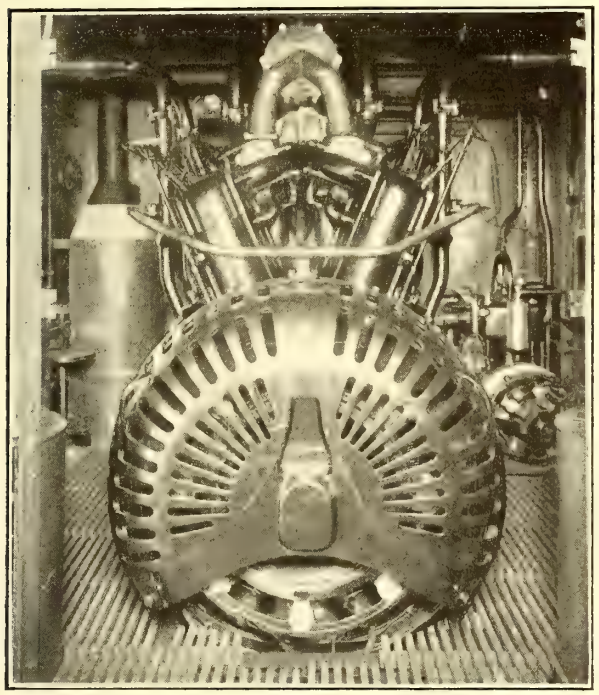
There are two advantages of this construction. By removing the flanges and the underlying insulation internally grounded field coils very often can be repaired at minimum cost. Drying out of the field coil insulation tends to loosen the winding on the spool, resulting in a shaky coil and ultimately a loose connection. With the split spool the coil can be held securely in place by tightening up the pole piece bolts.

The Sao Paulo Tramway, Light & Power Company, Sao Paulo, Brazil, Ltd., generates its current from a waterfall of the River Tiété, which is situated 23 miles from the city and is capable of developing up to 60,000 hp. Power is conveyed by transmission line built upon the company's private right-of-way. The company operates 105 miles of track in the city and surrounding districts.

GAS-ELECTRIC CAR FOR SAN FRANCISCO RAILROAD

A short article on the six gas-electric motor cars which the St. Louis & San Francisco Railroad Company has purchased from the General Electric Company was published in the ELECTRIC RAILWAY JOURNAL for July 22, but further particulars are now available.

The cars are 70 ft. long and 10 ft. width over the sills, with arch roof, pointed front end and observation rear platform. They are designed with special reference to light construction with adequate strength. The interior arrangement is designed to meet the Southern traffic conditions, providing separate accommodations and entrances for white and colored passengers. The observation platform is unusually wide and is equipped with trapdoors and brass railings. The windows are large, fitted with plate glass and so arranged that they may be raised to a height of 17 in. The window curtains are of pantasote and equipped with pinch handle fixtures. The interior of the car is finished in a high grade of mahogany with paneling on the bulkheads. Each of the three compartments has a toilet and drinking fountain. Electric fans are installed in each compartment. The seats are of unusual length, providing commodious accommodations for two persons and are amply large enough to seat three. The partition between the baggage room and negro compartment is movable and may be arranged to give the baggage compartment a length of 8 ft. or 1 ft. 5 in. to suit traffic requirements.



Gas-Electric Car—Main Engine and Cab

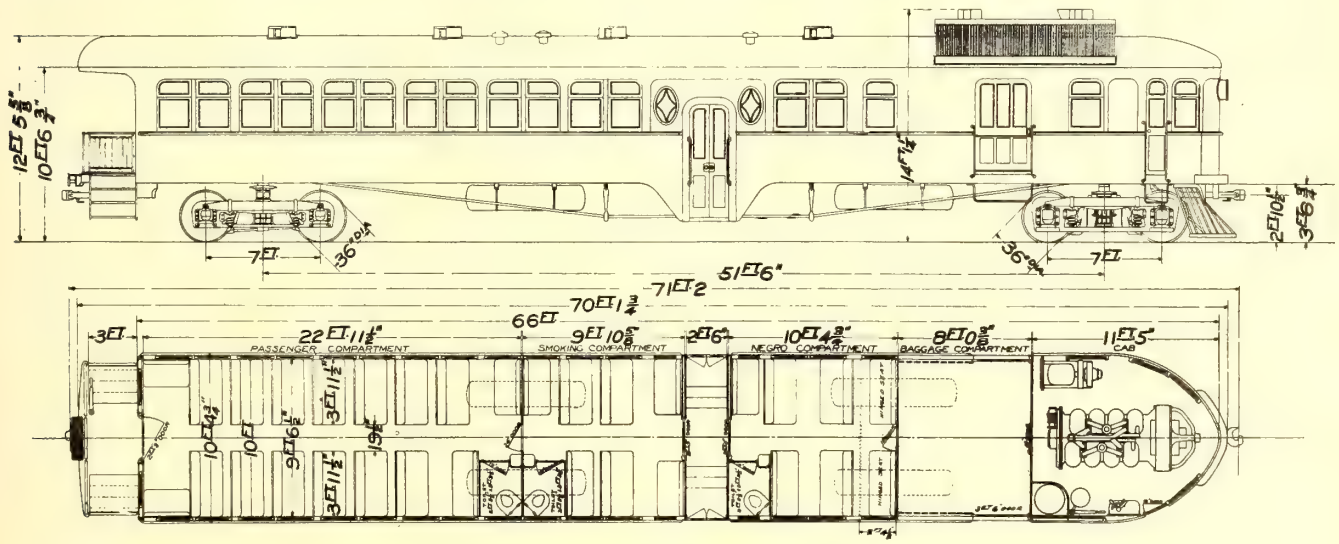


Gas-Electric Car—Front View

The framework of the car is entirely of steel, the under framing consisting of two I-beams for center sills and two channels for outside sills with truss rods for reinforcement. The center sills extend through to provide suitable supports for the rear platform. The outside sheathing is of sheet steel riveted to the posts with bats at the joints. The posts and carlines are of steel T's. The roof is of galvanized iron plates riveted to the carlines, except under the radiators, where it is of copper with well soldered joints. The floors in the passenger compartments are of two thicknesses with a heavy layer of felt between. There is also an additional lining of sheet iron beneath the lower wood floor.

Equipped and ready for operation the car will weigh in the neighborhood of 48 tons.

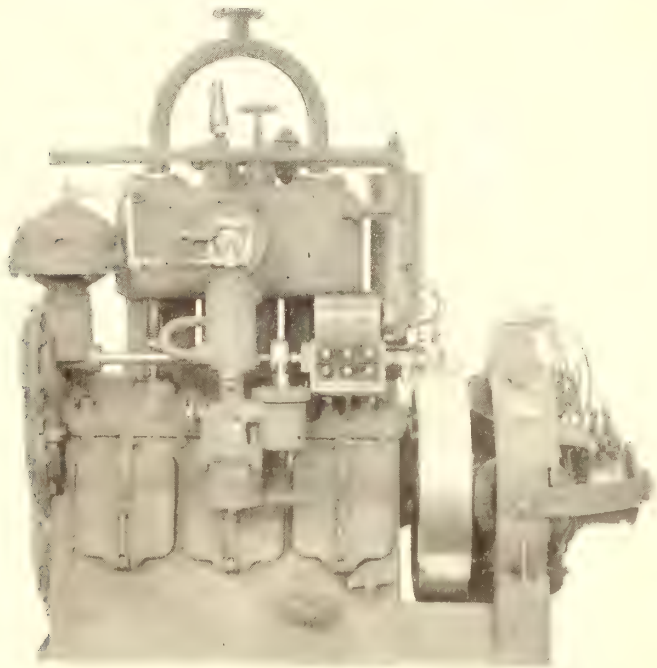
The power equipment is located in the cab at the front end of the car and consists of the following: A main gas engine generating set, consisting of an eight-cylinder gasoline engine with direct-connected generator, an auxiliary gas engine generating set with integral air pump and lighting generator, equipment for motor control, air and hand brake systems, pneumatic bell ringer, sander, warning and



Gas-Electric Car—Elevation and Plan

signal whistles and a coal-fired hot-water heater. The motors are mounted one upon each axle of the front truck.

The main gas engine is of the eight-cylinder, four-stroke cycle "V" type. The generator magnet frame is bolted to the frame of the gas engine, which rests upon the floor of the car with cushion support. The speed of the engine is adjusted by a throttle, the normal speed being 550 r.p.m. The cylinders are 8 in. in diameter with 10-in. stroke. The ignition system consists of two low-tension Bosch mag-



Gas-Electric Car—Auxiliary Engine and Generator

netos, one for each side of the engine, with Bosch magnetic spark plugs. The engine is lubricated by oil under pressure, delivered by a plunger pump direct-driven from the crankshaft. Gasoline is delivered by a direct-driven pump to the carburetors, which are of the automatic constant level type. The engine-cooling system consists of thermo-siphon circulation of the water in radiators of fin tube type, which are located on the roof of the car, with flexible metal tube connections from the engine to the radiator headers. The engine is started by air stored in tanks beneath the car, which may be charged from the auxiliary gas engine set or from the main compressor located at the rear end of the main engine and direct-driven from the crankshaft. The main compressor has a capacity of 22½ cu. ft. of free air per minute

The main generator is of the commutating-pole type designed specially for heavy traffic work The entire machine is inclosed within a three-arm bracket which supports the outer bearing of the generator armature.

The motors are of the box-frame, commutating-pole, oil-lubricated type, known as GE-205, 600-volt, 100-hp motors.

The auxiliary gas engine set consists of a three-cylinder, four-stroke cycle, vertical type gas engine, the center cylinder being used as an air compressor. The lighting generator is direct-connected to the gas engine with armature of the overhung type. A fly-ball gear-driven governor acting on a butterfly valve in the intake pipe is used to maintain a constant speed of 600 r.p.m. The cooling system for this engine is the same as for the large engine. The air pump on this engine is capable of delivering 45 cu. ft. of free air per minute and will charge the tanks to a pressure of 90 lb. in about ten minutes. This pump is used to supply air for starting the main engine after it has been idle if pressure in the main reservoirs has gone down. The auxiliary gas engine is started by hand.

One of the distinguishing features of these cars is the flexibility of control. Power is delivered to the motors from the main generator through a controller of a type similar in appearance to those used in trolley practice. Concentric with the electrical controller handle, but above it, is an air-starting throttle handle. This handle is so arranged that by pressing a lever air for starting the engine may be admitted to the engine distributing valve through an air valve mounted upon the car plate of the controller, at the same time opening the throttle. Provisions are made, however, so that the throttle may be open only to a set distance to prevent the racing of the engine. The engine started, the lever may be released, cutting off the air pressure, and the throttle opened wider. It is not possible to admit air again to the engine without returning to the initial point, thus closing the throttle. The direction of the car may be reversed, in a manner similar to that employed on a trolley car, by the moving of the reversing handle, the gas engine always running in the same direction.

The brake system consists of straight and automatic air with auxiliary hand brakes.

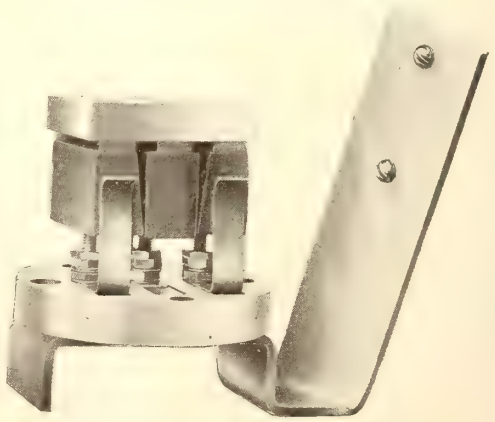
The car is heated by hot water supplied either from the gas engine jackets or from a coal-fired Baker hot-water heater located in the corner of the cab, which is fired from the baggage room. Provision is made so that hot water from the coal heater may be circulated through the engine jackets and radiators to prevent freezing on cold nights or during layovers.

The trucks are of the swing-bolster type, the frames being of boiler-plate steel with pedestal shoes of cast iron. The bolster springs are triple elliptic and the equalizer springs triple coil. The wheels are 36 in. in diameter with standard M.C.B. treads and flanges. Each truck has a wheel base of 7 ft., the total wheel base of the car being 58 ft. 6 in.

TELEPHONE PROTECTION FOR OUTDOOR SERVICE

A type of open space cut-out, which has been developed within the past year by the Western Electric Company and has already come into extensive use on telephone lines in railroad and commercial service, is the so-called No. 86 type protector. This device is made in two forms, one with a tin cover and the other with a cast-iron cover, known, respectively, as Nos. 86-A and 86-B. These covers are chained to the framework of the protector mounting, so that they cannot be lost through carelessness of the lineman.

The protector itself is mounted on a porcelain base, through the bottom of which the leading-in wires are



Cut-Out with Protector Open

brought in, and consists of heavy carbon blocks, as shown in the illustration. The spacing between these blocks regulates the voltage at which the protector operates. Under normal conditions this is adjusted to discharge at 1000 volts.

The shape of the carbon blocks gives a variable gap be-

tween the ground block and the two blocks connected to the line wire. The protectors are arranged so that carbon dust carried across by the discharge will not clog the spark gap, but will automatically drop to the bottom of the protector.

The No. 86 type protector, as is noted, is designed for use both outside and indoors, and it is arranged so that it can be mounted directly on the pole itself. In some cases it is desirable to have a protector which can be located in this manner outdoors, although, as a general proposition, such a practice is not to be recommended on account of the additional maintenance difficulty thereby involved.

On telephone train-dispatching lines the No. 86 type protector is being used to a considerable extent throughout the country and it is giving very good satisfaction.

NEW MILWAUKEE SPRINKLING CARS

The Milwaukee Electric Railway & Light Company is now operating eight new sprinkling cars of the design shown in the accompanying illustration. The bodies of these cars were built by the St. Louis Car Company and the tanks were installed at the railway company's shops in Milwaukee. The general dimensions of the cars follow:

Length over end sills	38 ft.	0	in.
Length over buffers	38 ft.	8	in.
Width over side sills	7 ft.	6	in.
Truck center	22 ft.	0	in.
Height from rail to underside of sills		40¾	in.
Height from rail to underside of bottom bolster plate		30¾	in.
Height from center of rail to center of drawbar		19	in.

The underframing includes side and center sills made of 10-in., 30-lb. I-beams connected by cross-sills made of 8-in., 18-lb. I-beams and end sills made of 10-in. 15-lb. channels bent to a radius of 7 ft. 5½ in. The joints between the steel underframe members are reinforced with heavy angles and the frame is diagonally braced with ⅜-in. x 2½-in. steel bars riveted to the longitudinal cross-sills.

The saddles, of which there are four, are built of ¼-in. plate, reinforced top and bottom with 3-in. x 3-in. x ⅜-in. angles. The bottom reinforcing angles are riveted to the side and center sills and the connections are reinforced with gusset plates. Steps are provided at all four corners of the car, and each end is covered with a vestibule, open at the rear. The sprinklers are equipped with air and hand brakes, two St. Louis Car Company's air sander boxes, 14-in. foot gongs and the company's standard M. C. B. type coupler and automatic trip fender. The body is supported on two St. Louis Car Company's trucks, No. 90 M.C.

The spray nozzles, three in number, are controlled from the car-operating position and are so arranged that the street may be sprinkled directly between the rails and on either side of the track or on both sides as required.



New Double-Truck Sprinkling Car at Milwaukee

EXPERIMENTS WITH THE BRIQUETTING OF LIGNITE

The results of the investigations into the briquetting of lignite have just been published by the Bureau of Mines in Bulletin No. 14. Charles L. Wright, who conducted the tests and who is author of the bulletin, declares that enough testing has been done to indicate that some American lignites equal German lignites in fuel value and can probably be made into briquets on a commercial scale without the use of binding materials. The author says that the cost of briquetting run-of-mine lignites with the German plant which was useed would be from $1.35 to $1.75 per ton, according to the location of the plant. The cost per ton of briquets, loaded on cars, from a briquet plant at the mine would be, in Texas, $2.51; in North Dakota, $3.53, and in California, $5.24. These figures are only approximate and are subject to wide changes because of local conditions. They apply to briquetting run-of-mine lignite to improve its heat value and weather-resisting properties rather than to briquetting slack or waste coal. Since the tests have shown that at least some lignites slacked by exposure to the weather can be made into excellent briquets, it may be possible to utilize lignite slack as well as bituminous slack and anthracite screenings for briquetting, the two latter materials having been made into briquets on a commercial scale both in this country and abroad. Of four samples of raw lignite, three samples contained about 40 per cent moisture and had a fuel value of 6079 b.t.u. to 6241 b.t.u., while a Texas lignite, with a moisture content of 33 per cent, had a fuel value of 6840 b.t.u. The percentage of moisture removed in the process of briquetting ranged from 24 per cent to 32 per cent.

ELECTRIC RAILWAY LEGAL DECISIONS

CHARTERS, ORDINANCES AND FRANCHISES

Indiana. — Eminent Domain — Proceedings — Appraisers' Award—Estoppel—Appeal.

In a condemnation proceeding the defendant excepted to the appraisers' award, demanding a review because the damages for land taken were inadequate, yet assenting to that part of the award fixing the value of the improvements. Plaintiff claimed that defendant was estopped because he had not excepted to the assessment of the improvements. Held that although a party cannot accept the benefit of an award and then contest its validity, the defendant was not estopped here because the case was tried de novo on his exceptions, his entire damages being in issue, and the burden of proof being upon him to establish them to improvements as well as land. (Indianapolis Traction & Terminal Co. v. Ripley et al., 93 N. E. Rep., 546.)

Indiana.—Private Property Taken for Power House.

An instruction that interurban railroad companies are so far quasi-public corporations that they may, on rendering compensation, take private property in fee for a power house and carhouse, when necessary to such use, is not subject to the objection that the jury might believe that the question of necessity was involved in the trial and that the burden of proving it rested on plaintiff, where the court had already instructed that the only question involved is the amount of damages defendant is entitled to. (Muncie & P. Traction Co. v. Hall et al., 90 N. E. Rep., 312.)

Indiana.—Eminent Domain—Bar to Recovery of Damages.

That a railroad was constructed along a street with the knowledge and consent of an abutting owner is not a bar to his right to recover damages for injuries done to his property. (Indianapolis Southern R. Co. v. Shea, 90 N. E. Rep., 330.)

Maine.—Construction—Change of Grade of Street—Damages.

Where, under the provisions of Rev. St. chap. 53, sec. 19, the grade of a street railroad located on the side of a town way was established and fixed by the municipal officers of the town, and also by authority of the municipal officers, the grade of the traveled side of the way was raised so as to conform to the grade of the street railroad, and an abutting owner was damaged thereby, held that under the provision of Rev. St., Chap. 23, Sec. 68, the town was liable for the damages sustained by the abutting owner. (Hurley v. Inhabitants of South Thomaston, 74 Atl. Rep., 734.)

New Mexico.—Crossings with Steam Railroad—Injunction.

Where a railroad company, suing to enjoin a street railroad company from crossing its tracks until the place and manner of crossing had been determined by the court, under Laws 1905, Chap. 97, Sec. 13, on the intimation of the court that it had no jurisdiction, asked for twenty-four hours to file an amended bill, and within that time so changed its tracks at the proposed point of crossing as to destroy the usefulness of steel crossings prepared by the street railroad company, it was proper for the court to issue a mandatory injunction commanding the railroad company to restore the status quo, but the court could not enjoin it from interfering with the street railroad company in the laying of its tracks, since the latter could not cross the railroad company's track except by agreement or on determination by the court. (Atchison, T. & S. F. Ry. Co. v. Citizens' Traction & Power Co., 113 Pac. Rep., 813.)

New York.—Taxation—Corporate Franchise—Completion of Railroad—Assessment—Equalization on Certiorari.

A special franchise of a railroad company may be assessed for taxation, although its road is not completed and in actual operation so as to earn revenue. In the assessment of a special franchise the cost and assessment of other property not of like nature in itself or in its business uses are not competent evidence. Where the State Tax Board has assessed a corporation's special franchise at its full value, and other real property in the same municipality is assessed on 89 per cent of its value, the valuation of the company's property should, on certiorari, be reduced accordingly so that it will stand on an equality with other property. (People ex rel. Hudson & M. R. Co. v. State Board of Tax Com'rs et al., 126 N. Y. Sup., 1063.)

Wisconsin.—Municipal Regulation—Street Sprinkling.

St. 1898, Sec. 1862, subjecting street railroads to municipal regulation, authorizes adoption of a reasonable ordinance requiring them to sprinkle streets occupied by them. An ordinance requiring a street railroad to sprinkle the part of streets occupied by it is not void as discriminating in favor of users of automobiles and other vehicles who are not compelled to bear like expense. (State ex rel. City of Milwaukee v. Milwaukee Electric Ry. & Light Co., 129 N. W. Rep., 623.)

Wisconsin.—Constitutional Law—Obligation of Contracts—Reservation of Power to Alter Franchises.

If the Legislature should specifically authorize a city to contract with an interurban railroad that its fare between the cities should not exceed 10 cents, such a contract, being made by the city as agent of the State, would be binding during its life and could not be impaired by subsequent legislation unless the ordinance which, with the acceptance thereof, constitutes the contract be considered part of the charter of the railway company and so subject to amendment or repeal under the power reserved by Const. Art. 11, Sec. 1. But where the city makes such a contract only under the power given it by St. 1898, Sec. 1863, as amended by Laws 1901, Chap. 425, to give its consent, on such terms as it may prescribe, to an interurban line using its streets, not only is there no specific power to make it and no surrender by the State of its governmental power of fixing rates, so that the right of the State to interfere when the public weal demands it is not abrogated, but the right conferred on the railroad company to use the street becomes one of its franchises, so that the conditions on which it was given may be modified by the Legislature under the power reserved to it by Const. Art. 11, Sec. 1, to repeal or alter charters and franchises of corporations. (City of Manitowoc v. Manitowoc & Northern Traction Co., 129 N. W. Rep., 925.)

LIABILITY FOR NEGLIGENCE

Arkansas.—Action for Injury to Intoxicated Person.

In an action against a street railroad company for injury by being struck by a car while walking toward it on the track in an intoxicated condition, where plaintiff was clearly guilty of contributory negligence, an instruction which warranted the jury in assuming that his intoxication relieved him from the consequences of such negligence was erroneous and prejudicial to defendant. (Little Rock Ry. & Electric Co. v. Billings, 173 Fed. Rep., 903.)

Delaware.—Injuries to Passenger on Wrong Car.

Where a person, with a right to transportation upon one of a street railway's cars by mistake enters another, he must be treated as a passenger with respect to his safety while on it. (Butler v. Wilmington City Ry. Co., 78 Atl. Rep., 871.)

Indiana.—Travelers at Crossings—Duties—Care Required of Deaf Persons.

A motorman may assume that a traveler seen approaching a crossing sees or hears the cars approach and will use ordinary care to avoid danger. As to liability to travelers at road crossings, there is no difference between a steam railway and an interurban line operating on its own private right-of-way or outside the traveled part of a highway. A traveler who is partly deaf in crossing a railroad track must use his other senses to avoid danger. (Snow v. Indianapolis & E. Ry. Co., 93 N. E. Rep., 1089.)

Indiana.—Notice to Agent—Carriage of Passengers.

Notice to the agent of a corporation relating to any matter of which he has control and management is notice to the corporation. Though a carrier is not an insurer of its passengers, it is not only required thoroughly to examine and test its vehicles, machinery and all parts and appliances used in transporting passengers, but it is required further thoroughly to examine the vehicle and machinery from time to time to know whether they are deteriorating. When it is established that a passenger on a boat, while being carried as a passenger for hire, has been thrown into the water and drowned, without his fault, by the sinking of the boat or the breaking down of parts thereof, the law presumes negligence of the person operating the boat. (Indiana Union Traction Co. v. Scribner, 93 N. E. Rep., 1014.)

Indiana.—Crossing Accident—Last Clear Chance Doctrine.

Plaintiff was struck and killed while attempting to cross the grade crossing of an interurban electric railway. The car was 300 ft. from the crossing when the motorman discovered that decedent was attempting to drive across the track, and other witnesses testified that when the car was that distance away the horses were on the track and that deceased was looking toward the car, which was moving at 30 m.p.h. while the horses were walking. Held that such evidence was sufficient to justify an instruction that plaintiff could recover, notwithstanding decedent's negligence exposed him to the risk of injury, if such injury was more immediately caused by defendant's omission, after becoming aware of the danger, to use ordinary care to avoid injuring him, etc. (Indiana Union Traction Co. v. Myers [No. 6874], 93 N. E. Rep., 888.)

Kentucky.—Duty to Alighting Passengers.

A street railway company's only duty to an alighting passenger who has signaled the car to stop is to stop until he has safely alighted, personal assistance not being required. (Bullitt v. Louisville Ry. Co., 134 S. W. Rep., 1153.)

Massachusetts.—Injuries at Crossings Caused by Boys Coasting.

In an action against a street car company for injuries to a boy sliding down hill, where evidence showed that the motorman had his car under control and had stopped to let another boy go safely in front of the car, it was not negligence on the motorman's part that he failed to see and prevent plaintiff from running under the rear wheels and being injured. While it is the duty of a motorman to keep his car under control and to be alert at intersecting streets to avoid collisions, he is not bound to look out for travelers who may run into the rear of his car. (Kiley & Boston Elevated Ry. Co., 93 N. E. Rep., 632.)

Massachusetts.—Injuries to Passengers from Premature Effort to Alight.

Where an elevated train had nearly reached a station and then properly stopped on the curve just outside to wait for a signal to enter, so that it was the duty of the brakeman to announce the station, which he did, the act of the brakeman in removing chains stretching across the open space on platforms of the cars in accordance with his regular practice was merely a reasonable preparation to facilitate rapid transit by avoiding the necessity of delay to travelers and it was not a negligent act for which the railroad was liable to a passenger on the platform falling therefrom on the train starting to enter the station. (Crowley v. Boston Elevated Ry. Co., 90 N. E. Rep., 532.)

Massachusetts.—Injuries to Passengers from Sudden Start.

In an action against a street car company for personal injuries from the sudden starting of a car, an instruction that a common carrier has a duty with reference to the passengers, which is to exercise the highest degree of care which can be exercised by human agency consistent with the operation of the road, it is not the care of ordinary prudence, it is the highest degree of care which a man can exercise with reference to running his car, and the failure of the conductor to exercise proper care is the negligence of the road, etc., was erroneous as setting the standard of defendant's care too high, since the conductor was only required to exercise the highest degree of care consistent with the practical management of his car for the carriage of passengers. (Gardner v. Boston Elevated Ry. Co., 90 N. E. Rep., 534.)

Michigan.—Crossing Accident—Speed—Negligence—Contributory Negligence.

Operation of an electric car in the country at a speed of 40 or 50 miles an hour over a crossing at which decedent was killed may be negligence or not, according to the surrounding circumstances, but is not negligence per se.

Where decedent drove on an electric railway crossing in the country, without looking for a car by which she was struck and killed, which was in plain sight before her horse reached the place of danger, and she could easily have avoided the accident, she was guilty of contributory negligence, precluding a recovery for her death. (Folkmire v. Michigan United Rys. Co., 121 N. W. Rep., 811.)

Michigan.—Injury to Passenger—Boarding Car.

Though an attempt by a man of sixty-two, weighing 200 lb., to board a street car going 6 miles an hour may be negligent and the jury would be justified in so finding, where it was not conclusively shown that the car was going 6 miles an hour and where the conductor was apprised of the person's intention to board the car in motion and of the danger, and rang the bell twice, the question of contributory negligence was for the jury. (Orth v. Saginaw Valley Traction Co., 127 N. W. Rep., 330.)

New York.—Carriers—Passengers—Jury Question—Contributory Negligence—Riding on Platform.

While a street car passenger while riding on the front platform assumed the ordinary risks of riding in that position, he was not negligent as a matter of law in not foreseeing that the motorman might permit the platform to become overcrowded, so that he could not control the car, causing a collision with a vehicle. (Garber v. Joline et al., 119 N. Y. Sup., 1070.)

New York.—Place to Alight—Transfers—Contributory Negligence.

A street railway company does not fulfil its duty to a passenger by furnishing him a suitable place to alight from its car where he is required to transfer from one car to another but must also furnish a reasonably safe way to make the transfer.

Where at a street railway transfer point one of the cars rounded a curve, but there was ample space for passengers to walk along the street adjacent to the car to make their transfer without danger from the overhang at the point of greatest projection, a passenger struck and injured by the overhang of a car while rounding the curve, because he walked too close to the track, was negligent. (Creenan v. International Ry. Co., 124 N. Y. Sup., 360.)

Tennessee.—Large Load on Car—Injury to Eye of Pedestrian.

That a street railway company permitted so large a number of passengers to occupy a car as to heavily load it while on a sharp ascent in the street did not show actionable negligence to a traveler on the street. A person while passing near a heavily loaded street car stalled on an upgrade was struck in the eye with force by a hard substance coming from under the car while its wheels were revolving rapidly in the same place on the track. An expert testified that the probable effect of such revolution of the wheels would be to throw out slivers of steel from the rail or wheel, or both. The track was examined at the place of the accident soon after it occurred and particles of sand were found on it; but it did not appear that the car men had used any sand. It was customary to place sand on the track when needed to prevent the slipping of the wheels. There was no evidence that either the machinery or the wheels of the car or rails were defective. Held, as a matter of law, that actionable negligence of the street railway company was not shown. (De Glopper v. Nashville Ry. & Light Co., 134 S. W. Rep., 609.)

Texas.—Boarding Car in Motion Not Negligence per Se.

It is not negligence per se in one desiring to get on board a car with a view of taking passage thereon to attempt to board the car while it is moving. (Osborne v. Texas Traction Co., 134 S. W. Rep., 816.)

Washington.—Master and Servant—Injuries to Servant—Violation of Rule.

A conductor on a street car injured in a collision between the car and a railroad train at a crossing could not recover from his employer where he permitted the motorman to run the car at the rate of 30 m.p.h. up to within 75 ft. of the crossing in violation of a rule of the employer, when both he and the motorman knew that the brakes were out of repair, and the conductor, having power to control the speed of the car by signals, made no effort to reduce the speed. (Craig v. Great Northern Ry. Co. et al., 106 Pac. Rep., 155.)

Wisconsin.—Dogs on Track.

A street car company is not required to stop its cars, when running at a legal or reasonable rate of speed, to avoid collision with dogs. A motorman operating a car is entitled to act on the presumption that ordinarily a dog on a street car track will get out of the way. Smith v. Railroad Co., 79 Minn. 254, 82 N. W. 577, followed and applied. (Henry v. St. Paul City Ry. Co., 124 N. W. Rep., 245.)

News of Electric Railways

Program of Meeting of C. E. R. A.

The Central Electric Railway Association will meet at Cedar Point, Ohio, on Aug. 23 and 24, 1911. It has been decided to make this a two-day meeting, and the following program of papers has been announced:

AUGUST 23—1:30 P. M.

Business session and reports of special committees.

Paper, "Headlights," by C. Dorticos, representative of the General Electric Company, Chicago, Ill.

Discussion.

Paper, "Insurance," by Henry N. Staats, insurance expert of the Central Electric Railway Association and the American Electric Railway Association.

Discussion.

Paper, "Overhead Standardization," by A. Schlessinger, superintendent of overhead construction of the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.

Discussion.

AUGUST 24—9 A. M.

Paper, "Little Things That Count," by J. C. Shade, assistant secretary-treasurer of the Winona Interurban Railway, Warsaw, Ind.

Discussion.

Paper, "Troubles of a Baggage Agent," by O. E. Anthony, baggage agent of the Indianapolis Traction & Terminal Station, Indianapolis, Ind.

Discussion.

Paper, "Trailer Car Operation vs. Multiple Unit Trains," by Clarence Renshaw, of the engineering department of the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.

Discussion.

The executive committee of the association will meet at the Breakers Hotel, Cedar Point, Ohio, at 9 a. m., on Aug. 23, to transact routine business. The hotel committee of the association has planned the following entertainment for the members of the association:

AUGUST 23

10 a. m.—Annual bath in the surf at Lake Erie.

11 a. m.—Water baseball in front of the Breakers Hotel.

7:15 p. m.—Fish supper served in the convention hall for members and visitors.

8:30 p. m.—Informal ball.

AUGUST 24

9 a. m.—Exploration expedition through the lagoons for the ladies.

1:30 p. m.—Trip on *Wehrle* to Lake Islands for the members and ladies.

Mayor Whitlock Approves Rental Ordinance

Brand Whitlock, Mayor of Toledo, Ohio, on Aug. 3, 1911, approved the ordinance recently enacted by the City Council providing for the payment of rental by the Toledo Railways & Light Company at the rate of $250 per day for the use of the streets where its franchises have expired. City Solicitor Schreiber is authorized by the ordinance to file suit to compel the company to vacate the streets in case it refuses to pay this rental. Mr. Schreiber is preparing an ordinance providing for 3-cent fare on the lines affected, with the idea of offering the company the alternative of operating at this rate of fare. Mayor Whitlock made the following statement in regard to the ordinance:

"I have approved the ordinance drawn by Mr. Schreiber because it is the unanimous or nearly the unanimous opinion of Council that it may tend to hasten a solution of the whole problem. If it will do that, I shall be very glad. The ordinance is not out of harmony with the administration's program for the solution of the transportation problem. In our letter of Dec. 15, 1910, in which the program was marked out, it was stated that the question of the temporary use of the streets was allowed to rest only in the hope of obtaining a solution of the larger problem.

"The ordinance grants no permanent rights and it is revocable at the will of Council, and inasmuch as it instructs the city solicitor to bring suit if the company does not pay the rental demanded, it will, at least, bring about an earlier judicial determination of questions which the company might be expected ultimately to raise, and thereby shorten the period of delay.

"I repeat, however, what I have so often said, that I should consent to no permanent solution of the transportation problem on the basis of rental, or of any division of profits, for that method affords no direct benefit to the street car passengers, that is, to the mass of the people."

Electric Railway Prospects in Connecticut

The Connecticut House has passed a bill giving further right to the Shore Line Electric Railway to lay additional tracks between its Saybrook-Essex line and the Old Saybrook ferry, and to sell electricity in Lyme, East Lyme, Chester, Saybrook, Essex, Old Saybrook, Clinton and Madison. The new electric railway charters which have passed the House are those of the Norwalk & New Canaan Electric Railway and the New Britain, Kensington & Meriden Street Railway. The former is a renewal of a charter which was allowed to lapse several years ago and provides for an electric railway between Norwalk and New Canaan. The latter provides for an electric railway over a new route between New Britain and Meriden via Kensington in Berlin and through Cat Hole Pass into Meriden by Lewis Avenue. The rights given in this charter cannot be exercised until after the lapse of a charter for a line over somewhat the same route owned by C. J. Danaher, of Meriden, which has a year and a half yet to run. The House has also passed the extensions and additional charter rights of the Connecticut Company in Hartford, New Haven, Orange, Meriden, Norwich and New London and of the Connecticut Railway & Lighting Company in Waterbury, Fairfield, Stratford and Bridgeport. The latter company has also been given the right to sell gas for lighting and heating purposes in Watertown and Redding and Easton. There is a spirited fight on before the committee on railroads for a charter for an electric railway between Shelton and Bridgeport by way of Huntington Centre, Trumbull and Nichols, which the Connecticut Company is opposing because of the claim that it is brought forward at the eleventh hour and is a parallel line to its Shelton and Bridgeport line, which runs by way of Stratford and the Housatonic Valley. The bill is offered as a substitute for a measure which would have reduced by 5 cents the through fare on the latter line.

Vice-President Rea of Pennsylvania Railroad Counsels Caution in New York Subway Matters

Samuel Rea, vice-president of the Pennsylvania Railroad, authorized a statement warning New York City against certain dangers, as he sees them, in the subway plan under which work is now going ahead on the Lexington Avenue line. Mr. Rea said he relied upon the good sense and civic pride of the Public Service Commission, the Board of Estimate and the Mayor to defer active construction work until the various legal questions and the city's monetary responsibilities were clearly defined. He said these questions should be carefully considered before any operating contract is made:

"First—Primarily, has the city the basis for such a tremendous expenditure—$160,000,000 to probably $200,000,000—and yet meet its other needs without imposing an unusual tax burden on its property holders, and those who rent or occupy the same? The Mayor and the Controller should publish the facts.

"Second—Is there any real present necessity for all the subway lines proposed, and can the same be profitably operated? The estimates already made of the revenues and expenses of the new subway system have performed a distinct service by pointing out the long term of years before the proposed subway system will be free from operating

losses, but they have not so clearly indicated when, in addition to these losses, the accumulated interest charges on the capital invested will be met; nor have they definitely shown the accumulated burden which the taxpayers and other citizens must pay for at least a period of thirty or more years. The bankers and investors who will be asked to provide for the city and the operating company about $225,000,000 under the conditions proposed will also do well to consider these estimates, and endeavor to save the city from the unfortunate results.

"Third—Can the city's credit be used and should it be used to guarantee either the Interborough or the Brooklyn Rapid Transit Company, or any other operator, against subway losses, or to make a preferential payment to them out of subway operations at the expense of the citizens?

"Fourth—Can the citizens under present rapid transit conditions wait for at least five years without any relief? Should they be asked to do it? The present crowded rapid transit conditions are almost unbearable.

"Fifth—Can it be regarded as a final settlement of the situation to offer the proposed operator the cream of the short distance Broadway-Fifty-ninth Street travel and not insist that in fairness it assume the operation of the much-needed west side Seventh Avenue subway?

"Sixth—Can the Pennsylvania Railroad and the Long Island Railroad, the largest taxpayers of the city, be satisfied when the urgent necessity for the Seventh Avenue subway, which would serve the Bronx, Brooklyn, and Queens, is absolutely ignored and no provision made in this vast outlay for anything to relieve the situation? In addition to being the largest taxpayers they also carry 30,000,000 of citizens in and out of New York City yearly, and by other traffic do as much as any other corporation to maintain the commercial supremacy of New York City. Yet all of this has not been deemed sufficient to commend the building of a subway to their station for the public benefit as a part of the comprehensive subway system."

Chicago Elevated Railways

The selection of Britton I. Budd as chief executive and E. C. Noe as the operating official of the Chicago Elevated Railways is said to be the first step in a series of developments which will shortly precede a rather complete rearrangement of elevated service and operating methods in Chicago. New plans for routing trains are to be carried into effect as rapidly as possible and it is reported that the new company will negotiate with outlying interurban roads with a view to handling their trains to the center of the business district. Samuel Insull, chairman of the executive committee of the Chicago Elevated Railways, will be the dominating factor in the operation of the properties. The elevated companies of Chicago own approximately 173 miles of single track, the lines radiating in four directions from the Union Elevated Loop which encircles the central business district. With the consolidation of the operation of the four roads it is planned to effect savings by rerouting and reducing power costs and administration expenses. In the report following examination made by Stone & Webster, who have acted as engineers for the bankers, possible economies totaling $700,000 in net earnings from year to year are said to be available without expense for new construction. The report includes the following statement on this subject:

"We find that the earning capacity of the various elevated properties in Chicago is, and has been for a number of years, largely limited by the method of joint operation of the loop, which is located in the heart of the business district, and that the capacity of the loop can be increased by through routing trains and other rearrangement of routes from approximately 30 per cent to over 150 per cent, and improvements of 30 per cent to 50 per cent can be made without any expenditures in changing the loop structure. In our judgment, one management and an increase in the capacity of the loop from 30 per cent to 50 per cent will increase the combined net earnings through a reduction of operating expenses and an increase of gross earnings by at least $700,000 per annum.

"The item of power will, it is confidently expected, show a saving of more than $350,000 per annum. At present the average cost per kw-hour for power is considerably in excess of what other properties are paying and it is believed that a much better rate can be obtained through long-term contracts which will be made."

The details of the terms of the merger of the elevated railways of Chicago as the Chicago Elevated Railways were referred to in the ELECTRIC RAILWAY JOURNAL of June 3, 1911, page 992, and June 10, 1911, page 1035.

Action Brought Against Interurban Companies at Cleveland to Secure Reduction in City Fare

A. G. Stafford has filed suit in the Cuyahoga County Court of Common Pleas asking for an order to restrain the interurban electric railroads which enter Cleveland from charging a fare of 5 cents within the city limits, and to compel the company to operate at 3 cents, with free transfers to other lines. Separate actions have been brought against the eight companies as follows: Cleveland Railway, Lake Shore Electric Railway, Northern Ohio Traction & Light Company, Cleveland, Southwestern & Columbus Railway, Cleveland, Painesville & Eastern Railroad, Cleveland, Painesville & Ashtabula Railroad, Cleveland & Eastern Railway and the Cleveland, Youngstown & Eastern Railway. Mr. Stafford is a carpenter, and the suit has presumably been brought against the companies with him as the instrument.

H. J. Crawford, of Squire, Sanders & Dempsey, attorneys for the companies affected by the suit, said that the 5-cent fare on the interurban lines was allowed by the provisions of Ordinance 24, which authorizes the city to fix the fare for special cars over interurban electric railways.

H. J. Davis, secretary of the Cleveland Railway, has handed City Auditor Wright a check for $63,006.65, in settlement in full of all bills due to the city up to the beginning of the present administration. Some of these bills have been in dispute more than five years. The accounts were complicated by credits, and counter credits, and an understanding remains to be reached in regard to certain expenses which are connected with the paving of Detroit Avenue, Cleveland.

An attempt is being made to secure a number of signatures sufficient to insure a referendum vote upon the amendments recently made to the Tayler grant. J. J. Stanley, president of the Cleveland Railway, recently stated that nothing would be done toward making improvements or purchasing new equipment until the question of the referendum was settled.

Test of Heating and Ventilating Devices in St. Louis.—The streets committee of the Civic League of St. Louis has secured an agreement with the United Railways, St. Louis, Mo., to test certain heating and ventilating devices in street cars.

Pittsburgh Subway Company Willing to Disclose Promoters.—The Pittsburgh Subway Company has sent a communication to the Pittsburgh City Council in which it states that the company will accept an ordinance providing that the company's financial resources must be approved by Council before Dec. 1, 1911, or the franchise forfeited.

A Notable Company.—William C. Brown, president of the New York Central & Hudson River Railroad; Thomas A. Edison, William R. Willcox, chairman of the Public Service Commission of the First District of New York; J. Sergeant Cram, member of the Public Service Commission of the First District of New York; Robert Adamson, secretary to Mayor Gaynor of New York; Herman A. Metz, formerly Controller of New York City, and ex-Governor Myron T. Herrick of Ohio all sailed from New York on Aug. 2, 1911, on the *Mauretania*.

Work Begun on San Francisco's Municipal Railway.—Work was begun on Aug. 1, 1911, at Point Lobos Avenue and Thirteenth Avenue, San Francisco, Cal., on the reconstruction of the Geary Street, Park & Ocean Railway, as a municipal undertaking, the supervisors having finally passed the bill authorizing the Board of Public Works to reconstruct the railway by day labor. The supervisors passed to print an accompanying bill authorizing the works board to expend not to exceed $270,000 in meeting the expenses of construction. The plans for the forty-three steel cars are about completed and will be submitted by the city engineer's office to the Board of Works and the Board of Supervisors for their inspection and approval.

Financial and Corporate

New York Stock and Money Markets

August 9.

Stocks fell sharply on Monday and Tuesday of this week, and further decline took place to-day when the government's report on crops was made public. Unfavorable conditions were recorded, but yields are expected to be normal. Trading was dull pending issuance of the report, but selling became general when the news was received in the Street. Preparations to finance the crops have tended slightly to tighten the money market. Quotations to-day were: Call, 2¼@2⅜ per cent; ninety days, 3@3¼ per cent.

Other Markets

Chicago trading was on a narrow scale to-day and prices were irregular. Chicago Railways certificates declined slightly in the latter part of the past week, and minor losses took place in Series 2 in to-day's market. Announcement of selection of B. I. Budd for president of the Chicago Elevated had no great effect on the shares of the company.

The Philadelphia market was very quiet to-day, and very few shares changed hands. Traction issues were neglected.

Prices in Boston have been irregular, and demand is light, although fairly well distributed through the list. Further declines were registered to-day in copper stocks.

Baltimore trading is in limited volume. The market to-day was moderately active, with Houston Oil the feature. United Railways was heavy.

Quotations of traction and manufacturing securities as compared with last week follow:

	Aug. 2.	Aug. 9.
American Light & Traction Company (common)	a304	a302
American Light & Traction Company (preferred)	a106	a106
American Railways Company	44½	44½
Aurora, Elgin & Chicago Railroad (common)	*44½	*44½
Aurora, Elgin & Chicago Railroad (preferred)	*87	*87
Boston Elevated Railway	a131½	127
Boston Suburban Electric Companies (common)	a15	a15
Boston Suburban Electric Companies (preferred)	75	75
Boston & Worcester Electric Companies (common)	a13	*13
Boston & Worcester Electric Companies (preferred)	a56	*56
Brooklyn Rapid Transit Company	a80½	76⅞
Brooklyn Rapid Transit Company, 1st ref. conv. 4c	*86¾	*86¾
Capital Traction Company, Washington	a132¼	a132
Chicago City Railway	a190	a190
Chicago & Oak Park Elevated Railroad (common)	*3	*3
Chicago & Oak Park Elevated Railroad (preferred)	*5	*5
Chicago Railways, ptcptg., ctf. 1	a101	a97
Chicago Railways, ptcptg., ctf. 2	a33⅞	a30¾
Chicago Railways, ptcptg., ctf. 3	a13	a12
Chicago Railways, ptcptg., ctf. 4	a7½	7½
Cincinnati Street Railway	a130	a131
Cleveland Railway	*99⅞	*99⅞
Columbus Railway (common)	81½	82
Columbus Railway (preferred)	a100	95
Consolidated Traction of New Jersey	a76	75¾
Consolidated Traction of N. J., 5 per cent bonds	a105	a105
Dayton Street Railway (common)	a25	a25
Dayton Street Railway (preferred)	a101	a101
Detroit United Railway	a72½	a75
General Electric Company	162	155
Georgia Railway & Electric Company (common)	154	154
Georgia Railway & Electric Company (preferred)	92	92
Interborough Metropolitan Company (common)	17½	a16½
Interborough Metropolitan Company (preferred)	49½	a44⅞
Interborough Metropolitan Company (4½s)	*79⅝	77¼
Kansas City Railway & Light Company (common)	a19	a19
Kansas City Railway & Light Company (preferred)	*44	a44
Manhattan Railway	*143	*143
Massachusetts Electric Companies (common)	a22¾	a21
Massachusetts Electric Companies (preferred)	a92¾	a92
Metropolitan West Side, Chicago (common)	*27½	*27½
Metropolitan West Side, Chicago (preferred)	*75	*75
Metropolitan Street Railway, New York	15	103
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	74½	72⅜
Northern Ohio Light & Traction Company	50¼	*50½
Northwestern Elevated Railroad (common)	*30	*30
Northwestern Elevated Railroad (preferred)	*70	*70
Philadelphia Company, Pittsburgh (common)	55	53½
Philadelphia Company, Pittsburgh (preferred)	44⅝	44
Philadelphia Rapid Transit Company	23½	23⅜
Philadelphia Traction Company	86½	85½
Public Service Corporation, 5% col. notes (1913)	a94	*94
Public Service Corporation, ctfs.	a107	*107
Seattle Electric Company (common)	a110½	a110½
Seattle Electric Company (preferred)	103	a103
South Side Elevated Railroad (Chicago)	*76⅞	76⅞
Third Avenue Railroad, New York	*11	a9¼
Toledo Railways & Light Company	6½	*6½
Twin City Rapid Transit, Minneapolis (common)	107½	a107
Union Traction Company, Philadelphia	52	*51⅜
United Rys. & Electric Company, Baltimore	18	18
United Rys. Inv. Co. (common)	*38½	a38
United Rys. Inv. Co. (preferred)	*69	a64¾
Washington Ry. & Electric Company (common)	a45	a45
Washington Ry. & Electric Company (preferred)	a92	a91
West End Street Railway, Boston (common)	89	88½
West End Street Railway, Boston (preferred)	a103	90
Westinghouse Elec. & Mfg. Co.	73	a65½
Westinghouse Elec. & Mfg. Co. (1st pref.)	118¼	*118¼

a Asked. *Last sale.

ANNUAL REPORT

Nashville (Tenn.) Railway & Light Company

Results of operations in the calendar years 1910 and 1909 compare as follows:

	1910	1909
Gross Earnings—		
Earnings, passenger	$1,238,554	$1,186,909
Earnings, light, power, etc.	579,678	521,833
Earnings, miscellaneous, both departments	14,232	15,637
Total gross earnings	$1,832,464	$1,724,379
Operating expenses and taxes	1,030,026	1,013,882
Gross income less operating expenses and taxes	$ 802,438	$ 710,497
Deductions from Income—		
Interest on funded debt	$ 402,426	$ 393,974
Interest on current liabilities	.....	379
Total deductions for interest	$ 402,426	$ 394,353
Net income less operating expenses, taxes and interest	$ 400,012	$ 316,144
Reserve funds, depreciation	54,861	51,513
Net income less operating expenses, taxes, interest and miscellaneous deductions	$ 345,151	$ 264,631
Balance net income to common and preferred stock	$ 345,151	$ 264,631
Dividend on preferred stock, 5 per cent	125,000	125,000
Surplus to profit and loss	$ 220,151	$ 139,631

Percy Warner, the president, states in his report in part:

"The gross earnings of your property for the year ended Dec. 31, 1910, show an increase over the year 1909 of 6.3 per cent; operating expenses, taxes, interest and depreciation increased 1.9 per cent, leaving a surplus for the year of $345,151. While the per cent of increase of gross earnings is not as great as in the previous year, the reduction in operating expenses is gratifying.

"During the year there was constructed 4.71 miles of new track. Old track aggregating 1.2 miles was reconstructed.

"Twelve of the cars operated were built in the company's shops during the year, with prepayment and door-controlled feature, the cost of which is less than the price quoted by the car manufacturers, and the workmanship and the material used are far superior. This type of car has proved so satisfactory that the management has decided to convert the balance of its equipment, already having about one-third of the cars so equipped. After the entire system has been changed it is expected that accidents will be decreased and more efficient service rendered. We are also preparing to build twelve additional cars of the same type during the year.

"No new installation has been made at the power house during the year, but it is the opinion of the management that an additional unit should be ordered with the necessary auxiliaries, so as to take care of our steadily increasing load. The capacity of the power house is sufficient to take care of our 1911-12 winter load. The intervening time will be required to install the additional capacity.

"The finances of your company are in a most satisfactory condition. It has no floating indebtedness of any character and has in its treasury $793,000 of its treasury bonds, which will be available for additions and extensions of its property.

"The operating forces in all of the branches of your company are in a most satisfactory condition.

"The relations of your company between its employees and the public continue pleasant and harmonious."

Traffic statistics in 1910 and 1909 compare as follows:

	1910	1909
Cash fare passengers	24,399,365	23,398,501
Transfer and passes passengers	13,815,807	13,400,249
Total passengers carried	38,215,172	36,798,750
Per cent of passengers using station transfers.	40.7	41.4
Per cent of passengers using street transfers.	3.4	3.1
Average passenger earnings per revenue passenger, cents	3.32	3.33
Average passenger earnings per total passenger, cents	3.2	3.20
Mileage	4,813,816.39	4,655,263.21

Boston (Mass.) Elevated Railway.—The directors of the West End Street Railway, on Aug. 8, 1911, voted to recommend the acceptance by the stockholders of the law providing for the sale of the company's property, rights and franchises to the Boston Elevated Railway. The same day a committee of the stockholders of the West End issued a circular to the stockholders urging them to reject the law, stating that their present security is more valuable than an equivalent of stock of the Boston Elevated Railway, and that the act authorizing consolidation is unconstitutional.

British Columbia Electric Railway, Vancouver, B. C.—The British Columbia Electric Railway is making a further issue of £600,000 of share capital, namely, £200,000 of 5 per cent cumulative perpetual preference shares of £1 each at 1s premium; £200,000 preferred ordinary shares of £1 each at 2s premium, and £200,000 deferred ordinary shares of £1 each at 4s premium, all offered to the preferred and deferred stockholders of record of July 12, 1911, to the extent of one share of each of the three classes for every complete £8 of preferred ordinary or deferred ordinary stock held by them.

Colorado Railway, Light & Power Company, Trinidad, Col.—The property of the Colorado Railway, Light & Power Company was sold at a receiver's sale on Aug. 2, 1911, to the Federal Light & Traction Company, New York, N. Y. It is expected that a new company, to be known as the Trinidad Transmission, Electric & Gas Company, will be formed to succeed the old company. The company at Trinidad failed about a year ago and was reorganized as the Trinidad Railway, Light & Power Company, with $5,000,000 capital stock and $5,000,000 of first mortgage 5 per cent bonds, of which $1,998,000 were issued. In rebuilding its power plant, which was destroyed by fire eighteen months ago, the company became involved, and the court which took charge of its affairs would not authorize capital expenditures even for substations or transmission lines. As a result a large part of the load which was under contract has not been connected to the lines and the earnings of the company are below normal. The company furnishes service to sixteen coal mines at Trinidad, Col., which contain the only large deposits of coking coal west of the Mississippi River. The engineers who recently investigated the properties of the company report the power plant and equipment well adapted to the business and territory served.

Columbus, Delaware & Marion Railroad, Columbus, Ohio.—Judge Babst on Aug. 8, 1911, entered a decree in the Court of Common Pleas that an order be given the Sheriff of Marion County commanding him to have appraised and sell at public auction the Columbus, Delaware & Marion Railroad to satisfy a mortgage for $1,000,000 given the Western Reserve Trust Company, Cleveland, two mortgages of $300,000 each held by the Standard Trust Company, New York, and a mortgage of $2,500,000 held by the Mercantile Trust Company, New York.

Columbus Interurban Terminal Company, Columbus, Ohio.—Those who subscribed to the stock of the Columbus Interurban Terminal Company to the extent of $175,000 have paid the first assessment of $50,000, and on Sept. 1, 1911, will pay a like amount. The company is now constructing a passenger and freight depot and terminals on South Third Street.

Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad, New York, N. Y.—The sale of the property of the Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad under foreclosure has been adjourned from Aug. 15, 1911, to Oct. 16, 1911.

Norwich & Westerly Railway, Norwich, Conn.—The Norwich & Westerly Railway, the property of which was sold under foreclosure recently, has been succeeded by the Norwich & Westerly Traction Company, organized in the interest of the bondholders of the old company. The Norwich & Westerly Traction Company has organized as follows: A. E. Locke, Boston, president; Robert W. Perkins, Norwich, secretary and treasurer; H. M. Verrill, Portland, Maine; Arthur L. Shipman, Hartford, Conn.; Arthur B. Peck, Hartford, Conn.; A. E. Locke and Robert W. Perkins, directors.

Toronto (Ont.) Railway.—Plans are under consideration by Sir William MacKenzie and his associates for the consolidation of the Toronto Railway, Toronto Power Company, Electrical Development Company, Toronto Electric Light Company, Metropolitan Railway, Toronto & Scarboro Railway, Mimico Electric Railway and Toronto & Suburban Railway. As previously stated in the ELECTRIC RAILWAY JOURNAL of July 22, 1911, the stockholders of the company are to meet on Aug. 14, 1922, to vote to increase the capital stock of the company from $8,000,000 to $12,000,000.

United Railways, St. Louis, Mo.—The Guaranty Trust Company, New York, N. Y., will purchase the $1,500,000 of first mortgage 5 per cent gold bonds of the Lindell Railway which matured Aug. 1, 1911, at par and interest to Aug. 1, 1911. As stated in the ELECTRIC RAILWAY JOURNAL of June 17, 1911, the company proposes to take care of the maturing issue by an issue of 4½ per cent ten-year bonds.

Walla Walla Valley Railway, Walla Walla, Wash.—The Walla Walla Valley Railway, which has succeeded the Pacific Power & Light Company, has elected officers as follows: Guy W. Talbot, president; A. S. Grenier, vice-president; George F. Nevins, secretary and treasurer; Lewis A. McArthur, assistant secretary and assistant treasurer; C. S. Walters, general manager; C. H. Still, purchasing agent; E. G. Miller, traffic manager; D. F. McGee, chief engineer.

Dividends Declared

Boston (Mass.) Elevated Railway, 3 per cent.

Detroit (Mich.) United Railway, quarterly, 1¼ per cent.

Federal Light & Traction Company, New York, N. Y., quarterly, 1½ per cent, preferred.

Philadelphia Company, Pittsburgh, Pa., 2½ per cent, preferred.

Portland Railway, Light & Power Company, Portland, Ore., quarterly, $1.

Tampa (Fla.) Electric Company, quarterly, 2 per cent; extra, 1 per cent.

MONTHLY ELECTRIC RAILWAY EARNINGS

BANGOR RAILWAY & ELECTRIC COMPANY.

Period.			Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1m.,	June,	'11	$49,580	*$25,337	$24,243	$12,472	$11,771
1 "	"	'10	45,707	*23,380	22,327	11,681	10,646
12 "	"	'11	574,890	*270,300	304,680	146,517	158,163
12 "	"	'10	555,937	*260,526	295,411	140,721	154,690

CHATTANOOGA RAILWAY & LIGHT COMPANY.

1m.,	June,	'11	$77,910	*$45,294	$32,616	$20,430	$12,186
1 "	"	'10	72,714	*42,150	30,564	18,431	12,133
6 "	"	'11	445,955	*257,023	188,932	118,171	70,761
6 "	"	'10	408,428	*246,369	162,059	108,833	53,226

COMMONWEALTH POWER RAILWAY & LIGHT COMPANY.

1m.,	June,	'11	$432,614	*$254,602	$178,012	$108,143	$69,869
1 "	"	'10	419,380	*234,257	185,123	107,704	77,419
6 "	"	'11	2,629,084	*1,504,188	1,124,896	619,628	505,268
6 "	"	'10	2,422,643	*1,367,995	1,054,648	617,934	436,714

EAST ST. LOUIS & SUBURBAN COMPANY.

1m.,	June,	'11	$185,736	*$106,973	$78,763	$45,605	$33,158
1 "	"	'10	200,553	*117,986	82,567	45,010	37,557
6 "	"	'11	1,091,720	*626,836	464,884	272,151	192,733
6 "	"	'10	1,119,353	*635,640	483,713	270,942	212,771

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY.

1m.,	June,	'11	$51,896	*$27,878	$24,018	$13,337	$10,681
1 "	"	'10	47,985	*29,655	18,330	13,187	5,143
12 "	"	'11	533,019	*331,134	201,885	158,349	43,536
12 "	"	'10	526,206	*314,877	211,329	171,587	39,742

MILWAUKEE LIGHT, HEAT & TRACTION COMPANY.

1m.,	June,	'11	$148,900	$43,689	$105,211	$74,375	$30,836
1 "	"	'10	140,995	40,751	100,243	72,015	28,229
6 "	"	'11	804,461	231,460	573,001	421,175	151,827
6 "	"	'10	742,493	217,424	525,069	411,003	114,067

MILWAUKEE RAILWAY & LIGHT COMPANY.

1m.,	June,	'11	$424,600	$226,695	$197,905	$128,922	$68,983
1 "	"	'10	392,467	206,943	185,525	112,010	73,515
6 "	"	'11	2,450,263	1,302,632	1,147,631	728,916	418,714
6 "	"	'10	2,283,217	1,237,622	1,045,595	666,420	379,175

PORTLAND RAILWAY, LIGHT & POWER COMPANY.

1m.,	June,	'11	$554,767	*$262,172	$292,595	$129,155	$163,440
1 "	"	'10	478,879	*219,494	259,385	117,709	141,676
6 "	"	'11	3,114,812	*1,504,136	1,610,676	742,824	867,852
6 "	"	'10	2,645,612	*1,247,322	1,398,290	679,218	719,072

ST. JOSEPH RAILWAY, LIGHT, HEAT & POWER COMPANY.

1m.,	June,	'11	$95,021	*$57,106	$37,915	$18,453	$19,462
1 "	"	'10	85,401	*51,238	34,163	18,584	15,579
6 "	"	'11	530,322	*322,001	208,321	115,474	92,847
6 "	"	'10	494,015	*299,002	195,013	109,443	85,570

UNION RAILWAY, GAS & ELECTRIC COMPANY.

1m.,	June,	'11	$237,408	*$141,328	$96,080	$61,242	$34,838
1 "	"	'10	219,137	*131,770	87,367	57,987	29,380
6 "	"	'11	1,518,456	*897,966	620,490	363,149	257,341
6 "	"	'10	1,431,020	*862,214	568,806	348,005	220,801

*Operating expenses include taxes.

Traffic and Transportation

Impediments Interposed to Making Lines Safe

On Sunday, July 30, 1911, two interurban cars of the Detroit (Mich.) United Railway met in a head-on collision on a curve near Dearborn. One person was killed and many others were more or less severely injured. The accident gave rise to much discussion as to whether or not the Detroit United Railway has shown the proper diligence, and with a view to placing the public in position to judge more accurately of the true situation F. W. Brooks, general manager of the Detroit United Railway, issued a statement in part as follows:

"The subject of making safe our interurban traffic has been one of the most vexatious, as well as one of the most important, problems with which we have had to deal in recent years. The Detroit United Railway several years ago mapped out a program of procedure that will eventually do away with all curves and dangerous places on our entire system. These plans matured about two years ago, when our authorized agents began to purchase rights of way, 33 ft. wide, on the various interurban lines running out of Detroit—principally on the Rapid Railway and on the Detroit, Jackson & Chicago lines.

"Up to the present time we have paid approximately $250,000 for land, trees, buildings and the removal of obstructions in rights of way in which it is our purpose to double-track our lines. This in itself is sufficient evidence that we determined long ago that double tracking is the only solution to the problem and is the best possible method of making absolutely safe the traffic over our interurban lines. We have been obliged to pay extortionate prices for many pieces of land. In some instances we were obliged to buy entire farms of several acres in order to obtain the desired right of way of only 33 ft. We have had to buy dozens of buildings, pay for scores of trees and stand the expense of moving structures away from the projected lines of the railway. Being a railway corporation, we have been obliged to pay, in some instances, two or three times the price the land would bring at private sale, but we did not hesitate even at that, knowing that it would eventually make perfect an already excellent system.

"As early as April, 1911, we started negotiations with the owner of the land lying opposite the curve near Dearborn where Sunday's accident occurred. We wished to make the line a straight one, double tracked, and do away entirely with that curve. Despite our willingness to pay a large sum of money for a right of way, the negotiations fell through, and at this time we are perfectly helpless, so far as that particular stretch is concerned. I will say unqualifiedly that if we had been given an opportunity to buy the right of way when we endeavored to secure it, there would have been no accident last Sunday, as the double tracking at that point would have been accomplished long before this.

"The suggestion has been made that the Detroit United Railway should proceed to condemn sufficient land for the necessary right of way. It may interest those who entertain this idea to know that under the railroad laws of Michigan an electric railway has not the power to condemn. The fact is, the law in regard to electric railways in Michigan is vague and disconnected and generally falls short of accomplishing the very things that the public now demand of us.

"The Detroit United Railway now has double-track lines from Detroit to Pontiac; on the Orchard Lake division as far as Farmington Junction; nearly the entire Toledo division; Rapid Railway, when line is built for which right of way is now being purchased, all the way to and a short distance beyond Mount Clemens, and eventually the Detroit, Jackson & Chicago line to Ann Arbor. Our first thought has been, however, the elimination of all danger points, and with that in view we brought our greatest energies to bear on those sections where those danger points exist. We have left nothing undone toward accomplishing this end. We are anxious to continue this policy, and if the owners of property will negotiate with us there will soon be not the slightest possibility of a recurrence of last Sunday's misfortune."

Co-operation of Public Invited in New York

The Interborough Rapid Transit Company, New York, N. Y., has addressed the following circular to the public:

"All lines of this company are carrying passengers far in excess of the capacity for which they were designed. At times our employees are compelled to perform their duties under trying conditions, due to this passenger overload, and while this company has always held its employees to a strict observance of its rules and regulations, it occasionally happens that some of these rules, especially those requiring courtesy to the public, are violated.

"We have, therefore, organized a separate bureau where all kinds of complaints will be received, and in addition we will welcome any suggestions or criticisms from the public that will tend to increase the safety or improve the efficiency of the service.

"We believe that with the hearty co-operation of the public better results can be obtained and would request that all complaints, criticisms, suggestions, etc., be made at the office of the vice-president and general manager, room 1229, 165 Broadway, either in writing or in person."

Special Excursions to the Beaches.—The Pacific Electric Railway, Los Angeles, Cal., has adopted the practice this summer of giving special half-fare excursions on specified days to Redondo Beach, Venice and Ocean Park.

Ordinance to Require Air Brakes in Terre Haute, Ind.—The City Council of Terre Haute, Ind., has passed an ordinance over the Mayor's veto requiring that all street cars operated in Terre Haute shall be equipped with air brakes.

San Francisco's Proposed No-Seat-No-Fare Ordinance.—The public utilities committee of the Board of Supervisors of San Francisco, Cal., has again put off consideration of the no-seat-no-fare ordinance.

Ordinance to Provide Sale of Strip Tickets in Louisville.—An ordinance has been introduced in the General Council at Louisville, Ky., providing for the sale of tickets by street railways in that city at the rate of six for 25 cents, or twenty-five for $1.

Special Service Between Norwich and Westerly.—The Norwich & Westerly Traction Company, Norwich, Conn., which has succeeded the Norwich & Westerly Railway, is operating a special service between Norwich and Westerly, R. I., to afford excursionists a ready means to reach Watch Hill and the other shore resorts near Westerly.

Freight Rights Granted in Neponsit, Mass.—The Massachusetts Railroad Commission has granted authority to the Boston & Northern Street Railway to conduct the business of common carrier of newspapers, baggage, express matter and freight in Boston between the drawbridge of the Neponsit River bridge and its carhouse in the Neponsit district of Boston, subject to the regulation of the board.

Excess Fare on New York State Road.—With the consent of the Public Service Commission of the Second District of New York, the Warren & Jamestown Street Railway, Warren, Pa., will after Sept. 1, 1911, collect an excess fare of 5 cents from all passengers who board cars without transportation, the excess fare to be refunded upon presentation of the conductor's duplicate receipt at any ticket office of the company. The excess fare will not, of course, apply where the ride is within the city limits of Jamestown.

Excursion Business Out of Indianapolis.—Excursion business out of Indianapolis continues good each Sunday, and the lines running long-distance excursions report increased patronage on these excursions each week. The Terre Haute, Indianapolis & Eastern Traction Company is running an excursion car from Terre Haute to Indianapolis every Sunday morning, covering the 72 miles between the cities in two hours flat. Thirty-eight minutes of this time is spent in getting out of Terre Haute and through Brazil, and twelve minutes more in entering Indianapolis. The Indiana Union Traction Company's Toledo and Detroit excursions are proving very popular.

Award of Arbitrators at Trenton.—The arbitrators selected to settle the differences between the New Jersey & Pennsylvania Traction Company, Trenton, N. J., and its employees have rendered their finding. There were two principal points involved—first, the demand of the men for

a closed shop, and, second, the demand of the men for the substitution of a flat rate of 25 cents for the sliding scale from 21 cents to 25 cents, according to service. The arbitrators have awarded the men a flat rate of 24 cents an hour, but decided the closed shop question against them. The company refused throughout the negotiations and arbitration to meet any representative of the union organized among the men.

Novel Double Post Card of Winona Interurban Railway.—The Winona Interurban Railway, Warsaw, Ind., is mailing a novel timetable in the form of a double post card. On the address side appears the following: "Our Assets: First-class Track and Roadway. Few Curves. New Cars. Fast Schedule. Quickest Route from Peru and points south to Goshen and points north. Our Liabilities: To please the traveling public. Keep this card for reference." The two interior pages of the single-fold post card contain timetables of the through service between Indianapolis, South Bend, Michigan City and St. Joseph via the Winona lines, and also show the local timetable of the Winona lines. The back of the post card folder shows a map of the Winona line and its Indiana electric and steam connections.

Pay-within Cars in Milwaukee.—The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., is reconstructing the ends of six double-truck city cars and adapting them for the pay-within method of fare collection. The end bulkheads are being removed and the seating arrangement changed slightly. The door operating mechanism of the Pre-payment Car Company is being installed. These mechanisms are arranged for the motormen to operate by hand the exit door at the front, and for the conductor to operate the exit and entrance door at the rear. New floors are being installed in the cars and the destination signs are being rearranged. The pay-within doors are being fitted with an electrical signaling device so that on closing the rear door a proceed signal will be given to the motorman automatically.

New York & Queens County Railway Requests Extension of Line.—Replying to the recent order of the Public Service Commission of the First District of New York for increased service, the New York & Queens County Railway, Long Island City, N. Y., has asked the commission for an extension of thirty days in which to indicate whether or not it would accept the order, and also for an extension of thirty days from Aug. 7, the time when the order goes into effect. The order required the company to operate daily, exclusive of Sundays and holidays, a sufficient number of cars to provide seats equal to the number of passengers. In its request for delay the company says it has not a sufficient number of men to operate its present schedule in a satisfactory manner, in spite of every effort it has made and is making to get such men, that it takes time to hire the men and break them in, and that its timetables, runs, schedules and working force have to be entirely readjusted.

Valley Forge Excursions.—The Philadelphia & Western Railway, Upper Darby, Pa., is conducting this summer special excursions over its line from Sixty-ninth and Market Streets, Philadelphia, to Valley Forge at a round trip fare of $1.25. The company operates from Philadelphia to Strafford, from which place an automobile service to Valley Forge Park is provided. The company has issued an attractive folder which contains half-tone views of scenes along the lines and maps showing the territory traversed and the Valley Forge Park reservation. In an advertisement of the service which it carried in the Philadelphia newspapers the company said in describing the trip: "This trip affords a most delightful ride through beautiful and interesting country. The automobiles of the Norris City Company not merely take visitors from Strafford to Valley Forge, but convey them over five miles of splendid drives within the great park of 500 acres established by the State, commanding fine views of the Schuylkill and Valley Creek and passing the noble Anthony Wayne statue, Fort Washington, intrenchments, observation tower on Mount Joy. Revolutionary schoolhouse, monuments, graves, regimental camps and soldiers' huts. The terminus is at Washington's headquarters and near the Washington Inn, where visitors can stop for luncheon or dinner. The trip is a notable revelation to those who have not explored the park and the country round about, and appeals strongly to the patriotic and lovers of the beautiful."

Personal Mention

Mr. J. W. S. Reigle has been appointed chief engineer of the Fremont (Ohio) City Railway.

Mr. W. J. Thompson has been elected vice-president of the Felicity & Bethel Railroad, Felicity, Ohio.

Mr. W. F. Snider has been elected treasurer of the Salisbury & Spencer Railway, Salisbury, N. C., to succeed Mr. R. E. Preble.

Mr. C. G. Grenshaw has been appointed electrical engineer of the Phoenix (Ariz.) Railway to succeed Mr. O. B. M. Tompkins.

Mr. W. J. Sanford has been appointed electrical engineer of the Norfolk Southern Railroad, Norfolk, Va., to succeed Mr. T. H. Hay.

Mr. J. R. Fairchild has been appointed master mechanic of the Western Ohio Railway, Lima, Ohio, to succeed Mr. W. P. Graydon.

Mr. C. D. Phillipp has been appointed superintendent of the Oregon Electric Railway, Portland, Ore., to succeed Mr. E. C. Marse.

Mr. J. H. Whiting has been elected vice-president of the Mobile Light & Railroad Company, Mobile, Ala., to succeed Mr. S. H. Wilson.

Mr. G. A. Dickie has been appointed master mechanic of the British Columbia Electric Railway, Vancouver, B. C., to succeed Mr. J. H. Hughes.

Mr. Thomas F. Sisk has been appointed chief engineer of the power station of the Tazewell (Va.) Street Railway to succeed Mr. L. L. Arnold.

Mr. F. L. Dame has been elected vice-president of the Anniston Electric & Gas Company, Anniston, Ala., to succeed Mr. R. J. McClelland.

Mr. C. C. Vandewater has been appointed chief engineer at the Oklahoma Union Traction Company, Tulsa, Okla., to succeed Mr. W. H. Praton.

Mr. W. H. Rudisill has been appointed chief engineer of the Anniston Electric & Gas Company, Anniston, Ala., to succeed Mr. C. J. Reynolds.

Mr. George A. Hopkin has been appointed master mechanic of the Oregon Electric Railway, Portland, Ore., to succeed Mr. W. O. Fragmeier.

Mr. D. P. Miner has been appointed chief engineer of the power station of the Rhode Island Company, Providence, R. I., to succeed Mr. George W. Hawley.

Mr. H. C. Daggett, who has been superintendent of transportation of the Salisbury & Spencer Railway, Salisbury, N. C., has been given the title of superintendent of the company.

Mr. E. W. Clark, formerly superintendent, claim and general freight agent of the Pacific Coast Railway, San Luis Obispo, Cal., has been elected vice-president of that company.

Mr. E. C. Noe, general superintendent of the Northwestern Elevated Railroad, Chicago, Ill., has been appointed general superintendent of the Chicago (Ill.) Elevated Railways.

Mr. F. P. Maize, who has been superintendent of shops of the Public Service Railway, Newark, N. J., has been appointed master mechanic of the Portland Railway, Light & Power Company, Portland, Ore.

Mr. H. G. Northrop has been appointed general manager of the Richmond & Chesapeake Bay Railway, Fredericksburg, Va., to succeed Mr. William Northrop, who has been elected vice-president of the company.

Mr. J. M. Sims has been appointed superintendent, claim agent and general freight agent of the Pacific Coast Railway, San Luis Obispo, to succeed Mr. E. W. Clark, who has been elected vice-president of the company.

Mr. F. A. Delano, president of the Wabash Railroad and chairman of the board of directors of the Metropolitan West Side Elevated Railway, Chicago, Ill., has been elected to the board of governors of the Chicago (Ill.) Elevated Railways.

Mr. J. M. Smith, who has been assistant secretary and assistant treasurer of the Cleveland & Erie Railway, Girard, Pa., has been elected secretary and assistant treasurer of the company. Mr. Smith succeeds Mr. C. S. Knauf as secretary of the company.

Mr. E. C. Derth has been appointed assistant secretary and assistant treasurer of the Columbus Street Railway & Light Company, Indianapolis, Ind., to succeed Mr. Gustave Ulbreicht. Mr. Derth was formerly auditor of the company and will retain that title also.

Mr. W. B. McKinley, president of the Illinois Traction Company, Champaign, Ill., formerly vice-president of the Quincy Horse Railway & Carrying Company, Quincy, Ill., has been elected president of the Quincy Horse Railway & Carrying Company, to succeed Mr. George F. Duncan, formerly president of the company, who has been elected vice-president.

Mr. George Bullock, president of the Susquehanna Railway, Light & Power Company, New York, N. Y., has been elected chairman of the executive committee of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., in which capacity will devolve upon him many of the duties previously performed by Mr. Joseph B. Mayer, who has resigned as president of the company.

Mr. Arthur R. Hill has resigned as purchasing agent to the New York & Queens Electric Light & Power Company, Long Island City, N. Y., effective Aug. 31, 1911, to become purchasing agent to the Monterey Railway, Light & Power Company, Monterey, Mexico, which controls the Monterey Water Works & Drainage Company, the Monterey Plumbing & Electrical Supply Company and the Monterey Gas Company.

Mr. A. M. Patten, who has been general superintendent and purchasing agent of the Topeka (Kan.) Railway, will also act as superintendent of the Wichita Railroad & Light Company, Wichita, Kan., to succeed Mr. W. R. Morrison, who will go from Wichita to Barbadoes Island to take charge of the construction of the Bridgetown Tramway, in which Mr. William B. McKinley, president of the Illinois Traction System, and his associates, who also control the Topeka and Wichita systems, are interested.

Mr. E. M. Wharff has been transferred from the operating engineering department of the Illinois Traction System and the Western Railway & Light Company, Peoria, Ill., to the Galesburg Railway & Light Company, Galesburg, Ill., as assistant general superintendent and operating engineer in charge of the electric light and power, electric railway, gas and steam-heating department, including power house, carhouses and gas works. The Galesburg Railway & Light Company is a part of the Western Railways & Light Company.

Mr. Joseph B. Mayer has resigned as president of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y. In a statement which he issued reviewing the prospects of the company Mr. Mayer said: "My sole reason for resigning as president is that I cannot give my undivided attention to the affairs of the company. I shall remain on the directorate and give such assistance as is necessary, and, although resigning as president, I am retaining my interest in the company, which interest is the same as it has always been."

Mr. C. Gordon Reel, who retired early last year as first vice-president and general manager of the Kingston (N. Y.) Consolidated Railroad, after holding that position since the organization of the company in 1902, has been appointed first deputy superintendent of highways of the State of New York. During the past year Mr. Reel has conducted an office as consulting engineer in Kingston and has been engaged on several important engineering undertakings, among them as a commissioner of appraisal in the land condemnation proceedings in connection with the Ashokan Dam, which is being built to hold the water supply of New York City. From 1910 to 1911 he was also secretary of the Street Railway Association of the State of New York, and in 1909-1910 was first vice-president of the association.

Mr. A. C. Wegner has recently been appointed traffic manager of the Toledo & Western Railroad, Toledo, Ohio, to succeed Mr. C. T. Chapman, resigned. Mr. Wegner became connected with the Michigan Central Railroad in December, 1906, as a stenographer. After being with that company several months as stenographer and foreign bill of lading clerk, he entered the service of the Toledo & Western Railroad as stenographer, and six months later was appointed rate clerk. In January, 1910, Mr. Wegner entered the service of the Chicago, Burlington & Quincy Railroad at Cleveland, Ohio, as contract agent and chief clerk to the general agent of the freight department, but returned to the Toledo & Western Railroad as chief clerk to the traffic manager. He was subsequently appointed traffic manager of the company.

Mr. D. C. Ward, whose appointment as superintendent of the Indianapolis & Louisville Traction Company, Scottsburg, Ind., to succeed Mr. H. D. Murdock, resigned, was noted in the Electric Railway Journal of Aug. 5, 1911, was formerly trainmaster and roadmaster of the company. Mr. Ward entered street railway work with the Indianapolis Street Railway in 1894, and continued with the company until 1903. In 1904 he accepted a position with the Wabash & Rochester Railway, a proposed road, and in 1905 he became connected with the Indianapolis & Cincinnati Traction Company, with which he remained until 1907. He entered the service of the Indianapolis & Louisville Traction Company in 1907, during the construction of the road. After acting as trainmaster of the company until the fall of 1908 Mr. Ward was also appointed roadmaster of the company.

Mr. Britton I. Budd, president of the Metropolitan West Side Elevated Railway, has been elected president of the Chicago (Ill.) Elevated Railways, which is a consolidation of the four elevated lines and union loop in Chicago. Mr. Budd was born at San Francisco, Cal., on Sept. 7, 1871. He was educated in the public schools of Chicago and at the Shattuck School, Faribault, Minn. He entered railroading in the engineering corps of an Ohio railroad, and was with the Intramural Railroad at the World's Fair, Chicago. In 1894 Mr. Budd entered the service of the Metropolitan West Side Elevated Railway as a clerk in the storekeeper's office, and was storekeeper for five years. In 1899 he was made purchasing agent, a position he held until April, 1907, when he was appointed general manager. In February, 1910, Mr. Budd was elected president of the Metropolitan West Side Elevated Railway and has continued in that capacity since that time. Mr. Budd is a member of the Union League, Western Railway and City Clubs, all of Chicago.



B. I. Budd

OBITUARY

Edward R. Price, at one time treasurer and general manager of the Interstate Electric Street Railway, North Attleboro, Mass., died at his home in North Attleboro on Aug. 6, 1911. Mr. Price was for many years treasurer of the North Attleboro Savings Bank and cashier of the First National Bank of that place.

Edward M. Shepard, a lawyer of New York, prominent in public life, died at Lake George, on July 28, 1911. Mr. Shepard was interested in many movements that had to do with civic betterments, and as counsel for the Rapid Transit Commission of New York he had much to do with the contracts under which the subway in New York was built and is now being operated.

R. B. Goodyer, of Cardiff, is dead at the age of seventy-three. Mr. Goodyer had long been connected with tramway and other transit systems, having held managerial appointments with Edinburgh Street Tramways, Rothesay Tramways, London Road Car Company and the Metropolitan (Paris) Tramways. For more than twenty years he was manager of the Cardiff branch of the Provincial Tramways, with which he continued his connection until two years ago.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Mobile (Ala.) West Shore Traction Company**—This company has filed articles of incorporation in Alabama to build an electric railway from Mobile to Alabama Port, near the west shore of Mobile Bay. Capital stock, $10,000. Officers: H. Austell, president; J. N. McAleer, vice-president; E. E. Posey, secretary and treasurer.

Albany (Ga.) Transit Company.—Incorporated in Georgia to build an electric railway in the city and suburban districts of Albany. Capital stock, $75,000. Incorporators: C. W. Rawson, S. B. Brown, F. F. Putney, W. W. Page and J. A. Davis, all of Albany. [E. R. J., July 22, '11.]

Omaha, Sioux City & Northern Railway, Omaha, Neb.—Application for a charter has been made in Nebraska to build an electric railway from Sioux City to Omaha, and branches from the main line to other towns in Nebraska [E. R. J., July 15, '11.]

New Castle & Beaver Falls Street Railway, Harrisburg, Pa.—Incorporated in Pennsylvania to build a 9-mile electric railway in Beaver and Lawrence Counties. Capital stock, $54,000.

Bellingham, Mount Baker & Spokane Interurban Railway, Spokane, Wash.—Application for a charter has been made in Washington to build a 500-mile electric railway from Puget Sound to Spokane. Capital stock, $25,500,000. [E. R. J., Aug. 5, '11.]

***Hancock County Electric Company, Cumberland, W. Va.**—Incorporated in West Virginia to build an electric railway in Hancock County. Capital stock, $12,000. Incorporators: Nelson D. Miller, John F. Flood and Harry E. Armstrong.

Kanawha-Ohio Valley Trade Promoting Company, Parkersburg, W. Va.—Incorporated in West Virginia to build a gasoline railway from Parkersburg to Ripley. Another line will be built from Ripley to Charleston, with branch lines to Millwood and through the valley to Pocotalico, while another line will be built from Cicerone to Spencer, with branch lines. Another line from Blennerhasset Island to Vienna Island, as a belt line encircling the city of Parkersburg, and another line throughout the coal belt of the State. Capital stock, $175,000. Albert E. Boone, Zanesville, promoter.

FRANCHISES

Montgomery, Ala.—The Alabama Traction Company has received a franchise from the Board of City Commissioners to build its tracks over Court Square and Dexter Avenue.

Chico, Cal.—The Northern Electric Railway has acquired from the Diamond Match Company all of its railway franchise and rights on Ninth Street, allowing the Northern Electric Railway to connect with the Southern Pacific Railway.

Fresno, Cal.—The Fresno, Hanford & Summit Lake Railway has asked the Board of City Trustees for a franchise to build an electric railway over I Street and Tuolumne Street.

Los Angeles, Cal.—The Pacific Electric Railway has received a franchise from the Council to build its tracks over Eighth Street, from Fremont Street to Garfield Street.

San Diego, Cal.—The San Diego Electric Railway has received a forty-two-year franchise from the City Council covering all of its lines in San Diego.

San José, Cal.—The Peninsula Electric Railway has asked the City Council for a franchise to build an electric railway in Alum Rock Park.

Santa Clara, Cal.—The San José & Santa Clara Railway has asked the Board of Supervisors for a franchise to build in Santa Clara County.

Santa Monica, Cal.—The Pacific Electric Railway has received a franchise from the City Council to build its tracks on Ocean Front to Third Street on Utah Avenue, and on Eighth Street from Oregon Avenue to Fremont Avenue.

Sebastopol, Cal.—The Petaluma & Santa Rosa Railway has received a franchise to build an electric railway over the public highways in Sebastopol.

Atlanta, Ga.—The Atlanta & Carolina Railway has received a franchise from the Board of Commissioners to build an electric railway over Moreland Avenue, from Ormand Avenue to the Paper Mill Road, a distance of 1 mile.

Louisville, Ky.—The Louisville Railway has asked the General Council for a franchise to build its tracks over certain streets in the West End.

Lynn, Mass.—The Boston & Eastern Electric Railroad, Boston, Mass., will ask the Municipal Council for a franchise in Lynn. The promoters of this railway have filed plans and profiles of the proposed route in Lynn and also in Chelsea, Revere, Salem, Swampscott and Danvers, and hearings on petitions accompanying these plans are soon to be held. The Beverly Aldermen will soon be asked by this company for a franchise to enable it to build its tracks in Beverly.

Kansas City, Mo.—The Metropolitan Street Railway has received a franchise from the City Council to build a double track over Woodland Avenue from Fifteenth Street, to connect with the northeast line of Missouri Avenue.

St. Louis, Mo.—The St. Louis & Jennings Railway has asked the County Court at Clayton for a franchise to build an electric railway from the western limits of the city to the Jennings Station Road. [E. R. J., July 22, '11.]

Oneida, N. Y.—The Oneida Railway has filed a petition with the Public Service Commission, Second District, for permission to exercise franchises for the construction of its road through Madison and Sconondoa Streets in Oneida. At the present time this company is operating over the electrified West Shore Railroad between Utica, Oneida and Syracuse. Double tracks will be laid from Main and Madison Streets to Cedar Street, from which point a single track will run along Madison Street to Sconondoa Street to a point where the tracks of the New York, Ontario & Western Railway cross the latter street.

Portland, Ore.—The Portland Railway, Light & Power Company has asked the City Council for a franchise to build its tracks over Sandy Boulevard, from East Seventy-second Street westward.

Middletown, Pa.—The Middletown & Elizabethtown Street Railway has received a franchise from the Borough Council to build an electric railway over the city streets. [E. R. J., July 1, '11.]

Water Gap, Pa.—The Stroudsburg & Water Gap Railway has asked the Borough Council for an extension of its franchise to build an extension in the Gap.

Providence, R. I.—The Rhode Island Company has asked the City Council for a franchise to extend its Reservoir line in order to connect with the crosstown line at Park Avenue.

Spartanburg, S. C.—The Greenville, Spartanburg & Anderson Railway has asked the City Council for a franchise to build an electric railway in this city.

***Watertown, S. D.**—Ferris Brothers, owners of the power plant in Watertown, have asked the City Council for an electric railway franchise.

Ft. Forth, Tex.—The Ft. Worth Southern Traction Company has received a franchise from the County Comissioners' Court to build an electric railway from Ft. Worth to Cleburne, via Everman, Burleston and Joshua. [E. R. J., July 15, '11.]

Salt Lake City, Utah.—The Utah Light & Railway Company has asked the City Council for a franchise to build its tracks over East Fifteenth Street and North State Street, in Salt Lake City.

Mt. Vernon, Wash.—The Nooksack Valley Traction Company has asked the City Council for a franchise to build an electric railway through Mount Vernon. [E. R. J., June 10, '11.]

Seattle, Wash.—The Lake Van Buren & Highland Park Electric Railway has received a franchise from the City Council to build its tracks over the city streets. W. H. Coufiin and George Gunther are interested. [E. R. J., May 27, '11.]

TRACK AND ROADWAY

Fresno, Hanford & Summit Lake Interurban Railway, Fresno, Cal.—This company plans to let a contract for the grading of the extension from Fowler to Hanford as soon as the present grading from Fresno to Kingsbury is completed.

San Francisco, Oakland & San José Railway, Oakland, Cal.—This company will construct a fill on the Key Route 9500 ft. long and 1000 ft. wide.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—The contract has been let by this company to construct a tunnel 1 mile long through the Contra Costa hills, and work will begin immediately.

Richmond, Cal.—John Nichols and the California Pressed Brick Company will present plans to the United Properties Company to build an electric railway from Richmond Avenue along Marine Drive and to the Pressed Brick Company's plant.

Sacramento Valley West Side Electric Railway, Sacramento, Cal.—The Dozier Construction & Engineering Company, Sacramento, has been awarded the contract by this company to prepare the necessary surveys and the data on the cost of construction for its electric railway from Red Bluff to Woodland. [E. R. J., May 13, '11.]

Central California Traction Company, San Francisco, Cal.—This company is reballasting its road from Stockton to Sacramento. At Sacramento double tracks will be laid as far as Colonial Heights, and on its waterfront property a wharf will be built and tracks laid over it.

Tidewater & Southern Railway, Stockton, Cal.—Surveying has been begun by this company for its proposed electric railway between Merced River and Merced. J. H. Wallace, chief engineer. [E. R. J., July 8, '11.]

Pueblo & Suburban Traction & Lighting Company, Pueblo, Col.—This company plans to spend about $2,000,000 for extensions and improvements of its lines.

Atlanta (Ga.) & Carolina Railway.—This company has completed grading from White City to Carters, a distance of about 10 miles. Grading will be completed between Atlanta and Conyers by Oct. 1, and track laying will begin immediately.

Middle Georgia Interurban Railway, Jackson, Ga.—Track laying has been begun by this company in Jackson, and as soon as this part of the line is finished extensions will be made to Griffin to connect with the Central of Georgia Railway. W. Smith is interested. [E. R. J., July 29, '11.]

Boise & Interurban Railway, Ltd., Boise, Idaho.—This company plans to extend its line from Caldwell, its present western terminal, to Nampa.

East St. Louis, Columbia & Waterloo Electric Railway, East St. Louis, Ill.—The J. A. Ware Construction Company has been awarded the contract by this company to grade its line between East St. Louis and Waterloo. George C. Smith & Sons have been awarded the contract for the bridge and concrete work. [E. R. J., May 27, '11.]

Kankakee-Urbana Traction Company, Kankakee, Ill.—It is reported that this company has voted to issue $300,000 of bonds to be used for the construction of its 75-mile electric railway between Kankakee, Champaign, Urbana and Villa Grove. The first section to be built will be between Urbana and Rantoul. G. M. Bennett, Urbana, president. [E. R. J., Oct. 8, '10.]

Springfield & Northwestern Railway, Springfield, Ill.—Surveys have been made by this company and much of the right-of-way has been obtained for its electric railway from Springfield to Petersburg, via Andrew, Cantrall, Athens, Tice and Old Salem. [E. R. J., July 29, '11.]

Kokomo (Ind.), Frankfort & Western Railway.—The A. J. Yawger Company, Indianapolis, has been awarded the contract by this company to build an electric railway from Kokomo to Frankfort. About 200,000 yds. of grading will be sublet. Charles La Rue, St. Louis, is in charge. [E. R. J., July 15, '11.]

Keokuk (Ia.) Electric Railway & Power Company.—It is reported that the Stone & Webster Engineering Corporation, Boston, has acquired this company's street railway system at Keokuk and will expend $300,000 for reconstruction work.

Paducah (Ky.) Traction Company.—J. T. Omberg has been awarded the contract by this company to build a steel and concrete bridge over Island Creek.

Algiers Railway & Lighting Company, Algiers, La.—This company will extend its Algiers-Gretna line to McLellanville and the Mississippi River.

Boston (Mass.) Elevated Railway.—The Massachusetts Railroad Commission has approved the plans of the Boston Elevated Railway for the construction of its tracks on the East Cambridge extension of the elevated structure, from Causeway Street, near Haverhill Street, Boston, to Lechmere Square, Cambridge.

Interurban Construction Company, Hastings, Minn.—This company advises that it has begun work on its electric railway from Hastings to St. Paul, and that it will be extended to Rochester, Minn. W. L. Southerly, general manager. [E. R. J., July 15, '11.]

Piedmont Traction Company, Charlotte, N. C.—Work is nearly completed on this company's line from Hoskins to Mount Holley. [E. R. J., June 34, '11.]

***Beach City, Ohio.**—The citizens of Beach City plan to build a 26-mile electric railway from Beach City to Millersburg, via Winesburg, Mt. Hope and Berlin.

Dayton & Xenia Traction Company, Dayton, Ohio.—This company has obtained the necessary consent of property owners for the proposed loop on Fifth Street, Dayton, and hence up Main Street to Third Street, and west on Third Street to Ludlow Street.

***Portland, Ore.**—The Ladd Estate Company has begun work on its electric railway from West Moreland to East Moreland.

Portland (Ore.) Railway, Light & Power Company.—This company will spend $135,000 for improvements in and around Salem. This work will include track improvements and additional power house equipment.

Beaver Valley Traction Company, Beaver, Pa.—This company will make improvements in this city that will cost about $50,000, consisting of new track, overhead construction and carhouses.

Pittsburgh, Monongahela & Washington Railway, Monongahela City, Pa.—This company, which has changed its name from the Monongahela & Carroll Street Railway to the Pittsburgh, Monongahela & Washington Railway, plans to build an extension between Monongahela and Ellsworth during the next year.

Northern Electric Street Railway, Scranton, Pa.—This company will build extensions of its lines from Clark's Summit to the Hillside home and on to Newton and from Nicholson to Montrose.

Greenville, Spartanburg & Anderson Railway, Greenville, S. C.—W. J. Oliver has been awarded the contract to build this company's road between Greenwood and Greenville. Grading is almost completed, and track laying will begin in a few days.

Chattanooga Railway & Light Company, Chattanooga, Tenn.—This company has begun work remodeling its road up Missionary Ridge and along the Crest and reducing the grade in many places.

Denton (Tex.) Traction Company.—Overhead construction work and track construction work has been begun on the extension to the northern part of Denton and to the College of Industrial Arts.

Waco (Tex.) Street Railway.—This company plans to build several miles of new track in Waco, and to double-track its line to the exposition grounds.

Utah Light & Railway Company, Salt Lake City, Utah.—This company placed in operation on July 15 its West Temple Street extension. The line has been extended about 2 miles from West Tenth Street South to West Twelfth Street South in Salt Lake City.

Tyler Traction Company, Clarksburg, W. Va.—Surveying has been nearly completed by this company and construction will begin in a few days on its electric railway from Sistersville to Middlebourne. [E. R. J., June 10, '11.]

***Bloomington, Wis.**—E. Norwood plans to build an electric railway from Wyalusing to Shullsburg, through the towns of Patch Grove, Mount Hope, Bloomington, Lancaster and Plattville.

SHOPS AND BUILDINGS

Geary Street Municipal Railway, San Francisco, Cal.—The Board of Public Works has voted a $400,000 bond issue, part of which is to be used to build a carhouse in San Francisco.

Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind.—This company will build an interurban passenger station at Bluffton, Ind.

Des Moines (Ia.) City Railway.—This company will build a $70,000 addition to its carhouse on Twenty-fourth Street, in Des Moines.

Louisville (Ky.) Railway.—This company has purchased a ten-acre tract of land at Twenty-ninth Street and Broadway, Louisville, on which it will erect a carhouse for its West End lines. It is intended to remove the repair department of the company, now located at Seventeenth Street and Walnut Street, to the new location and to enlarge the shops.

North Carolina Public Service Company, Charlotte, N. C.—This company will build a three-story brick and granite building in front of its substation on South Main Street, Charlotte, to be used as an office building.

Wheeling (W. Va.) Traction Company.—This company is building a new passenger station to replace the one that was destroyed by a storm a few months ago.

POWER HOUSES AND SUBSTATIONS

Birmingham (Ala.) Railway, Light & Power Company.—This company has awarded a contract to the Westinghouse Electric & Manufacturing Company for a 1000-kw, 60-cycle, self-starting rotary converter, with the necessary transformers and switchboards.

Geary Street Municipal Railway, San Francisco, Cal.—The Board of Public Works has voted a bond issue of $400,000, part of which will be used to build a power house at San Francisco.

Connecticut Company, Bridgeport, Conn.—This company is building an addition to its power house on Seaview Avenue, and is installing new turbo-generating equipment.

Capitol Traction Company, Washington, D. C.—The Westinghouse Electric & Manufacturing Company has been awarded a contract by this company for two complete substation equipments, one covering a 1500-kw, 25-cycle, self-starting rotary converter with the necessary transformers and switchboards, and the other a 1000-kw, 25-cycle, self-starting rotary converter with switchboards and transformers.

Georgia Railway & Electric Company, Atlanta, Ga.—The Westinghouse Electric & Manufacturing Company has received an order from this company for a 1000-kw, 60-cycle, self-starting rotary converter with transformers and switching apparatus.

Illinois Traction System, Springfield, Ill.—This company has placed an order with the General Electric Company for a 2000-kw Corliss engine for use in its power plant at Riverton.

Des Moines (Ia.) City Railway.—This company has placed in operation a 300-kw rotary converter at its Klondyke Junction substation.

Metropolitan Street Railway, Kansas City, Mo.—The Westinghouse Electric & Manufacturing Company has received an order from this company for a 3000-kw, 25-cycle, self-starting rotary converter, with three 11,000-kva air-blast transformers and the necessary switching and blower apparatus.

Syracuse (N. Y.) Rapid Transit Company.—The contract for this company's substation, on Townsend Street, will be let this week, and construction work will begin immediately. The equipment will consist of two 1000-kw rotaries with the necessary transformers and appliances.

Charleston (S. C.) Consolidated Railway & Light Company.—This company will install in its new power house at Charleston three 1000-kw turbo-generators.

Nashville (Tenn.) Railway & Light Company.—This company has purchased a site on First Avenue and Second Avenue, fronting about 250 ft. on each street, for an addition to its power house.

Manufactures & Supplies

ROLLING STOCK

Evansville (Ind.) Railways is said to be in the market for five city cars.

Maysville (Ky.) Public Service Company is in the market for four city cars.

Detroit (Mich.) United Railway is reported to be in the market for fifty city cars.

People's Gas & Electric Company, Burlington, Ia., is reported to be in the market for ten city cars.

Boston (Mass.) Elevated Railway has ordered 100 Brill 27-MCB-1 trucks from The J. G. Brill Company.

New York & Queens County Railway, New York, N. Y., is said to be considering the purchase of ten closed cars.

Kokomo, Marion & Western Traction Company, Kokomo, Ind., is reported to be in the market for three or four interurban cars.

Union Electric Company, Dubuque, Ia., has ordered six 20-ft. 1-in. pay-as-you-enter cars, mounted on Brill 21-E trucks, from the American Car Company.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., is rebuilding six double-truck cars by removing the bulkheads and installing pay-within doors.

Public Service Railway, Newark, N. J., has ordered through Wendell & MacDuffie four size 6 Russell combination snow plows from the Russell Car & Snow Company.

Mount Hood Railway & Light Company, Portland, Ore., has ordered two 56-ft. baggage and express motor car bodies, mounted on Brill 27-MCB-3 trucks, from The J. G. Brill Company.

Hutchinson (Kan.) Interurban Railway has ordered a double equipment of No. 92-A railway motors, with type K-10-A control, from the Westinghouse Electric & Manufacturing Company.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., has ordered a partial equipment of No. 307 interpole railway motors from the Westinghouse Electric & Manufacturing Company.

Denver & Inter-Mountain Railway, Denver, Col., has ordered four quadruple equipments of No. 306-B interpole railway motors, with K-35 control, from the Westinghouse Electric & Manufacturing Company.

Southwestern Traction & Power Company, New Orleans, La., noted in the Electric Railway Journal of July 29, 1911, as being in the market for several interurban cars, will purchase four double-truck combination passenger and baggage cars, two single-truck city cars, two bench trailers and an electric locomotive. Headquarters, Hennen Building Annex, New Orleans.

TRADE NOTES

Railway Improvement Company, New York, N. Y., has received an order from the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., for 300 coasting clocks, of which fifty will be installed on interurban cars and 250 on city cars.

Railway Audit & Inspection Company, Philadelphia, Pa., announces the appointment of Paul H. Diehl, former traveling representative through the West for the company, as district manager of the company's Chicago office, to succeed Charles Gable, resigned.

H. B. Tilley, manager of Messrs. Bruce Peebles' office in Manchester, England, has left England for an extended business tour in Canada on behalf of his firm. Mr. Tilley will visit all places of importance in the Dominion and expects to be away for fully a year.

Canadian Fairbanks-Morse Company, Montreal, Que., has been formed in Canada with a capital stock of $2,000,000, to take over the Fairbanks-Morse Canadian Manufacturing Company and its subsidiaries, Dominion Safe & Vault Company, Ltd., and E. T. Fairbanks Company, Sherbrooke, Que.

Ackley Brake Company, New York, N. Y., has received an order for Ackley no-staff brakes, through the Compagnie Francaise des Freins Ackley, Paris, France, for Madrid, Spain, and Lyons, France. The company also reports the

receipt of an order for Ackley adjustable brakes from the Sao Paulo Tramway, Light & Power Company, Sao Paulo, Brazil.

Hildreth-Jones Company, New York, N. Y., has been formed by the consolidation of Hildreth Company, New York, and Morgan T. Jones & Company, Chicago, Ill., to act as inspecting and supervising engineers. Morgan T. Jones will be in charge of the Western district, with headquarters in Chicago. Mr. Jones was connected with R. W. Hunt & Company for almost ten years, and later was president of the American Bureau of Inspection & Tests for nearly seven years. Mr. Hildreth has been in business as a consulting and inspecting engineer in New York since 1888.

Western Electric Company, New York, N. Y., has recently put on the market for use in railway work a new dry battery. This new cell has the same high efficiency, long life, high voltage and great recuperative power that characterize the standard Blue Bell battery. It differs from the standard cell in that the cardboard carton has been treated with a special impregnating compound which effectually prevents moisture from reaching the cell proper. This will give sufficient protection so that the life of the batteries used in outdoor work will be as great as that of the batteries used in any other magneto service under ordinary conditions.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., reports the receipt of the following orders for power equipment: Kokomo Public Utility Company, Kokomo, Ind., for a 1500-kva turbo-generator unit, a 500-kw self-starting rotary converter, and the necessary transformers and switching apparatus; Olympic Power Company, Port Angeles, Wash., for two 3000-kva waterwheel generators, seven 1000-kva water-cooled transformers of 38,200 volts, on the high-tension side, with the usual exciters and switchboard; Dakota Power Company, Rapid City, S. D., for three 500-kva waterwheel generators, three 500-kva water-cooled transformers for the 24,000-volt transmission lines and three 200-kva, self-cooled transformers for 24,000 volts, high tension. A large switchboard is included in this order.

Wickecheoke Corporation, Trenton, N. J., has been incorporated with a capital stock of $125,000 to organize associations and corporations for all kinds of business. Theodore G. Kitchin has been elected president and manager of the company. Mr. Kitchin has been connected with the operating department of the New Jersey & Pennsylvania Traction Company for the past two years, and previous to that time he was on the editorial staff of the *Daily State Gazette*, of Trenton. Frank M. Wilson will have general charge of the engineering department of the new company; J. H. Brown will be in charge of the foreign corporation business, and Leroy W. Skelton will manage the corporation supply department. The Wickecheoke Corporation will have headquarters at 58 Pennington Avenue, Trenton, and branch offices in Philadelphia, Pa., and Wilmington, Del.

ADVERTISING LITERATURE

Electric Service Supplies Company, Philadelphia, Pa., has issued a 24-page booklet entitled "The Book of the Automotoneer," which fully describes and illustrates this device for insuring proper controller operation on electric cars.

Ohmer Fare Register Company, Dayton, Ohio, is mailing two circulars showing the relation between the ordinary register and the Ohmer register, which indicates and prints, separately, a record of the different classes of fares collected in city cars.

Federal Storage Battery Car Company, New York, N. Y., has reprinted in booklet form the paper entitled "Beach Cars Equipped with Edison Storage Batteries," presented by Ralph H. Beach at the last convention of the Street Railway Association of the State of New York, at Cooperstown, N. Y.

Pratt & Whitney Company, Hartford, Conn., has issued Catalog No. 6 on small tools. The catalog is divided into seven sections, as follows: Taps, dies, milling cutters, reamers, punches, drills and miscellaneous tools. There are also several pages devoted to conversion and computing tables, and an index. The publication is profusely illustrated and contains 250 pages.

C-A-Wood-Preserver Company, St. Louis, Mo., has issued a 24-page pamphlet on "Wood Preservation for Electric Railways—Its Principles and Evidence of Its Efficiency and Economy." Some striking statistics are brought out in regard to the saving effected by wood preservation, and illustrations are given of the condition of treated and untreated ties after the same period of use and under parallel conditions. Letters are also reproduced from users of C-A-Wood-Preserver, indorsing its value. These users include the Denver (Col.) City Tramway Company, the Indianapolis, Columbus & Southern Traction Company, Los Angeles & Redondo Railway, Freeport Railway, Dallas Consolidated Railway, Colorado Springs Electric Company, Durham Railway and Greenville Railway.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has issued revised editions of the following sections of perpetual Catalog No. 3001, No. 121, on type CC carbon circuit breakers; No. 231 on expulsion type fuse blocks, No. 233 on outdoor type fuse blocks, No. 327 on type C watthour meters, and No. 667 on type KD generator and feeder panels. These revised sections embody new features of interest. The following sections describe an entirely new line of switchboard meters which are very compact in size and yet retain the accuracy, the long scale and other advantageous features of the older types: No. 307 covers types L, SL and TL switchboard meters; No. 310, types FM and TM switchboard meters; No. 311, types FD and TD frequency meters; No. 312, types FI and TI power factor meters; No. 314, type TG electrostatic ground detectors and voltmeters; No. 327½, type OA watthour meters, and section No. 740 covers 75-kva and 100-kva distributing transformers.

NEW PUBLICATIONS

The Railway Library for 1910. Compiled and edited by Slason Thompson, Director of Bureau of Railway News and Statistics, Chicago, 1911. The Gunthorp-Warren Printing Company. Cloth, 456 pages. Price, $0.75.

Two years ago Mr. Thompson, the well-known writer on railroad subjects, conceived the idea of reprinting in pamphlet form different short papers and addresses by railroad authorities, discussing different phases of the railway situation, and the following year bound these in permanent form and sold them for 75 cents a volume. The plan has been followed again this year and the Railway Library for 1910 contains twenty-six articles, addresses, judicial decisions and reports, relating for the most part to subjects of rates and federal and State regulation, but including, also, one or two articles on statistics and on engineering subjects, such as block signal systems and the Pennsylvania station in New York.

Railway Shop Kinks. Compiled by Roy V. Wright, New York; 1911. *Railway Age Gazette.* Cloth, 290 pages. Price, $2.

This book is largely a reprint of descriptions of steam railway shop kinks which have appeared in the shop section of the *Railway Age Gazette* in the first issue of the month during the past two years. It has been compiled under the supervision of a committee of the International Railway General Foremen's Association. While the methods and special devices described have all been gathered from steam railway shop practice, many of them are applicable to electric railway work and to many miscellaneous machine shop, boiler shop and smith shop operations. The arrangement of the material is excellent. The kinks are divided into seventeen classes, according to the character of the work for which they are used. The first section includes machine shop kinks of all kinds, and among the other classifications are oxy-acetylene welding and cutting, brass foundry kinks, tin and copper shop kinks, passenger car kinks, planing mill kinks, blacksmith shop kinks, air-brake kinks and paint shop kinks. Nearly every description is accompanied with one or more excellent line drawings or illustrations from photographs, which aid materially in understanding the text. With contents so large and varied a comprehensive index is essential to a book of this kind. The compiler has supplied such an index, of six pages.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVIII NEW YORK, SATURDAY, AUGUST 19, 1911 No. 8

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.
HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.
CURTIS E. WHITTLESEY, Secretary and Treasurer.
TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

HENRY W. BLAKE, Editor.
L. E. GOULD, Western Editor.
Associate Editors:
RODNEY HITT, FREDERIC NICHOLAS, WALTER JACKSON.
News Editors:
G. J. MACMURRAY, FRANK J. ARMEIT.

CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1021 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues publihsed from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Thursday, 9 A. M., of the week of issue.

Copyright, 1911, by MCGRAW PUBLISHING COMPANY.

Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, *8500 copies are printed.*

NEW YORK, SATURDAY, AUGUST 19, 1911.

CONTENTS.

The Returns of Electric Railways for 1910..... 303
Seats for Women and Children First..... 303
Eliminate Rule-of-Thumb Construction in the Way Department.... 304
Comparison of Operating Features of Two Important Third-Rail Roads 304
Rolling Stock Maintenance and Other Operating Features of the Aurora, Elgin & Chicago Railroad..... 306
Transfers in New York City..... 310
Reports of Electric Railway Operation in 1910..... 311
Arnold Report on Providence Transportation Conditions..... 315
New Company Building in Portland, Ore..... 319
Civic Federation Committee Report on Regulation..... 320
Des Moines Strike Situation..... 320
Hearing on Side Doors on Local Trains in New York Subway..... 320
Plans for Running Illinois Traction Private Car to Cedar Point Convention..... 321
Removable Brake Shoe and Holder..... 321
Sanitary Car Flooring..... 321
Test Case on Brakes in Ohio..... 321
Kerwin-Detroit Rail Grinder..... 322
Cars for Great Falls, Mont..... 323
New Type of Storage-Battery Car..... 324
A New Direct-Reading Ohmmeter..... 325
A New Trolley Ear..... 325
News of Electric Railways..... 326
Financial and Corporate..... 328
Traffic and Transportation..... 331
Personal Mention..... 333
Construction News..... 334
Manufactures and Supplies..... 337

The Returns of Electric Railways for 1910

The 1911 edition of the *McGraw Electric Railway Manual,* formerly entitled *American Street Railway Investments,* contains interesting statistics regarding the operations of the electric railways of the country and some of these statistics are republished in the current issue of the ELECTRIC RAILWAY JOURNAL. In part they correspond to those which have been compiled for the ELECTRIC RAILWAY JOURNAL in previous years directly after the publication of *American Street Railway Investments.* It was thought best this year to have the statistics appear first in the publication containing the returns on which the totals were based, but in order to make the record complete so far as this paper is concerned, the tables of totals for the different states and for the entire country are also printed in this issue. The most important improvement from the plan of previous years is in the compilation of totals, so far as they are available, of gross earnings, operating expenses, net earnings, passengers carried and transfers issued. The returns in this respect are incomplete, but they indicate a gross earning power for the companies reporting of $478,873,671 during 1910. Another improvement made in the compilation of the statistics of this year was the computation for the first time of the total authorized stock and funded debt. In preceding years the totals of only the outstanding capital stock and funded debt have been given. Some of the changes in track, etc., from the record of previous years are due to differences in classification in the compilation of the statistics, but these are explained in the text, which is published elsewhere.

Seats for Women and Children First

This week an interesting attempt was begun by the New York police to ameliorate the rush-hour conditions for women and children at the Manhattan terminal of the Brooklyn Bridge. At this place there are eight surface car loops along four of which high railings separate the opposing streams of alighting and boarding passengers. This plan, coupled with effective police regulation, has been very effective in preventing the scuffling and accidents which formerly occurred between passengers attempting to board cars and those wishing to alight. But it still failed to prevent the stronger and more ruthless men and boys waiting at the terminal from obtaining precedence over women in the scramble for seats. To eliminate this condition the police are now permitting women and children to board the cars as soon as the first stop is made, or that to discharge passengers, and before the car reaches the section reserved for men. The present trial

is in operation on three loops, but will doubtless be extended to others if its present success continues. The responsibility for this departure rests with the police, as it properly should in extreme cases of this kind. No matter how ready a railway company may be to improve the amenities of travel a point is sometimes reached when politeness and even decency can be secured only by the presence of the official police club. The strain upon New York transportation facilities has been great for so many years that it seems to have dulled the sense of courtesy in the traveling public. Any effort of the railway to have applied this "Jim Crow" measure would probably have been denounced as an attack upon the sacred liberties of the American citizen. We trust that the Brooklyn Bridge experiment will prove as satisfactory as the police regulation of vehicular traffic, which has now become a matter of course in New York and other large cities. Official co-operation in matters of this kind will do much to enable electric railway managements to eliminate the worst features of the crowding which seems to be an unavoidable accompaniment of the American rush hour.

Eliminate Rule-of-Thumb Construction in the Way Department

The differences between the methods followed in the erection of wooden and of steel buildings are strikingly paralleled in the field operations of the way departments of electric railways. The builders of a frame house saw, chisel, trim and otherwise adjust most of their materials at the place of installation, whereas the erectors of a steel structure are supplied with finished members all marked as to their exact location. Many way departments still do most of their fitting at the place of installation because they have not studied the possible economies which would ensue if most of the finishing work was done at one place and in accordance with the scientific calculations of the engineering staff. In the erection of a trestle, for instance, much waste in lumber may usually be avoided if every piece is cut at the way department shops according to a drawing and then marked with the proper bent number as a guide for the construction gang. This method will also eliminate any loss of time in waiting for a given member to be made to shape, and it will also minimize the amount of material to be hauled. In like manner, it is often feasible to bend rails and drill plates at the shops rather than in the field. The greatest advantage of such centralization lies in the opportunity to use accurate, high-grade machinery at one place under the charge of expert master carpenters and master machinists instead of relying on the rough and ready portable tools used by rule-of-thumb construction foremen. The contrast between these two practices shows how at least one principle of efficiency engineering, namely, the delivery of finished material to the assembler, can be applied to the operations of the way department. These considerations pertain more particularly to city railways whose track gangs are within easy call of headquarters. It is a fact, nevertheless, that the concentration scheme described has made good in saving time and money on a combined city and interurban system which operates several hundred miles of cross-country track.

A COMPARISON OF OPERATING FEATURES OF TWO IMPORTANT THIRD-RAIL ROADS

The Aurora, Elgin & Chicago Railroad, operating westward from the business center of Chicago, as described in this and in the two preceding issues of the Electric Railway Journal, forms an excellent subject for profitable study to those interested in suburban traffic conditions. The service given by this line is comparable with that which an electrified steam road might give to and from a metropolitan terminal. It operates limited trains at very high speeds and local trains at speeds which are high in comparison with those of its steam competitors.

In type of construction and in character of schedules this Illinois road differs widely from the usual interurban trolley road. It connects Chicago with a closely built suburban territory and is favored with commuter traffic which can be depended upon to fill a fixed number of trains night and morning each day in the year. This is a favorable traffic condition as compared with that of some trolley roads which do a heavy business in the summer and a light business in the winter. By reason of this regular commuter traffic the Aurora, Elgin & Chicago Railroad is enabled to handle summer excursions during the middle of the day in the same cars that are used at night and morning for the commuters. Thus it keeps its cars operating in revenue service for a larger part of the day than it could under less favorable conditions.

The closest parallel to the third-rail division of the Aurora, Elgin & Chicago Railroad, when both service and equipment are considered, is probably the West Jersey & Seashore branch of the Pennsylvania Railroad, and a comparison is possible owing to the valuable paper on the latter road by B. F. Wood read before the American Institute of Electrical Engineers and abstracted in the Electrical Railway Journal for July 1, page 19. In many particulars of physical equipment and traffic conditions the roads bear a close resemblance. Perhaps the two points of greatest difference are the monthly fluctuations in traffic and the station load-factor. On the New Jersey railway the car miles run in mid-summer are 100 per cent greater than in mid-winter because of the pleasure traffic between Philadelphia and Atlantic City, whereas on the Illinois railway the traffic conditions are very uniform. Finally, the station load-factor of the New Jersey railway is comparatively even lower than this condition would require because of the extensive sale by the Illinois road of energy for commercial purposes. In the following comparison the third-rail division only of each property is considered, although the Illinois road owns and operates some 75 miles of trolley lines and the New Jersey road is part of a large steam railroad system.

The Illinois road has 66 miles of route and 97.8 miles of track and the New Jersey road has 74.3 miles of electrified route and 150 miles of electrified track. The location of population along the two roads is not widely different. Each road has one metropolitan terminal, but while the Illinois road reaches the center of the business district of Chicago over the elevated structure of the Metropolitan West Side Elevated Railway, passengers on the New Jersey road have to transfer at Camden and reach Philadel-

phia on ferry boats. Suburban settlement has taken place on both roads largely in proportion to the time required to reach the property from the metropolitan terminals.

The track of the Illinois road is laid with 80-lb. running rails and that of the New Jersey road with 85-lb. and 100-lb. running rails. The New Jersey road has a smaller number of curves and grades because of the flat country through which it is built. Power is distributed to the cars of both roads through 100-lb. third-rail conductors of the exposed type. The third-rail on the New Jersey road is of track steel and has a lower conductivity than that on the Illinois road, which is of a special composition.

Train service on the two roads does not vary greatly. The average train on the Illinois road consists of 1.59 cars and that of the New Jersey road 3.518 cars. Although the passenger cars of both roads seat the same number of passengers, the difference in carrying capacity for average trains is not so great as the foregoing figures would seem to indicate, because many trains of the New Jersey road include mail or baggage cars or both. The Illinois road's service has greater variety than that of the other road because parlor and dining cars and funeral and express trains are operated.

The car-mileage statements for 1910 show that the Illinois road operated 3,456,425 car miles and the New Jersey road 4,552,056 car miles. The figures for the former road include passenger, work and express cars, while those for the latter road include passenger, baggage and mail cars. Each road operates limited and local trains at high rates of speed. The fast trains on the Illinois road average 41.2 m.p.h. and those on the New Jersey road 43.3 m.p.h. But these schedule speeds are not a correct indication of the maximum speeds in either case because the limited stops on both roads, if we except a few trains on the West Jersey & Seashore Railroad, are close together. Those on the Illinois road are probably the closer, as they average only 3.2 miles apart. Local trains on the Illinois road are scheduled at 32.7 m.p.h. and the stopping points average only 0.9 mile apart. Motive power of high capacity is demanded by these fast schedules.

The cars on both roads seat fifty-eight passengers. The Illinois road operates four-motor, two-motor and trail cars, while each car of the New Jersey road is equipped with two motors. Motors of 125 hp capacity are used by the Illinois road and of 200 hp capacity by the New Jersey road. The four-motor cars of the Illinois road weigh 84,000 lb., the two-motor cars 74,000 lb. and the trail cars 55,000 lb., while each car of the New Jersey road weighs 94,500 lb.

The Aurora, Elgin & Chicago limited trains average two motors, or 150 hp, per car and weigh 278 lb. per horsepower and 1192.2 lb. per passenger seat. The local trains on the same road average three motors, or 375 hp, per car and weigh 210.7 lb. per horse-power, or 1362.1 lb. per seat. The New Jersey trains weigh 238.1 lb. per horsepower of motor capacity and 1630 lb. per seat. Energy consumption at the cars, including thus the distribution losses, compares about as might be expected from the running speeds and car weights mentioned. The trains of the Illinois road use 4.29 kw-hours per car mile and those of the New Jersey road require 4.83 kw-hours per car mile.

The difference between the summer and winter traffic on the New Jersey line is sufficient to explain the difference in the average mileage per car per day obtained by the two roads. The figure for the Illinois road is 175 miles per day and for the New Jersey road is 134 miles per day. The managements of both roads have recently announced the early purchase of additional cars.

The buildings of the Illinois road provide no storage space for cars except for those under repair. It is the theory of the management that on a road which keeps its cars in service from eighteen to twenty-four hours per day the overhead expense for carhouses is not warranted, except for the extra equipment that is not in daily use.

Comparing the total output of the generating stations of the Illinois and New Jersey roads we find that in 1910 the plant of the New Jersey road generated 28,312,500 kw-hours, whereas the Illinois figure was 38,764,000 kw-hours. But of this amount 5,590,000 kw-hours were delivered to lighting and power customers as alternating current, leaving 33,174,000 kw-hours as the output from the generating station to the railway substations. The direct-current output of all rotary converters in the substations was 21,379,500 kw-hours. Of this, however, 6,540,000 kw-hours were used on the trolley divisions or sold to d.c. customers. Deducting this from the total output of the substations we have 14,839,500 kw-hours as the d.c. output of the substations for use on the third-rail division. The substations of the New Jersey road delivered 21,972,300 kw-hours. The New Jersey road's substations exceeded the output of the Illinois road's substations by about 48 per cent, while the car mileage requiring the energy exceeded that on the Illinois road by only 31 per cent. On the other hand, the efficiency of transmission between the power station a.c. busbars and the substations d.c. busbars was 81.6 per cent on the New Jersey road as compared with about 65 per cent on the Illinois property.

The Illinois road has seven substations, with a total capacity of 8500 kw, of which about 6000 kw is utilized by the third-rail division. The New Jersey road has eight substations with a total capacity of 17,000 kw. The substation capacities per mile of track are 61.3 kw for the Illinois road and 113.3 kw for the New Jersey road. Considering substation capacities per passenger car operated we have 120 kw for the Illinois road and 212.5 kw for the New Jersey road. A twenty-four-hour service is supplied from the Illinois station, while no trains are run on the New Jersey line between 1 a. m. and 4 a. m. On the basis of output per kilowatt of substation capacity, the output of the Illinois road last year was 2473.1 kw-hours and that of the New Jersey road was 1292.4 kw-hours. In other words, the substation load-factor on the Illinois road was almost twice that on the New Jersey road.

Both roads are subject to severe competition. The Illinois road is paralleled for a considerable distance by five steam railroads, three of which operate transcontinental trains at high speed in addition to frequent suburban trains. Its chief defence against this competition is its higher speeds and the greater accessibility of its stations. The competition to the New Jersey road is principally the high speed service between Philadelphia and Atlantic City supplied by two double-track steam lines. Both of these lines have a shorter route into Philadelphia; nevertheless, the electric road secures much of the through business.

Rolling Stock Maintenance and Other Operating Features of the Aurora, Elgin & Chicago Railroad

Reasons Controlling Car Design and Motor Capacity Are Given As Well As Costs of Maintenance For Cars, Transmission Lines and Substations. The Article Also Presents a Description of the Lighting Systems Operated, One of Which Uses 25-Cycle Current

Illustrated articles in the two preceding issues of this paper have described the track and roadway operating methods and the power generating and distributing system of the Aurora, Elgin & Chicago Railroad. The following article concludes the series on this property:

The rolling stock equipment of the third-rail division includes fifty passenger cars, all of which have heavy steel underframes, semi-steel side construction and mahogany interior finish. The cars are designed for train operation and have end doors and Van Dorn couplers. They are equipped with automatic air brakes and electromagnetic conductor's signals which are operated by utilizing one wire in the regular train control cable.



Aurora, Elgin & Chicago—Three-Car Train

The cars originally purchased for the third-rail division were 47 ft. 10 in. long. All were built to conform to the clearances of the Metropolitan West Side Elevated Railway and were provided with running gear for operation in trains around the sharp curves on the elevated structure. After two or three years of operation it was found that the car length could be increased to 53 ft. 4 in. and still meet the elevated track operating conditions. This length accordingly is the present standard.

Six years ago the original straight air-brake equipment was replaced by the Westinghouse AMM schedule of automatic air having the features of graduated release, quick recharge and high emergency braking power. GE 66-B 125-hp motors are standard on the third-rail division. Originally all motor cars had quadruple equipments and a certain number of the standard passenger cars without motors were used as trailers, but the severity of the service has made it advisable to equip most of the former trail cars with two motors each. This change has greatly increased the flexibility of operation because each car can now be moved by its own motors, thus permitting every train to be made up with the most suitable number of motors per train, which often was found impossible when some of the cars had no motors under them. The four-motor passenger cars, without load, weigh 84,000 lb. complete.

Owing to the very high speed conditions and the short length of the first thirty cars put in service, considerable difficulty was experienced in making the cars ride comfortably. It was found necessary to discard all of the trucks under these cars and replace them with a truck of the double-equalizer M. C. B. type designed by the company's engineers in accordance with the requirements of severe service. The original trucks were of the box-holster type having small coiled springs and no elliptics. The new trucks, with three full elliptic springs, have not only improved the riding qualities of the cars, but have noticeably decreased the maintenance cost of the rolling stock equipment.

All recent car equipments have been installed with the wiring in iron conduit, and the older cars as they are shopped are being similarly wired.

The freight and miscellaneous equipment of the third-rail division includes three motor express cars, one combination express car and snow plow, one four-motor nose-type snow plow and twenty box, gondola and flat cars.

The rolling stock of the Fox River division consists of forty-seven single-truck cars and eighteen double-truck cars for city service. The interurban equipment on this division includes twelve double-truck motor cars and one baggage-express car, in addition to twenty utility cars used by both city and interurban sections of the Fox River division.

The latest city cars purchased were built by the Niles Car & Manufacturing Company and were designed for pay-as-you-enter fare collection. No decision, however, has yet been reached as to the advisability of the rearrangement of the platforms of the other cars. The interurban cars of the Fox River division are wired in iron conduit and are being standardized as fast as overhauled.

The snow-fighting equipment consists of three single-truck sweepers and two double-truck plows on the Fox River division. Similarly on the third-rail division the equipment consists of one double-truck nose plow and two detachable noses, each nose mounted on a single pair of wheels and so arranged that it can be fitted in a short time to one of the company's baggage and express motor cars.

All oiling and inspection of cars on both divisions are done on a mileage basis, the intervals on the third-rail division being 800 miles and on the trolley division 600 miles. Overhauling is done about every 60,000 miles.

SHOP FACILITIES

With the consolidation of the third-rail division and the Fox River trolley division in 1904 a rearrangement of the shop work became necessary. At that time all of the third-rail equipment was maintained at the central shops at Wheaton and the Fox River line had division shops at both Aurora and Elgin. Soon after consolidation the shop work was discontinued at Elgin and only regular inspection work was done there, all the overhauling and heavy repairs for the trolley division thereafter being performed at Aurora. It was found impracticable to consolidate the Aurora and Wheaton shops because of dead mileage, but certain work for the Fox River division is now done at Wheaton, namely, the renewal of wheels, all armature and winding work, painting and varnishing.



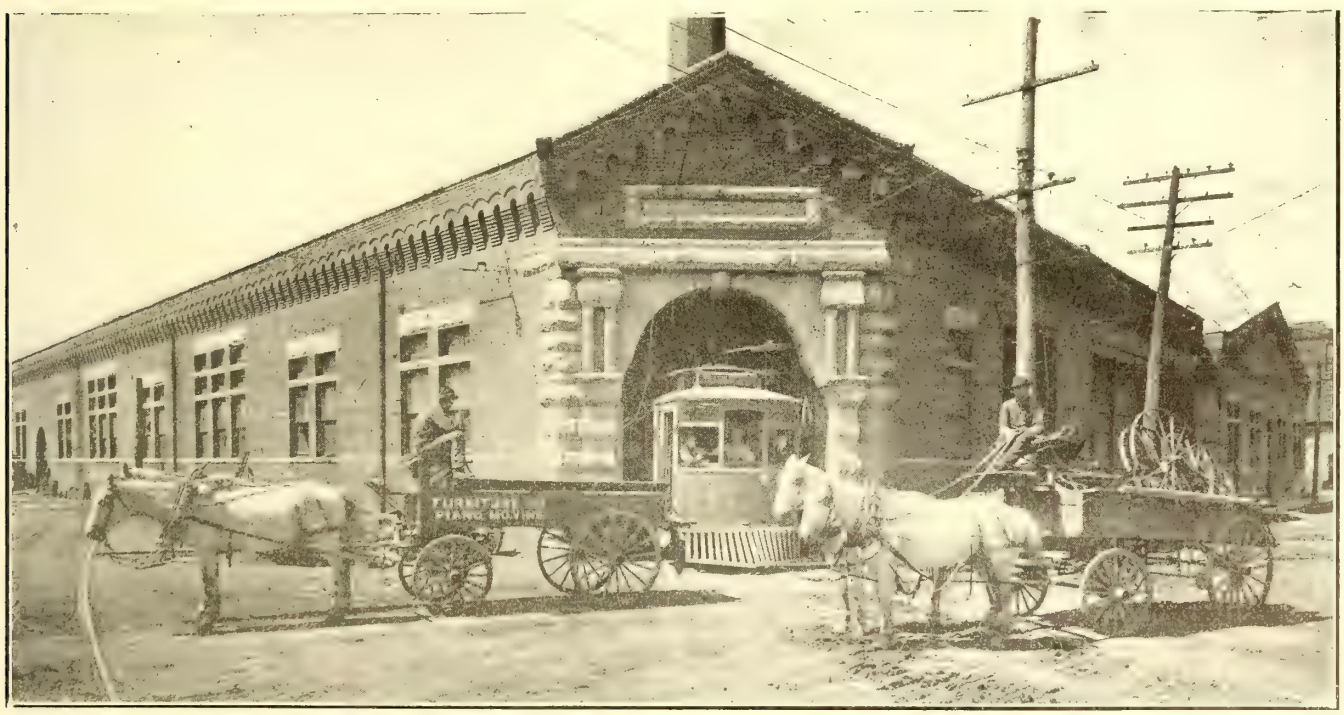
Aurora, Elgin & Chicago—Main Car Shop and Yards at Wheaton

Recently the Aurora shop equipment has been increased by the addition of an 18-in. x 10-ft. engine lathe, several smaller tools, such as drill presses, forge, conduit benders and a number of gas-heating appliances and compressed-air tools and hoists. At the Wheaton shops for the third-rail division the original wheel press, which was of 150 tons capacity, has been replaced by one of 300 tons capacity, manufactured by Niles-Bement-Pond. A wheel-turning lathe of Niles manufacture also has been installed. There has been added from time to time a very extensive equipment of air tools, gas-heating appliances and smaller equipment for the machine and carpenter shops.

GEARS AND PINIONS

It is interesting to note that, although the engineering department made thorough studies with a view to using gearing for a lower speed than 70 m.p.h., the results of the investigation as well as experiments with cars geared for slower speeds, show that the fast schedules cannot be made unless extremely high speeds are reached between stops.

There has been a continual quest for GE-66 gears and pinions which would stand up under the severe service on the third-rail division, and many types of gears and pinions have been tried, including oil-treated pinions and the removable forged-rim gears. The life of these latter has averaged 223,000 miles for the gears and 271,000 miles for the pinions. The company has also been trying for nearly two years with particularly good results the specially hardened gears and pinions made by the Tool



Aurora, Elgin & Chicago—Freight and Express Station at Aurora

Steel Motor Gear & Pinion Company, and the indications are that these will have a much greater life. Originally the motor gears had fifty-eight teeth on three pitch and the pinions had thirty-six teeth. Three years ago the pitch was changed to 2.489, the gear having forty-eight teeth and the pinion thirty teeth. The latter type of gear with



Aurora, Elgin & Chicago—Interior Standard Passenger Coach

the larger teeth greatly reduced the breakage, the gear ratio remaining practically the same.

BRAKE SHOES

The requirements of the braking service on the third-rail division are especially severe. At one time the company was obtaining from 4000 miles to 4500 miles of wear with gray-iron shoes having steel backs. The conditions were studied and specifications were drawn asking for shoes that would give a life of not less than 7500 miles and not more than 9000 miles, but it was found impossible to get shoes to meet these requirements without unduly wearing the wheels. A soft-iron shoe that gives a high braking power and has a chill on both ends to maintain even wear has finally been adopted.

SLEET SHOES

When the road was first operated there was considerable difficulty in collecting current from the third-rail during sleet storms and a method of melting the sleet by the distribution of a solution of calcium chloride was devised. Cans of the solution were carried in the front ends of trains and the mixture was led to the top of the third-rail and distributed in advance of the shoe. While this method served to keep the trains in operation during severe sleet conditions, it had a bad effect on the insulation of the third-rail and the car wiring and led to the development of a side-contact shoe. These shoes as now used have a cross-section similar to the letter "V" inverted. They ride on the edges of the rail head and thus either mechanically remove the sleet or make contact where the sleet is the thinnest.

TABLE I.—CAUSE OF CAR AND EQUIPMENT FAILURES ON THIRD-RAIL DIVISION IN 1910.

Causes of Failures	Number of Causes Total	Per Cent of Total
Car body	13	2.0
Brake troubles	51	7.8
Compressor, governor valves, piping, etc	82	12.5
Motor troubles, all kinds	134	20.0
Control apparatus	95	14.5
All other electrical trouble	100	15.0
Hot journals	104	16.0
Hot motor bearings	32	4.9
Gears	7	1.7
Pinions	2	.3
Trucks, other than brakes	7	1.7
Third-rail shoe	3	.4
Accidents	21	3.2
Total for year	651	100.0
Passenger car-miles	3,199,044	
Number of car-miles per failure	4,914	

MECHANICAL CAR DETENTIONS

Table I shows for the third-rail division the causes of car and equipment failures requiring the attention of the shop or terminal forces. It should be noted that a large number of these failures were not such as to delay the service.

Table II shows the detailed costs for maintenance and operation of the transmission, rolling-stock and substation equipment of the third-rail division only. The costs on the trolley division are much lower.

TABLE II.—THIRD-RAIL DIVISION—COST OF MAINTENANCE. AURORA, ELGIN & CHICAGO RAILWAY

	Cost per 1000 Car Miles
*Electric line:	
Transmission line and poles	$0.396
Third-rail	.223
Third-rail crossing cables	1.099
Track bonding	.028
Miscellaneous line expense	.200
Total electric line	$1.946
*Cars:	
GE-66 motors, not including armatures	$2.330
GE-66 motor armatures	1.500
Type-M control apparatus	1.090
All wiring and switches	.470
Trolley and third-rail shoes and parts	.500
Car body and trimmings	1.760
Trucks, including pilots	1.435
Wheels and axles	1.200
Compressors and governors	1.110
Painting and varnishing	.504
Brake shoes, all kinds	1.030
Total car operation	$12.929
*Cleaning, oiling and inspection:	
Car cleaning	$1.980
Car-cleaning supplies	.439
All other supplies	.934
Oiling and packing	.387
Lubricants and waste	.562
Motor and electrical equipment inspection	1.310
Car and truck inspection	1.370
Shop repairs, etc	.400
All other carhouse wages	.864
Heating and lighting shops	1.580
Total cleaning, oiling and inspection	$9.826
*Substation operation:	
Rotary converters	$1.220
Rotary converter transformers	.069
Oil switches	.103
Switchboards, etc	.275
Total substation operation	$1.667

*Note—The above costs apply to third-rail division only. Costs on Fox River division are much lower, owing to lighter equipment and less severe service.



Aurora, Elgin & Chicago—New Limited Destination Sign

NEW CLASSIFICATION SIGN

A new classification sign has been developed for use on the limited trains. The purpose of this sign is to indicate to people on the platforms whether a train is "limited," and also to show them to what destination it is scheduled. The use of such a sign prevents misunderstanding on the part of passengers waiting at stations where the train is not scheduled to stop and also avoids the loss of time by passengers mistaking one train for another, as, for example, flagging an Elgin limited when they wish to board an Aurora limited. These new signs, which are the result of study over a period of several years, are 30 in. square and are made of two pieces of sheet steel, each 15 in. x 30 in. in size and hinged at the center so that one piece folds against the other. When in the folded position the sign cannot readily be seen because the outside of it is painted the same color as the dash of the car. Thus no indication is given. When the lower half is dropped a white sign, 30 in. square, is displayed in the center of which is an 8-in. lens illuminated by a 16-cp lamp. The name of the train's destination station is painted on the white background.

ILLUMINATED ORDER HOLDER

A new order holder also has been developed on this road. This consists of a metal frame about the size of an order blank mounted to the left and just above the controller. The frame has a clip for holding the order. Attached to the top of the frame, just above the order, is a small bronze box, square in section, which contains a small electric lamp. One side of the box is fitted with a diamond-cut lens of red glass so that the motorman may note readily whether the lamp within is burning or not. The bottom of the box is fitted with a shutter which the motorman can push to one side and thus obtain direct illumination on his order without the illumination being sufficient to disturb his view ahead of the car. This small lamp as used for illuminating the order is similar to an air-gage lamp and is operated in the same circuit with such lamps.



Aurora, Elgin & Chicago—Armature Room Wheaton Shops

These order holders have been found particularly satisfactory because they furnish a convenient means for the crews to display their orders and thus the common practice of carrying orders about in coat pockets and hats is avoided.

LIGHTING BUSINESS

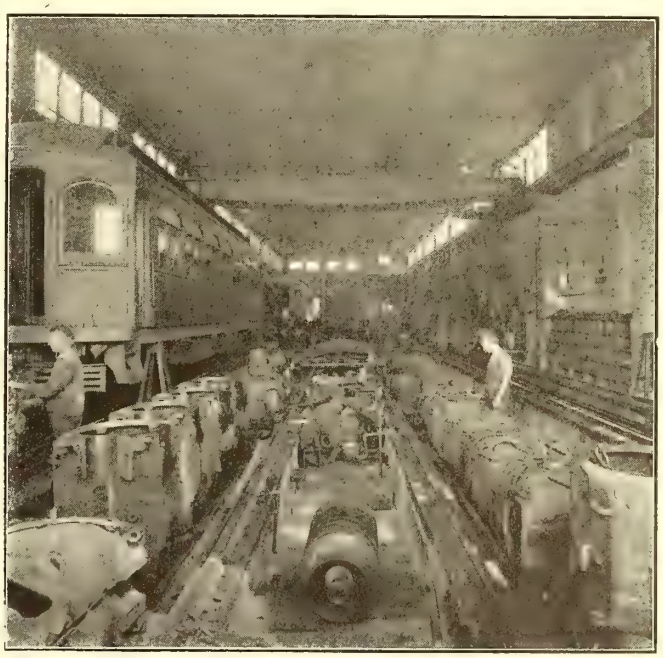
With the consolidation in 1904 of the Elgin, Aurora & Southern Traction property with the Aurora, Elgin & Chicago Railroad Company the latter company acquired the lighting business of the city of Elgin, which has about 26,000 inhabitants. At that time energy was supplied from an antiquated steam-generating station, one of the first installed in that part of the country. The entire equip-



Aurora, Elgin & Chicago—Dispatcher's Office and Shop Yards at Wheaton

ment consisted of small high-speed automatic engines, each driving two 125-volt Edison bipolar generators, ranging in size from 25-kw to 60-kw capacity.

As soon as the company obtained this property plans were inaugurated for the reconstruction and extension of the service. These resulted in the building of a modern lighting substation at Elgin and the rehabilitation and extension of the distribution system. At the Elgin substation 25-cycle current is taken from the railway transmission system and converted for local use by four motor-



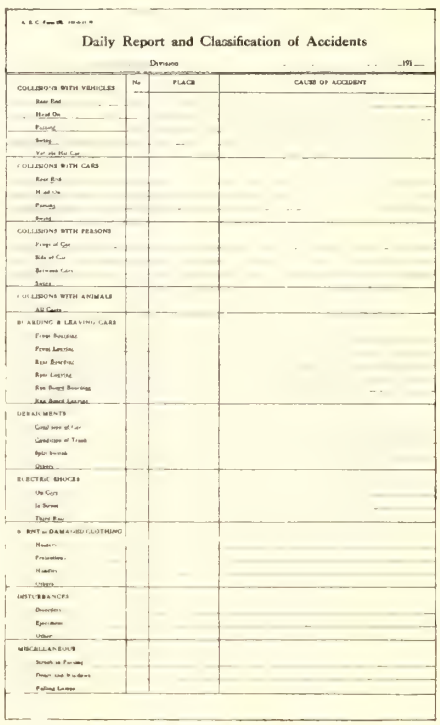
Aurora, Elgin & Chicago—Interior Wheaton Shops

generator sets. Two of these are of 300-kw capacity each, feeding an Edison three-wire d.c. distribution circuit; the other two are of 150-kw capacity each and convert the 25-cycle current into 60-cycle current for 2300-volt distribution about the city. This substation plant also includes rectifier sets for supplying current to 470 magnetite-arc lamps.

There is also provided as a reserve against interruption to the d.c. supply service in the business district an 8 0-amp storage battery which constantly floats on the line in a fully charged condition. The two motors of a four-unit battery booster set are used as a balancer set for forming a proper neutral on the three-wire system.

25-CYCLE LIGHTING

A fifty-year franchise for commercial lighting and a fifty-year contract for street lighting have just been obtained in West Chicago. For this installation 25-cycle current is used without changing the frequency, as is done in Elgin. The Ingleton rotary-converter substation on the Elgin branch of the third-rail line is about 2 miles from West Chicago and current is taken from the railway transmission system at this point for lighting West Chicago. Transformers have been installed in the substation for reducing the 26,400-volt transmission current to 2300-volts, three-phase, which is in turn transmitted over a 2-mile cross-country line to West Chicago and distributed around the town as single-phase, 2300-volt, 25-cycle current. Induction regulators are installed at Ingleton to control the voltage for lighting. This service has been found satisfactory, and the use of 25-cycle current has considerably reduced the cost of the first installation.

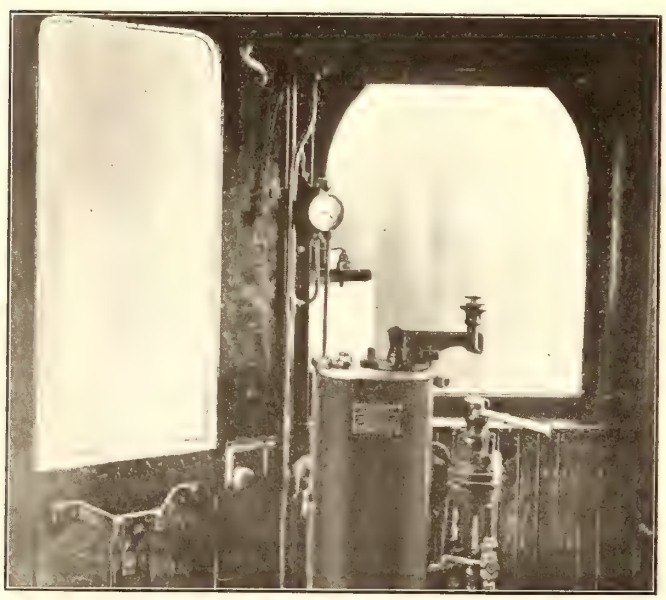


Daily Report and Classification of Accidents

Division ... 191

	No.	Place	Cause of Accident
COLLISIONS WITH VEHICLES			
Rear End			
Head On			
Passing			
Swing			
Run into Rear Car			
COLLISIONS WITH CARS			
Rear End			
Head On			
Passing			
Swing			
COLLISIONS WITH PERSONS			
Jumps off Car			
Ride off Car			
Between Cars			
Struck			
COLLISIONS WITH ANIMALS			
All Cases			
BOARDING & LEAVING CARS			
Front Boarding			
Front Leaving			
Rear Boarding			
Rear Leaving			
Rear Bumper Boarding			
Rear Bumper Leaving			
DERAILMENTS			
Complete off Car			
Caused by Track			
Split Switch			
Others			
ELECTRIC SHOCKS			
On Cars			
In Street			
Third Rail			
DIRT or DAMAGED CLOTHING			
Heaters			
Fenderless			
Handles			
Others			
DISTURBANCES			
Disorders			
Ejectment			
Other			
MISCELLANEOUS			
Struck at Fenders			
Power and Accidents			
Falling Lamps			

Aurora, Elgin & Chicago—Report and Classification of Accidents



Aurora, Elgin & Chicago—Interior of Car Vestibule Showing New Order Holder

In addition to lighting Elgin and West Chicago the Aurora, Elgin & Chicago Railroad transmits energy at wholesale to five municipalities along the road, which distribute it for lighting and miscellaneous uses.

RURAL CUSTOMERS SUPPLIED

This road was one of the first to undertake to supply power from its low-tension distribution system for small installations at farms along its right-of-way. At the present time there are sixty-five customers receiving power from the 600-volt circuits, some of these being fed from the third-rail division and others from the trolley division. Many of these installations include 20-hp and 25-hp motors installed at the farm buildings and arranged for such uses as chopping feed, sawing wood, pumping water, threshing and cleaning grain. In most of these installations the 600-volt current also is used for lighting the premises. The company furnishes power only to the edge of its right-of-way and insists on protecting devices being installed to assure no disturbance on the distribution circuit. The revenue from the average farm customer with a small motor installation is about $5 per month.

DEPARTMENT MEETINGS

The management of the Aurora, Elgin & Chicago Railroad has obtained excellent results from its plan of regularly holding department meetings. Each day of the week the general manager meets the heads of different departments and discusses problems in hand. The manager presides at all meetings and a stenographer is present to keep a careful note of the points brought up and decided. Those questions which are tabled are summarized for presentation at the meeting the week following. The schedule of meetings are as follows: Monday, transportation; Tuesday, traffic; Wednesday, shops; Thursday, power generation and distribution; Friday, maintenance of way and buildings; Saturday, claims for one meeting and light and power for another meeting.

Each morning the general manager's office is furnished with a report and classification of accidents tabulated on a blank of the form illustrated. The originals of these blanks are 8½ in. x 14 in. in size. Reference to the blank gives the general manager an excellent survey of the irregularities of service for the preceding day.

TRANSFERS IN NEW YORK CITY

A hearing on the question of transfers on the Manhattan surface railways was held by the New York Public Service Commission, First District, on Aug. 15. Letters from the various companies affected by the suggested order of the commission on this subject were placed on the record. Mark Goldberg, a member of the assembly of the New York State Legislature, appeared before the commission to urge definite action for free universal transfers. W. D. Guthrie, special counsel for the bondholders' committee of the Third Avenue Railway, asked that the remarks of Mr. Goldberg be stricken from the record, but this motion was denied.

After the adjournment of the hearing Mr. Guthrie stated that the receivers of the Metropolitan Street Railway Company had proposed recently the issue of universal transfers at 1 cent each on all surface lines in Manhattan. He added, however, that Frederick W. Whitridge, receiver for the Third Avenue Railroad, did not favor the suggestion. This plan would involve the abolition of 168 points at which the Metropolitan and Third Avenue lines now issue free transfers. These points, as well as 151 points where no transfers are now given, would become points where transfers would be issued for 1 cent under the plan suggested. It was also suggested by the receivers of the Metropolitan company that a second transfer should be issued on payment of an additional cent. Mr. Whitridge felt that the public would be opposed to this plan. This proposition was not made to the commission.

Reports of Electric Railway Operations in 1910

Statistics Published in the 1911 Edition of the McGraw Electric Railway Manual, Just Issued, Relate to Cars, Trackage and Capitalization of Substantially All Companies and Earnings of a Smaller Number of Properties.

The *McGraw Electric Railway Manual,* the 1911 edition of which has just been issued, is the successor to *American Street Railway Investments.* It contains statistics of the combined principal returns of operating electric railway companies reporting for 1910. It has been the practice shortly after the issue of this publication in previous years to compile similar statistics for publication in the Electric Railway Journal. For this plan there was substituted this year the improvement of publication of the principal statistics in the volume containing the detailed returns and these are presented herewith. The form of the statistics has also been changed to some extent. A compilation of the three principal items of operating returns has been included, and while this does not give the full returns of all companies, it furnishes the totals for all that make statements public and therefore indicates the gross earning power of the principal properties in the country.

The statistics published in this issue relate to miles of track, cars operated, capitalization, and also, so far as they are reported, to the items of gross earnings, operating expenses and net revenue. The table on capitalization follows rather closely the form of the table which has been published in previous years in the Electric Railway Journal.

Some explanation of the changes made in the basis of compilation and in the items compiled should be given. The division of States into groups has been followed as in previous years, in order that the basis for comparison might be maintained as closely as possible from year to year. In most instances the returns of interstate properties are included within the State from which the report is made, and in which, as a rule, the major part of the mileage is located. This plan was followed because of the necessity for estimates in all attempts to segregate the various items of track, cars, capitalization, earnings and expenses so as to distribute them between the States on a reasonable basis.

No separation was attempted in the 1910 statistical compilation between electrically equipped cars and other cars for the reason that the returns of many of the companies were incomplete, and failed to show the proportion of motor cars operated as distinguished from other cars. A report of the electrically equipped cars and other cars was requested of the companies, but it was not furnished for a large number of properties.

TOTALS OF AUTHORIZED SECURITIES

For the first time the compilation includes the amount of the authorized capital stock and funded debt, in addition to the outstanding securities. In the main the excesses in the authorized amounts over the outstanding amounts probably represent a provision for anticipated future requirements, but they also include allowances which, in the case of many underlying companies, will never be isssued. Many controlling operating companies prefer to sell their own bonds, secured by a general mortgage under which a large issue is authorized, rather than to increase the small underlying issues outstanding.

The tables show a discrepancy in the number of companies and the miles of track should be explained. The number of companies is much smaller in the table of earnings for the reason that the returns of capitalization necessarily included companies that are underlying parts of large systems, and, therefore, do not make separate reports of earnings as a rule, but preserve their corporate independence and have securities outstanding in the hands of the public. As the track mileage of companies reporting earnings is smaller than that of the companies whose capitalization is reported, it is given separately so as to show the track mileage on which the earnings are based. The mileage in the table of earnings is that of the companies that reported gross revenue. Some of these companies did not report operating expenses or net revenue and therefore the totals of these accounts do not balance with the gross revenue in some States and in the complete totals for the United States.

The varying fiscal years adopted by the corporations made it necessary to take the returns of gross earnings as made, mostly for the calendar year 1910 or the fiscal year of companies ending at some time in 1910, or, in a few instances, for the fiscal year whose greater part was in the calendar year 1910. Owing to the change of the date of completion of the fiscal year in Massachusetts, the returns from that State are for only nine months with most of the companies. Operating expenses, as reported, include taxes in some cases and not in others, and no effort was made to effect uniformity in the treatment of this item in the statistics.

The number of companies which reported revenue and transfer passengers carried is much less than the number that gave gross earnings, and is, of course, far from complete. The record of transfer passengers is still less full than that of the revenue passengers. In some States the traffic returns are confined to one or two companies. In New Jersey, for instance, the returns are based almost entirely on the report of the Public Service Railway, of Newark.

ELECTRIFIED TERMINALS

The electrified mileage and electric locomotives of steam railway terminals are reported, but no general attempt was made to allot part of the capitalization or earnings and expenses to this costly but relatively small part of the systems involved. In one case where a report appeared to apply particularly to the electrified section its figures were included, but they did not affect the totals materially. The Illinois Subway Company was omitted in the statistical compilations because of the unusual character of its operations.

Another point which may be mentioned is that the returns include a nominal or no amount for participation certificates which have been issued without actual par value, but have actual market values in excess of many stocks reported at full par value.

By the use of the totals in the tables published in the Electric Railway Journal and the Street Railway Journal in previous years a comparative table was prepared and is published on page 314, giving the number of companies, cars, tracks and capitalization for ten years.

This indicates a small increase in the number of companies in 1910 as compared with 1909, and a larger number of operating companies last year than is shown for any previous year. A decrease is shown in the total miles of track, but this is due to the difference in the basis of compilation, as there is, of course, a regular increase from year to year. It is due in part to the elimination so far as is possible of all but electric railway mileage and is also attributable in part to incomplete returns. The varying practice of companies in including or excluding trackage of all underlying companies complicates the computation for a small part of the total mileage. The number of cars shows a decrease, due to causes similar to those mentioned in connection with the trackage.

INTERCORPORATE HOLDINGS

The outstanding capital stock was determined by elimination of the intercorporate duplicate holdings so far as they were determinable from the returns, and the slight decrease in 1910 is a small percentage of the total amount shown as outstanding, and follows a similar change in 1909 as compared with 1908. Outstanding funded debt, on the other hand, shows an increase, making a net

MILES OF TRACK, CARS AND CAPITALIZATION OF ELECTRIC RAILWAY COMPANIES IN 1910.

STATE	Number of Ry. Companies	Miles of Track	Cars	Capital Stock		Funded Debt		Total Stock and Bonds	
				Authorized	Outstanding	Authorized	Outstanding	Authorized	Outstanding
New England States									
Connecticut	14	1,013.8	2,651	$62,442,100	$60,237,300	$58,105,000	$36,938,700	$120,547,100	$97,176,000
Maine	18	527.	795	9,222,400	9,051,200	20,243,575	12,195,075	29,465,975	21,246,275
Massachusetts	61	3,068.5	10,173	96,087,350	92,217,590	97,597,000	67,731,700	193,684,350	159,949,290
New Hampshire	20	282.	384	6,482,200	6,407,200	4,327,000	4,008,000	10,809,200	10,415,200
Rhode Island	9	442.2	1,173	37,322,800	31,585,100	17,403,500	16,426,700	54,726,300	48,011,800
Vermont	10	97.	151	4,960,300	4,380,800	4,400,000	3,476,000	9,360,300	7,856,800
Total	132	5,430.5	15,327	$216,517,150	$203,879,190	$202,076,075	$140,776,175	$418,593,225	$344,655,365
Eastern States									
Delaware	5	48.	81	$10,870,000	$8,350,000	$6,524,000	$4,979,000	$17,394,000	$13,329,000
Dist. Columbia	7	305.7	1,516	42,726,500	31,372,550	44,941,168	31,331,518	87,667,668	62,704,068
Maryland	13	630.4	1,961	35,864,000	23,161,250	91,857,000	70,439,800	127,721,000	93,601,050
New Jersey	49	1,311	2,689	91,800,340	84,589,490	117,728,285	89,404,385	209,528,625	173,993,875
New York	146	4,689.	17,608	565,382,100	514,923,222	862,767,140	482,896,250	1,428,149,240	997,819,472
Pennsylvania	242	4,343.3	8,915	375,057,950	280,456,012	382,771,639	210,210,729	757,829,589	490,666,741
Virginia	21	451.3	885	41,795,000	23,547,537	47,152,000	34,394,100	88,947,000	57,941,637
West Virginia	19	356.2	518	20,500,000	13,500,800	21,975,000	13,077,500	42,475,000	26,578,300
Total	522	12,134.9	34,173	$1,183,995,890	$979,900,861	$1,575,716,232	$936,733,282	$2,759,712,122	$1,916,634,143
Central States									
Illinois	85	3,147.9	7,810	$256,260,600	$152,594,400	$408,164,000	$292,416,349	$664,424,600	$445,010,749
Indiana	47	2,244.8	2,281	120,685,000	91,750,000	149,525,900	90,537,750	270,210,900	182,287,750
Iowa	30	753.8	1,177	45,370,000	36,595,155	71,905,500	32,613,000	117,275,500	69,208,155
Kentucky	11	517.1	1,088	51,000,000	33,633,940	38,735,000	19,890,800	89,735,000	53,524,740
Michigan	22	1,454.9	2,636	43,125,000	36,885,200	91,908,000	57,624,000	135,033,000	94,509,200
Minnesota	9	497.	954	36,225,000	25,589,000	28,380,000	23,138,000	64,605,000	48,727,000
Missouri	23	1,069.2	2,520	117,600,000	83,033,980	152,274,000	114,899,700	269,874,000	197,933,680
Ohio	91	4,127.	5,767	272,187,500	200,462,940	229,281,000	126,562,140	501,468,500	327,025,080
Wisconsin	26	735.7	1,011	64,603,000	22,323,000	86,055,500	35,084,900	150,658,500	57,407,900
Total	344	14,547.3	25,244	$1,007,056,100	$682,867,615	$1,256,228,900	$792,766,639	$2,263,285,000	$1,475,634,254
Southern States									
Alabama	13	307.5	670	$22,177,000	$17,507,000	$52,425,000	$15,966,000	$74,602,000	$33,473,000
Arkansas	10	103.8	237	10,040,000	5,386,800	10,831,000	5,934,000	20,871,000	11,320,800
Florida	10	128.5	242	5,890,000	5,372,000	10,750,000	3,420,500	16,640,000	8,792,500
Georgia	14	409.	685	24,034,600	23,471,000	61,400,000	23,823,500	85,434,600	47,294,500
Louisiana	8	257.2	726	54,345,900	31,591,300	94,530,000	33,444,500	148,875,900	65,035,800
Mississippi	10	106.4	163	8,950,000	4,462,670	11,075,000	5,506,500	20,025,000	9,969,170
North Carolina	12	135.2	247	24,704,500	19,044,400	24,415,000	10,379,700	49,119,500	29,624,100
South Carolina	6	118.5	176	12,900,000	6,300,700	6,000,000	4,146,000	18,900,000	10,446,700
Tennessee	11	349.4	820	20,800,000	19,949,900	59,125,000	25,421,000	79,925,000	45,370,900
Total	94	1,915.5	3,966	$183,842,000	$133,085,770	$330,551,000	$128,241,700	$514,393,000	$261,327,470
Western States									
Arizona	5	57.5	41	$815,000	$650,000	$100,000	$50,000	$915,000	$700,000
California	55	2,244.5	4,068	249,507,250	192,559,350	301,491,000	141,172,000	550,998,250	333,731,350
Colorado	16	518.8	791	48,020,000	21,111,700	67,848,000	29,436,000	115,868,000	50,547,700
Idaho	5	131.	54	8,900,000	4,784,000	5,750,000	1,413,000	14,650,000	6,197,000
Kansas	15	256.8	366	5,700,000	3,583,220	10,330,000	5,593,000	16,030,000	9,176,220
Montana	7	130.	150	3,744,615	3,179,615	2,500,000	1,810,000	6,244,615	4,989,615
Nebraska	6	237.5	550	23,850,000	12,645,600	14,580,000	10,888,000	38,430,000	23,533,600
Nevada	2	10.3	12	2,000,000	1,042,000	1,000,000	135,000	3,000,000	1,177,000
New Mexico	2	10.5	11	550,000	400,000	450,000	225,000	1,000,000	625,000
North Dakota	3	22.5	59	450,000	440,000	300,000	200,000	750,000	640,000
Oklahoma	17	197.	256	24,020,000	7,205,300	21,300,000	5,128,500	45,320,000	12,333,800
Oregon	9	420.6	1,195	53,990,000	43,290,000	98,481,000	38,432,000	152,471,000	81,722,000
South Dakota	3	19.5	23	1,000,000	600,000	500,000	200,000	1,500,000	800,000
Texas	36	624.2	1,044	40,895,000	29,597,000	35,203,000	20,930,000	76,098,000	50,527,000
Utah	6	237.8	297	12,500,000	8,237,500	21,750,000	6,996,000	34,250,000	15,233,500
Washington	19	936.2	1,960	68,015,000	50,878,200	101,100,000	40,968,000	169,115,000	91,846,200
Wyoming	1	5.	14	75,000	75,000	20,000		95,000	75,000
Total	207	6,059.7	10,891	$544,031,865	$380,278,485	$682,703,000	$303,576,500	$1,226,734,865	$683,854,985
United States	1,279	40,088.	89,601	$3,135,443,005	$2,380,011,921	$4,047,275,207	$2,302,094,296	$7,182,718,212	$4,682,106,217

addition in 1910 in the total capitalization outstanding. Most of the companies continue to do their financing through the issue of bonds. This is due in part to the fact that their bonds have a better investment market than their issues of stock. Some companies, however, have financed their requirements through the sale of preferred stock and will continue to follow that practice. It will be noted that in the entire United States there is a

RESULTS OF OPERATION REPORTED BY ELECTRIC RAILWAYS IN 1910

STATES	Number of Railway Companies Reporting Gross Revenue	Miles of Track	Results of Operation			Passengers Carried	
			Gross Revenue	Operating Expenses	Net Revenue	Revenue	Transfers
New England States							
Connecticut	8	923	$7,938,374	$4,912,418	$3,025,956	150,358,258	27,588,919
Maine	16	512	2,736,977	1,784 355	952,622	41,858,809	4,675,542
Massachusetts	51	2,983	27,167,860	17,722,577	9,445,283	524,479,169	21,657,629
New Hampshire	15	246	1,487,003	1,006,728	480,275	18,789,590	*
Rhode Island	6	409	5,088,123	2,907,237	2,180,886	7,272,933	*
Vermont	5	63	474,992	302,020	193,626	3,311,925	56,459
Total	101	5,136	$44,893,329	$28,635,335	$16,278,648	746,070,684	53,978,549
Eastern States							
Delaware	—	—	*	*	*	*	*
District of Columbia	4	300.7	$6,957,762	$3,567,448	$3,390,314	52,769,750	17,452,126
Maryland	2	404	7,696,155	3,608,396	4,087,759	155,143,785	60,789,807
New Jersey	24	1,264.8	16,393,111	9,873,116	6,520,195	259,904,915	82,606,135
New York	99	4,509	105,484,620	58,476,958	47,258,029	2,006,801,467	416,220,033
Pennsylvania	116	4,169	47,316,190	26,969,097	19,640,267	930,151,488	52,177,638
Virginia	4	152.4	1,956,612	1,111,039	1,040,877	32,634,565	12,993,051
West Virginia	6	230.5	2,054,338	984,041	1,070,297	17,786,416	957,403
Total	255	11,030.4	$187,858,788	$104,590,095	$83,007,738	3,455,192,386	643,196,193
Central States							
Illinois	39	2,755	$51,931,674	$34,610,382	$17,321,302	520,876,926	217,022,371
Indiana	21	1,881	14,405,732	8,346,272	5,787,092	27,867,869	4,795,331
Iowa	14	714	5,936,575	3,711,114	2,223,461	34,103,043	5,230,534
Kentucky	5	327	4,265,399	2,442,755	1,822,674	418,751	296,214
Michigan	10	1,233	13,075,999	7,900.273	4,899,985	207,640,689	50,833,756
Minnesota	4	477	8,660,141	4,273,451	4,355.056	168,707,252	52,850,372
Missouri	8	984	21,353,846	11,691,867	9,614,369	370,691,308	153,501,606
Ohio	59	3,791	33,442,160	15,905,608	9,127,837	99,098,331	9,985,491
Wisconsin	15	690.6	10,965,147	4,288,735	5,734,588	105,883,749	33,679,582
Total	175	12,852.6	$164,036,673	$93,170,457	$60,886,364	1,535,287,918	528,201,257
Southern States							
Alabama	3	295	$3,395,258	$1,642,988	$1,172,452	12,438,686	2,138,684
Arkansas	2	55	1,242,476	659,245	583,231	13,578,650	1,969,527
Florida	3	104	1,442,148	798,806	643,342	*	*
Georgia	8	395	6,560,831	3,313,022	3,247,809	2,952,743	110,230
Louisiana	3	221	6,515,397	3,591,194	2,764,203	80,408,085	19,246,906
Mississippi	5	69	720,624	349,193	156,191	1,525,240	236,576
North Carolina	6	104.7	1,616,051	1,041,192	574,859	7,383,706	*
South Carolina	2	66	1,253,240	727,466	525,574	5,937,822	*
Tennessee	5	306.7	4,673,166	3,090,807	2,214,154	24,399,365	13,815,807
Total	37	1,616.4	$27,419,191	$15,213,913	$11,881,815	148,624,297	37,517,730
Western States							
Arizona	—	—	*	*	*	*	*
California	11	865	$13,985,382	7,442,944	$5,596,044	62,078,879	12,054,308
Colorado	3	251	4,459,749	2,322,318	2,137,431	*	*
Idaho	—	—	*	*	*	*	*
Kansas	5	113	793,956	449,497	354,459	1,205,733	293,776
Montana	2	51	774,751	548,840	225,911	1,961,895	96,948
Nebraska	3	216.5	3,219,009	1,811,161	1,380,664	10,956,671	1,658,005
Nevada	—	—	*	*	*	*	*
New Mexico	—	—	*	*	*	*	*
North Dakota	—	—	*	*	*	*	*
Oklahoma	6	137	1,147,817	718,026	429,791	19,642,632	2,375,544
Oregon	3	329.9	7,161,499	3,586,530	3,574,969	786,600	*
South Dakota		—	*	*	*	*	*
Texas	9	375	6,994,117	4,213,809	2,724,772	1,586,153	155,728
Utah	2	166	2,662,299	1,538,555	1,123,744	26,600,090	6,222,538
Washington	8	856.5	13,467,111	7,834,763	5,632,348	36,074,434	*
Wyoming	—	—	*	*	*	*	*
Total	52	3,360.9	$54,665,690	$30,466,443	$23,180,133	160,893,087	22,856,847
United States	620	33,996.3	$478,873,671	$272,076,243	$195,234,698	6,046,068,372	1,285,750,576

*Not reported.

margin of over $750,000,000 between the authorized stock and the outstanding stock. There is a much larger margin between the authorized amount of bonds and the outstanding amount of bonds, and the difference in the total capitalization authorized and outstanding is over $2,500,000,000.

A detailed comparison between the returns for 1909, as published in the Electric Railway Journal of Aug. 27, 1910, and the returns for 1910, published herewith, shows a large increase in the number of railway companies in the Eastern States. The number of companies in 1910 was 502 as compared with 452 in 1909. The number of companies in the New England States was smaller in 1910 than in 1909, and was less in 1909 than in the preceding year.

This is due to the gradual consolidation of properties which has been a notable feature of electric railway development in New England, particularly in Massachusetts. The number of companies in the latter State, for instance, was sixty-one in 1910, as compared with sixty-six in 1909 and sixty-nine in 1908. A number of these companies failed to earn their full operating expenses for the nine months ended June 30, 1910, the period for which most of the reports were made. Owing to the change of the date on which the fiscal year prescribed by the Board of Railroad Commissioners of Massachusetts ends, these companies completed the fiscal period without the advantage of the returns for the months of July, August and September, which constitute their best traffic season.

The amount of outstanding stock is reported as smaller in 1910 than in 1909 for the group of Eastern States, Central States and Southern States, while the New England States and Western States show an increase.

In the statement of funded debt outstanding, the returns of the groups of companies in the Central States, Southern States and Western States show an increase in 1910 as compared with 1909, while the companies in the New England States and Eastern States show a decrease.

COMPARISON WITH CENSUS FIGURES

An interesting comparison may be made between the returns given in these tables and those in the census of street and electric railways of 1907. In the census report the returns of individual companies are not made public, so that many reports are included which are not available for publication under ordinary circumstances. The capitalization and earnings of companies devoted mainly to electric light and power operations, but transacting incidentally a small railway business, were excluded in some instances in the compilation of the *McGraw Electric Railway Manual*, and in other cases of combined operations the reports segregated the earnings so that those used for statistical purposes are from railway sources alone; in most instances, however, the returns of earnings were taken as reported for the year 1910. By the compilation of the statistics in this form revenue derived from regular commercial light and power departments, and also revenue from the sale of electric current as an incidental part of railway operation were included where reported. In the census report the data were excluded for light and power plants where available, and were included where the companies could not segregate their reports so as to make separate returns for the two branches of the business.

The names of individual companies are not divulged in the census report and this condition facilitated materially the collection of the data desired. As only a few small companies, however, fail to make full returns regarding their capitalization, trackage and cars the statistics on these subjects afford a valuable record of the progress of the industry since the date at which the census report was compiled.

Where the total number of miles of track operated by electricity is shown as 40,088 in the figures for 1910, the corresponding mileage in the census of 1907 was 34,059.69. This indicates an increase in this period of 6,028.31 miles of track, or 17.7 per cent.

The amount of capital stock authorized as of 1907, according to the census, was $2,508,054,336; it was $3,135,443,005 in 1910, according to the returns made by electric railways, or an increase of $627,388,669. The gain in three years is equal to 25 per cent, or an average of over 8 per cent annually.

INCREASE IN CAPITAL STOCK

The amount of capital stock outstanding in 1907, as reported by the Census Bureau, was $2,097,708,856, whereas the 1910 returns of electric railway companies upon which the latest compilation is based show a total of $2,380,011,921 outstanding, or an increase of $282,303,065 in a period of about three years. The percentage of gain is much smaller in outstanding stock than in authorized stock, amounting to 13.5 per cent for the three-year period, or an average of 4.5 per cent a year.

The aggregate amount of the authorized funded debt reported by the census bureau was $2,322,720,837 in 1907. The aggregate was $4,047,275,207 in 1910. This indicates an increase of $1,724,554,370 in the authorized funded debt. The percentage of gain in the authorized bond capitalization is 74 per cent, which is so large that it appears to be due in part to differences in classification. The amount of outstanding funded debt was shown as of 1907 at $1,677,063,240, and this was increased by the 1910 returns to $2,302,094,296, or an increase of $625,031,056. This gain is equivalent to 37.3 per cent in the three years, or an average of 12.4 per cent annually. The increase in the total outstanding capitalization in the same period was from $3,774,772,096 to $4,682,106,217, or an increase of $907,334,121. The gain in this item is 24 per cent during the interval of three years, or an average of 8 per cent a year. This rate of gain is a little larger than the average increase in miles of track in the same time. The census shows a total of 83,641 cars for street and electric railways, and the later report, showing an aggregate of 89,601 cars, therefore indicates a gain of 5960 cars, of 7.1 per cent. This is less than one-half of the percentage of increase in track mileage in the same period.

Changes of similar interest may be shown in the statement of earnings. Some of the companies, in making reports for publication herein, separated other income from the revenue from operation. The census table, however, states separately the items of income from other sources and operating earnings and then gives the gross income from all sources. Where the total gross income was reported by the Census Bureau at $429,744,254 in 1907, the gross revenue shown in 1910 by the smaller number of companies which make their earnings public was $478,873,671.

TOTALS OF MILEAGE, CARS AND CAPITALIZATION FOR TEN YEARS.

	Total Number of Companies	Miles of Track	Total Number of Cars	Capital Stock Outstanding	Funded Debt Outstanding	Total Capitalization Outstanding
1910	1,279	40,088	89,601	$2,380,011,921	$2,302,094,296	$4,682,106,217
1909	1,253	40,490	91,153	2,427,935,397	2,224,800,236	4,652,735,633
1908	1,252	40,247	89,216	2,444,892,057	2,112,244,086	4,557,136,143
1907	1,238	38,812	86,204	2,251,425,882	1,872,408,516	4,123,834,598
1906	1,164	36,932	84,732	2,039,948,875	1,725,369,000	3,765,317,875
1905	1,081	32,517	79,751	1,844,565,136	1,524,371,926	3,368,937,062
1904	993	29,548	75,904	1,761,571,812	1,455,520,159	3,217,091,971
1903	1,187	29,212	76,186	1,700,726,898	1,401,664,048	3,102,390,946
1902	1,110	25,592	70,006	1,522,068,760	1,272,269,491	2,794,338,251
1901	1,062	22,063	68,777	1,324,072,053	1,086,598,082	2,410,670,135

Arnold Report on Providence Transportation Conditions

Analysis of Service of the Rhode Island Company in the Largest City of the State, Prepared for a Committee of the Council—Co-operation of the Municipality Essential to Improvement in Schedules and Routing

An abstract of the preliminary report of Bion J. Arnold on transportation conditions in Providence, R. I., was published in the ELECTRIC RAILWAY JOURNAL of June 17, 1911, page 1069. The full report, as made to the joint committee on railroad franchises of the Providence City Council has now been issued.

GENERAL CONDITIONS

In a preliminary general analysis of present conditions the report says:

"The present traffic investigation is the result of expiring franchises and a shortage in cars during the past winter, due to delayed deliveries from the builder; bad weather naturally aggravated the shortage difficulty. The company was forced to handle its winter traffic with a total of 365 cars, including reserve, operating in or into Providence. At the present time it has 415 cars available, an increase in actual seating capacity of nearly 20 per cent.

"It appears clear that the company has not kept fully abreast of the demand for new equipment. From 1902 to 1910 inclusive the revenue fares on the entire system increased 62 per cent, while the car equipment increased only 22 per cent. It is also true, however, that the conditions causing undue congestion within the loading district of the city are directly or indirectly responsible for a large share of the dissatisfaction expressed regarding the traction service. With the present limited trackage and extreme concentration of traffic along certain streets, adequate service can hardly be expected in Providence with any amount of equipment, for the reason that it is impossible to maintain a reasonable schedule speed and secure

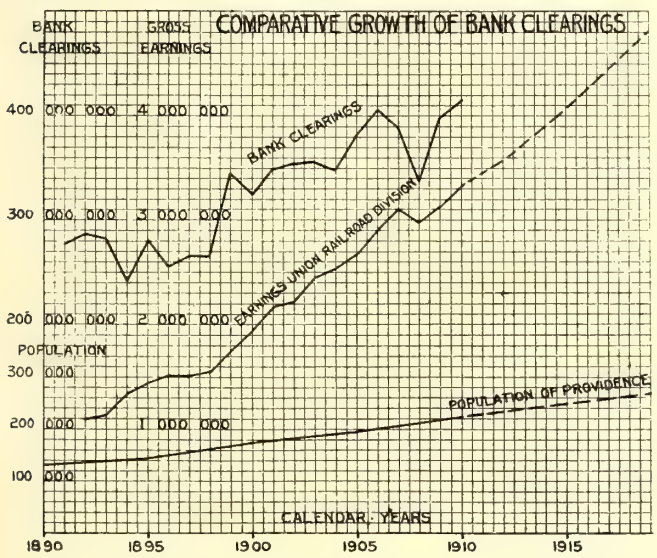


Fig. 1—Providence Report—Bank Clearings and Electric Railway Earnings

the proper mileage per car. The speed is further retarded within the city by the excessive number of stops. Absence of prepayment fare collection, short and constricted platforms, general absence of prompt movement on the part of both passengers and trainmen, constitute further retarding influences which should be improved. Much can be done by prompt, rigid dispatching and inspection.

"The most important factor in the present problem is increased speed of car movement through down-town districts and of passenger movement at all points. Rapid car movement can only be brought about by thorough re-routing in the terminal district to equalize more logically the distribution of cars according to the available street capacity. This will require widened roadways, new tracks, extensions, new streets and a new terminal loop system centering in Exchange Place.

EARNINGS PER CAPITA—RHODE ISLAND COMPANY SYSTEM.

	Earnings.	Population.	Earnings Per Capita.
1900		359,944	
1903	$2,584,453	*383,000	$6.75
1905	3,242,972	407,171	7.97
1910	4,502,922	465,983	9.67
1915	*5,515,000	*515,000	*10.70
1920	*6,720,000	*569,000	*11.80
1925	*7,970,000	*620,000	*12.85

*Estimated.

"These improvements cannot be carried out without the co-operation of the city and the acceptance by its citizens of reasonable recommendations for relief. The company seems to have been influenced in the past to adopt certain routings not calculated to serve the best interests of the city as a whole. But a broad-minded policy of re-routing should now be adopted to care for the future as well as the present. And it is especially important that the city should not be niggardly in its provisions for proper routing. The city has now reached a point where it has outgrown its streets without having exerted itself toward a general improvement.

ELECTRIC AND STEAM SERVICE

"It is not a function of this report to consider the relations between electric and steam service, both of which are handled in Providence by the same corporation. It should be said, however, that even though both steam and electric lines are under one management, this fact by itself constitutes no valid reason for forcing an interchange of traffic desirable to the corporation but opposed by the patrons. The only way in which a corporation should accomplish a desired diversion of traffic from steam to electric lines or vice versa is not by curtailing the one, but by improving the other so greatly as to insure its immediate acceptance.

"The corporation is now in a position where the hostility of the public prevents it from asking for and executing improvements really needed and where operating conditions are officially sanctioned which would not be permitted against its better judgment under more fortunate relations. The essential thing for the corporation is to encourage increase in the riding habit. This can only be done by good service. Adequate service requires friendly co-operation between public and company.

"It cannot safely be assumed by the city that its co-operation in the matter of thoroughfare improvements will necessarily be reciprocated in the improved service anticipated to a proportionate degree. The only way in which the city can be assured that it is receiving the degree of service equivalent to its rightful expectations is by the systematic recording of service provided. It is firmly believed that the maintenance of such an official record would secure and perpetuate the relations desired between the company and the public by virtue of the positive character of the record."

The report then discusses the radial form in which the city has developed and the abuse of the transfer privilege

which has arisen because of the absence of crosstown lines.

It is estimated that, barring territorial expansion or calamity, the population of the 5-cent fare zone, which is larger than the limits of Providence, will increase from 286,000 at present to 386,000 persons in 1925. The entire district tributary to the Rhode Island Company lines at present has a population of 465,000. Referring to the relation of bank clearings and electric railway earnings the report says:

"Starting with 1898, when commercial prosperity was resumed after a prolonged depression, the clearings increased by irregular steps from $226,000,000 to $415,000,000—156 per cent. During the same period, traction earnings increased from $1,550,000 to $3,315,000 or 112.5 per cent. Thus for 1898 the earnings represented 0.58 per cent of the clearings; in 1910, 0.8 per cent. This means that the railway company earned $1.00 for every $172 clearings

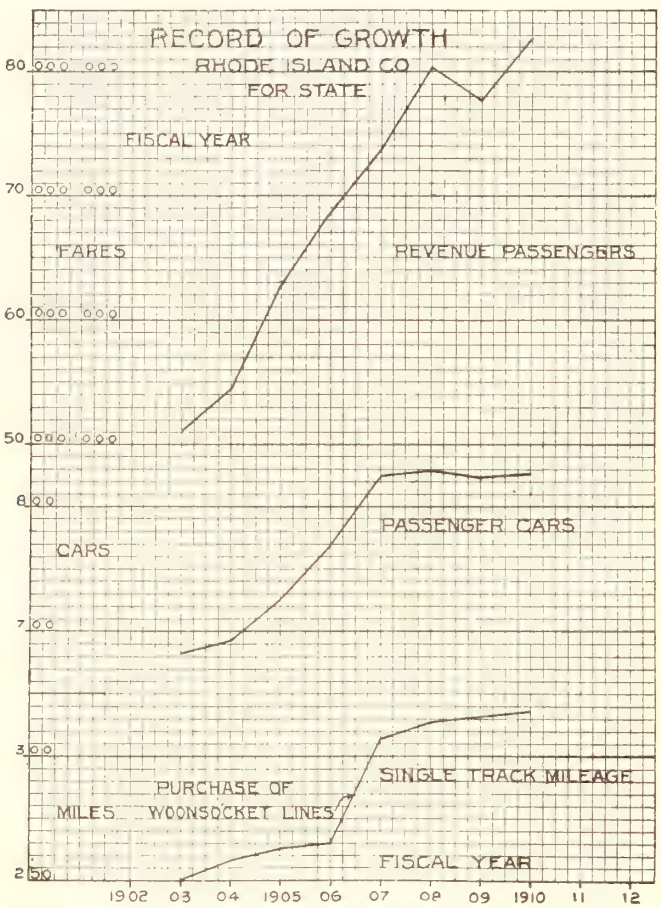


Fig. 2—Providence Report—Development of Rhode Island Company

in 1898 and $125 in 1910, indicating that transportation in Providence is becoming more and more indispensable to the patrons and valuable to the company. The high level in Providence, and especially the growth, should be regarded as very encouraging."

THE RHODE ISLAND COMPANY

Taking up in detail the operations of the Rhode Island Company the report says:

"During 1907 the system was expanded by the acquisition of other properties. Neglecting this rise, the increase in trackage was 24.87 miles in six years, or 4.14 miles per year over the entire system.

"The passenger traffic suffered one severe slump in 1908-09. For the entire period of seven years, however, the total increase amounted to over 31,000,000 passengers —61.4 per cent—or 8.75 per cent per year average. The record of equipment shows an abrupt halt since 1907, after a steady increase for three or four years previous. However, considering the slump in traffic in 1907-08, this retrenchment seems justifiable for the year 1908. It is apparent that the company did not accurately anticipate the demands of the increase in traffic that took place thereafter; in other words, it is now about one and one-half years behind in car equipment. Between 1903 and 1907 the passenger traffic increased 43 per cent, the car equipment 21 per cent; by 1910 the increase in traffic had distanced the equipment by 62 per cent, or nearly three times.

"The total gross earnings increased steadily from 1893 up to the slump of 1907-08. In the track mileage a sharp increase occurred in 1900, but the growth has been uniform since—31.31 miles in ten years, or 3.13 miles per year.

"Taking this last decade, the record shows an increase of 69.8 per cent in gross earnings (66 per cent for the city of Providence), and 26 per cent in trackage (20 per cent for the city) or 2.53 miles per year (1.48 miles for the city). In 1910 the proportion of the city mileage and earnings to the total mileage and earnings of the Union division was 72.4 per cent. This proportion has been increasing somewhat during the ten years, but has not increased materially since 1905.

"The single-track mileage in Providence for the past ten years has increased about as fast as the population of the district served, which indicates normal growth. The past three years, however, show a disposition to retrench in the matter of extensions, which, if continued, will sooner or later bring about unsatisfactory development of the city proper. Thus, in 1910 there were 3.95 miles of track per 10,000 persons; in 1900, 4.0 miles; in 1903, 4.5 miles approximately.

"Considering the Rhode Island System as a whole, for that portion of the State which it occupies, it is found that the earnings per capita approximate $9.70 for the year 1910, and the ratio has increased rapidly since the company began operation in 1903, when they were only $6.75 per capita.

"For the city of Providence only the earnings per capita have steadily increased, with the exception of a few fluctuations, from about $6 in 1895 to $8.55 in 1910. For the Union division district [the 5-cent fare district] the earnings appear to be relatively higher. Starting with $11.57 per capita in 1910 the present 5-cent-fare zone will earn in 1925 over $6,000,000 per year."

TERMINAL DISTRICT

All cars out-bound from the terminal district must pass through nine outlets. By observation at points of maximum load during the evening rush-hour, 5:30 p. m. to 6:30 p. m., the average loading was found to be 133.5 per cent of the seats furnished; i. e., 14,730 passengers and 11,036 seats, while the individual throats averaged 133 per cent, 118 per cent, 145 per cent, 141 per cent, 142 per cent, 143 per cent, 132 per cent, 147 per cent and 102 per cent respectively. The report adds that as a private check on the accuracy of these counts the company stationed inspectors at the same points and independently obtained very nearly the same results for the traffic as a whole. Thus, the average traffic of the nine throats was found to be 133.5 per cent of the seating capacity by the city's count and 128 per cent by the railway's. The report adds:

"An essential measure of service is the proportion of rush-hour to normal or non-rush-hour service. The company's schedule provides for 11 per cent more service during mid-day and 102 per cent more during rush hours than at normal hours. This is a condition for which the company is to be commended. The standard of double service at rush hours is admittedly good, and if adhered to, indicates the company's desire to justly meet all reasonable demands of rush-hour patrons.

"The company's method of assigning reasonable capacity of equipment during rush hours is to station inspectors at the various throats indicated. If on three successive days cars appear to be loaded beyond a certain limit, additional trippers are ordered into service, and vice versa."

SERVICE REQUIREMENTS

For the purpose of discussion 70 per cent was assumed as the proper operating ratio, including taxes and also annual payments into a depreciation reserve fund. For 1910 the earnings in the Union division, the 5-cent-fare zone, amounted to $3,315,149. Assuming car mile earnings of 30 cents for the division and total operating expense of 21 cents per car mile, the report adds that the company should have operated approximately 11,050,000 car miles per year. In 1910 the company operated 9,427,787 car miles. The report adds:

"Since 1907 the car mileage not only has not increased, but has actually decreased up to June 30, 1910. Unquestionably, the records for the fiscal year of 1911 will show an improvement due to the addition of the fifty forty-two-seat cars. Whereas during the three years mentioned the total passenger traffic increased 6.75 per cent, the car mileage decreased 1.1 per cent. As no new equipment was put in operation during this period on the Rhode Island system, there still may have been some shifting of equipment from other divisions to Providence.

"It was, therefore, incumbent upon the company to increase its car mileage at least 1,622,300 car miles, or 17.2 per cent for the calendar year 1910. It is only just, however, to point out distinctly that this does not mean a proportionate increase in equipment, necessarily; for with faster schedule speed secured by improved thoroughfares contemplated in this report a large increase in car mileage will be possible with the present equipment.

"For the year 1911, assuming no improvement in faster schedules is made, an increase of about 10 per cent in car mileage would be warranted, judging by the steady growth in traffic since 1898.

"The present density of service in car miles per mile of single track (per year) averages for the entire 5-cent-fare zone 61,800 per mile. This is no doubt due somewhat to the low average speed.

"In 1910 the earnings of the Union division averaged $21,740 per mile of track, slightly greater than in 1907, but about the same as for the past fifteen years. For the entire Rhode Island system the earnings averaged $14,200 per mile in 1910. Both ratios compare favorably with other railway systems of similar character."

GENERAL SERVICE IMPROVEMENTS

Under this heading the report treats first of schedule speed, the average of which in the city and immediate suburbs is 7.96 m.p.h. from terminus to terminus. Counting from a point outside the congested district where reasonably unhampered operation begins the average is 8.71 m.p.h. Maximum speed is limited by city ordinances to 6 m.p.h. in the congested district and from 9 m.p.h. to 12 m.p.h. elsewhere. As stops alone consume from 15 per cent to 30 per cent of the time in normal operation and acceleration and retardation perhaps 50 per cent of the balance, the best schedule speed possible would not be over 5 m.p.h. Schedules could be made satisfactory to patrons only by violation of these ordinance requirements. Observations showed that, except on certain suburban lines, the average running speed, exclusive of stops, did not exceed 10 m.p.h. It is recommended that cars be permitted at least the same latitude of running speed as ordinary vehicles, which are allowed 15 m.p.h.

The average interval between white stopping posts within the settled limits of the city and immediate suburbs is approximately 250 ft. It is suggested that these be fixed at least 500 ft. apart except in the congested district where street intersection stopping points should be maintained. Car interference at street intersections should be avoided. The use of automatic signals, inaugurated by the company last year, is commended.

It is recommended that electric switches be installed at all important intersections, at least within the loading districts.

Owing to the narrow streets in the downtown district the report says that the city should regulate the width of extraordinary vehicles or confine them to certain streets during certain hours. Cars should be given the right of way, next to fire, police and hospital equipment, and suitable penalties should be provided for fractious drivers.

Two or three cars should be permitted to stop and load simultaneously at the same corner. Cars are not allowed by present rules to run closer than 30 ft.

The transfer traffic averaged less than 19 per cent on the Union division in 1910 and it had increased by only a small margin since 1907.

Regarding double-tracking the report says: "To illustrate the limitations, a five-minute headway may be used. For eighteen-hour operation, this corresponds to an annual total of 114,000 car miles per mile of track. Up to this point single track can be operated effectively with the proper number of turn-outs for accommodating the headway, but as a general rule, when necessary turn-outs are more frequent than three per mile, or 1750 ft., corresponding to an average of 2.5 minutes headway, double-tracking becomes advisable."

If separate routes could be found for the suburban express cars their adoption is recommended. Local business, however, need not be accepted on express cars. Electric freight cars should not be operated on main line thoroughfares at times of heaviest street traffic.

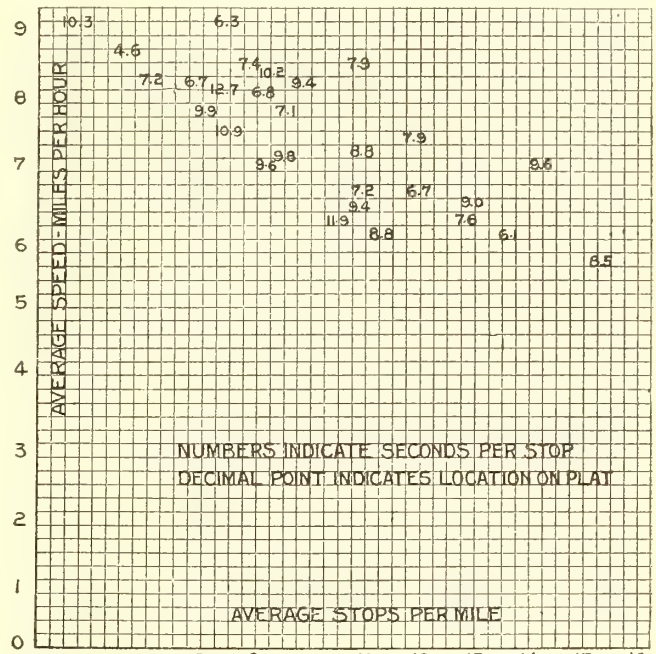


Fig. 3—Providence Report—Reduction of Speed with Stops

GENERAL IMPROVEMENTS IN PLANT AND EQUIPMENT

On the subject of tracks the report says that, in general, the permanent way is fairly well constructed and maintained, especially on lines of heavy travel.

In reference to the cars the report says in part: "The most serious objection to the design of rolling stock may be found in the short and narrow vestibules which universally exist. The present narrow vestibules on the new cars have resulted from the necessity of securing as great a seating capacity as possible in the car body, and the ordinances limiting car dimensions to 43 ft. overall, but it is difficult to see why the narrow vestibules were necessitated upon the thirty-four-seat class, except as a matter of tradition. Complicated by the single entrance principle, the construction problem becomes all the more acute as the car body increases in capacity."

It is strongly recommended that the prepayment type of car be adopted immediately.

The result of preliminary studies of the car question is summarized as follows, assuming the present platforms replaced by prepayment platforms:

Car body—present Bradley body 31 ft. over corner posts; width over drip rail, 8 ft. 7½ in.

Platforms—prepayment 6 ft. 6 in. overall, tapered to 6 ft. 6 in. width at bumpers.

Truck centers—same as at present, 19 ft. 6 in., four motors.

Typical designs of cars and of a proposed car are submitted. The alternatives in regard to the present equipment are stated as follows:

"First, retain the present Bradley car with platform, and pass all passengers in at the rear and out at the front, for double-ended operation; second, same as above, except clear rear platform for single-ended operation; third, retain front platform with bulkhead and extend rear platform to prepayment, single-ended operation; fourth, remove both bulkheads and install folding doors and steps operated by the conductor; fifth, extend both platforms and remove both bulkheads, double-ended operation; sixth, same as the fifth, except for single-ended operation.

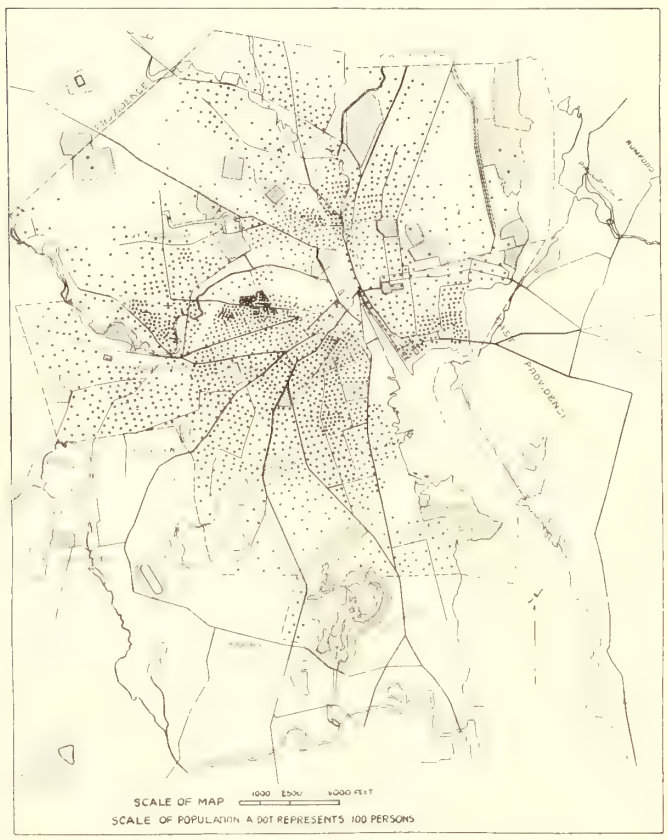


Fig. 4—Providence Report—Population Chart

"The first could only be regarded as a makeshift. The second little better than one. The third and fourth would be a considerable improvement. The fifth and sixth, a great improvement.

"The cost of these changes would be about as follows: By using the 'pay-as-you-enter' plan with center bulkheads with split corner posts and using the present doors, about $425 per platform; removing the bulkheads entirely and using four-leaf folding doors on the 'pay-within' plan, the cost would be about $500 per platform. In each case the canopy would be spliced and the platform sills reinforced by steel angle stiffeners."

It is recommended that the semi-convertible feature be incorporated in future prepayment equipment.

CARHOUSE STANDARDS

On this point the report says in part:

"By the company's statement, every car on its system is run in every 500 miles for thorough inspection of trucks, motors, trolley stands, brakes, controllers, etc. Gear cases are opened twice a month. Cars are swept and dusted, windows washed and commutators sanded each daily run-in. The entire body is washed each 500 miles turn-in. Car bodies are painted every two seasons and varnished every season. A 500-mile turn-in in regular service corresponds to about three and one-half days interval, or on some lines twenty round trips.

"The standard is fairly reasonable if maintained, although the standard in some other cities is better. The facilities at the more modern barns would unquestionably make it possible of attainment, but there is little doubt that from lack of equal facilities at older barns, and the evident condition of the cars as sent out each day from these particular barns the standard is not maintained."

RE-ROUTING

This section takes up first the question of re-routing in the terminal loading district and expresses certain principles, in part as follows:

"Long-haul routes are best suited to looping at central terminals.

"Short-haul routes having equal or multiple headway may be connected so as to secure the most direct route through the city.

"Long-haul surburban lines should use the shortest possible loops just outside the congested center.

"Short-haul loop lines should use the loops which pass through or around the retail district.

"Permit only straight-away crossings instead of branch-offs at seriously congested street intersections.

"Use no transverse street to close a loop that has not sufficient capacity for absorbing a 5-minute accumulation of cars without interfering with traffic on main intersecting streets.

"Branch-off to the right on out-bound track, not to the left against the flow of inbound tracks.

"Avoid crossed or figure eight loop; keep the throat open if possible.

"Avoid counterflow operations at all junctions of single track with main line.

"Double-track on parallel or alternative streets on lines of heavy traffic, at least outside of the loading district.

"Provide independent routes for single-track lines except all cars moving in one direction.

"Determine the ultimate capacity of present streets in order to plan for the future.

"Business and private interests must not be allowed to unduly influence the assignment of routing to specified streets.

"A walk of one block from any point to a desired car line is within the bounds of good service for any business house if necessary for an adequate re-routing scheme."

Observations at one point showed that cars passed in one direction during the rush hour at an average headway of 40 seconds and required 13½ seconds per stop. However, the minimum headway was frequently less and the delay in loading greater so that congestion occurred. At various other loading points downtown the average time observed per stop was 8.7 seconds.

Alternative plans for re-routing are suggested. It is also regarded as essential that the city permit tracks to be laid in certain down-town streets for the sole purpose of emergency routing.

REDISTRIBUTION OF OUTLYING SERVICE

This problem is stated to resolve itself into certain basic questions, assuming an increase of 1,622,000 car miles per year to be distributed equitably over the system. These questions are, in part, as follows:

"Will short-haul extras relieve long-haul cars?

"Will a split headway or 'double-header' tripper best serve rush-hour load?

"Are limited-stop expresses necessary to reserve sufficient long-haul seats?

"Should express stops be limited during rush hours only?"

On many of the longer outlying lines the average ride is stated to be from 4 miles to 7 miles and generally the loading upon these lines is about as heavy as on the city lines. This results in a standing load often exceeding 5 miles. The report says that less standing should be permitted on these long-haul lines than on short-haul city lines for the reason that persons do not object to standing for a short distance, while a standing trip of thirty to forty minutes is extremely fatiguing. The report then says:

"The average passenger haul over the lines of the Union division was determined by passenger counts as 2.07 miles. This is low, as much as 30 per cent below some cities. It appears from the records that the long-haul suburban routes earn per seat-mile not much less than the short-haul routes and average what would be a fair earning capacity for the entire system, 30 cents per standard car mile, or 0.7 cent per seat mile."

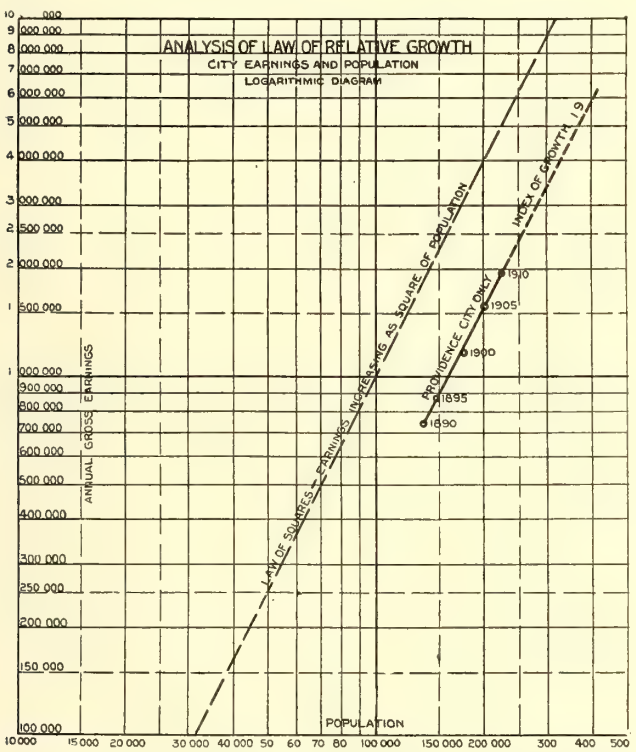


Fig. 5—Providence Report—Analysis of Law of Increased Earnings

In a discussion of the number of stops, the report says that "from 15 per cent to 30 per cent of the time is consumed in normal stops, the longer periods occurring on those lines where advantage is taken of the frequent pole stops or else where the delays are excessive due to over-crowding. The average length of stops varies from six to fourteen seconds, the latter on over-crowded lines. Attention must, therefore, be directed to: First, a reduction in the possible number of stops; second, a reduction in the delays from over-crowding; third, a reduction in the delays due to lack of promptness in handling of cars en route, exclusive of unavoidable delays in the terminal district."

For the entire Union division the dead mileage was 4.48 per cent, or, excluding suburban lines, 2.93 per cent.

The Rhode Island Company is distinctly commended for the establishment of many through routes.

In order to ascertain if possible the existence of communities of interest, not indicated by the traffic counts on present routes, a canvass of several large manufacturing establishments was made.

SPECIFIC RECOMMENDATIONS

These include an average speed, deducting time of stops, of at least 10 m.p.h. or 12 m.p.h. on free running lines. This would raise the average schedule speed, including stops, to 8.5 m.p.h. or 9 m.p.h.

EXPLANATION OF ENGRAVINGS

Fig. 1, published on page 315, compares the relative increases in earnings of the Union Railroad division and of bank clearings in Providence.

Fig. 2, published on page 316, shows the relative growth of passenger traffic, track mileage and rolling stock of the Rhode Island Company within the State for the last seven years. The figures are for the fiscal years ended June 30.

Fig. 3, published on page 317, illustrates from a large number of observations in Providence how the speed is decreased rapidly with an increased number of stops per mile. The figures indicate the average duration of stops and vary but little, showing that reduced speed is due largely to frequency of stops outside of the business district.

Fig. 4, published on page 318, shows by means of dots, each representing 100 persons, the actual distribution of population throughout Providence, based on the 129 enumerating districts of the 1910 census.

Fig. 5, shown on this page, is an analysis of the law of increased earnings. This diagram shows graphically that, based upon the last thirty years, earnings in Providence are increasing as the 1.9th power of the population, i. e., nearly as the square—a result which has already been developed from a study of the fifteen larger cities of the United States. This law means that when the population doubles earnings will quadruple. The dotted line indicates this law of the square. A line parallel thereto must conform to the same law, which is practically the case for Providence.

NEW COMPANY BUILDING IN PORTLAND, ORE.

A reinforced-concrete building, fully fireproof, is being constructed at the corner of East Water and Hawthorne Streets, Portland, Ore., for the Portland Railway, Light & Power Company, which is to be used as a combination warehouse and clubhouse for the corporation's employees. The building will cost between $60,000 and $70,000 and will occupy ground space 100 ft. x 200 ft. and will be four stories high.

The construction of this building is along the lines of the company's plans to give its employees opportunities for associating together and for developing a spirit of co-operation. Not only is the building to contain clubrooms for the light and power employees, but it is also to be the office headquarters for the transmission department of the interurban lines of the company. In the basement is to be located a garage for the company automobiles. In addition, space is to be provided for heavy line and underground material, such as cables, transformers, reels, wire and conduits.

The first floor will be the general headquarters for the line department. Here also will be the headquarters for the Oregon Water Power System, the train dispatcher and the trainmaster's department.

A large part of the second floor will be devoted to the clubrooms for the employees. It is planned to equip the rooms with gymnasium apparatus, shower baths, pool and billiard tables, reading room and a technical library for the exclusive use of the 1000 or more employees. The Light and Power Beneficial Association will have its headquarters in these rooms, and will, in a measure take charge of the activities. On this floor will also be the meter department. About one-half of the area will be used for this branch of the company.

Progress is being made on the structure, and it is expected that it will be completed and ready for use before Sept. 1.

CIVIC FEDERATION COMMITTEE REPORT ON REGULATION

The subcommittee on plan and scope of the department on regulation of interstate and municipal utilities organized by the National Civic Federation has made a preliminary report. The committee is composed of the following: Emerson McMillin, M. S. Decker, John H. Gray, Franklin K. Lane, Franklin Q. Brown, P. H. Morrissey and Milo R. Maltbie.

The committee starts with the premises that it is taken for granted that government regulation of some kind and character is essential. The recommendations made relate, therefore, to the general field to be covered and the organization to be provided. In part the report says:

"These utilities, which now represent investments of millions and millions of dollars throughout the United States, are vital to the growth and development of the country and the well-being of our cities. Various authorities have granted to public service corporations extraordinary and far-reaching powers. The acceptance of these special and important powers carries with it duties and obligations from which the individual and the ordinary corporations are entirely free.

"The nature and character of these public services tend to make them monopolistic.

"Uncontrolled monopoly not only contains elements of danger to the public, but sometimes leads to stagnation and inefficiency, which, reacting, are harmful to the public and may prevent the development of a community or a nation. A proper system of public regulation should, therefore, not only protect the interests of the public, but should provide a means whereby initiative and enterprise may receive proper reward and encouragement, while securing to the public upon the other hand proper service at reasonable rates.

"Your committee believes that the utilities to be considered by the national committee should include the principal services, namely, transportation—steam and electric—communication, lighting and water. It does not believe, however, that any absolute limit should be fixed, for there have been interesting experiments in the control of other utilities, and it may be found very desirable to have such experiments investigated and considered in the preparation of the final report. Furthermore, if model statutes are to be prepared, one of the important points to be decided will be what utilities should be regulated.

"The time seems ripe for full investigation and thorough discussion of the various plans of governmental regulation. All concede that these public agencies must be effectively controlled. Few conceive as yet that such supervision and control may proceed so far through legislative action and growth of administrative authority along independent lines in each of the states, and as between the states and the nation that the results will be not merely incongruous but damaging to the interests of commerce, thus tending to defeat the underlying reason for transportation regulation, and that this can be avoided only by the attainment of general uniformity in statutory provisions and methods of administration.

"It is recommended that investigation should be made into the principal methods that have been tried in the United States and Europe, particularly Great Britain. For instance, the laws enacted in New York and Wisconsin within a few years, and the results of the regulation provided for therein, should be considered. Likewise the experience of Massachusetts, which was the first State to attempt to control in any broad way the public utilities other than railroads. The results of the operation of the Texas law would be interesting and profitable. The recent experience of such states as Virginia, Nebraska and Tennessee would be illuminating.

"Your committee also believes that a most useful function will be the preparation in outline of a statute providing for public regulation and the organization to carry it into effect.

"To carry forward the work, your committee recommends the appointment by the president of the National Civic Federation of an executive committee of nine to supervise the various investigations which are to be made, to determine the precise subjects to be investigated, to appoint sub-committees upon the various phases of the subject, to provide the necessary means for the conduct of the work, and to employ and direct all experts and investigators.

"Without intending to limit the functions of the executive committee or to determine what that committee should do, we consider that at least the following committees should be appointed by the executive committee, and that, so far as practicable, members of the executive committee should be chairmen of such sub-committees: (*a*) Regulation of rates; (*b*) control of service; (*c*) control of accounts and reports; (*d*) regulation of financial matters; (*e*) conflicts of jurisdiction; (*f*) control over labor questions; (*g*) legal and legislative; (*h*) committee on ways and means."

DES MOINES STRIKE SITUATION

Trainmen of the Des Moines (Ia.) City Railway have submitted a copy of a proposed new agreement to J. R. Harrigan, general manager of the company. A vote upon the text of the agreement has been taken by the trainmen and it is now before the company for consideration. It is stated that the proposed contract has no direct bearing on the case of Conductor B. L. Hiatt, whose discharge was followed by the strike of Aug. 5.

The section of the proposed new contract relating to discharge provides that if a suspension is sustained by the general manager, or general manager and superintendent, or either of them, and the employee feels himself aggrieved by the action of the officer or officers he may take up the matter with the association for adjustment.

Concerning arbitration, the new contract provides that if any question arises which cannot be adjusted by the company officers or association officers the question shall be arbitrated by a board of arbitration.

A formal statement has been made by Guernsey, Parker & Miller, counsel for the Des Moines City Railway, stating that the company is willing to defer the hearing upon the motion to dissolve the injunction until after the State fair. It was stated that the company was not unmindful of the near approach of the exposition and of the importance of uninterrupted street railway service during the fair. The statement also declared that counsel for the company did not pretend to have discovered any new legal principles, but that the company will stand squarely upon its rights arising out of the facts in the case and out of the guarantees contained in the constitutions of the State of Iowa and of the United States which "though venerable, seem at times to be overlooked."

HEARING ON SIDE DOORS ON LOCAL TRAINS IN NEW YORK SUBWAY

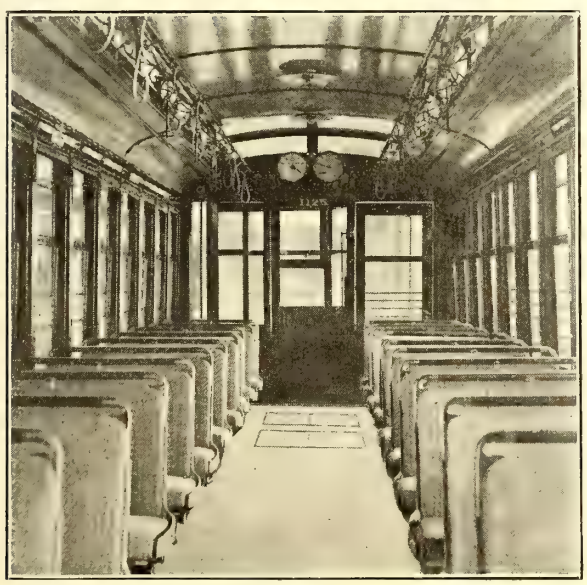
A hearing was held before Commissioner Eustis of the New York Public Service Commission of the First District on Aug. 16 to determine whether or not the Interborough Rapid Transit Company should be ordered to install center sliding doors in all the local trains of the subway service. Express trains are already equipped with this type of door. George Keegan, assistant to the vice-president and general manager of the company, declared that the company was perfectly willing to equip its cars without an official order. He said that the board of directors had already appropriated $530,000 necessary for the improvements and the work would proceed at once.

PLANS FOR RUNNING ILLINOIS TRACTION PRIVATE CAR TO CEDAR POINT CONVENTION

H. E. Chubbuck, general manager Illinois Traction System, is endeavoring to learn weather it would be possible for him to take a party of officials of his company and invited guests in his private car from Danville, Ill., to the meeting of the Central Electric Railway Association at Cedar Point, Ohio. The principal question to be considered is that of clearances. It was found that the private car could be operated over all the intermediate electric lines except on one street in Ft. Wayne, where the clearance would be insufficient to pass an opposing city car. It has therefore been proposed to have Mr. Chubbuck's car reach this street at a time when the tracks can be kept free of opposing city cars. Mr. Chubbuck furnished blue prints of the wheel tread and flanges of his car to E. F. Peck, president of the Central Electric Railway Association, to enable the latter to anticipate all track-work problems en route. A part of the proposed schedule follows: Leave Indianapolis at 7 a. m. Tuesday, Aug. 22; reach Ft. Wayne, 11:50 a. m.; arrive Lima, 1:55 p. m.; leave Lima, 2:15 p. m.; arrive Sandusky, 5:35 p. m. Mr. Peck's object in having Mr. Chubbuck's car reach Indianapolis Monday afternoon or evening is to have men available to take off the trolley hold-down hook and reduce the height of the smoke jacks if such work should be found necessary.

SANITARY CAR FLOORING

During January, 1911, the United Railways Company, of St. Louis, installed in twenty-six new cars a sanitary flooring which as yet has indicated no appreciable wear. This material is stated to be non-absorbent and a non-conductor of heat, cold and electricity. It is so elastic that it possesses the resiliency of linoleum. The compressive strength of this flooring is 1730 lb. per square inch. Its fireproof qualities were demonstrated by a test

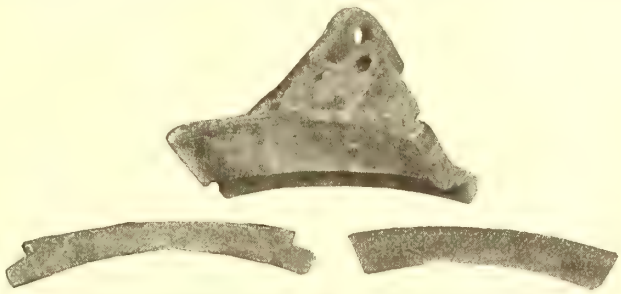


Sanitary Flooring in St. Louis Car

in which it failed to ignite at a temperature of 400 deg. Fahr. The accompanying illustration shows this flooring applied to one of the St. Louis cars. Its installation offered no difficulties, since this covering holds nails firmly and does not crack or splinter. It can also be applied to stucco work, moldings, imitation marble, etc. This material is made under the name of "Hy-ge-nia" by the National Hygienic Floor Company, St. Louis, which has absorbed the original maker, the Chemical Floor & Tile Company.

REMOVABLE BRAKE SHOE AND HOLDER

The Malcolm Brake Shoe Company, Charleston, W. Va., is introducing in the electric railway field a new type of brake shoe holder and removable brake shoe which, it is claimed, reduces the weight of scrap shoes to 2 lb. or less. The holder is made in one piece and no keys, bolts or other loose parts are required to fasten the shoe in the holder. The face of the holder is curved to a larger radius than the face of the wheel and the ends have beveled lugs or



Removable Brake Shoes and Holder

dovetails formed on them to hold the shoe in place. To insert a new shoe the brake rigging is slacked off sufficiently to allow the shoe to be slipped over the wheel flange from the inside. The shoes are made to fit loosely in the dovetail of the holder so that they are easily and quickly applied, and the play of the shoe in the holder is quickly taken up by the accumulation of sand and dirt that works into the joint.

The face and back of the shoe are made to different radii so that the ends are ⅜ in thicker than the center. When the shoe is worn through at the center the scrap consists of two thin wedges of metal. As the shoes are reversible they may be turned end for end if they wear unevenly. The holders are made to fit the brake rigging of any type of electric car truck. In addition to the iron brake shoes the manufacturers are prepared to furnish carborundum blocks for use in truing up wheels.

TEST CASE ON BRAKES IN OHIO

After a conference with representatives of forty street and interurban railway companies, held on Aug. 7, the Ohio Public Service Commission has decided to have a test case brought against one of the companies to compel it to equip its cars with brakes which will operate automatically to reduce the pressure on the wheels as the speed of the car slackens. Officials of the roads stated that they could not secure equipment to operate in that way and the members of the commission are inclined to agree with them, as they have seen nothing of the kind. At the same time the commissioners feel that a test should be made in order that the question may be settled. It is estimated that 85 per cent of the street and interurban cars in the State are equipped with either air or other power brakes.

Another section of the German State railways which is to be converted to electric traction is a group of lines in Silesia, near the frontier of Bohemia, including a line 76 miles in length, from Lauban to Königszelt, and certain branches aggregating about 90 miles. Much of this is mountainous country with heavy grades and sharp curves. The lines will work with a trolley pressure of 10,000 volts single-phase, 15 cycles, which is now the standard for the Germain main lines. Two types of locomotives will be used, one for passenger traffic capable of speeds up to 68.5 m.p.h. and the other for freight traffic similar to those for the Dessau-Bitterfeld section of the Prussian State Railways. These will be capable of speeds up to 40 m.p.h.

KERWIN-DETROIT RAIL GRINDER

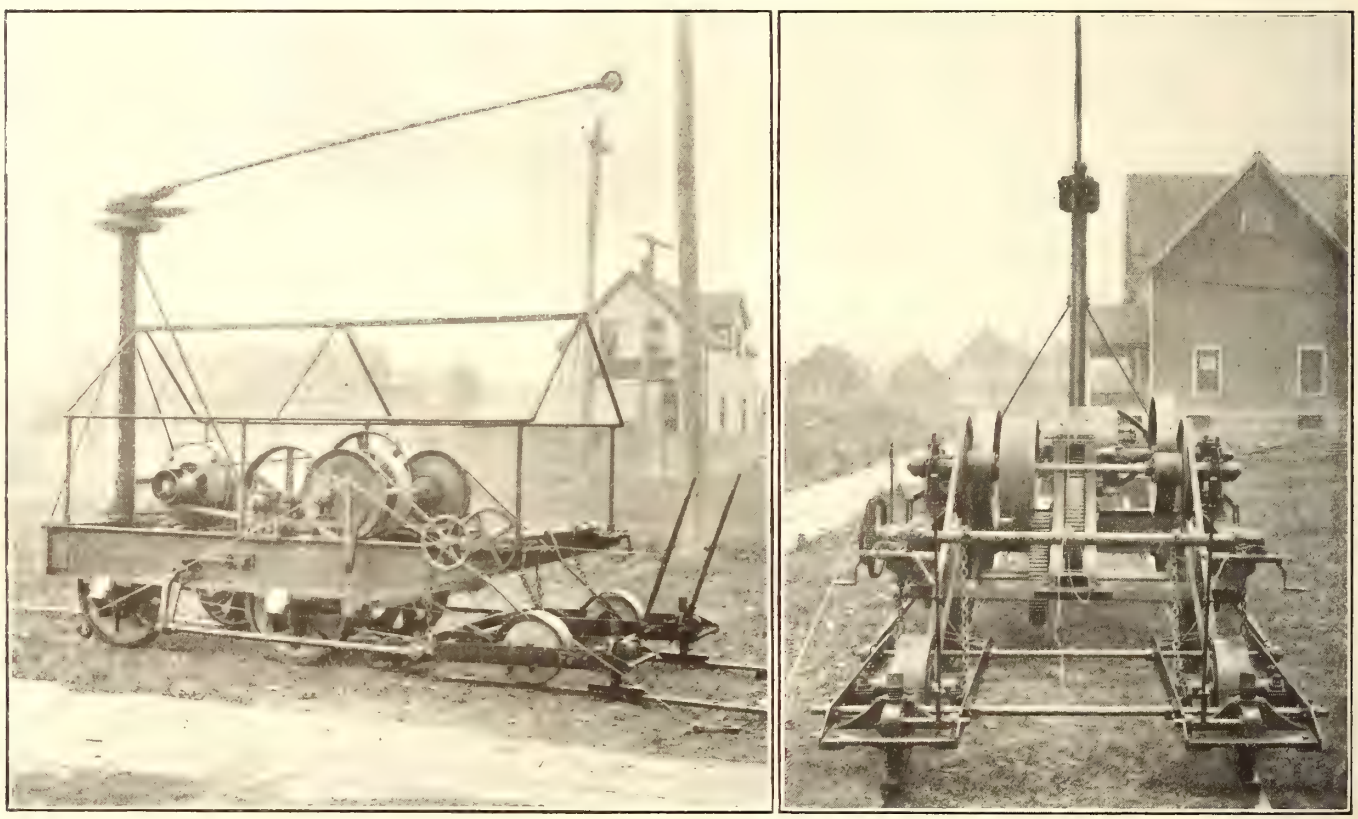
The Kerwin Machine Company, of Detroit, Mich., of which John Kerwin, superintendent of tracks Detroit United Railway, is an executive, has recently built and sold a number of machines for grinding track rails. By the use of these machines a number of railways have been able to extend the life of existing tracks for several years. In Detroit many miles of track so badly cupped at the joints that the rails had been condemned and ordered replaced were saved by the use of the rail grinder. The joint plates were first stepped so that the bottom of the cups on the receiving rails were brought to the level of the uninjured delivering rail. After the stepped joint plates had been tightened the Kerwin rail grinder was used and the cups were ground out of the receiving rail. The joints were thus brought to the surface of the track.

The rail grinder has other uses besides that of renewing old joints. It has been found profitable to grind new joints to a true surface because the tendency to batter and cup is thereby delayed. Similarly, the grinding of special track-work rail heads, joints and hard centers is profitable because it improves the riding qualities of the track work and prolongs the life by removing any unevenness which may cause vibration and destruction of the rail head. Several of the larger city properties have purchased these rail grinders for removing corrugations from different classes of track work. The cost for grinding out corrugations is said to be from 1½ cents to 2¼ cents per foot of rail according to the depth of the waves.

Accompanying engravings illustrate the appearance of the rail grinder arranged for operation. Briefly described it consists of a steel underframe mounted on four car wheels, a driving motor and a group of friction wheels and driving belts which operate emery wheels supported by a carriage which slides along the track rails. The machine is designed with a view to operating from one part of a railway system to another part under its own power, at which times the grinding-wheel carriage is raised clear of the track, as illustrated.

The main framing of the grinding machine consists of two side sills, which are I-beams 15 in. deep and weighing 42 lb. to the foot. This frame is 13 ft. long over all. The end members are 15-in. 33-lb. channels and the intermediate cross-members are 12-in. 31.5-lb. I-beams and a 9-in. channel. The motor is mounted on a subframe built of 6-in. I-beams and covered with a ⅜-in. plate, 38 in. x 29¼ in. in area. The trolley stand is made of extra heavy 5-in. pipe and is 7 ft. 6 in. high. Its base is bolted to the heavy end sill of the underframe and is guyed in three directions. The post fits over a casting which is bolted to the end sill so that a very secure support is given for the trolley base. With each rail grinder the manufacturer supplies a Bayonet trolley harp, stand and wheel.

The underframe of the rail grinder is supported on 4-in. street-car axles equipped with 33-in. 500-lb. standard street car wheels and journal boxes. This running gear permits the operation of the car at comparatively high speeds on long runs from one part of the railway system to another.



Rail Grinder—Side and End Views

The motor, mounted on top of the frame, is used to move the car along the rails. Power from the motor is transmitted through a belt, friction pulleys and reduction gearing to a standard street railway split gear on one of the main axles. This gear is 23 in. in diameter and has a 4½-in. face and sixty-nine teeth of three pitch.

Friction clutches and other transmission mechanisms are designed to provide either continuous movement of the car in either direction or a movement alternately back and forth over the short length of track or joint which is to be ground. Provision is also made for continuously driving the emery wheels while the car is moving forward and backward or letting them remain idle while the car is being moved from one end of the road to the other.

The transmission gearing may be described briefly as follows: A belt from the motor drives the upper or main shaft, shown in the end view of the grinder. This shaft carries two paper friction pulleys, each about 6 in. wide, and two larger pulleys which are fitted with narrow V-shaped belts for conveying power to the emery wheels.

Thus the grinding wheels are driven at high speed through the single intermediate shaft between them and the motor. The friction pulleys deliver power as desired for moving the grinder along the track. Two large iron pulleys are mounted with their journal boxes on guides so that they may be thrown against the small friction pulleys as desired. The shaft of each of the large friction pulleys con-



Rail Grinder—View with Housing

nects through a universal joint with the main train of gearing. One of the friction pulleys drives through a single intermediate pinion and the other through two pinions. Thus when the first friction pulley is transmitting power it will move the car in one direction, while the use of the other pulley with its train of two pinions will move the car in the opposite direction. One of the gears in the train leading from the pinions on the friction pulley shafts to the gear on the car axle is fitted with a clutch which permits the grinding wheels to be run while the car stands still.

The machine does its work automatically and but one man is required to set and operate it. A lever at the side of the frame controls the forward and backward movements. Two ropes with weights attached are usually employed to throw this lever at the end of the travel of the car. The reversing gear is so nicely adjusted that a pull of a few ounces only is required to operate it.

The carriage for the grinding wheels [illegible] made of angle irons tied together with [illegible] rods. It is 5 ft. 10 in. long and is [illegible] dependent of the main frame of [illegible] except for the push rods, which [illegible] nected. Flexible connections [illegible] ding carriage remove the pos[illegible]he smoothness of grinding being [illegible] ny jarring of the car. The grind[illegible]e rests on four 14-in. shoes whic[illegible]the tops of the rails. Two of [illegible] are adjustable for height by me racks and pinions, which may be o ated through direct levers or by me of small windlasses which wind rope [illegible] ng through pulleys on the adjusting lever. The [illegible] sses are located on the ends of the grinder frame.

The emery-wheel shafts have bab [illegible] boxes designed to provide easy adjustment for variou [illegible] es and different widths of track. As earlier stated, [illegible] emery wheel is independently driven at a constant speed irrespective of the movement of the machine along the track. Either emery wheel can be raised or lowered or moved forward or back to grind staggered joints. The head of the rail is ground while the car is moving in either direction.

The machine may be set so as simultaneously to grind a high joint on one rail and a low joint on the other rail and do its feeding automatically.

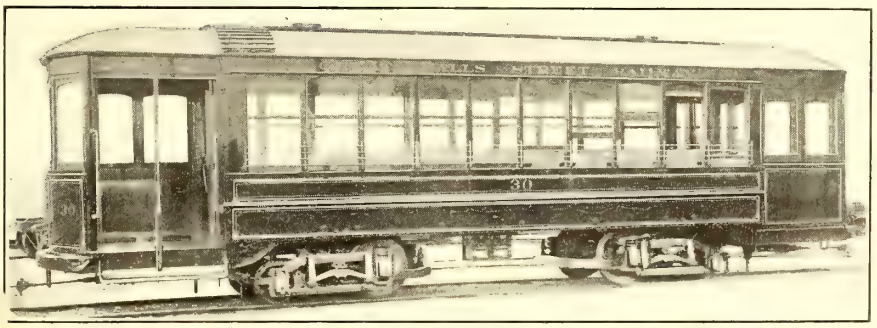
CARS FOR GREAT FALLS, MONT.

The Danville Car Company has recently completed for the Great Falls (Mont.) Street Railway eight semi-convertible cars of the type shown in the accompanying illustration. The principal dimensions are the following: Length of car body over the end panels at the sill, 25 ft. 9 in.; length of the car body over the platform crown pieces or outside vestibule sheathing, 38 ft. 9 in.; width of the car at the sill, including the panels, 7 ft. 11½ in.; width of the carbody over the posts at the belt rail, 8 ft. 2 in. Mutually operating double sliding doors are provided at each end of the body. Both sashes of each window are arranged to slide into the roof.

The bottom framing consists of 4-in. x 7¾-in. yellow pine side sills plated with ⅜-in. x 12-in. steel; 5¼-in. x 7¾-in. white oak end sills and center cross pieces of 3½-in. x 5⅞-in. white oak. The body framing has 3¾-in. corner posts and 3¼-in. side posts. The sweep of the posts is 1¾ in. Ash ribs, ⅝ in. x 1¾ in., are placed on the concave panels. They are mortised into the sills and fastened securely on the concave rails without screws. The center panel ribs, which are also ⅝ in. x 1¾ in., are mortised into the belt and concave rails. A sheath of No. 20 sheet steel is applied to form the bottom panel. The floor boards are of 13/16-in. narrow yellow pine covered with hardwood tapered floor mat strips, ⅝ in. at the top and ¾ in. at the bottom. The roof is of the Brill arch pattern without side ventilators. Three-ply birch veneer is used for the interior finish. Eight transverse reversible and two stationary longitudinal seats, all of rattan, seat forty persons.

Each platform is 6 ft. 6 in. long. The dashers are of No. 14 sheet steel and extend around one side, leaving step openings at the right-hand side facing the car; the dasher rail at the left-hand side is secured to the carbody. The vestibules are of the round-front type with a narrow center post to separate the entrance and exit step. The step openings are inclosed by folding doors, while the opposite closed side of the vestibule has two drop sash windows.

The cars are mounted on Brill No. 39-E single-motor trucks of 4-ft. 6-in. wheelbase, which will be operated over curves of 35-ft. radius. These trucks have 33-in. diameter



One of Eight Arch Roof Cars for Great Falls, Mont.

chilled-iron drivers and 21-in. ponies. The diameter of the driving axles is 4½ in. and of the pony axles 3⅞ in. Among other Brill specialties on these cars are fixed link drawbars, angle-iron buffers, sand boxes, signal bells and "Dedenda" pedal alarm gongs. These cars are also equipped with Peacock brakes, Hunter destination signs and Consolidated electric heaters. The approximate weight of the carbody, exclusive of the trucks, the motor and control equipment, etc., is 15,000 lb.

NEW TYPE OF STORAGE-BATTERY CAR

The Federal Storage Battery Car Company has recently completed for the People's Electric Railway Company, Muskogee, Okla., the storage-battery car shown in the accompanying engravings. The car is designed for interurban service and possesses a number of very novel features of car construction as well as of electrical equipment. Hence its practical service on the Oklahoma line should be attended with interest. Several trial trips with this car have been run during the past two weeks over the tracks of the Erie Railroad from the shops of the Federal Storage Battery Car Company at Silver Lake, near West Orange, N. J. During these runs the car has shown a performance on level track at 24 m.p.h. of 600 watts per car mile.

The car body is 40 ft. 6 in. in length and has a width of 8 ft. 2 in. It is divided into three compartments; a baggage compartment which is 8 ft. in length with seats for four people, a smoking compartment with longitudinal seats for twelve passengers, and a main passenger compartment with ten stationary seats. Nine of these seat two passengers each and one seats four passengers. This longer seat and one of the shorter seats are near the entrance. The other eight seats are arranged back to back as cross seats. The car is double-ended and the motorman's controller and brake handles are in the express baggage compartment at one end of the car and on the platform at the other end of the car. The roof is of the arch type with ventilators, and the batteries are located under the seats of the car where they are protected from the heels of the passengers by perforated sheet-steel risers.

Every effort has been made to keep the weight of the car to a minimum, and the designers have succeeded in obtaining a weight of the complete car, including the battery, of 18,000 lb., and without the battery of 14,000 lb.

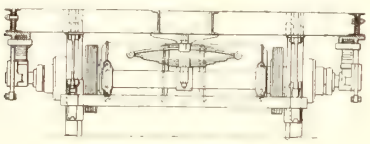
The floor frame of the car is entirely of steel. Each side sill consists of two 6-in. channels bolted together. The end sills and the eight intermediate bridging pieces are also 6-in. channels. Two of these intermediate bridging pieces at each end of the car are used to support the motors which operate the car. Two 6-in. I-beams support the rear platform and two in the front support the front of the car.

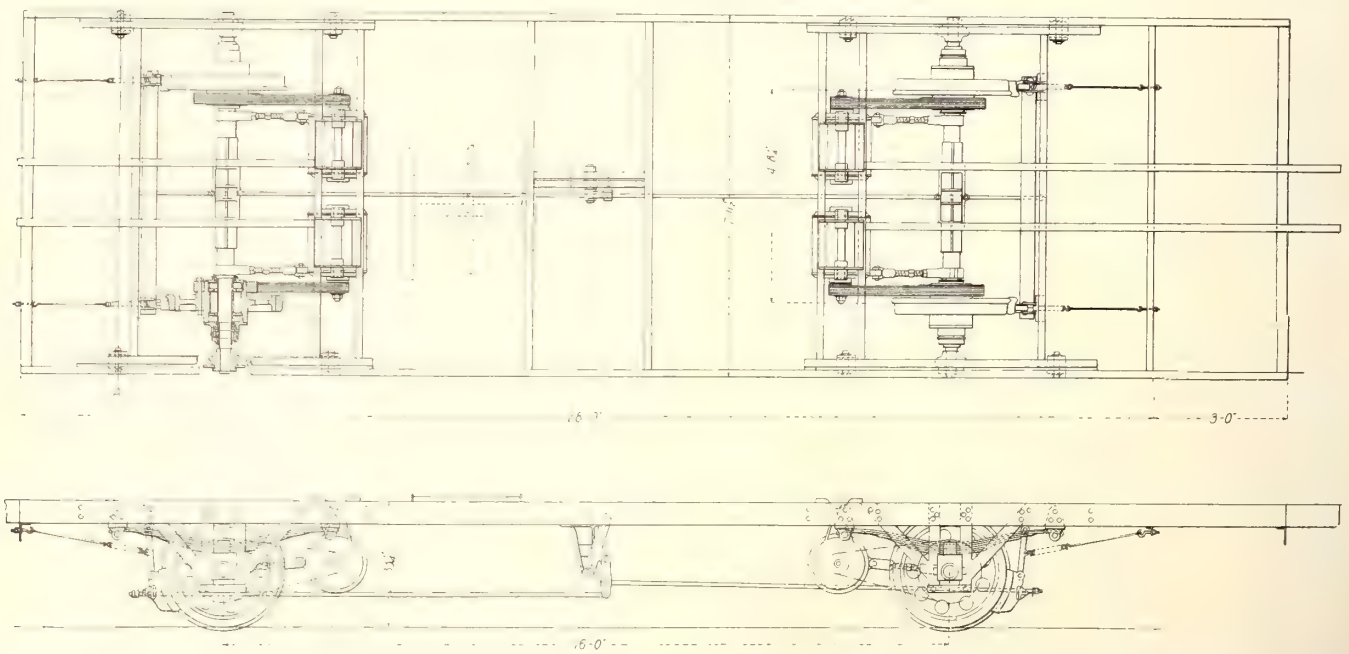
An especially interesting feature of the construction is that no independent truck is used. Instead the car is supported on the car axles by the European type of running gear in which half elliptic springs, which rest on the journal boxes, support the car. These springs rest in pockets, which are bolted to the side sills. The journal box slides in pedestals, so that it has a free vertical movement, but none in a horizontal direction. The wheel base is 16 ft., but no difficulty has been experienced in operating the car around curves with as short a radius as 100 ft.

The axles are stationary and each wheel is independently



Storage-Battery Car—Side View





Plan, Elevation and Section of Storage-Battery Car Floor Frame. The Sills Supporting the Rear Platform Are Not Shown

driven by a 37½-amp, 250-volt motor, according to designs furnished by Messrs. Beach and Thresher, of the Federal Storage Battery Car Company, and Mallett, of the Diehl Manufacturing Company. The motor drive is with a Morse silent chain, and the speed reduction between motor pinion and wheel gear is about 3 to 1. Each wheel



Interior of Storage-Battery Car

is mounted on roller bearings made by the Railway Roller Bearing Company, Syracuse, N. Y. Hand-brakes are used, operated by a lever near the controller. The wheels are steel tired and weigh about 250 lb. each.

The batteries are of the standard Edison battery A-6 type. The car is equipped with 200 cells.

A NEW DIRECT-READING OHMMETER

The instrument shown in the accompanying illustration is an ohmmeter recently brought out by Queen & Company, Inc., Philadelphia, for the rapid and direct measurement of resistances which fall within the range of the slide wire or Wheatstone bridges to a commercial degree of accu-



Ohmmeter

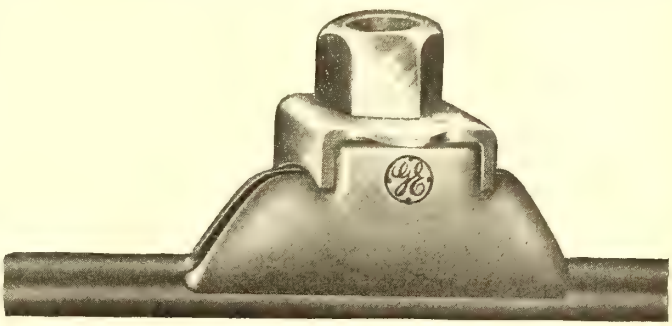
racy. The manipulation consists of closing the battery and galvanometer keys and rotating the index until the galvanometer indicates a balance. The unknown resistance is then read from the scale without the necessity of referring to a table of values. To give maximum accuracy multipliers are provided so that a balance can be obtained in the mid-part of the scales for all resistances ordinarily measured in actual practice.

A contained battery adapts it for portable purposes as well as bench use in manufacturing establishments and repair shops. The portable feature makes this instrument applicable for use in carhouses for checking resistances in the car circuits, etc. Provision is also made for connecting an external battery.

The scale is engine-divided on brass and is therefore not subject to the defacement of paper scales. The convenience of manipulation is very striking, since it is only necessary to rotate the index to balance. This feature adapts it for use by those not skilled in the use of Wheatstone bridges. The galvanometer in the ohmmeter is a sensitive D'Arsonval type as used in the portable testing sets of the manufacturers.

A NEW TROLLEY EAR

The General Electric Company has recently placed on the market a new mechanical clamping ear, known as form M. It is made of forgings and punchings of steel, thus eliminating entirely such imperfections and variations as are common to iron castings. This feature also permits the use of small light sections of great mechanical strength and results in an ear which gives a maximum clearance from passing trolley wheels and a minimum height from the center of the wire to the top of the clamping nut. The jaws are duplicate drop forgings so that each lip should fit into the recesses of the trolley wire with abso-



New Trolley Ear

lute accuracy. The jaws are hinged by a steel pin located close to the wire and are of a length sufficient to utilize the maximum clamping effect produced by the clamping nut. The machine steel stud jacket engages shoulders on the clamps and fits into the hexagonal interior of the clamping nut. Thus by rotating the nut the stud jacket is drawn on to the suspension stud while the nut exerts an outward pressure on the upper outer edge of the jaws, which, by reason of the hinge, press against the trolley wire.

The punched washer is formed around the top of the jaws to prevent its turning while the clamping nut is being tightened. It is also provided with two small lugs which may be bent up against the side of the clamping nut, effectually preventing any possibility of the ear becoming loosened in service.

The new ear is made up to take round, grooved and figure 8 wire, and is furnished with either japanned or standard sherardized finish.

The form M ear, when used in connection with form H-3 suspension of the mining and ceiling type, renders possible an increase in head room of 1 in. to 2½ in.

The operators of the Glasgow, Scotland, municipal street railway declared a strike on Aug. 12. Attempts to operate cars by non-union men resulted in rioting in which several persons were killed and cars damaged.

News of Electric Railways

Addition to the Central Electric Railway Association Program

A. L. Neereamer, secretary-treasurer Central Electric Railway Association, has announced that in addition to the papers already scheduled for the meeting of the Central Electric Railway Association at Cedar Point, Ohio, next week, J. F. Keys, general passenger agent Detroit United Railway, is to present a paper on "Traffic."

Hearing on Bay State Street Railway Improvements

The Massachusetts Board of Railroad Commissioners held a hearing on Aug. 15 on the petition of the Bay State Street Railway for the modification of the board's order for the double-tracking of Malden Street, between Paul Street, Malden, and Broadway, Revere, Mass. About a year ago the board suggested the desirability of this work, and recently the Malden board of aldermen passed a resolve asking for the construction of double-track on still more mileage.

Counsel for the company, Bentley W. Warren, in presenting the case, stated that estimates had been made of the cost of the two propositions, and that the roadmaster had estimated the cost of double-tracking the 17,500 ft. recommended by the Railroad Commission at $72,363, and of the 4½ miles of track urged by the Malden aldermen at $111,809. Mr. Warren stated that this line is used for the most part by tourists in summer making the trip to the beach at Revere, and that travel in the winter is light. He asked the commission to decide whether other improvements planned by the company were not needed much more than the double-tracking of this line.

As an alternative to the suggestions of the board Mr. Warren stated that the company proposed the following improvements:

1. To install United States automatic block signals in place of the present hand-thrown signals. Cost estimated at $2,500.

2. To double-track the distance between two turnouts in Revere, 2775 ft., at an estimated cost of $21,340.

G. H. Gray, superintendent of the division, testified that in his judgment these changes would remove the difficulties now experienced and that cars could then be operated without much delay, and with such frequency as the volume of travel warranted. They could be made at a saving of about $75,000, as compared with the cost of double-tracking the whole distance.

Mr. Warren then outlined the improvements that have been asked by the public, in part ordered by the Legislature, and all considered desirable by the directors of the company, and planned to be carried into effect in the near future, as follows:

1. The abolition of grade crossings. The total cost of this work already planned would be $645,500, in addition to which similar work will have to be done soon in other places.

2. A large amount of work is being done in placing wires underground; some is under way at the present time, and more is provided for by law. The estimated cost of this work is: In Brockton, $110,000; Salem, $60,000; Beverly, $135,000. All this work is demanded by the public, though the company has opposed it on the ground that it could not afford it. The Legislature, in passing the special legislation, has taken the view that it is of first importance.

3. Rebuilding of bridges. Four bridge improvements were ordered by the last Legislature, involving a total expenditure by the company of $121,250. In addition, there are other bridges that will require large expenditures in due time.

4. Extensions and double-tracking, which ought to be done, and which the company proposes to do. The total estimate for extensions and double-tracking is $561,000.

5. Other necessities of pressing importance are these: Seventy-five new cars, $450,000; development for express and freight-carrying service, $450,000; improvements in steam plants, in the Fall River central station, in the Salem station (new boilers and generator), in the Lynn station (new boilers) and in the Chelsea station (new boilers). The total cost is estimated at $929,800.

To summarize, $4,492,063 will be required to put the company's plant in prime condition to meet the permanent demands of business, most of which, counsel asserted, ought to be done before such work as the petition asks to have modified.

Mr. Warren stated that the gross receipts of the Northern division were 28.77 cents per car-mile. The operating expenses were 18.02 cents, and the fixed charges, including interest, taxes, etc., were 5.97 cents, making a total of 23.99 cents.

The cost to operate the whole division averaged 5.10 cents more per car-mile than the gross receipts of the Boston-Saugus Center line, which goes over part of the route under consideration, and 2.70 cents more per car-mile than the Malden-Revere line, which goes over part of the line under consideration.

George H. Gray said that the automatic signals would do much to remove the causes of delays, even if the line is not double-tracked.

Mr. Warren, in closing, urged that as between pleasure riding and regular business traffic, the latter should have first consideration. The board took the matter under advisement.

Supreme Court Refuses to Restrain Work on New Subway in New York

Justice Ford rendered a decision on Aug. 16 in the New York State Superme Court denying the motion brought by the Admiral Realty Company for an injunction restraining the Bradley Construction Company from building four sections of the proposed Lexington Avenue subway, and also enjoining the Public Service Commission and the Board of Estimate from authorizing the construction of the subway under these contracts. The decision of Justice Ford in part is as follows:

"Upon the argument I was inclined to the view that the changes in the specifications of the construction contracts between their advertisement and actual award might be of such a nature as to call for the intervention of this court, but a careful study of the excellent and exhaustive briefs submitted has brought me to the contrary view. Plaintiff has, in my opinion, failed to rebut the presumption that the public officials charged with the preparation, advertisement and awarding of the so-called Bradley contracts have acted throughout in good faith, and in compliance with the law. Indeed, there was not injected into the arguments or inserted in the briefs any suggestion reflecting upon the integrity or capacity of any public official.

"The graver question is the second. The seemingly contemplated guarantee of certain net earnings to a prospective bidder might, or might not, be either violative of the Constitution, or ultra vires of the municipal corporation. But I think that plaintiff's application for injunctive relief upon this branch of the case is premature. The proposed plan of operation with its prospective guarantee of net earnings could be held to imminently threaten irreparable damage to a taxpayer only on the assumption that the public authorities of the city intend to disregard the plain intent of the statute. After plaintiff appears and objects at the public hearing required by law to be held upon the proposed contract for operation—if indeed such a form of contract as the one in question is ever actually advertised for hearing—if the public authorities then persist in attempting to consummate it, an application for a restraining order might properly be entertained, but the possibility of such consummation, it seems to me, is as yet too remote to warrant the court's interference with the thus far lawful acts of public officials."

An appeal is likely to be taken to the Appellate division, but this cannot be brought until October, and there is nothing to prevent the Bradley Construction Company from going ahead with the work.

The argument on application of the Admiral Realty Company for an injunction was heard before Justice Ford in the Supreme Court on Aug. 9. Louis Marshall, who appeared for the Admiral Realty Company, asserted that it was impossible to separate the construction contracts granted to the Bradley Construction Company from the resolution by the Board of Estimate. Leroy T. Harkness, counsel for the Public Service Commission, argued that as it was impossible to grant a contract for operation to the Brooklyn Rapid Transit Company or any other concern without advertising for bids and public hearing, the court had no right now to consider what did not exist, but Justice Ford declared that what he could not get out of his mind was that the city was guaranteeing to the Brooklyn Rapid Transit Company a rate of dividends out of all proportion to the capital actually invested.

Permits were granted on Aug. 11 to the Bradley Construction Company, which has the contract for four sections of the new subway, to erect three more platforms and to sink the necessary shafts. These platforms will be at Lexington Avenue and Eighty-ninth, Ninety-seventh and 103d Streets.

Charles H. Peckworth, who was the lowest bidder for section 7 of the Lexington Avenue subway, will not go ahead with the contract awarded to him. The reason he has given to the Public Service Commission for refusing to undertake the work is the long delay which elapsed between the time his bid was made and the letting of the contract. Mr. Peckworth's bid for the section was $2,750,463, while the Bradley Construction Company, the next lowest bidder, asked $3,870,333 for the work. It has not yet been decided by the commission whether new bids will be advertised for or whether the contract will be given to the Bradley company.

Proposed Franchise Terms in Los Angeles

The ordinance prepared by the Board of Public Utilities of Los Angeles, Cal., and the city attorney to govern the granting of franchises in that city in the future has been reported to the City Council. It contains no reference to an "indeterminate franchise" provision, but it is understood that this plan will be advocated by the administration and that the people will be asked to vote on a charter amendment, when the new charter is framed, incorporating this in the basic law of the city.

The most important innovation is the provision that the franchise in each case shall be awarded to the person or firm making the highest bid, and that open bidding at a sort of municipal auction shall be allowed. These bids may be in a flat sum or in percentage of annual gross earnings.

The ordinance provides that no public service corporation shall use the streets without a franchise. It then proceeds to outline the machinery for granting franchises, including the provision that no franchise shall be granted until the application therefor shall have been referred to the Board of Public Utilities. The latter may recommend the terms on which the franchise shall be granted, and then the franchise must be advertised.

The second paragraph of Section 5 states that "the permit shall be awarded to the bidder offering the city during the life of the franchise the highest percentage of the gross annual receipts received from the use * * * of the franchise, provided that such percentage shall not be less than 2 per cent of the gross annual receipts during the first five years, not less than 4 per cent during the next eight years, and not less than 5 per cent during the remaining period of the grant."

In case this amount is not deemed commensurate the Council may fix a minimum figure at which the franchise may be sold. In either case, after the bids are opened the highest bidder may be "raised" by the lower bidders, or by others, until the highest possible amount has been secured to the city, when the highest bidder shall receive the award.

The ordinance provides that all holders of railroad franchises in the city shall be compelled to exchange track privileges with others, for a reasonable rental.

Once sold, franchises cannot be transferred without the consent of the city. Work must begin within four months and be finished within three years. Parts of franchises cannot be abandoned, and in case an entire piece of work under a franchise is abandoned the grantee must remove all his construction materials and put the street in its original condition. This abandonment must be approved by the Council.

So long as the City Council does not violate provisions of the charter it may take over the property of companies granted franchises by due process of law. The ordinance also reserves explicitly the right of the city to fix rates, fares and charges for service to be charged by the grantee of a franchise. In case a contention arises as to the exact meaning of any wording either of the ordinance itself or of advertisements, or of franchises granted, the ambiguity, says the ordinance, shall be construed in favor of the city.

Funds for the Investigation of the Chicago Terminal Electrification

The expense of the investigation of the feasibility of electrification of the Chicago steam railway terminals which is to be conducted by a committee of the Chicago Association of Commerce will be met by the railways concerned. The basis of division of the expense will be formulated by the General Managers Association. The active work of the committee will be conducted by the following: Horace G. Burt, chief engineer; Hugh Patterson, who has been connected with the Pennsylvania Railroad electrification in New York, electrical engineer; Louis H. Evans, formerly chief engineer of the Chicago Junction Railway, terminal engineer; Theodore H. Curtis, formerly superintendent of machinery for the Louisville & Nashville Railway, mechanical engineer.

New York Engineers Go Over Pittsburgh Subway Route.—J. Forgie and A. Snyder, representing Jacobs & Davies, of New York, were shown over the proposed Pittsburgh, Pa., subway route by representatives of the City Council on Aug. 7.

Another Subway Plan for San Francisco.—John Pierce Hill, a civil engineer of San Francisco, has sent to the Board of Supervisors a communication outlining a plan for a subway for passenger traffic in San Francisco, commencing at the Ferry and extending up Market Street.

San Francisco Indictments Quashed.—In accordance with the order of the District Court of Appeals of California Superior Judge William P. Lawlor on Aug. 17 dismissed the indictments in the trolley bribery case against Patrick Calhoun, Tirey L. Ford, Thornwell Mullally and William M. Abbott, officials of the United Railroads of San Francisco.

Another Terminal Proposed for Cleveland.—It is reported that options have been given on property on the south side of the Public Square to be used as a depot and terminal for steam and interurban roads. This project is different from the one announced some months ago, which, it is said, has not been abandoned. The properties involved in the two, however, are almost adjacent.

New Jersey Commission Rules That Transfer Must Be Issued on Transfer.—The Board of Public Utility Commissioners of New Jersey has rendered an opinion that the Public Service Railway must issue transfers on all intersecting and connecting trolley lines in Newark. This, according to the board, must be done even though it involves giving retransfers, a practice which the company abandoned some years ago.

Referendum Vote Asked Upon Amendment of Cleveland Franchise.—The socialists of Cleveland, Ohio, have filed a petition with City Clerk McCray, asking for a referendum vote upon the amendments made to the Cleveland Railway franchise by the City Council. It is claimed that the petition contains more than 15,000 signatures, while the required number is a little over 12,000. Should it be found that the petition contains the necessary number of registered voters' names, a vote will be taken at the regular election in November, unless the city should set an earlier date. At any rate, the step will delay improvements.

Arbitration Difficulties at Detroit, Mich.—Conferences between J. C. Hutchins, president of the Detroit United Railway, and William D. Mahon, on the question of wages and hours for trainmen, were abandoned on Aug. 7, after it

became apparent that a satisfactory agreement could not be reached. The company offered to advance the wages 1 cent an hour, but this was not accepted. The arbitrators named by the company and the union, respectively, have failed so far to agree upon a third man, and every effort is being made to find some one who will be acceptable to both sides.

Conference on Valuation at Lincoln, Neb.—The Nebraska State Railroad Commission has issued a call to railroad commissioners of thirteen other States to attend a conference to be held in Lincoln, on Aug. 29, for the purpose of discussing the question of physical valuation. The letter reads in part as follows: "The purpose of this meeting is to discuss and agree, if possible, upon plans for the unification and standardization of methods in obtaining a physical valuation of public service properties by the several State departments now interested in this work; also to arrange for the permanent association of those individuals having to deal with this very important matter, if deemed advisable. Much interest has already been manifested in a preliminary suggestion that such conference be held, and it is hoped that a goodly representation of the various State commissions will be present."

Decision in Covington (Ky.) Franchise Case.—Judge M. L. Haberson, of the Kenton Circuit Court, Covington, Ky., on Aug. 7 rendered a decision holding that the South Covington & Cincinnati Street Railway is not liable to the city of Covington for about $75,000 claimed under certain franchise ordinances. The action was begun to recover $2,600 a year under an ordinance of July 18, 1887. The company had paid these yearly amounts until 1892, when an ordinance was passed providing for the payment of $2,600 a year for the first five years, $4,000 for the next five years, $5,000 annually for the next five years and $6,000 annually for the last five years of a twenty-year period provided in the ordinance. All the installments under the last ordinance have been paid and the city is now receiving $6,000 a year. The company contended that this last ordinance operated as a repeal of the first one, and it was sustained in this contention.

Strike on Coney Island & Brooklyn Railroad.—The strike of the conductors and motormen of the Franklin Avenue, Smith Street and Hamilton Avenue lines of the Coney Island & Brooklyn Railroad, which began on Aug. 5, 1911, is now over. After two weeks from the beginning of the strike the cars are being operated by men who were regularly employed at the main office of the company for permanent positions. The new men, the company officials say, signed under the old flat rate of 23 cents an hour. These men have replaced strikebreakers who were employed at first to break the strike. The barracks and restaurant at Franklin Avenue car house were closed on Aug. 15 and the barracks and restaurant at the Smith street car house were closed Aug. 18. About twenty strikers have made application for positions as individuals, and their applications are being considered. Two of the applications have been acted upon favorably and the men are back on the cars. A parade by the strikers and their sympathizers had been planned for Aug. 12, but it was prohibited by the police.

Illinois Committee Investigates Commissions in Wisconsin and New York.—John Dailey, of Peoria, chairman of a committee of the Illinois Legislature, in speaking of the investigations by that committee into the Railroad Commission of Wisconsin and the New York Public Service Commission, Second District, stated that the conditions in New York State are more nearly like those existing in Illinois than conditions in Wisconsin, as both Illinois and New York have one large city which has a predominating influence. The question of a divided commission in Illinois is a vital one in connection with the investigation which the Illinois committee is making. Mr. Dailey referred to the large amount of business handled by the New York commission. He said that the committee was very much impressed by the high character of the members of the Wisconsin commission and the Wisconsin laws, but that it was more impressed with the expedition exercised in the dispatch of business by the New York commission of the Second District. The committee also was impressed strongly by the independence of the New York commission.

Financial and Corporate

New York Stock and Money Markets

August 16.

Partial recovery from the violent decline that occurred late last week was made on Monday, but further reaction took place on Tuesday, and in to-day's market many issues reached their lowest prices thus far in the year. News of several failures abroad and selling for foreign account assisted in depressing the local market. Recent declines in the grain markets indicate improvement in crop conditions. The money market has not changed appreciably since the last report. Quotations to-day were: Call, 2@2⅜ per cent; ninety days, 3@3¼ per cent.

Other Markets

Weakness has developed in the outside markets, reflecting conditions on the New York Exchange. Prices fell to-day in the Philadelphia market.

Chicago Elevated Railways preferred was sold at 85 to-day, a drop of 5 points from the last quotation. Changes in the common were fractional. Prices in general showed a downward tendency.

Declines were registered throughout the active list in Boston to-day and of the copper shares some lost from 3 to 5 points.

Very little business was done in the Baltimore market on Wednesday and the small amount of trading resulted in lower prices.

Quotations of traction and manufacturing securities as compared with last week follow:

	Aug. 9.	Aug. 16.
American Light & Traction Company (common)	a302	a296
American Light & Traction Company (preferred)	a106	a106½
American Railways Company	44½	*44½
Aurora, Elgin & Chicago Railroad (common)	*44½	*44⅜
Aurora, Elgin & Chicago Railroad (preferred)	*87	*87
Boston Elevated Railway	127	126½
Boston Suburban Electric Companies (common)	a15	*15
Boston Suburban Electric Companies (preferred)	75	*75
Boston & Worcester Electric Companies (common)	*13	*13
Boston & Worcester Electric Companies (preferred)	*56	*56
Brooklyn Rapid Transit Company	76⅞	*74⅝
Brooklyn Rapid Transit Company, 1st ref. conv. 4c.	*86¾	*86¾
Capital Traction Company, Washington	a132	a131
Chicago City Railway	a190	a190
Chicago & Oak Park Elevated Railroad (common)	*3	*3
Chicago & Oak Park Elevated Railroad (preferred)	*5	*5
Chicago Railways, ptcptg., ctf. 1	a97	*97
Chicago Railways, ptcptg., ctf. 2	a30¾	*30¾
Chicago Railways, ptcptg., ctf. 3	a12	a12
Chicago Railways, ptcptg., ctf. 4	7½	*7½
Cincinnati Street Railway	a131	130
Cleveland Railway	*99⅞	*99⅞
Columbus Railway (common)	82	82
Columbus Railway (preferred)	95	95
Consolidated Traction of New Jersey	75¾	76
Consolidated Traction of N. J., 5 per cent bonds	a105	a105
Dayton Street Railway (common)	a25	a25
Dayton Street Railway (preferred)	a101	a101
Detroit United Railway	a75	a75
General Electric Company	155	151
Georgia Railway & Electric Company (common)	154	154
Georgia Railway & Electric Company (preferred)	92	92
Interborough Metropolitan Company (common)	a16½	a15½
Interborough Metropolitan Company (preferred)	a44⅞	a42
Interborough Metropolitan Company (4½s)	77½	77½
Kansas City Railway & Light Company (common)	a19	a19
Kansas City Railway & Light Company (preferred)	a44	*19
Manhattan Railway	*143	a137
Massachusetts Electric Companies (common)	a21	19
Massachusetts Electric Companies (preferred)	a92	89½
Metropolitan West Side, Chicago (common)	*27½	*27½
Metropolitan West Side, Chicago (preferred)	*75	*75
Metropolitan Street Railway, New York	*15	*15
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	72⅜	69½
Northern Ohio Light & Traction Company	*50½	*50½
Northwestern Elevated Railroad (common)	*30	*30
Northwestern Elevated Railroad (preferred)	*70	*70
Philadelphia Company, Pittsburgh (common)	53½	53
Philadelphia Company, Pittsburgh (preferred)	44	44
Philadelphia Rapid Transit Company	23⅜	23
Philadelphia Traction Company	85½	85½
Public Service Corporation, 5% col. notes (1913)	*94	a94
Public Service Corporation, ctfs.	*107	a107
Seattle Electric Company (common)	a110½	a110½
Seattle Electric Company (preferred)	a103	*103
South Side Elevated Railroad (Chicago)	76⅞	95⅜
Third Avenue Railroad, New York	a9¼	*8½
Toledo Railways & Light Company	*6½	*6½
Twin City Rapid Transit, Minneapolis (common)	a107	a107
Union Traction Company, Philadelphia	*51⅜	51
United Rys. & Electric Company (Baltimore)	18	18
United Rys. Inv. Co. (common)	a38	31½
United Rys. Inv. Co. (preferred)	a64¾	60
Washington Ry. & Electric Company (common)	a45	a44⅛
Washington Ry. & Electric Company (preferred)	a91	a85⅛
West End Street Railway, Boston (common)	88½	88
West End Street Railway, Boston (preferred)	90	88
Westinghouse Elec. & Mfg. Co.	a65½	65½
Westinghouse Elec. & Mfg. Co. (1st pref.)	*118¼	114

a Asked. *Last sale.

ANNUAL REPORT

East St. Louis & Suburban Company

The circular report to shareholders gives the following earnings, expenses and taxes of the operating companies comprising the East St. Louis System and the fixed charges (interest and taxes of the East St. Louis & Suburban Company) for 1908, 1909 and 1910:

	1908	1909	1910
Gross receipts	$2,009,514	$2,035,789	$2,364,142
Operating expenses	1,062,310	1,097,236	1,223,354
Net earnings	$ 947,204	$ 938,553	$1,140,788
Interest and taxes, all companies	571,655	587,907	605,462
Surplus	$ 375,549	$ 350,646	$ 535,326
Preferred dividend	350,000	350,000	350,000
Surplus	$ 25,549	$ 646	$ 185,326
Per cent of operating expense	52.8	53.9	51.7

Gross earnings in 1910 increased 16 per cent over 1909, and net earnings 21.5 per cent.

C. M. Clark, the president, states in the report in part:

"There was expended for construction of track, cars, power, new installations in connection with new customers, etc., $193,354, of which $163,810 was charged to capital accounts and $29,544 to renewals and replacements. There are 185.3 miles of track in the system, of which the operating companies own 181.5 miles, 3.8 miles being operated under trackage agreement.

"A conservative estimate of the population served by the lines of the East St. Louis & Suburban Company in 1910 is 150,000, compared with 85,000 in 1900, an increase of 76.4 per cent. In addition the lines of the company enter St. Louis over the Eads bridge, thereby reaching a population of nearly 700,000 additional.

"The territory served by the East St. Louis & Suburban System, including East St. Louis, Belleville, Madison, Granite City and Alton, is essentially a manufacturing district, made up largely of industries which manufacture railway equipment and supplies. The prosperity of the community is therefore largely dependent upon general railway conditions throughout the country, and at the present time the railways are limiting as much as possible their orders for supplies and equipment. Any improvement in these conditions will be reflected immediately in the earnings of the East St. Louis & Suburban Companies. The physical condition of the property is in excellent shape to take full advantage of any improvement in business conditions.

"There are two elements in the present situation which are very promising for the future prosperity of the company. About one year ago there was created by law the East Side Levee and Sanitary District for the purpose of building levees to protect this section from floods of the Mississippi River and to divert Cahokia Creek so as to allow its waters to reach the Mississippi without passing through the city of East St. Louis, thereby removing a great source of danger during high water. Work has been progressing rapidly on the Cahokia Creek diversion channel and the levee work. The completion of these two undertakings will result in East St. Louis and the territory immediately north being absolutely protected from floods. The president of the commission in charge of this work states that the northern protection of the district will be entirely completed by Sept. 15, 1911, and that before Jan. 1, 1912, the levee work will be in progress along the entire front from the diversion to the southern limits of this district.

"Another important matter which will naturally benefit East St. Louis and adjacent territory is the construction of the hydroelectric power plant at Keokuk, Ia. Active work is progressing in building a dam across the Mississippi River and it is expected that by 1913 electricity will be delivered from this development to St. Louis and adjacent territory. The territory served by the lines of this company will naturally be benefited by this large supply of cheap electric power, experience elsewhere having shown that cheap power invariably stimulates manufacturing and encourages the location of new industries. This means increased sales of power by your company as well as increased earnings from electric-light and railway business."

The total number of transfer and revenue passengers carried in 1910 was 45,688,867, as compared with 40,943,538 in 1909 and 40,007,779 in 1908.

Boston (Mass.) Elevated Railway.—Directors of the West End Street Railway have sent a circular to stockholders advising the sale to the Boston Elevated Railway. They state that Richard Olney has furnished an opinion that the contention of the opponents of the merger, who declare that the act is unconstitutional, is not well taken. In this opinion the counsel of the West End Street Railway concurs. The directors say they consider it safe for the stockholders to rely on the fairness of the tribunal provided by the act to decide whether, after 1922, the common stock shall bear more than a 7 per cent dividend, and state that in their judgment the act is more favorable to the stockholders than any legislation that would probably be made by any future Legislature. Continuing, the circular says: "Your directors feel that the position of your stock under the proposed consolidation is safer than if the act were rejected. It must be borne in mind that future financing after the consolidation must under the law be so done by the elevated that its bonds shall not increase faster than its common stock, all of which common stock will add to your security. Moreover, it should be borne in mind that it is unconstitutional to limit by legislation the earnings of any company to a point below a reasonable return on the sum invested. Finally, the elevated has never been able to issue in the past and can never hereafter issue securities, either bonds or stocks, for any of its expenditures, whether for land damages, rights-of-way, or for anything else, except with the approval of the Board of Railroad Commissioners." The West End stockholders' protective committee has issued circulars to West End stockholders, urging the non-acceptance of the act.

Chicago (Ill.) Elevated Railways.—The Northwestern Elevated Railroad, a subsidiary of the Chicago Elevated Railways, has elected new officers and directors. Britton I. Budd was elected president, to succeed Mason B. Starring. Samuel Insull was made chairman of the board of directors. All but three of the old members retired and the following board was elected: Samuel Insull, Britton I. Budd, William A. Fox, Henry A. Blair, W. V. Griffin, Mason B. Starring, Samuel McRoberts, John H. Gulick and Ira M. Cobe. Messrs. Insull, Blair, Cobe and McRoberts are four of the seven members of the board of governors of the Chicago Elevated Railways. The holders of the stock trust certificates for stock of the Northwestern Elevated Railroad have been notified of the termination of the voting trust agreement. At a special meeting of the directors of the Metropolitan West Side Elevated Railway, also a subsidiary of the Chicago Elevated Railways, the following new board of directors was elected: Samuel Insull, W. A. Fox, J. H. Gulick, Ira M. Cobe, Henry A. Blair, John F. Gilchrist and Gilbert E. Porter in place of Charles C. Adsit, R. Floyd Clinch, H. A. Dewindt, James B. Forgan, George H. High, Charles H. Requa and Joseph E. Otis, who have resigned. Fred A. Delano, former chairman, H. G. Hetzler and Britton I. Budd, were re-elected. Mr. Insull was elected chairman of the new board and Mr. Budd retains the presidency of the road. P. D. Sexton remains as secretary and treasurer until the annual meeting, the first Monday in February. The new members of the executive and finance committee are Samuel Insull, Henry A. Blair, Ira M. Cobe, H. G. Hetzler and President Budd. President Budd and Mr. Hetzler were members of the old executive committee.

Chicago & Oak Park Elevated Railroad, Chicago, Ill.—A minority stockholders' protective committee, consisting of Albert G. Perrill, Theodore W. Smith, Alfred Cohn, Corey E. Robinson and William Dougall, with Frederick A. Fischell as counsel, calls for deposits of the stock with the Continental & Commercial Trust & Savings Bank, Chicago, on or before Nov. 1, under an agreement dated July 1, 1911, effective when 12,000 shares are deposited. The object is to induce the Chicago Elevated Railways to purchase the Oak Park minority shares, the controlling interest (53 per cent), which is held by the Northwestern Elevated Railroad, being already virtually in its possession.

Columbus, Delaware & Marion Railway, Columbus, Ohio.—William M. Rockel, as commissioner in the case of Eli M. West, receiver, against John G. Webb, president of the Columbus, Delaware & Marion Railway, wherein an ac-

counting for various transactions was asked, had a hearing on the matter at Springfield, Ohio, on Aug. 7. James S. Webb was the principal witness. He testified that he had not been interested in the transactions. John G. Webb, president of the company, was not present, and the hearing was adjourned to Aug. 16, so that he could testify. C. C. Williams, who was cited for contempt of the Franklin County court in connection with the appointment of George Whysall as receiver of the Columbus, Delaware & Marion Railway by Judge Daniel M. Babst, on July 11, filed his answer on Aug. 7. He declared that he represented Messrs. Webb, Whysall and Walker at Marion in good faith.

Joliet & Southern Traction Company, Joliet, Ill.—The bondholders' committee of the Joliet & Southern Traction Company has extended the time for the deposit of bonds from Aug. 1 to Aug. 15. The interest on the bonds of the Joliet, Plainfield & Aurora Railroad, due on Aug. 1, 1911, was not paid.

Kokomo, Marion & Western Traction Company, Kokomo, Ind.—F. R. McMullin & Company and the Ft. Dearborn Trust & Savings Bank, Chicago, Ill., are offering, at a price to yield about 5¾ per cent, $600,000 first mortgage 5 per cent bonds of the Kokomo, Frankfort & Western Traction Company, guaranteed principal and interest by the Kokomo, Marion & Western Traction Company. The bonds are dated July 1, 1911, and are due on July 1, 1941, but are redeemable on any interest date at 105 and interest on 60 days' notice

Ocean Shore Railway, San Francisco, Cal.—A. C. Kains has transferred to W. A. Martin his interest in the Ocean Shore Railway, including property in San Francisco, San Mateo and Santa Cruz Counties, rights-of-way and other property. Mr. Martin has recently succeeded Mr. Kains as a member of the bondholders' committee of the Ocean Shore Railway.

Riverside Traction Company, Trenton, N. J.—C. L. Rihl, secretary of the company, gives notice that in order to provide funds to pay bills incurred and to be incurred in the rehabilitation of the property and for additions thereto, and to provide working capital, an assessment of $10 per share (20 per cent) on the common stock is made, payable to H. H. Aikens, treasurer, Philadelphia, in two installments, viz.: $5.00 per share on Aug. 30 and $5.00 on Nov. 1, 1911.

Richmond & Henrico Railway, Richmond, Va.—Two bills were filed on Aug. 9 in the Law and Equity Court at Richmond, Va., following suits brought some time ago against the Richmond & Henrico Railway by Thomas F. Jeffries, James D. Patton and others. The bills set forth that the company, authorized by the Legislature to do business on March 10, 1902, made contracts that were never carried out. They claim also that the transfer, changing the old company to the Richmond & Henrico Railway, was done without the permission of the State Corporation Commission.

San Joaquin Valley Electric Railway, Stockton, Cal.—A mortgage has been filed by the San Joaquin Valley Electric Railway to the Mercantile Trust Company of San Francisco, as trustee, to secure an issue of $1,000,000 bonds due 1941, of which about $825,000 are to be issued in connection with the construction, and equipment of an electric road between Stockton and Modesto, about 35 miles.

Seattle, Renton & Southern Electric Railway, Seattle, Wash.—Peabody, Houghteling & Company, Chicago, Ill., have acquired control. The following directors and officers have been elected: William R. Crawford, president; James B. Houghteling; E. M. Mills, of Peabody, Houghteling & Company, vice-president; E. S. McCord, of Kerr & McCord, attorneys, Seattle; F. J. French, secretary.

Shelburne Falls & Colerain Street Railway, Shelburne Falls, Mass.—F. S. Field, Shattuckville, Mass., has been elected a director of this company, to succeed the late Moses Newton.

Tampa (Fla.) Electric Company.—This company has declared, in connection with the regular quarterly dividend of 2 per cent, an extra dividend of 1 per cent, both payable on Aug. 15.

Underground Electric Railways of London, Ltd., London, Eng.—The Underground Electric Railways of London, Ltd., has drawn for redemption on Jan. 15, 1912, at par and interest to that date, £868,700 of its 4½ per cent bonds of 1933. Arrangements have also been made to redeem on the same date £220,000 additional of the same bonds, which in accordance with the trust deed have been bought in the open market below par. The total amount of 4½ per cent bonds of 1933 to be redeemed on the above date is, therefore, £1,088,700 out of an outstanding issue of £2,818,700. These bonds were issued in 1908.

Washington, Baltimore & Annapolis Electric Railroad, Baltimore, Md.—The Cleveland Stock Exchange has listed $5,000,000 first mortgage, 5 per cent bonds, $1,460,000 6 per cent non-cumulative preferred stock and $3,000,000 common stock. The certificates of deposit of the securities of the old company have been withdrawn from the exchange.

Wilmington, New Castle & Southern Railway, New Castle, Pa.—Appraisers have gone over the New Castle & Delaware City line of the Wilmington, New Castle & Southern Railway to ascertain the scrap value of the property if operation should be abandoned.

Dividends Declared

Columbus Railway & Light Company, Columbus, Ohio, quarterly, 1¼ per cent.

Kokomo, Marion & Western Traction Company, Kokomo, Ind., 1½ per cent, common.

Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, ¾ per cent, common.

Northern Texas Electric Company, Ft. Worth, Texas, 3 per cent, preferred; quarterly, 1½ per cent, common.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., quarterly, ½ per cent, common.

MONTHLY ELECTRIC RAILWAY EARNINGS

Period.			Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
BATON ROUGE ELECTRIC COMPANY.							
1m.,	June,	'11	$9,870	$6,524	$3,346	$2,041	$1,306
1 "	"	'10	8,942	5,825	3,118	1,945	1,173
12 "	"	'11	114,267	70,665	43,602	23,707	19,896
12 "	"	'10	106,371	68,955	37,516	22,905	14,511
BROCKTON & PLYMOUTH STREET RAILWAY.							
1m.,	June,	'11	$10,974	$8,335	$2,639	$1,559	$1,080
1 "	"	'10	10,419	7,485	2,934	1,760	1,174
12 "	"	'11	120,701	84,394	36,308	18,843	17,465
12 "	"	'10	125,089	91,010	34,079	21,007	13,071
CLEVELAND, PAINESVILLE & EASTERN RAILWAY.							
1m.,	June,	'11	$35,765	$18,736	$17,029	$8,112	$8,916
1 "	"	'10	33,260	17,107	16,153	9,173	7,980
6 "	"	'11	163,718	91,957	71,761	48,916	22,844
6 "	"	'10	153,579	83,837	69,741	48,077	21,665
DALLAS ELECTRIC CORPORATION.							
1m.,	June,	'11	$122,110	$85,962	$36,148	$27,287	$8,861
1 "	"	'10	114,514	81,445	33,069	26,604	6,465
12 "	"	'11	1,551,790	979,726	572,064	315,159	256,905
12 "	"	'10	1,394,814	906,477	488,337	323,780	164,557
EAST ST. LOUIS & SUBURBAN COMPANY.							
1m.,	June,	'11	$185,736	$100,402	$85,333	.....	.....
1 "	"	'10	200,553	112,876	86,678	.....	.....
6 "	"	'11	1,091,720	587,624	504,096	.....	.....
6 "	"	'10	1,119,353	606,064	513,288	.....	.....
EL PASO ELECTRIC COMPANY AND SUBSIDIARY COMPANIES.							
1m.,	June,	'11	$52,471	$31,624	$20,847	$8,337	$12,510
1 "	"	'10	45,224	27,409	17,815	8,195	9,620
12 "	"	'11	665,454	386,174	279,280	98,286	180,994
12 "	"	'10	626,631	361,273	265,358	101,169	164,181
GRAND RAPIDS RAILWAY.							
1m.,	June,	'11	$101,647	*$58,273	$43,374	$14,993	$28,381
1 "	"	'10	99,952	*52,357	47,595	15,065	32,530
6 "	"	'11	553,636	*320,465	232,895	90,338	142,557
6 "	"	'10	530,823	*292,618	238,205	90,974	147,231
HOUGHTON COUNTY TRACTION COMPANY.							
1m.,	June,	'11	$26,940	$12,495	$14,446	$6,498	$7,948
1 "	"	'10	26,752	14,578	12,174	6,317	5,857
12 "	"	'11	604,947	160,780	144,168	78,734	65,434
12 "	"	'10	320,847	170,159	150,688	76,158	74,530
LAKE SHORE ELECTRIC RAILWAY.							
1m.,	June,	'11	$113,950	$58,182	$55,768	$34,605	$21,163
1 "	"	'10	103,533	52,244	51,289	34,751	16,537
6 "	"	'11	558,586	313,129	245,457	208,003	37,454
6 "	"	'10	526,728	298,698	228,030	208,610	19,420
NORTHERN OHIO TRACTION & LIGHT COMPANY.							
1m.,	June,	'11	$245,097	$134,983	$110,114	$44,333	$65,781
1 "	"	'10	221,673	123,125	98,548	43,375	55,173
6 "	"	'11	1,222,676	697,023	525,653	266,107	259,545
6 "	"	'10	1,087,335	624,230	463,105	259,916	203,188
PADUCAH TRACTION & LIGHT.							
1m.,	June,	'11	$20,648	$11,940	$8,708	$7,748	$960
1 "	"	'10	19,740	11,685	8,055	6,989	1,066
12 "	"	'11	256,859	140,591	116,268	90,705	25,563
12 "	"	'10	238,066	143,301	94,766	82,012	12,754
PENSACOLA ELECTRIC COMPANY.							
1m.,	June,	'11	$24,742	$14,232	$10,510	$5,851	$4,660
1 "	"	'10	21,763	12,808	8,955	5,053	3,903
12 "	"	'11	284,165	165,349	118,816	66,637	62,179
12 "	"	'10	257,716	150,138	107,577	56,103	51,475

Traffic and Transportation

Overcrowding Ordinance Upheld by Circuit Court at Covington, Ky.

In the case of the Cincinnati, Newport & Covington Light & Traction Company against the city of Covington, Ky., wherein an injunction was asked to prevent the enforcement of an ordinance limiting the number of passengers to be carried on a car, Judge Matt. L. Haberson, of the Kenton Circuit Court, rendered a decision on Aug. 7, upholding the measure. The ordinance stipulates that it shall be unlawful to carry more than one and one-third times the seating capacity of any car, excepting on July 4, Decoration Day and Labor Day; that there shall be an open space large enough for ingress and egress, and that it shall be kept free and open, a fine being provided where persons refuse to vacate on request of the conductor; that the company shall operate enough cars at all times to accommodate the people within the meaning of the ordinance, and that the council shall have power at any time to direct the company to increase the number of cars on any line to a sufficient number to accommodate the public.

The company attacked the ordinance on the ground that the city has no power under its charter to control the operation of cars; that the ordinance embraces more than one subject; that it impairs the obligations of a contract entered into between the company and the city; that it is unlawful and unreasonable, and that it is an interference with the interstate commerce law and is not in accord with the federal constitution.

The attorneys for the city argued that the remedy in this case did not lie in injunction proceedings, but in a writ of prohibition and that the petition should be dismissed upon that ground.

The decision states in part:

"Ordinances to prevent overcrowding of street cars have been enacted in Pittsburgh, Minneapolis and Detroit; and in Boston prohibiting the company from permitting persons to stand between seats upon the open cars. These cases do not appear to have been as yet passed upon by the courts of last resort in the respective jurisdictions, but copies of the opinions of the lower courts deciding and passing upon the validity of the ordinances have been furnished the court by counsel upon both sides, and so far as the power of the municipality to enact an ordinance prohibiting the overcrowding of street cars, the courts in each case decided that it is within the police power of the municipality, if the regulation is reasonable.

"Even if the regulation was required to directly affect the safety, health or morals of the public the court holds that overcrowding of the cars does so, but the court is of the opinion that that is not the limitation of the police power.

"There is a very indefinite statement in the evidence relative to whether or not the plaintiff is engaged in interstate commerce at all. It has no franchise or property except in Kentucky, and has no franchise in Cincinnati to operate over its streets. There is another corporation called the C., N. & C. Street Railway Company, or the Covington & Cincinnati Street Railway Company, which it seems has rights over certain streets in Cincinnati. However, if it did own and operate the line in Cincinnati this ordinance does not, in the opinion of the court, interfere with interstate commerce, and is not such a burden upon it as is restricted by the federal grant of power to regulate commerce between the States.

"The court is of the opinion that the evidence shows that there is not the slightest difficulty in operating a sufficient number of cars in Covington to comply with the ordinance under consideration. The schedule of the cars clearly shows it. The only place in Covington where all the lines operate over the same tracks is between Third and Second streets, where they go upon the bridge. The bridge is double-tracked, with a driveway in the center. The greatest number of cars which operate over this track during the rush hours is 81 cars per hour, according to the testimony of T. M. Green, superintendent. On the tracks up Walnut and over Fifth Street to Vine, he testified that the Cincinnati Traction Company operates 254 cars per hour, and besides that the plaintiff operates 81 cars per hour, which makes 335 cars per hour, and this, too, in the busy part of Cincinnati with its wagon and automobile travel using the street.

"It is not for the court to determine whether or not this ordinance will operate successfully, nor is it for the carrier to complain that the public by this ordinance is depriving itself of the privilege of crowding cars, which it is claimed it loves to do. The ordinance has for its purpose a lawful one. It is within the power of the municipality to enact it, and it violates no constitutional or other right of the plaintiff, and, in the court's opinion, is reasonable; and that is all that can be passed upon by the court."

A stay was given, allowing twenty days for the company to appeal the case to the higher courts.

Employees' Clubs in Portland, Ore.

The Portland Railway, Light & Power Company, Portland, Ore., has built three clubhouses for its employees, one at the Sellwood carhouse, one at Piedmont, and one at the East Ankeny carhouse. A temporary clubhouse has also been fitted up at Savier Street. The company proposes also to build clubhouses for the use of the linemen. Altogether this work has cost about $100,000, and with the two contemplated buildings the cost will be about $200,000.

The clubhouse at Sellwood was opened last May. It is a brick building, two stories high, with a basement, and represents an outlay of about $20,000. In the basement are a steam-heating plant, lavatories for the men, and a room with one hundred and fifty-two individual lockers. The first floor is used partly by the company and partly by the men. Here are the offices for the inspectors, an office for the cashier, a waiting room for the men and the suites of two rooms each for the chief dispatcher and the superintendent. Here, also, are shower and tub baths for the men. The second floor is given over altogether to the men. On this floor, in the rear, there is a large billiard room with two pool tables, and athletic paraphernalia. Around the walls are artistic settees. In the front of this floor is the library. Here the library association has installed a branch library with fiction and technical works. On this floor there also are four bedrooms.

The clubrooms at the Piedmont and Ankeny carhouses, although not in separate buildings, have practically the same appointments as the clubhouse at Sellwood. The clubrooms to be built at the Savier carhouse will also conform to the same general lines. The Ankeny structure is of concrete. The Piedmont club differs from the others in that it is equipped with a bowling alley. The clubhouse for the linemen will be used in part by the lighting department of the company. The building will be 100 ft. x 200 ft., two stories high, with a basement. It will be built of brick or reinforced concrete. In the basement there will be a garage for the automobiles of the company. On the first floor there will be a waiting room and a meter room. The rooms for the men will occupy the entire second floor.

Effect of Low Fares on Wages

In connection with the question of street railway fares on the lines of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., which is now before the Railroad Commission of Wisconsin, John Humphrey, secretary of the Wisconsin State Board of Arbitration, has brought forward the factor of wages of the employees. In a recent interview Mr. Humphrey was quoted as follows:

"It seems to me that this is an especially timely occasion for calling attention to the fact that while the interests of the investor and of the traveling public are considered in general public discussion of the 3-cent fare question, the position of the employees of the company seems to have been lost sight of.

"In this instance I believe the Railroad Commission would be justified in taking into consideration: First, whether the employees of the company are receiving adequate remuneration, and second, what provision, if any, has been made for future rewards for efficient and loyal service. Here are thousands of men who have the lives of thousands of their fellow citizens daily in their care, and it seems to me circumstances well warrant a consideration of the position they

occupy in the community, and the pay that they are getting for work performed.

"While adjusting the difficulty between the employees of the La Crosse City Railway and the company two years ago I recommended that the State enlarge the powers of the Railroad Commission to furnish a tribunal to which labor could appeal for the adjustment of such questions as the wage question, an economic problem that is perpetually alive.

"The Legislature is about to adjourn without having given this subject consideration. It is not yet too late. I believe it is a most important question, and that while there are investors' interests and public interests generally at stake, there are also specifically the interests of employees to bear in mind."

Near-Side Stops in Lawrence, Kan.—On Aug. 1 the Lawrence Railway & Light Company began to stop its cars at the near side of all crossings.

Pennsylvania Road Discontinues Sale of Strip Tickets.—Announcement was made by the Southern Pennsylvania Traction Company, Chester, Pa., on Aug. 13, that it had decided to abolish the sale of six tickets for 25 cents in Chester.

Special Provision for Women in Brooklyn Bridge Rush.—The bridge police department and officials of the Brooklyn Rapid Transit Company are co-operating in an experiment designed to separate men and unescorted women at the Brooklyn Bridge between 5 and 6:30 p. m. in order that women may get seats in the cars.

Collision Near Warren, Me.—A collision occurred on the Rockland, Thomaston & Camden Street Railway, Rockland, Me., near Warren, on Aug. 8. It is attributed to a misunderstanding of orders by trainmen. One passenger was injured so that he died the next day. The Maine Railroad Commissioners made an investigation on Aug. 15 of the causes of the accident.

Seattle Passes Held by Municipal Officials Good Only When Used for Official Business.—The Seattle (Wash.) Electric Company which furnishes several hundred city employees with passes annually, has notified the head of each department that the public service commissions law prohibits the issue of such transportation except for use exclusively when the holder is engaged in city business.

Increase in Wages in Chester, Pa.—The Southern Pennsylvania Traction Company, Chester, Pa., increased on Aug. 15 the wages of employees 1 cent per hour, making the rate 24 cents for the old men and 22 cents to new men, who are now receiving 21 cents. A sliding scale has been in vogue for some time, by which new men received 21 cents per hour the first year and an advance of 1 cent per year until the fourth year of service.

Reduced Tickets for School Teachers Held to Be Discrimination in New Jersey.—In a decision announced by the New Jersey Board of Public Utilities Commissioners it was held to be illegal for street railways to sell tickets to school teachers at reduced rates. The commission finds that reduced rates of fare for the trips of school teachers are prima facie discriminatory and therefore illegal, unless there be a municipal contract with the carrier entitling the teachers to ride at a reduced rate as municipal employees.

Verdict in New Jersey Head-On Collision Case.—A coroner's jury in Hackensack, N. J., has officially placed upon F. R. Pilgrim, superintendent of the North Jersey Transit Company, the blame for the head-on collision which occurred near Ridgewood, N. J., on July 21 and which resulted in the death of Mr. Pilgrim and William Hutchison, motorman of the opposing car, and in the injury of fifteen persons. The evidence showed that Mr. Pilgrim had endeavored to run an extra car past a signal set at danger. It was also believed that he had not heard the shouts of warning because of his deafness.

Trainmen on Detroit United Railway Arrested on Charge of Manslaughter.—On Aug. 8 a coroner's jury rendered a verdict at Dearborn, Mich., on the death of the passenger who lost his life as the result of a head-on collision on the Detroit, Jackson & Chicago division of the Detroit United Railway on July 30, 1911. The jury found that the crew of the east-bound train made an error, and referred to the lack of a double track on the railway at that point. The motorman of the east-bound train, Forrest Woodin, and the conductor, Frederick Dresselhouse, have been arrested at the request of the State's attorney of Wayne County, F. H. Aldrich, on a charge of manslaughter. The company's inability to double-track its line at this point was explained in the Electric Railway Journal of Aug. 12, 1911.

Trainmen Arrested in Minneapolis for Not Displaying Car-Full Sign.—Harold Smith, a conductor and H. Evart, motorman, of the Twin City Rapid Transit Company, Minneapolis, were arrested on Aug. 8 on the charge of taking on more passengers than the legal capacity of the car. N. M. Thygeson, counsel for the company, declared before Judge E. A. Montgomery in the Municipal Court that the employees of the company were arrested for something they could not help, saying that if any violation had been committed it was traceable to the company officials for failure to put more cars in service. He said the employees cannot build cars and put them in service, yet the police are subjecting them to arrest under the ordinance. Judge Montgomery announced that he would give his decision at a later date.

Through Routes and Joint Rates Established for Oakland & Antioch Electric Railroad.—The Railroad Commission of California rendered a decision on Aug. 8 establishing through routes and joint rates between the Oakland & Antioch Electric Railroad and the Atchison, Topeka & Santa Fe Railway, operative Sept. 10. Application for the through route and joint rates with the Santa Fe Railroad was made by the Oakland & Antioch road on March 16, 1911. After several months of ineffectual effort to bring about the arrangement the Railroad Commission sent its expert to the territory affected, and he found a strong demand for the through routes and joint rates among shippers and residents. The commission in overruling the decision of the Santa Fe stated that there was no reason for discrimination against electric roads, held that the combination of local rates was an excessive and unreasonable demand and set aside practically all of the contentions of the steam road.

Improvements in Service of the Interborough Rapid Transit Company.—The 16-cp carbon lamps in the subway express cars of the Interborough Rapid Transit Company of New York are being replaced by 32-cp tungsten lamps. The Interborough company has furnished subway conductors, guards, station agents, gatemen and porters with two white duck uniforms apiece, and has contracted to have the suits laundered as often as necessary without expense to the employees. T. P. Shonts, president of the Interborough Rapid Transit Company, in a letter to Mayor Gaynor said that his company desires to afford to the inmates of orphan asylums and to other indigent children and their mothers an opportunity during the summer months to ride free to and from Bronx Park and Van Cortlandt Park, between the hours of 8 a. m. to 10 a. m. and 4 p. m. to 6 p. m. Mayor Gaynor requested Charity Commissioner Drummond to make all further arrangements with the Interborough Company.

Answer of Schenectady Railway on Fare Question.—The Public Service Commission of the Second District of New York has received the answer of the Schenectady Railway upon the complaint of Mayor Charles C. Duryee as to the refusal of that company to sell six passenger tickets for 25 cents. The company denies that the fares now charged within the city are unjust and unreasonable, and denies that prior to March, 1909, it transported its passengers for a flat rate of five cents for a single passage and sold six tickets for 25 cents, and that during the period of the sale of such tickets it obtained many franchises from the city of Schenectady without other condition except as prescribed by law upon the representation or agreement, express or understood, that the sale of such tickets at the rate of six for 25 cents would not be discontinued. The company admits that prior to March, 1909, it did sell six tickets for 25 cents, good within the local fare limits of the city. It denies that the withdrawal of the six tickets for 25 cents was unjust and unreasonable, and finally states that the five-cent flat rate is necessary to yield a reasonable average return upon the value of the property actually used in the public service.

Personal Mention

Mr. John Craig has been appointed engineer of the power station of the Alton, Granite & St. Louis Traction Company, Alton, Ill., to succeed Mr. F. A. Schlosser.

Mr. W. H. Dowhouer has been appointed master mechanic of the Sunbury & Northumberland Electric Railway, Williamsport, Pa., to succeed Mr. H. F. Lentz.

Mr. F. Wheeler has been appointed engineer of the power station of the Ottumwa Railway & Light Company, Ottumwa, Ia., to succeed Mr. A. A. Ainsworth.

Mr. E. A. Wine has been appointed chief engineer and engineer of power stations of the Bartlesville (Okla.) Interurban Railway, to succeed Mr. W. Fowbles.

Mr. G. W. Jenks has been elected vice-president of the Shelburne Falls & Colerain Street Railway, Shelburne Falls, Mass., to succeed the late Moses Newton.

Mr. Joseph H. Moore has been elected vice-president of the Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, Pa., to succeed Mr. W. A. Goehring.

Mr. Joseph M. Burns has been appointed superintendent of the electrical and mechanical department of the Morris County Traction Company, Morristown, N. J.

Mr. C. L. Easton has been appointed chief engineer of the power station of the Bakersfield & Kern Electric Railway, Fresno, Cal., to succeed Mr. W. R. Mongerson.

Mr. David M. McClosky has been elected treasurer of the Webster, Monessen, Bellevernon & Fayette City Street Railwy, Charleroi, Pa., to succeed Mr. J. K. Tener.

Mr. K. W. Daly has been elected vice-president of the Webster, Monessen, Bellevernon & Fayette City Street Railway, Charleroi, Pa., to succeed Mr. J. K. Tener.

Mr. Wm. B. S. Davies has been appointed master mechanic of the Providence & Fall River Street Railway, Swansea Center, Mass., to succeed Mr. A. J. Gardella.

Mr. R. C. Howe has been appointed chief engineer of the power station of the Bay State Street Railway, Boston, Mass., at Gloucester to succeed Mr. W. J. Hooper.

Mr. N. C. Draper, formerly superintendent of the Ohio Electric Railway, Zanesville, Ohio, has been elected general manager of the Consolidated Light & Power Company, Sioux Falls, S. D.

Mr. F. W. Adams has resigned as vice-president and general manager of the Toledo, Fostoria & Findlay Railway, Fostoria, Ohio. Mr. Adams has been connected with the company since its organization.

Mr. George H. Ross, Jr., has been appointed superintendent of transportation of the Morris County Traction Company, Morristown, N. J. Mr. Ross was formerly president of the Hopatcong Construction Company.

Mr. Charles A. Baumann has been appointed assistant superintendent of the Essex division of the Public Service Railway, Newark, N. J., to succeed Mr. Bernard F. Mullin, who has been appointed supervisor of inspection.

Mr. C. F. Beames has resigned as manager of the power companies controlled by the Northern Ontario Light & Power Company, Ltd., Cobalt, Ont., to become chief electrical engineer to the Government, State of Mysore, India. Mr. Beames sailed from New York for his new post on Aug. 16.

Mr. Hugh Dougherty has been appointed superintendent of the Dodson line of the Metropolitan Street Railway, Kansas City, Mo., to succeed Mr. E. C. Ecker, resigned. Mr. Dougherty has been in the service of the Metropolitan company for seven years, having been chief timekeeper for four years.

Mr. Bernard F. Mullin has been appointed supervisor of inspection of the Public Service Railway, Newark, N. J. Mr. Mullin will report to Mr. R. E. Danforth, general manager of the company, and will have jurisdiction over all the railway inspectors in the company's employ. Mr. Mullin was formerly assistant superintendent of the company's Essex division.

Mr. H. R. Warfield, who has been treasurer, general manager and purchasing agent of the Union Utilities Company, Morgantown, W. Va., has been elected president of the company. Mr. Warfield retains his title of general manager, but Mr. C. D. Junkins, heretofore auditor of the company, succeeds him as treasurer, auditor and purchasing agent of the company.

Mr. H. H. Read has been elected general auditor of the Bay State Street Railway, Boston, Mass., which is a consolidation of the Boston & Northern Street Railway and the Old Colony Street Railway. He succeeds Mr. D. Dana Partlett, who retired to engage in other business. Mr. Read has been identified with street railways since 1889, when he became connected with the Globe Street Railway, Fall River, Mass.

Mr. C. M. Paxton has been appointed assistant to the general manager of the Amreican Railways Company, Philadelphia, Pa., and entered upon his duties on July 15, 1911. Since Jan. 1 of the present year Mr. Paxton has been connected with an industrial company at Des Moines, Ia. Prior to that time he was connected for seven years with the Dayton & Troy Electric Railway, Dayton, Ohio, serving one year as auditor, one year as secretary and traffic manager, and five years as secretary and general manager. Previously Mr. Paxton had several years' experience in various capacities in the operating department of steam railways.

Mr. Frederick J. Macleod, of Cambridge, Mass., has been appointed by Governor Foss of Massachusetts to the office of chairman of the Massachusetts Railroad Commission, to fill the vacancy caused by the resignation of Mr. Walter Perley Hall, lately appointed to be a justice of the Superior Court. Mr. Macleod is a native of Prince Edward Island and is forty-one years of age. He was graduated from Dalhousie College, Halifax, N. S., and from Harvard Law School. He has been engaged in the practice of law since 1899. In 1900 he prepared a report for the United States Industrial Commission as an expert in corporation law and taxation. He has served in the Massachusetts Senate and as chairman of the Democratic State Committee.

Mr. Henry Gebhart, formerly superintendent of the Oakwood Street Railway, Dayton, Ohio, has been appointed general manager and purchasing agent of the company to succeed Mr. Harrie P. Clegg, who remains with the company as vice-president. Mr. Gebhart was graduated from the University of Pennsylvania with the degree of electrical engineer. For two years he was instructor in mechanical engineering at the University of Pennsylvania. After leaving the university he was with the Westinghouse Electric & Manufacturing Company, at East Pittsburgh. On June 1, 1907, Mr. Gebhart became connected with the Oakwood Street Railway as superintendent and purchasing agent and recently succeeded Mr. H. P. Clegg as general manager of the company.

Mr. C. H. Andrews has recently been appointed assistant general manager of the North Carolina Public Service Company, Greensboro, N. C. Mr. Andrews was graduated from the school of electrical engineering at Purdue University at Lafayette, Ind., in June, 1908. He entered business with the Public Service Corporation of New Jersey in the electrical department and worked at Perth Amboy and at New Brunswick, N. J., until April 1, 1910, when he accepted a position in the electric department of the North Carolina Public Service Company. He served as head of various departments of the North Carolina Public Service Company until April, 1911, when he was appointed assistant manager. Subsequently he was appointed assistant general manager of the company.

Mr. Masami Suyama, who has been studying high-tension a.c. and d.c. railway work for the Japanese traffic ministry and State railways, has been spending the present week in visiting the Pennsylvania and New Haven Railroad installations about New York, the works of the Westinghouse Electric & Manufacturing Company and the 1200-volt d.c. lines of the Washington, Baltimore & Annapolis Electric Railroad. Previous to his arrival in this country Mr. Suyama had spent almost a year studying heavy electric-railway work in Germany. Before leaving for Japan, however, he decided to familiarize himself with some of the work done along these lines in the eastern part of the United States. Mr. Suyama hopes to visit the United States again in the near future with the special intention of studying the installations on the Pacific Coast.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

*Napa & Clear Lake Railway, Napa, Cal.—Application for a charter has been made in California by this company to build a 90-mile electric railway from Napa to Lakeport. Capital stock, $500,000. Directors: C. W. Conlisk, W. M. Rank and R. A. Morton.

Mesaba Electric Railway, Duluth, Minn.—Incorporated in Minnesota to build a 35-mile electric railway to connect Hibbing, Chisholm, Buhl, Mountain Iron, Virginia, Eveleth and Gilbert. Preliminary arrangements are being made and contracts will be awarded at once for grading and building bridges. It is expected to have construction under way within thirty days. Franchises will be asked at once. Oscar Mitchell, president, and E. C. Thomas, engineer in charge. [E. R. J., April 15, '11.]

*Oklahoma-Shawnee Railway, Oklahoma, Okla.—Application for a charter will be made in Oklahoma by this company to build a 100-mile electric railway to connect Oklahoma City, Shawnee and Tecumseh, with a branch line to Chandler. This company is a reorganization of the Oklahoma-Shawnee Interurban Railway. Capital stock, $3,000,000. L. E. Patterson, Oklahoma City, president.

*Portland & West Coast Railroad & Navigation Company, Portland, Ore.—Application for a charter has been made in Oregon by this company to build an electric railway between Minnville and Bay City, via Willamina, Grand Ronde, Tillamook, Sheridan and Pacific City. The company also plans to furnish power and light for Sheridan, Willamina and Tillamook, the power to be secured from the Little Nestucca. In addition, the company plans to operate a line of steamboats on the Yamkill, Nestucca, Siletz and Tillamook rivers, and on Tillamook Bay and the Pacific Ocean. Capital stock, $1,000,000. Incorporators are W. F. Prier, C. F. Hendricksen and Jay H. Upton. Headquarters, Portland.

*Manatawny Railroad, Douglassville, Pa.—Incorporated in Pennsylvania to build an 8-mile electric railway between Douglasville and Spangville. Capital stock, $100,000. Incorporators: Milton J. Person, Bethlehem, president; John Palmer, Jr., Jersey City, N. J.; Stephen Robinson, Jr., Audubon, N. J.; Lewis F. Huthmacher, Bethlehem; Charles M. Allen, Bayonne, N. J.; Daniel J. Driscoll, Reading, and Robert L. Runyon, Allentown.

*Snyder Avenue Railway, Philadelphia, Pa.—Application for a charter has been made in Pennsylvania by the Philadelphia Rapid Transit Company for this company to build a double-track line on Snyder Avenue from Delaware Avenue to Thirty-sixth Street in South Philadelphia. Incorporators: Charles O. Kruger, president of the Rapid Transit Company; Alexander Rennick, James J. Springer, George W. Mantz and W. L. Maize.

South Austin Street Railway, Austin, Tex.—Chartered in Texas to operate an electric railway in South Austin. Capital stock, $25,000. Directors: J. H. Green, F. H. Faust, T. M. West and C. V. Birkhead, San Antonio, and E. B. Birkhead, Dallas. [E. R. J., June 11, '10.]

FRANCHISES

Pueblo, Cal.—The Pueblo & Suburban Traction & Lighting Company has asked the City Council for a franchise to extend its lines in Pueblo.

San Diego, Cal.—The San Diego Electric Railway has received a forty-two-year franchise from the City Council for all of its lines in San Diego.

San Jose, Cal.—The San Jose Railway has asked the Board of Supervisors for a 50-year franchise to extend its lines along Willow Street, Delmas Avenue and Lincoln Avenue in San Jose.

San Jose, Cal.—The San Jose & Santa Clara County Railroad has asked the Board of Supervisors for a 50-year franchise to build a single or double-track line over the Alameda road, also for a franchise over Fourteenth Street in San Jose.

San Jose, Cal.—The Board of Supervisors has ordered a franchise over Saratoga Avenue from Meridian Corners to the town limits of Santa Clara advertised for sale. It is the intention of the Peninsular Railway to buy the franchise in order that it may connect the interurban line with the line running out of Alameda to Santa Clara, thus forming a loop.

San Rafael, Cal.—George D. Shearer, San Rafael, has asked the council for a franchise in San Rafael. It is reported that he has secured funds to build the line if the necessary rights can be secured from the city. The franchise provides for four different routes. [E. R. J., Feb. 25, '11.]

Venice, Cal.—Pacific Electric Railway, Los Angeles, has asked the Council for a franchise to build a one-mile extension from Santa Monica to Venice.

Joliet, Ill.—The Chicago & Joliet Electric Railway has asked the City Council for a franchise to double track and extend several of its lines in Joliet.

Forest, Ind.—The Kokomo, Frankfort & Western Railway, Kokomo, has asked the Council for a new franchise through Forest. This 26-mile railway will connect Middletown, Russiaville, Michigantown and Forest. T. C. McReynolds, Kokomo, general manager. [E. R. J., Aug. 12, '11.]

Shelbyville, Ky.—The question of accepting the offer of the Louisville & Interurban Railway to pay $15,000 for a franchise to operate through the main street of Shelbyville, Ky., will be an issue in the next election.

Erving, Mass.—The Miller's River Street Railway, Miller's Falls, has received a franchise from the Selectmen to build its tracks in Erving. F. L. Greene is interested. [E. R. J., Aug. 5, '11.]

Bay City, Mich.—A. J. Broesbeck, representing the Saginaw & Flint Railway, Saginaw, has received a franchise from the Common Council for an electric railway in Bay City. Later it will be extended to Saginaw.

Hibbing, Minn.—The Mesaba Electric Railway, Duluth, has received a franchise from the City Council in Hibbing. A franchise has also been received by this company in Buhl and in Chisholm. Oscar Mitchell, president. [E. R. J., April 15, '11.]

Minneapolis, Minn.—The Twin City Rapid Transit Company will ask the City Council for a franchise to extend several of its lines in Minneapolis.

Chatham, N. J.—The Morris County Traction Company has received a franchise on Main Street in Chatham.

Newark, N. J.—The Public Service Corporation has asked the City Council for a franchise to build three extensions of its lines in Newark.

East Syracuse, N. Y.—The Syracuse Rapid Transit Company has received a franchise from the Board of Trustees to double track its line on Manlius Street in East Syracuse.

Rome, N. Y.—The Public Service Commission of the Second District has received a petition from the Utica & Mohawk Valley Railway asking for permission to exercise franchises granted by the city of Rome for various extensions and changes of route in Rome.

Rock Hill, N. C.—The North Carolina Traction Company, Danbury, has asked the City Council for a 50-year franchise in Rock Hill.

Wilkes-Barre, Pa.—The Wilkes-Barre Railway has asked the City Council for a franchise to extend its tracks on North Main Street in Wilkes-Barre to Brookside.

Brownsville, Tex.—S. A. Robertson, representing the San Benito Interurban Railway, has received a franchise from the City Council to build a belt line over the principal streets in Brownsville for freight purposes.

Richmond, Va.—The Richmond & Henrico Railway, Richmond, has asked the Common Council for a franchise to extend its lines in Richmond. It expects to double track some of its lines and to build several extensions.

Mount Vernon, Wash.—The Bellingham-Skagit Railway, Bellingham, has received a perpetual franchise from the City Council for an electric railway in Mount Vernon. C. M. Drummond, Bellingham, president. [E. R. J., Aug. 5, '11.]

*Vancouver, Wash.—Lawrence Harmon, Vancouver, has asked the City Council for a 50-year franchise to build an electric railway in Vancouver to extend east of the garrison and up along the Columbia River.

Glendale, W. Va.—The Wheeling Traction Company has received a franchise from the County Court to double track its line through Glendale.

Sistersville, W. Va.—The Parkersburg & Ohio Valley Electric Railway, Parkersburg, has received a renewal of its franchise from the City Council in Sistersville.

TRACK AND ROADWAY

Fresno, Hanford & Summit Lake Interurban Railway, Fresno, Cal.—This company will extend its line to Kingsburg from Selma.

Pacific Electric Railway, Los Angeles, Cal.—The construction of an electric railway from Homewood to Watts, for the Redondo line of this company is to begin at an early date. When this connecting link is completed it is the plan of the company to change the entire line from Homewood to Redondo into a broad-gage road.

Oakland & Antioch Railway, Oakland, Cal.—J. G. White & Company, Oakland, will receive bids for the construction of a tunnel between Oakland and Walnut Creek.

Sacramento Valley West Side Electric Railway, Sacramento, Cal.—This company has awarded a contract to the Dozier Construction Company, Sacramento, for the construction of its electric railway from Woodland to Red Bluff. [E. R. J., May 13, '11.]

Tidewater & Southern Railroad, Stockton, Cal.—The survey of this line now being built between Stockton and Merced has reached the city limits of Merced. Branch lines are contemplated for Livingston, Creassey, Winton and Yam; also a branch line in San Joaquin County, to leave the main line in Hilmar colony and run to Newman on the west side of the San Joaquin River. [E. R. J., Aug. 12, '11.]

*Attawaugan Street Railway, Killingly, Conn.—This company, which expects to build an electric railway between Dayville, Attawaugan, Ballouville and Pineville, has organized and elected the following officers: Elbert L. Darble, president; M. A. Phillips, secretary, and H. E. Black, treasurer.

Macon Railway & Light Company, Macon, Ga.—This company has placed contracts for material to build about two miles of new track in Macon.

Fox & Illinois Union Railway, Aurora, Ill.—This company advises that it will begin work about Sept. 1 on the construction of its 20-mile electric railway between Yorkville and Morris. Capital stock, authorized, $300,000. Officers: H. H. Evans, president; John Meredith, vice-president; Ralph Putnam, secretary; A. R. Evans, treasurer, and F. M. Zimmerman, chief engineer, all of Aurora. [E. R. J., Nov. 19, '11.]

*Hillsboro, Ill.—A survey is being made for an electric railway from Hillsboro to Taylor Springs. The line, it is said, will be financed by the Hillsboro Electric Light & Power Company.

The Ft. Wayne & Springfield Traction Company, Portland, Ind.—This company is securing rights-of-way and preparing to let a contract for the construction of an electric railway from Springfield to Portland.

Vincennes, Washington & Eastern Interurban Company, Vincennes, Ind.—Surveyors for this company made soundings Aug. 1, in White River, to locate the position for the bridge across the river. It is understood the bridge will be let as a separate contract. [E. R. J., Aug. 5, '11.]

Albia (Ia.) Interurban Railway.—This company will soon build an extension to Buxton.

Louisville (Ky.) Railway.—Surveys have been made by this company for a line between Ornell and Kosmodale. Ultimately the Orell road will be built on to West Point.

Owensboro (Ky.) City Railway.—This company has announced plans for improvements of various kinds which are to be made during the next few months. Several thousand dollars has been appropriated for the purpose of bettering the system.

Athens, Maine.—The proposed 10-mile electric railway from Skowhegan, via East Madison to Athens, is claimed by Athens people to be assured. The towns of Athens and Skowhegan have each voted to take $15,000 in stock, and the Maine Central Railroad has promised an equal amount. The proposal is to issue $75,000 stock and provide the rest of the funds by the sale of bonds. J. E. Chapman is interested. [E. R. J., Aug. 20, '11.]

United Railways & Electric Company, Baltimore, Md.—This company is constructing some double track on lines in Baltimore.

Berkshire Street Railway, Pittsfield, Mass.—Work has been begun by this company on its extension from Ashley Falls to Canaan.

Battle Creek, Coldwater & Southern Railway, Battle Creek, Mich.—This company has not awarded the contract to the J. T. Adams Construction Company for the construction of its proposed railway between Battle Creek and Coldwater, as was stated in the ELECTRIC RAILWAY JOURNAL for July 29, 1911.

Interurban Construction Company, Hastings, Minn.—This company will begin construction of its interurban road from St. Paul to Hastings immediately. [E. R. J., May 27, '11.]

St. Louis, St. Charles & Northern Traction Company, St. Louis, Mo.—This company plans to build an extension from Paris to St. Louis. Work has been begun on the main line and probably will begin on the extension this fall. [E. R. J., Feb. 6, '09.]

Columbia Falls & Southern Railroad, Columbia Falls, Mont.—Surveys have been completed and most of the right-of-way has been secured by this company for its 26-mile railway between Columbia Falls, Jessup and Big Fork. A. L. Jordan, Columbia Falls, president. [E. R. J., July 22, '11.]

New York City (N. Y.) Interborough Railway.—Work has been begun by this company on its Hunt's Point crosstown line from Randall Avenue to Intervale Avenue, in New York.

New York, Westchester & Boston Railway, New York, N. Y.—Stockholders of the Harlem River & Portchester Railroad will hold a special meeting on Sept. 8, to consider a contract with the New York, Westchester & Boston Railway for joint construction and operation of the railroads of the companies from the Harlem River to One Hundred and Seventy-fourth Street, New York, and for the perpetual use by the latter railway of two tracks of the Harlem River & Portchester Railway.

Syracuse, Watertown & St. Lawrence River Railway, Syracuse, N. Y.—Application has been made by this company to the Public Service Commission to issue $120,000 capital stock and $225,000 of 5 per cent bonds to pay the cost of constructing 6⅓ miles of its railway from stop No. 9, on the Syracuse & South Bay Electric Railway, to Brewster, on the shores of Oneida Lake. [E. R. J., July 22, '11.]

North Carolina Public Service Company, Greensboro, N. C.—Work has been begun by this company on its 1½-mile extension of its High Point line.

Tidewater Power Company, Wilmington, N. C.—This company advises that it will build 1 mile of double track in Wilmington.

Bellefontaine & Sidney Traction Company, Bellefontaine, Ohio.—Interest has again been revived in this proposed electric railway to connect Bellefontaine, Columbus and Sidney. Right-of-way is being secured. Hugh T. Mathers, Sidney, president. [E. R. J., May 1, '09.]

*Clinton, Okla.—A company is being formed in Clinton to build an electric railway between Clinton, Taloga, Thomas and Watonga.

El Reno (Okla.) Interurban Railway.—Surveys are being made by this company on the 12-mile extension from Yukon to El Reno. One of the surveys is west of El Reno and two are to the northwest of El Reno. It is understood that this company expects to build a line to Richland and then turn into El Reno over the Ft. Smith & Western Railroad tracks, the latter company in turn using the interurban tracks into Oklahoma City.

People's Electric Railway, Muskogee, Okla.—This company has received permission from the Government to pro-

ceed with the construction of a bridge across the Arkansas River. A company to build the bridge has been formed with a capitalization of $10,000. The incorporators are Reuel Haskel, Ira D. Millinax and George W. Risser, all of Oklahoma City. [E. R. J., April 15, '11.]

*London, Ont.—A proposed electric railway is being discussed to extend from Toronto to London, with connections to St. Thomas. A. H. Campbell, of Toronto, is reported to be interested.

North Midland Railway, London, Ont.—A. E. Welch, London, announces that financial arrangements have been completed for the construction of this line from London to St. Mary's, with a branch line to Granton. Construction work will begin this fall, and hydroelectric power will be obtained from the St. Mary's municipal substation. [E. R. J., Jan. 16, '09.]

Morrisburg & Ottawa Electric Railway, Ottawa, Ont.—This company plans to begin the construction of its electric railway from Ottawa to Morrisburg in the fall.

Toronto, Ontario.—The subway committee of the City Council, Toronto, is to have specifications prepared for the proposed Teraulay subway with a view to calling for bids about Sept. 15. According to the plans prepared by the engineer, E. L. Cousins, Toronto, the subway will start at the corner of Front Street and Bay Street, adjoining the proposed new Union Station, and will run due north under Bay Street, Teraulay Street and North Street, up to Davenport Road, diverging to the east so as to reach the present level of the east end of Ramsden Park.

Portland, Eugene & Eastern Railway, Portland, Ore.—The entire holdings of the Corvallis & Alsea River Railway have been bought by this company, including 31 miles of right-of-way track terminals at Corvallis, rolling stock, etc. The Portland, Eugene & Eastern Railway, it is reported, will electrify 18 miles of the line from Corvallis to Monroe, and then extend the line from Monroe to Eugene, a distance of 22 miles. Power for operation of the new line will be furnished by the Oregon River Power Company.

Southern Cambria Railway, Johnstown, Pa.—This company has completed grading its extension to Ebensburg, and the work on the overhead construction and track laying has been begun.

West Penn Railways, Pittsburgh, Pa.—The contract for the erection of the steel bridge over Cats Run, on the Masontown-Morgantown extension of this railway, now being constructed, was let to the John Eichlasy, Jr., Company, of Pittsburgh.

Knoxville Railway & Light Company, Knoxville, Tenn.—This company has begun work double-tracking its line from Broadway to the city limits of Knoxville.

Nashville-Gallatin Interurban Railway, Nashville, Tenn.—Carmichael & Spradlin has been awarded the contract by this company to grade the 12-mile section between Gallatin and Saundersville. H. H. Mayberry, Nashville, president. E. R. J., July 29, '11.]

Austin (Tex.) Street Railway.—This company will award contracts during the next month for building and repaving about ½ mile of new track in Austin.

Beaumont (Tex.) Traction Company.—Work has been begun by this company on the double-track construction of several lines in Beaumont. The company will spend $125,000 on the track construction and about $20,000 repaving some of its lines.

Dallas (Tex.) Consolidated Electric Street Railway.—The double-tracking of several of its lines in Dallas is being planned by this company.

Northern Texas Traction Company, Ft. Worth, Texas.—This company will double-track its Evans Avenue line.

*Sherman, Tex.—C. B. Dorchester and J. F. Etter plan to build an electric railway from Sherman to Paris, via Bonham and Honey Grove.

Belton & Temple Traction Company, Temple, Tex.—Surveys are being made by this company to shorten its line between Belton and Temple.

Southwestern Traction Company, Temple, Tex.—This company advises that it has placed all orders, and material is arriving for the construction of 1 mile of new track in Temple.

*Urbana, Va.—Plans are being made to organize a company to build an electric railway between Urbana, West Point and Richmond, crossing the Mattaponi River. T. M. Carrington and William T. Dabney are interested.

Tyler Traction Company, Clarksburg, W. Va.—This company has awarded the contract to Messrs. Board & Reed, Charlestown, W. Va., for the construction of its line between Sistersville and Middlebourne. H. W. McCoy, president. [E. R. J., Aug. 12, '11.]

Badger Railway & Light Company, Milwaukee, Wis.—Most of the right-of-way has been secured by this company on its 22-mile railway between Lake Geneva, Elkhorn and Whitewater. The company is considering plans to extend the line to Ft. Atkinson. Gustav Pickhardt, Milwaukee, chief engineer. [E. R. J., July 8, '11.]

Waupaca Electric Light & Railway Compan, Waupaca, Wis.—This company advises that during the next few weeks it will place contracts for the construction of several extensions of its lines in Waupaca. One branch will be built to the Wisconsin Veterans' Home and the other to the Waupaca-Green Bay Railway.

SHOPS AND BUILDINGS

British Columbia Electric Railway, Vancouver, B. C.—This company has awarded the contract for the construction of a new freight house at the foot of Carrall Street, Vancouver, near False Creek, to D. Matheson, Vancouver. The building is to measure 30 ft. x 167 ft., and will be used in connection with the existing freight shed for the interurban freight traffic of the company.

Illinois Traction System, Champaign, Ill.—This company is now building a temporary passenger station on the block bounded by Twelfth Street, High Street, Lucas Avenue and Lind Street in St. Louis. It will be a two-story structure of brick and cement construction and will cover about three-fourths of the block. The cost will be about $20,000.

Indiana Union Traction Company, Anderson, Ind.—This company and the Ft. Wayne & Wabash Valley Traction Company have entered into an agreement for maintaining a new passenger and freight station in Bluffton. A contract has been signed by which a portion of the opera house block is to be used.

Kentucky Traction & Terminal Company, Lexington, Ky.—This company will build an ice factory in connection with its new power house in Lexington. The cost of the entire plant will be $500,000. Work will begin in a few weeks and it will be ready for use early next spring.

Citizens Railway, Lincoln, Neb.—This company's carhouse at Twenty-fifth Street and D Street in Lincoln, and used as a storage house by the Lincoln Traction Company, was destroyed by fire. The loss is estimated to be about $20,000.

Public Service Corporation, Newark, N. J.—Plans are being made by this company to build a waiting station on Hillside Road and Palisade Avenue in West Hoboken.

Northern Ohio Traction & Light Company, Akron, Ohio.—A new station and train shed will be constructed by this company on North Main Street in Akron in the near future.

People's Electric Railway, Muskogee, Okla.—Work has been begun by this company on the construction of its five-story terminal building at the corner of C Street and Callahan Street in Muskogee. [E. R. J., April 15, '11.]

Berlin & Waterloo Street Railway, Berlin, Ont.—This company advises that it will extend its carhouse to accommodate new rolling stock and install a hydraulic motor lift.

Seattle, Renton & Southern Railway, Seattle, Wash.—This company expects to build an addition to its carhouse at Columbia Station in Seattle. It will also build new foundations under the present buildings.

Sheboygan Light, Power & Railway Company, Sheboygan, Wis.—Construction will be begun at once by this company on its new carhouses at South Eighth Street and Clara Avenue, in Sheboygan.

Twin City Electric Company, South Bend, Wash.—Plans are being made by this company to build station waiting rooms along the route between South Bend and Raymond. Its new carhouse will be constructed midway between South Bend and Raymond.

POWER HOUSES AND SUBSTATIONS

Aurora, Elgin & Chicago Railroad, Chicago, Ill.—This company contemplates the installation of a coal-handling and coal-storage plant at its Batavia power house.

Chicago (Ill.) Railways.—The Westinghouse Electric & Manufacturing Company has received a contract from this company for equipment for the extension of its La Salle Street substation, including two 3000-kw, 25-cycle, self-starting rotary converters, with the necessary transformers, and a ten-panel switchboard.

Des Moines (Ia.) City Railway.—Plans are being considered by this company to build a one-story brick addition to its power plant in Des Moines.

Southwestern Traction & Power Company, New Orleans, La.—During the next ten weeks this company will place contracts for the construction of a new power house in New Iberia. The company expects to purchase two 250-hp. water tube boilers, turbines, generators, etc. It will use fuel oil under the boilers.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—This company will rebuild at once its substation on the Manawa line. The building was recently destroyed by lightning.

The Delaware & Hudson Company, Albany, N. Y.—This Company has placed an order with the General Electric Company for one 7500-kw turbine, one 100-kw turbo-exciter and four 2500-kva transformers. This apparatus will increase the power supply of the company's electric railway interests in Albany, Troy and Schenectady, and will also furnish power for the company's new shops at Watervliet, N. Y.

International Railway, Buffalo, N. Y.—This company has awarded the contract to the General Electric Company for two 1000-kw rotary converters, with transformers and switchboard.

Tidewater Power Company, Wilmington, N. C.—This company has ordered a 2000-kw turbo-generator and condenser for its power house in Wilmington.

Lake Erie, Bowling Green & Napoleon Railway, Bowling Green, Ohio.—This company will place contracts during the next six weeks for an additional compound steam engine or turbine unit in its power plant in Bowling Green, and will probably install an automatic stoker.

Ohio Valley Electric Railway, Cincinnati, Ohio.—This company will erect an addition to its power house at Kenova, W. Va.

Youngstown & Southern Railway, North Lima, Ohio.—This company's depot and substation, at North Lima, was destroyed by fire on Aug. 2, with a loss of $30,000.

Berlin & Waterloo Street Railway, Berlin, Ont.—This company advises that it has let the contract to the Gould Storage Battery Company to rebuild its storage battery reserve.

Mount Hood Railway, Light & Power Company, Portland, Ore.—This company will build a two-story reinforced concrete substation, at the foot of Williams Avenue, Portland. The cost is estimated to be about $60,000.

Lynchburg Traction & Light Company, Lynchburg, Va.—This company advises that it has just completed the installation of a 1000-kw. Curtis turbine at its power house in Lynchburg.

Bellingham-Skaget Interurban Railway, Bellingham, Wash.—This company has begun work at Mount Vernon, clearing a site for its new substation and car yards. The construction of an 800-ft. trestle and a bulkhead will also be undertaken by the company.

Twin City Electric Company, South Bend, Wash.—The power house of this company will be located midway between South Bend and Raymond.

Eastern Wisconsin Railway & Light Company, Fond du Lac, Wis.—This company will build a brick addition to its power plant on North Main Street and Rees Street, in Fond du Lac, and will install new stoking apparatus.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—Work has been begun by this company on the foundations for a new substation at Twentieth Street and North Avenue, in Milwaukee.

Manufactures & Supplies

ROLLING STOCK

San Luis & Potosi (Mex.) Electric Railway has ordered twenty single-truck cars from the St. Louis Car Company.

Detroit (Mich.) United Railway is reported to have ordered fifty city cars from the G. C. Kuhlman Car Company.

Dayton & Troy Electric Railway, Tippecanoe City, Ohio, expects to purchase a double-truck snow sweeper and four heaters.

Elmira Water, Light & Railroad Company, Elmira, N. Y., expects to change ten double-truck cars to the pay-as-you-enter type.

Jacksonville (Fla.) Electric Company has ordered from the St. Louis Car Company ten cars of the Birney semi-steel type.

Montreal (Que.) Street Railway has ordered ten steel pay-as-you-enter car bodies from the Canadian Car & Foundry Company, Ltd.

Waupaca Electric Light & Railway Company, Waupaca, Wis., is in the market for two side dump cars, having about eight to ten tons' capacity, for coal-hauling purposes.

St. Louis & Jennings Railway, St. Louis, Mo., has ordered twenty-two double-truck cars from the St. Louis Car Company for use on its new line now in course of construction.

Missouri & Kansas Interurban Railway, Overland Park, Kas., expects to purchase a refrigerator compartment dairy and farm produce car for express service between Olathe and Kansas City.

Central Pennsylvania Traction Company, Harrisburg, Pa., noted in the Electric Railway Journal of Aug. 5, 1911, as considering the purchase of several cars, has ordered six pay-within cars from The J. G. Brill Company.

Lynchburg Traction & Light Company, Lynchburg, Va., has ordered six 43-ft., semi-convertible, pay-as-you-enter cars from The J. G. Brill Company. The cars will be equipped with four G.E.-80 motors and Westinghouse air brakes.

TRADE NOTES

American Car & Foundry Company, St. Louis, Mo., has bought about 200 acres of land in Gary, Ind., where it is planning to erect a car-building plant to cost $10,000,000. About 6000 men will be employed.

Lagonda Manufacturing Company, Springfield, Ohio, has had its automatic cut-off valve admitted to the Museum of Safety Devices, 29 West Thirty-ninth Street, New York. This valve is so made as to close automatically if a break occurs on either side of the valve.

Whipple Supply Company, New York, N. Y., reports that the Tool Steel Gear & Pinion Company, for which it is selling agent, has obtained an order from the Chicago Railways Company for 1000 specially hardened and toughened gears and 1000 pinions, for application to new equipment.

United States Electric Company, New York, N. Y., has received an order from the Baltimore & Ohio Railroad for Gill selector telephone train dispatching outfits complete for forty stations, to be used in the extension of its telephone dispatching circuits from Clarksburg to Salem, W. Va.

Le Moyne L. Parkinson, Pittsburgh, Pa., has resigned his position with the Standard Underground Cable Company, of that city, to become district sales manager of the Esterline Company, of Lafayette, Ind. Mr. Parkinson will have charge of the State of Michigan, having his office at Detroit.

W. R. Kerschner, New York, N. Y., has recently received two orders for the Cincinnati Car Company, one being an order for five 20-ft. car bodies for the Altoona & Logan Valley Electric Railway, the other an order for three 30-ft. 8-in. car bodies mounted on Standard O-50 trucks for the Conestoga Traction Company.

Kellogg Switchboard & Supply Company, Chicago, Ill., has closed a contract with the Mount Hood Railway & Power Company, Portland, Ore., for a telephone system for its 29-mile electric railway extending to Bull Run. Dispatchers' and way-station equipment and Gill selectors are called for by the specifications.

Allis-Chalmers Company, Milwaukee, Wis., has announced that its Scranton plant will be entirely closed down by Jan. 1, 1912, and that the hydraulic department will be taken to Milwaukee and the sugar machinery department to Chicago. C. L. Glasgow has been appointed Montreal district sales manager of Allis-Chalmers-Bullock, Ltd. Mr. Glasgow has had extensive experience in the construction of electric railways and the design of power plants.

F. B. DeGress, for over ten years New York district manager, Crocker-Wheeler Company, has resigned to assume the position of general sales manager, Pulsometer Company, 17 Battery Place, New York City. Besides looking after the sales end of the business Mr. DeGress is also carrying on a series of experiments with a view to improving certain features of the pulsometer in order to make it suitable for general pumping work in power plants, industrial establishments, etc.

Federal Storage Battery Car Company, New York, has purchased a large factory at Silver Lake, N. J., near West Orange, and in the future will manufacture at these shops car bodies, motors and all other equipment required for its storage battery cars, except the Edison storage battery, which will still be manufactured at the Edison plant at West Orange. The new shops are so arranged that they can easily be enlarged to secure any capacity desired. On Aug. 19 the company will move its principal office to these works and thereafter its address will be Franklin Street, near Belmont Avenue, Silver Lake, N. J.

Western Electric Company, New York, N. Y., reports that its gross sales for July show a falling off of 3 per cent, as compared with July, 1910, but the seven months of the current fiscal year which have elapsed are 4 per cent ahead of the corresponding period of last year. It now seems unlikely that the company will realize its earlier prospects of a $71,000,000 year, but the showing to date, which is at the rate of $66,000,000 for the year, is close behind the company's high record of $69,000,000 for 1906. The Western Electric Company is employing 26,000 persons as compared with 29,000 in 1906, which was the largest number ever on the company's books at any one time.

ADVERTISING LITERATURE

J. A. Nelson, New York, has issued a little treatise on "Bearings," giving some forty questions and answers on anti-friction bearings. It is sold for 10 cents a copy.

Browning Engineering Company, Cleveland, Ohio, has issued a 55-page catalogue of locomotive cranes, showing the various uses to which they can be put to advantage.

A. Stucki Company, Pittsburgh, Pa., has published an illustrated bulletin showing the advantages to be derived by the use of Stucki side bearings on steam railroad freight and passenger cars and electric cars.

Chicago Railway Equipment Company, Chicago, Ill., has published a pamphlet entitled "The Brake Beam," which contains a comprehensive discussion of air-brake mechanism, with special reference to the Creco brake beam.

Kerr Turbine Company, Wellsville, N. Y., has issued Catalog No. 19, which is a treatise on the theory, construction, uses and advantages of small Kerr steam turbines for driving generators, pumps, blowers and other small high-speed machines. The catalog contains numerous data and illustrations.

Electric Railway Improvement Company, Cleveland, Ohio, has published an illustrated pamphlet describing its well-known methods of electric bond welding. Among the new features are descriptions of apparatus developed for the electric welding of third-rail and of track on 1200-volt overhead conductor systems. This process is also adapted to the installation of large cables around special work.

Hayes Track Appliance Company, Richmond, Ind., has issued Circular No. 64, illustrating the extensive use of Hayes derails on the Southern Pacific Railway. The circular mentions the use of Hayes derails in connection with automatic block signals on the Harriman lines and illustrates some details of practice on this system.

Electric Service Supplies Company, Philadelphia, Pa., has published a fifty-page catalog and price list of Protected rail bonds, bonding tools and rail bond testing sets. The company has also issued Bulletins Nos. 48, 49, 51, 53, 54, 55 and 56, giving complete descriptions of the different types of Garton-Daniels lightning arresters and accessories for direct and alternating-current circuits.

Gould Storage Battery Company, New York, N. Y., has issued a twelve-page bulletin, entitled "The Electrical Installations in the Detroit River Tunnel Plant." This bulletin describes the Gould battery and allied regulating apparatus by means of which current from the Detroit Edison Company's plant is used to pull the trains of the Michigan Central Railroad through the new Detroit River Tunnel.

James Beggs & Company, New York, N. Y., have issued a sixteen-page catalog on the Blackburn-Smith pressure filter. This filter consists of small, easily removable and renewable cloth-covered cartridges for removing suspended matter from hot or cold water, and is useful in the clarification of a murky water supply, removing oil and slime from boiler water or for clarifying the water in processing systems.

Allis-Chalmers Company, Milwaukee, Wis., has issued Bulletins Nos. 1512, 1080 and 1623. Bulletin No. 1512 contains a description of various types of compound Corliss engines, together with illustrations which show their adaptability to many different uses. Bulletin 1080 describes various types of alternating-current generators and supersedes Bulletin No. 1048. Bulletin No. 1623 is an engineering description of the Priests Rapids development of the Hanford Irrigation & Power Company.

Bates Machine Company, Joliet, Ill., has issued a twenty-four-page catalog which describes and illustrates Cookson cast-iron heaters and receivers with cut-out valves. This type of heater serves as a purifier, filter, oil separator and condensation receiver, and possesses the special feature of being able to purify all the exhaust steam from the engines and auxiliaries.

Western Electric Company, New York, N. Y., has issued Bulletin No. 1105, on the selection, installation and wiring of inter-phone systems. Two new systems are shown, one a selective-ringing, common-talking set, made in both four and eight-button types to accommodate five and nine-party service, the other a selective-ringing, common-talking set for limited service. This limited service is one where, from a master station, a call may be made to any outlying station, and the master station may in turn be called from any outlying station. In addition to these new sets, all the standard sets manufactured by the company, together with accessories and supplies necessary for the complete installation of inter-phone systems, are shown.

Titanium Alloy Manufacturing Company, Pittsburgh, Pa., has issued a 40-page catalog on titanium alloy rails, giving the results of service tests on a number of steam railroads. Titanium steel rails, which have been in use on sharp curves and sections subjected to heavy traffic for periods of from two to three years, show much better wearing qualities than the best untreated carbon steel. Among the electric railways which have purchased titanium steel rails in quantities of 500 tons or more may be mentioned the Pittsburgh Railways, 2871 tons; Metropolitan Street Railway, New York, 700 tons; Rochester Railway, 500 tons; United Railroads of San Francisco, 500 tons. The catalog is profusely illustrated with sections of rails after service tests and views of titanium rails in the track.

Electric Service Supplies Company, Philadelphia, Pa., has just issued Vol. I of Catalog No. 4 describing exclusively its overhead line and track supplies. The present volume numbers 700 pages and is substantially bound in cloth. This edition is notable for the additional data on catenary line material, such as diagrams of hanger lengths and pole spacing in addition to detailed descriptions of individual catenary parts. Much attention is also given to electric block signals, highway crossing signals, signal bells and buzzers and telephones, which are especially adapted for dispatching. The catalog also includes references to a great many devices used for the construction, testing and operation of electric railways. The book is concluded with elaborate indexes of code words, and list numbers of the material described.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVIII NEW YORK, SATURDAY, AUGUST 26, 1911 No. 9

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.
HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.
CURTIS E. WHITTLESEY, Secretary and Treasurer.
TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

HENRY W. BLAKE, Editor.
L. E. GOULD, Western Editor.
Associate Editors:
RODNEY HITT, FREDERIC NICHOLAS, WALTER JACKSON.
News Editors:
G J. MACMURRAY, FRANK J. ARMEIT.

CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1021 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Thursday, 9 A. M., of the week of issue.

Copyright, 1911, by MCGRAW PUBLISHING COMPANY.

Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, AUGUST 26, 1911.

CONTENTS.

Economies in Substations..... 339
Outside Criticism..... 339
The Strong-Arm Brigade..... 340
Lunchrooms and Barber Shops in Carhouses..... 340
Height of Car Steps..... 341
New Power Station of Worcester Consolidated Street Railway..... 342
Creosoted Ties in Brooklyn..... 345
Detroit Testing Laboratory..... 345
Papers at the C. E. R. A. Convention..... 347
Additional Exhibitors at Atlantic City Convention..... 357
Aviation Flights at Atlantic City..... 357
Cedar Point Meeting of the Central Electric Railway Association.... 358
Compensation for Carrying United States Mail..... 360
Handling Chartered Car Service in Boston..... 360
Interest of Employees in Milwaukee Fare Case..... 362
Plain Arch-Roof Cars for Freeport, Ill..... 363
Single-Truck Arch-Roof Cars for Texarkana..... 363
Aviation Meet at Rockford, Ill..... 363
News of Electric Railways..... 364
Financial and Corporate..... 366
Traffic and Transportation..... 368
Personal Mention..... 371
Construction News..... 372
Manufactures and Supplies..... 375

Economies in Substations

The isolated locations of many of the substations of interurban railways and the comparative simplicity of their operation tend to their being overlooked as possible sources of waste and inefficiency. A comparison of the power station output as measured at the high-tension bus and the substation output as measured at the direct-current feeder bus will show at a glance the combined efficiency of transmission and conversion. The efficiency of the ordinary interurban high-tension transmission line is about 90 per cent, so that the difference between this efficiency and the combined efficiency of transmission and conversion represents the substation losses, which include the losses in the transformers and rotaries. The largest single source of loss is the idle operation of rotaries. Like all other electrical machines, a rotary converter has certain constant losses whether it is running light or under load. A single overloaded rotary will have smaller losses than two underloaded machines, and yet the latter condition prevails in substations more often than the former. Frequently it would be possible to shut down an intermediate substation at times of light traffic and more than make up for the line losses due to the longer transmission of the trolley current from the adjoining substations. As illustrating what can be accomplished along these lines the West Jersey & Seashore Railroad increased the combined efficiency of transmission and conversion from 72.2 per cent in 1907 to 81.6 per cent in 1910 by careful supervision of substation operation. Equally good results probably could be obtained on many interurban roads. The saving is well worth attempting.

Outside Criticism

The desire which Burns expressed for a gift to see ourselves as others see us is repeated in the paper read by J. C. Schade at the meeting of the Central Electric Railway Association at Cedar Point, Ohio, this week. We agree with the author of this paper that if railway officials when traveling over other properties would make mental notes of the deficiencies which they see and afterward give the information to the officials responsible for the operation of the property it would be helpful. While the official is looking for defects on his neighbor's property he may also discover the beams in his own eye by observing good practice which he should adopt. Successful railway operators recognize this fact and plan trips for the chiefs of their departments. As an illustration, the superintendent of transportation of a large electric railway operating a combined city and interurban system having about 600 cars recently took his assistant for an inspection tour of the roads in several nearby states. They rode on the cars of many interurban companies and acquainted themselves

with the properties as best they could. Thus they obtained from the passenger's standpoint an idea of the operating conditions. On their return they frankly stated that they had seen many interesting operating features which their company might well adopt, yet their own road was in the lead with regard to some other things. When questioned as to the features which the inspection tour most firmly impressed upon their minds the travelers said that these were the sharp, unprotected curves and the lack of private right-of-way. Such inspection trips are most valuable whether they are made incognito or not. They give a much better opportunity for studying the actual operating conditions than does the platform of a special car.

The Strong-Arm Brigade

Foreign observers of our social customs have frequently remarked that there is a strong tendency when the ordinary crowd in America takes an outing for its fun to degenerate into rowdyism. They say that it would be practically impossible to duplicate in this country the festivities, for instance, of a Continental carnival without great chance that the more boisterous elements in the crowd would indulge in a roughness absent from such celebrations abroad. Whether this be true or not, it is undoubtedly a fact that there is a considerable number of men and boys of every city who seem to find enjoyment in maltreating inoffensive citizens when they can indulge in such practices without fear of the law. Of late years a favorite place for such hoodlumism in New York has been on the outgoing and returning electric cars or subway trains to pleasure resorts. No part of an outing on a pleasant Sunday afternoon has seemed to provide more pleasure to the average East Side tough than that during his return trip when he has played ball in the car or otherwise has annoyed or terrorized the other passengers to his heart's content. Last year the municipal authorities made a praiseworthy and effective effort to stop this practice. On the evenings of every pleasant Saturday and Sunday during the latter part of the summer the police gathered to the station house a number of those jubilant spirits who do not seem to be happy except when they are interfering with others. This year even more satisfactory progress has been made through the efforts of what is popularly known as the "strong-arm brigade." This consists of a detachment of plain-clothes men from the police force selected for their ability to control this kind of disorder. Assignments from this brigade are made to each railway line on which previous experience has shown that disturbance may be expected. Operating on the homeopathic principle of *similia similibus curantur,* these special policemen bat the batters, knock the knockers and punch the punchers until the erstwhile toughs are ready to accompany them to court. The municipal court judges are co-operating with the police in the effort to reduce the rowdyism by imposing jail sentences in most cases rather than fines. A fine is usually paid by a man's friends or family when he himself has not the money, but the inconvenience of a jail sentence of five or six days is not so easily transferred to others. Other cities which are suffering from this kind of disorder might find the same remedy efficacious.

LUNCHROOMS AND BARBER SHOPS IN CARHOUSES

One of the subjects discussed at a recent meeting of the committee on buildings and structures of the American Electric Railway Engineering Association was that of providing lunchrooms and barber shops in operating carhouses. The topic was considered by this committee in connection with carhouse design because the committee expects to submit plans of one or more typical carhouses, in which part of the space will be assigned to various employees' welfare features. Nevertheless, the interchange of experiences which took place at the meeting was of value in defining quite clearly the conditions under which such features as lunchrooms and barber shops might be made successful.

So far as the carhouse lunchrooms are concerned it seems advisable to establish them only in those carhouses which are in districts where there are no suitable eating places and where most of the men do not live within easy walking distance. The simplest method for a railway to carry out a project of this character is to furnish the culinary and table equipments and the light and heat, but to lease the operation of the lunchroom to a restaurant keeper who is kept under proper supervision. There is no valid reason why food in such a restaurant should be sold at cost. The enterprise ought to go out of business if it cannot exist on its own merits as a convenience for the men. As a rule, cost-price restaurants are practicable only on very prosperous roads. Even then a considerable proportion of the employees will probably consider the restaurant as being conducted principally as a scheme to keep them from entering saloons. If the restaurant privilege is leased for profit it is not uncommon for the company to apply the rentals or profits in some way for the direct benefit of those who patronize the lunchroom. This action would avoid any feeling that the management was trying to exploit its employees. The practice of the Metropolitan Street Railway Company in this respect is to pay the profits of the lunchrooms into a fund from which employees can borrow up to twice the sum of their weekly wages without interest. This plan was adopted to counteract the exactions of the loan sharks, into whose clutches some of the employees of the company had fallen. It was found that in certain cases these lenders were exacting rates of interest amounting to considerably more than 300 per cent per year for temporary loans.

The field for barber shops in carhouses is necessarily much more limited than that for restaurants. The costly equipment of a good barber shop makes its installation as a business venture justifiable in none but the very largest carhouses. Only a fraction of the lunchroom patrons will visit the barber, because a shave can be postponed far more readily than a meal. Some railways go even farther and maintain bootblacks and clothes-pressing facilities in combination with the barber shop, as is done by the Georgia Railway & Electric Company. A similar low-price valet service is also offered to the employees in the main offices of the Public Service Railway, Newark, N. J. The neat appearance of the employees secured in this way adds to their self-respect and must also prove a good asset to the electric railway that employs them, even if its value cannot be directly calculated in dollars and cents.

HEIGHT OF CAR STEPS

Perhaps no single detail of electric railway car construction affects the comfort, convenience and safety of passengers to such an extent as the dimensions of the platform steps. These dimensions in general are controlled by the dimensions of other parts of the car in no way related to the steps or platforms. In double-truck cars it is necessary to raise the floor high enough to clear the wheels and the wheels must be large enough in diameter to provide clearance for the motors. The size and shape of the principal members of the body underframing and the type of trucks used are other factors determining the height of the car floor. To provide a proper foothold, the step has to be a certain width, and the safety and comfort of passengers will not allow the platform to be notched greatly or to be materially reduced in width. At the same time the steps must not project beyond the side of the car. These limiting conditions permit the use of only one side step in most city cars, so that it is necessary to divide the total rise from pavement to car floor into three parts. Some cars have a high first step and shorter rises to the platform floor and to the car floor. In others the total rise is divided into three steps of more nearly equal heights. The exact dimensions of the steps are arrived at by a process of arbitrary division rather than by selecting a uniform and convenient height and multiplying it by three to get the height of the car floor.

In 1908 the committee on standards of the Engineering Association recommended as standard certain heights of car steps based on a height of car floor of 41 in. These were adopted by the association, but they have not been closely followed in cars built since that time. The investigation of the practice of member companies which was made by this committee before submitting its report disclosed very wide variations in the dimensions used. About the same time the Ontario Railway & Municipal Board began an investigation of a similar nature which a year later resulted in the issue of an order limiting the height of car floors in Toronto and also fixing the maximum and minimum heights of the first step for different types of cars. The Public Service Commission of the First District of New York has recently begun a series of hearings on a proposed order fixing the maximum heights of car steps for all the surface lines in New York City. Several complaints have been made to the commission regarding steps, and its engineers have found that the height of the first step on cars operated in the city varies from 12 in. to nearly 20 in. These were about the limits found by the committee on standards of the Engineering Association when it investigated the practice of companies all over the country three years ago.

The Engineering Association standard heights of steps are respectively 17 in., 14 in. and 10 in., which gives a total height of floor from top of rail of 41 in. The Ontario Railway & Municipal Board fixes the maximum height of car floor at 40 in. and for closed double-truck cars requires that the first step shall be between 14 in. and 16 in. high. The Public Service Commission proposes maximum heights for the three steps of 15¼ in., 13¼ in. and 11½ in. respectively, making a total height of car floor of 40 in.

The greatest inconvenience and even danger to passengers is caused by a first step of excessive height. With the present fashions in women's skirts, it is an acrobatic feat, requiring both strength and agility, for a woman to ascend a step 17 in. high. This is very nearly the height of the seat of an ordinary chair. The height is measured from the top of the rail, and where the tracks are laid in unpaved streets or where the pavement has a sharp crown the surface of the street on which the intending passenger is standing may be 20 in. or more below the tread of the first step. A height of 15 in. is about the maximum for comfort, and unquestionably a low step which is easily ascended and descended accelerates boarding and alighting and hence has a positive value from an operating standpoint as well as a negative value from the standpoint of accident prevention.

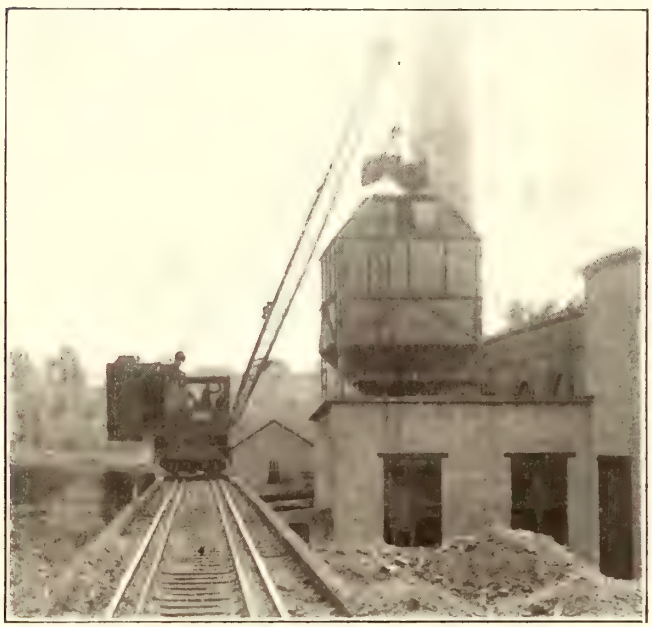
When it is not possible to reduce the height of the car floor below 40 in. by using maximum traction trucks or wheels of small diameter the only other alternative to obtain a low first step is to drop the whole platform floor and thereby increase the height of the third step into the car. The step from the platform floor to the car floor is ascended under the most favorable conditions, yet in practically every type of car it is the lowest of the three. Ordinarily its height is determined by the depth of the body end sill, which varies from 5 in. to 10 in. By inserting filling pieces between the bottom of the end sill and the top of the platform sills the platform floor could easily be lowered from 1 in. to 3 in. and the height of the first step reduced correspondingly. There should be no serious objection to a sill step 11 in. or even 12 in. high, especially on prepayment cars where every passenger must stop for an instant on the platform and pay his fare before ascending into the car. The narrower entrances and exits on prepayment cars provide convenient hand holds when ascending or descending the step from the platform to the car floor, so that the danger of stumbling or falling would be little or no greater with a rise of 10 in. or 12 in. than with a rise of 6 in. to 8 in. One possible objection to lowering the platform slightly would be the reduction of clearance between the platform sills and the apron of the wheel guard. This is of minor importance, however, as compared with the advantages of reducing the height of the first step. Another difficulty might be encountered in attaching the hand-brake chain to the equalizing lever pull rod which must be made to pass over the motors on the truck.

While it is very desirable that the heights of car steps should be standardized as far as possible and kept within certain limits conducive to safety and convenience of passengers, the cost of rebuilding old cars solely to make them conform to such standards usually would be so great as to be unwarranted. Standardization in matters of this kind should be a slow process, beginning with all new cars built and carried out gradually on old equipment as it is overhauled or rebuilt as the result of ordinary service deterioration. Thus, in Toronto, the order of the Ontario Railway & Municipal Board relating to heights of car steps was made to apply only to new cars to be built in the future. This works no hardship on the railway companies and in time will bring about the desired result.

New Power Station of Worcester Consolidated Street Railway

This Article Describes the Improvements Which Have Recently Been Made in the Worcester Power Generating and Distributing System.

One of the latest power plant installations in the New England electric traction field is the new Millbury station of the Worcester Consolidated Street Railway Company. For many years the Worcester & Blackstone Valley Street



Worcester Power—Coal-Handling Machinery

Railway Company has maintained a reciprocating steam engine plant on Providence Street, Millbury, and the local lines of the Worcester Consolidated Company have been oprated by a steam-driven station on Fremont Street, Worcester, Mass., about two miles south of the business center. Worcester is one of the most rapidly growing cities in New England, its population being about 150,000 within the municipal limits. It is surrounded by many suburban or semi-rural communities whose commercial interests are in Worcester.

The Fremont Street station at Worcester has a capacity of about 6000 kw, practically all the equipment being of the direct-current type. This plant shows the evolution from the belted units of twenty-five years ago to direct-connected engine and generator sets. Since the electrification of the street railway system at Worcester it has carried the brunt of the service with reasonable economy. The limitations of the Fremont Street water supply, the low cost of land at Millbury, and the convenient location of the Blackstone Valley Company's station caused the officers of the system to decide in favor of enlarging the generating plant at Millbury, transmitting current to Worcester by a three-phase line and distributing to the local city service from a substation located in the heart of the business district and at the center of load of the system as a whole. Investigations showed that by building a turbine plant at Millbury and operating the Fremont Street station only at peak loads or in emergencies, substantial savings could be effected and the character of service considerably improved. Current was first delivered on Feb. 21, 1911, to the Worcester system from Millbury. The substation is located on Madison Street, Worcester, and is connected with the Fremont Street station by tie lines.

CHANGES AT MILLBURY STATION

The Millbury station contains two 300-kw generators direct-driven by horizontal cross compound engines and a 5500-kva turbo-alternator, with auxiliaries and boiler equipment. The plant is a brick and steel structure about 126 ft. long x 119 ft. wide, within about 6 miles of the center of distribution at Worcester. Extensive alterations of the original power plant building were made in connection with the construction of the turbine plant, the latter being built in the main as an extension of the original installation. To take care of the expansion of the station an addition was made to the boiler house, giving a length of the steam generating section of about 100 ft. and a width of 14½ ft., the height being 40 ft., with monitor roof. Concrete foundations were used throughout. Other additions consisted of a brick and concrete pump room 54 ft. long x 18 ft. wide, and a coal conveyor house 33 ft. long x 20 ft. wide. The extension of the plant included the building of a coal trestle 350 ft. long, including a steel girder bridge across the canal from which the plant receives its boiler feed and condensing water. At its upper end, about 500 ft. north of the station, the canal receives water from the Blackstone River, and the supply of condensing water is delivered to the station by gravity, no circulating pumps being required. Additional concrete work required in the enlargement of



Worcester Power—Present Appearance of Enlarged Power Plant

the station included foundations for the turbo-alternator, foundations for a new stack, a discharge tunnel for the turbine room, smoke flue leading from the boilers to the stack, boiler foundations, hot well and reinforced concrete

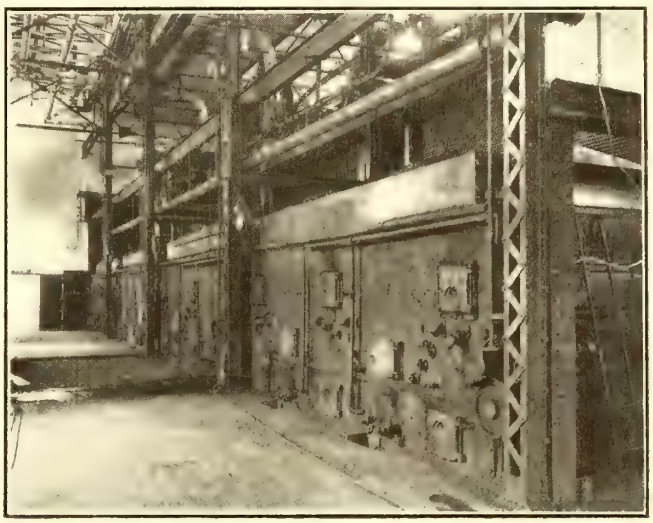
floors of various areas and thicknesses. About 2500 cu. yd. of concrete were required in the work. In connection with the expansion of the station it was necessary to raze several old walls and in some cases dynamite the foundations of the old machinery. All the excavation 3 ft. below the natural grade consisted of large boulders in coarse gravel. The seepage from springs and silt from the river necessitated the continuous use of three steam pumps during construction.

COAL HANDLING

Coal is handled mechanically at the plant from the entrance of the fuel to the property to its delivery to the furnaces. All coal is hauled to the plant from the New York, New Haven & Hartford Railroad over the street railway company's siding by an electric locomotive as far as the coal trestle, where a McMyler locomotive-type steam crane takes the cars and distributes the coal to the storage pile as illustrated. The crane has a capacity of 7000 lb. at 45 ft. radius and 14,000 lb. at 20 ft. The boom length is 55 ft., the boom being built of structural steel members tied together by lattice bracing and webs at each end. The horizontal speed of the crane is 350 ft. per minute and the hoisting speed 250 ft. per minute. The crane is fitted with a 2-ton grab bucket which handles either coal or ashes. Coal received by the plant is either dumped from the cars into a storage yard outside the station or delivered by the grab bucket into a 125-ton per hour crusher. From the lower hopper of the crusher, which is located outside the boiler room, the coal descends into a larry operated on tracks over the tops of the boiler furnaces, whence it is fed upon the grates.

STEAM EQUIPMENT

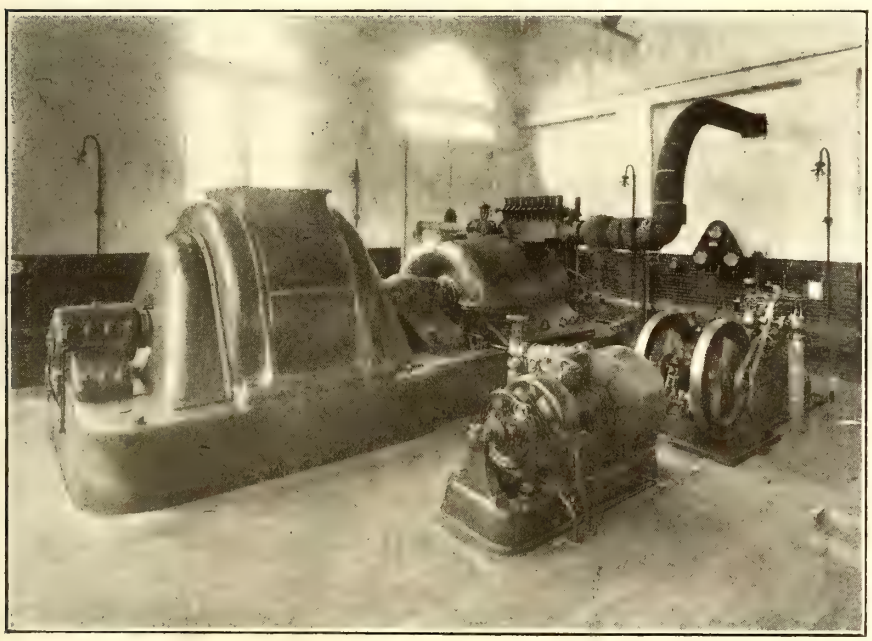
The steam-generating plant at present consists of four 820-hp Edge Moor water-tube boilers, each boiler being of the four-pass type and operated at a steam pressure of 200 lb. The boilers are equipped with Murphy furnaces. Provision has been made back of the boilers for the installation of economizers when needed. Foster superheaters which raise the steam temperature about 200 deg. are installed in each boiler. The products of combustion are discharged into the stack through a concrete flue lined with firebrick. This flue has a typical cross-section of about 8 ft. 7 in. x 8 ft. 2 in. inside, the firebrick lining being 2½ in. thick at the sides and 4 in. thick at the top of the flue. The flue enters the stack with a cross-section of 13 ft. 6 in. x 7 ft. It is reinforced at the sides and top by ½-in. steel rods, staggered and in general spaced 6 in. apart on centers. A cleaning entrance 22 in. wide x 4 ft. 2 in. high is provided at the end of the flue. The new stack is located at the north end of the boiler room and is of the Kellogg patent sectional type, fitted with a concrete flue and firebrick lining 12 ft. in diameter. It is 225 ft. high. The stack rests upon an octagonal five-course concrete foundation 10 ft. deep x 37½ ft. wide.



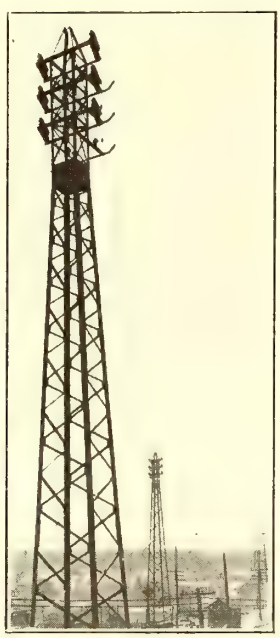
Worcester Power—Boiler Room

The boiler feed lines are provided in duplicate. Feed water is handled by two 16-in. x 10-in. x 12-in. center-packed plunger pumps built for a working pressure of 200 lb. The feed-water heater is a 3600-hp closed outfit, having 1160 sq. ft. of heating surface. It was supplied by the C. H. Wheeler Manufacturing Company, Philadelphia, which also furnished the feed pumps. Extra-heavy steam mains are installed in the plant, and all joints are of the Van Stone type. Steel valves are used throughout. The Holly drip system is in service. The boilers are provided with 2½-in. blow-offs leading to a 3½-in. trunk which discharges into a creek near the station.

The furnaces are cleared of ashes by rotating grates, the discharge being handled beneath by ash-car equipment running through a concrete tunnel and delivering into a pit outside the building whence the ashes are elevated by the grab bucket of the locomotive crane and delivered into cars on the coal-handling trestle alongside of the boiler room for removal. The plant has a total coal storage capacity of 20,000 tons in the open air.



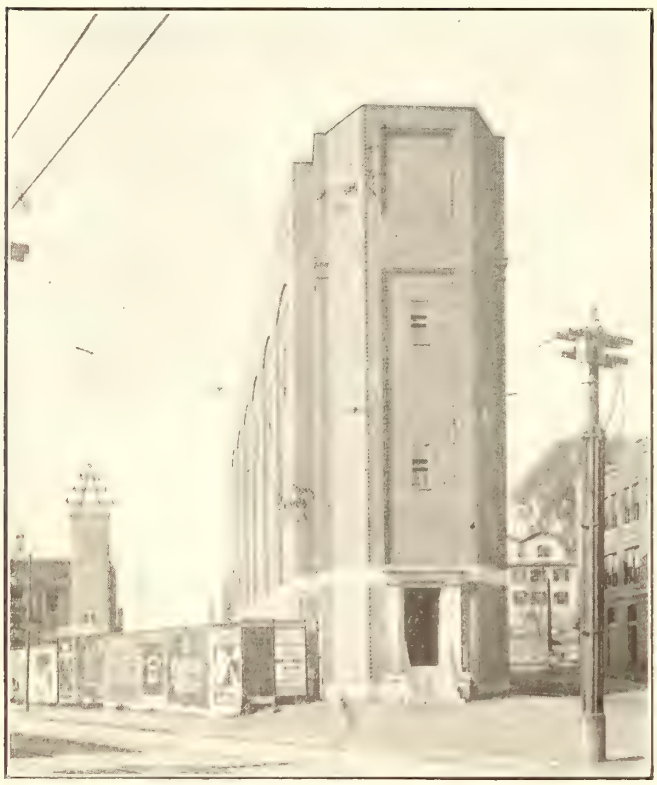
Worcester Power—5500-kva Horizontal Turbo-generator Unit in Main Station



Worcester Power—High-Tension Transmission

ELECTRICAL GENERATING EQUIPMENT

The new generating equipment consists of a 5500-kva, 13,200-volt, three-phase, G. E. 25-cycle alternator driven by a seven-stage Curtis horizontal turbine at a normal



Worcester Power—Triangular Substation

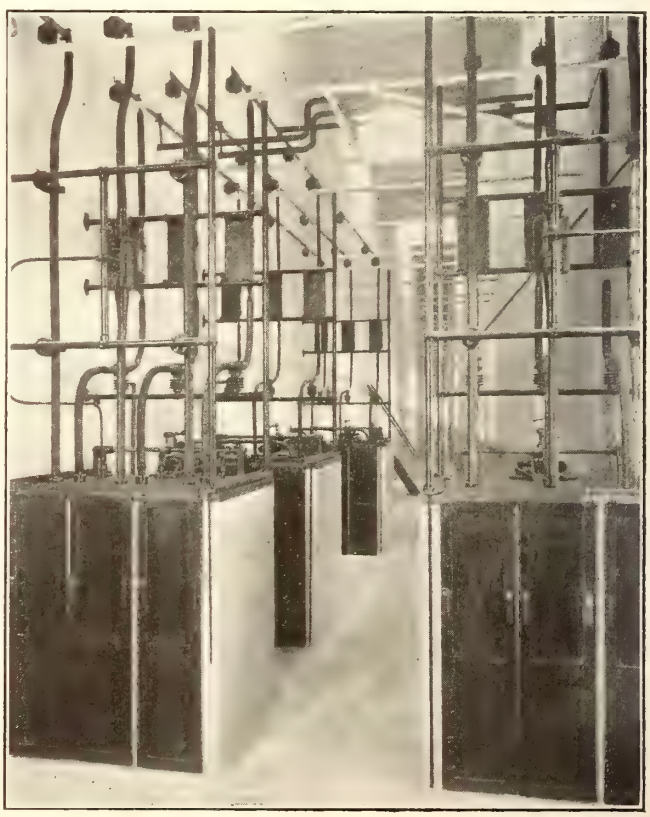
speed of 1500 r.p.m. The machine delivers 243 amp per phase at 90 per cent power factor and is of the two-pole type. At the time of its installation this unit was the largest horizontal outfit installed by its makers. It is equipped with hydraulically operated valves controlled by a pilot valve connection with the governor. An emergency stop is carried on the main shaft with a provision for tripping the throttle valve and shutting down the machine if the speed rises 10 per cent above normal. The turbine unit occupies a space about 28½ ft. long x 13 ft. wide x 10½ ft. high over the base. It is excited by a 75-kw turbo-generator delivering current at 125 volts and operating at 3300 r.p.m. The larger turbine exhausts into a Worthington surface condenser having a cooling surface of 10,000 sq. ft., the condenser being located immediately beneath the turbine and connected with it by a copper expansion joint. The turbine is self-contained and no external oil pumps are required. Oil is maintained in circulation from a tank cast in the turbine base. It is supplied to the bearings at a pressure of about 15 lb. per sq. in. The circulating water discharge is carried away from the condenser and returned into the river below the plant. The generator ventilation is supplied with air through a reinforced concrete duct which connects the casing with the outer atmosphere, the duct section being 3 ft. 6 in. x 7 ft. The turbine has a 10-in. x 22-in. x 18-in. rotative dry vacuum pump of Worthington make, installed in the turbine room at the side of the unit. The hot-well pump is a 4-in. Worthington two-stage centrifugal, turbine-driven outfit. If desired, the turbine can be operated non-condensing, the exhaust being discharged above the roof level through a 30-in. spiral riveted galvanized-iron pipe. The turbine room is served by a 10-ton hand-operated crane.

The d.c. generating units are operated only upon the local service of the Worcester & Blackstone Valley Street Railway Company. Feed water for the present boiler plant is supplied either from the town mains or from a well located outside the station and equipped with a 4-in. centrifugal pump driven by a belted motor. The coal and ash handling equipment was supplied by R. M. Beaumont, Philadelphia. The 5500-kva set is used exclusively on the Worcester Consolidated Company's load, which ordinarily enables the plant to be run close to the rating of the machine. The excess demands are cared for by the less efficient machinery at Fremont Street station in Worcester.

Current from the turbo-alternator at Millbury is passed through temporary switching and lightning arrester equipment and delivered to a double three-phase line of No. 0 copper for transmission to Worcester. The line is carried on steel towers of A-frame section, the average span being about 350 ft. and the maximum 400 ft. The line is carried at heights of from 45 ft. to 68 ft. over the right of way of the New York, New Haven & Hartford Railroad between Millbury and Worcester. On tangents the line is carried on the A-frames, but steel towers are used at corners. There are fifty-nine A-frames, twenty-nine towers and five latticed poles on the line. The standard frame is 42 ft. high above the ground, and the tower heights vary from 46 ft. to 52 ft. Ohio Brass triple-petticoated porcelain insulators are installed on the line, which is insulated to operate safely at 33,000 volts in case the load requirements increase or become more widely distributed in the future. The towers and frames were built by the Archbold-Brady Company, Syracuse, N. Y.

SUBSTATION

The Worcester substation is equipped with two 1500-kw rotary converters delivering direct current to the city system at 600 volts. Space is provided for three additional rotaries of the above capacity. The substation is a triangular building located at the intersection of Madison, Beacon and Southbridge Streets, on a lot of rather limited area. It is a brick and steel structure 144 ft. long x 35 ft. wide x 60 ft. high, there being two floors and a basement in



Worcester Power—High Tension Cells in Substation

its design. The first floor is 27 ft. high, and the second is 26 ft. in height. Each floor is served by a Maris electric crane. Near the substation, which is located within a block of the railroad company's freight yards, the line de-

flects from the railroad right of way, and is carried into a fireproof lightning arrester house located across the street from the substation. Both the substation and the arrester house are equipped throughout with General Electric apparatus.

After passing disconnecting switches and choke coils, the incoming lines are carried to the bottom of the tower and across the street to the substation in underground conduits. The top of the substation is devoted to a remote-control, oil switch installation which is handled from the operating room on the street floor. Two banks of three 550-kw transformers each are installed on the second floor to reduce the potential to 430 volts for delivery to the rotaries. The transformers are of the air-cooled type, each bank being cooled by a fan driven by a 7½-hp induction motor. Each fan has a capacity of 20,000 cu. ft. of air per minute at 460 r.p.m.

The rotaries are located on the street floor. Each has a starting panel containing a main switch, reactance switch, and a remote control button which controls the oil switch equipment on the alternating current side of the machine. The main switchboard contains twenty-seven panels and twelve panels are assigned for the tie line service between the substation and Fremont Street. The basement is utilized for negative busbars, return feeders and equalizer busbars. A small steam boiler provides heat for the substation.

GENERAL

Since the inauguration of the service from the Millbury plant a large amount of rearranging of the local feeder system has been effected, and the voltage conditions on the system are much improved. The completion of the turbine installation at Millbury places the entire Worcester Consolidated system on a modern basis of power supply, and the plant provides room for additional units to meet the anticipated expansion of the urban system at Worcester for an indefinite period. Henry C. Page is general manager of the Worcester system, including the Blackstone Valley lines, and George W. Dunlap is superintendent of power stations. The design and construction of the Millbury station was carried out under L. S. Storrs, president. The substation building in Worcester was designed by Frost, Briggs & Chamberlain and built by the J. W. Bishop Company of Worcester.

CREOSOTED TIES IN BROOKLYN

The Brooklyn Rapid Transit System is now making extensive use of creosoted ties in its track reconstruction. These ties are of square-hewn, long-leaf yellow pine 6 in. x 8 in. x 8 ft. in size and are impregnated with 10 lb. of creosote per cubic foot. The first important application of creosoted ties was made last year in rebuilding about 1 mile of double track on Fulton Street and on Fifth Avenue. The company is now installing these ties on 9000 ft. of route on Flatbush Avenue. At the end of the season it will have completed other double-track sections as follows: 6000 ft. on Manhattan Avenue, 2500 ft. on Fifth Avenue, 2500 ft. on St. John's Place and 1000 ft. on Broadway. On all of these sections in paved streets the ties will be laid 24 in. centers on soil foundation, which is largely sand, to carry 60-ft. lengths of 7-in. Lorain grooved girder rail No. 433 weighing 105 lb. per yard. The joints will be of the riveted type, installed staggered, and fitted with No. 0000 single cable bonds.

The tramway system of San Luis Potosi, Mexico, has been sold by its Mexican owners to an English company, consisting of Messrs. Hooghwinkel, Anthony Brown and partners, of London. The system includes 14 miles of track in the city and suburbs, with equipment of mules, cars and shops. The new owners will electrify the line.

DETROIT TESTING LABORATORY

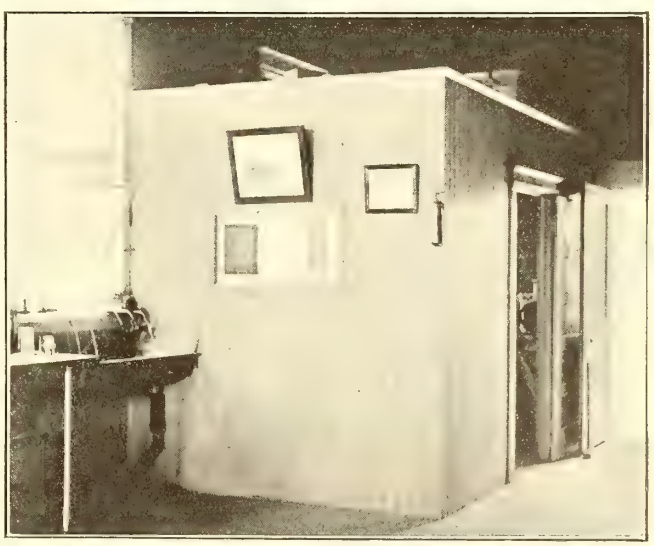
BY CHARLES M. ROGERS, COMBUSTION ENGINEER DETROIT UNITED RAILWAY

The Detroit United Railway has recently built and equipped a testing laboratory at 371 Atwater Street, near its largest power stations, "A" and "B." The building is of brick and concrete, 40 x 22 ft. It was especially designed



Detroit Laboratory—View of Exterior

and constructed for the combustion and chemical work of the power department, for which purpose connections are made from station "A" for hot, cold and distilled water, steam, gas and electricity. The chemicals and apparatus used are the best obtainable. Electric hot plates and drying ovens are used. The new McKer gas burners were chosen in preference to the old style Bunsen burners because of their time-saving features. The instruments for making efficiency tests on boilers, furnaces, economizers and condensers include the necessary mercurial and electric py-



Detroit Laboratory—Calorimeter Room

rometers, anemometers, barometers, mercury columns, hand flue-gas analyzers, calorimeters, draft gages, etc.

Two motor-driven coal grinders are employed for grinding samples of coal. The first one delivers the coal about the size of ground coffee and the second at 100 mesh, in which state it is of the required size for approximate analysis. This eliminates the hand method of pulverizing and thus shortens the time which would otherwise be required for preparing the sample.

The interior of the laboratory is finished in mock mahogany excepting the birch table tops, which are treated with a solution furnishing a deep ebony black to render them highly resistant to the action of acids and alkalis. Ample cupboard, drawer and cabinet room is provided.

Heat determinations by the Atwater oxygen-bomb calorimeter of the Berthelot type are made in a separate room which is kept at nearly constant temperature and which is free from drafts or direct sunlight.

A large hood built of sheet metal and glass is used for operations, which must be free from air currents and virulent gases. Flue gas and draft lines are run from the boiler room so that draft may be had and gas analyses be made at any time. Thermo-electric couples are inserted in the different gas passages and furnaces and connected to a selective switch and pyrometer in the laboratory by means of which the temperatures are read without going to the boiler room. This makes it possible for the combustion engineer to know at any time what the firemen and furnaces are doing.

The most important work at present is the analysis of coal and the preparation of data which will enable the company to write specifications for the purchase of coal on the empirical and calorific bases. This subject deserves more labor and consideration than are usually given to it. If large coal consumers could realize how many thousands of dollars they are paying every year merely for weight instead of heat they could soon pocket larger dividends by spending a little more money for analyses which would make it possible to purchase fuel on a calorific basis.

In this laboratory proximate analysis is now made of an average sample of each day's consignment of coal received at power stations "A" and "B" only. This consignment is usually ten cars. To take a sample for analysis from the six suburban plants would mean more work than is necessary at present, and, besides, the same kind of coal is used throughout. The value of this coal as a steam producer is known, and after analyzing it every day for a month it is evident that suitable specifications can be written for this particular grade. In the meantime careful consideration is given to the load conditions, draft available, furnace equipments, smoke nuisance, etc., so that when the superintendent of power and the purchasing agent succeed in getting cars of different classes of coal tests will be run to determine the most desirable coal.

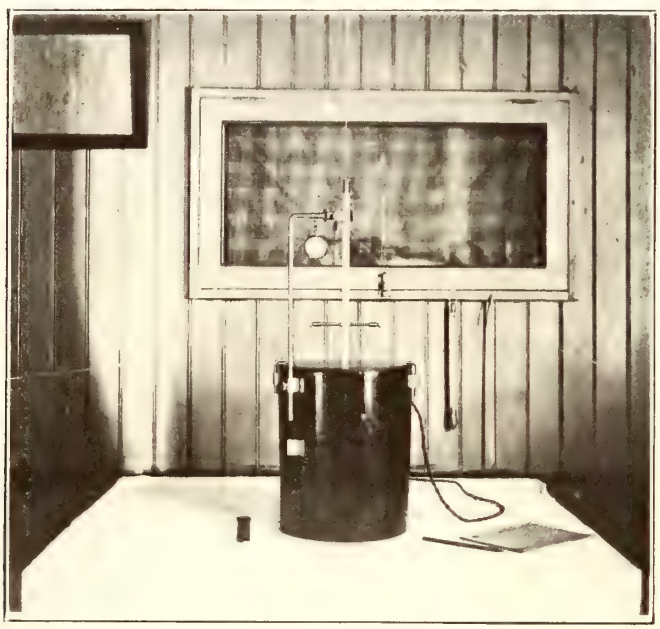
The basis of purchase will not be the laboratory analysis but rather the steam-producing quality of the coal as determined by trials under working conditions. One or more batteries of boilers will necessarily have to be used for this purpose on account of weighing water and coal and taking readings. Coal in the furnace burns differently from coal in the calorimeter. As a matter of fact, an inferior coal may produce better results with the particular equipment at hand than one shown by analysis to be of superior quality. Its real value is reckoned by its total cost to produce 1 kilowatt, or, better still, the total cost to evaporate a unit quantity of water, taking into consideration the cost per ton, freight rate, ash handling, unloading, stoking and other expenses which vary with different coals. There is no furnace on the market that will burn coals differing widely in volatile matter with equal efficiency and without smoke. Since the greatest avoidable loss is due to the escape of combustible hydrocarbons and since a Detroit city ordinance prohibits the emission of dark smoke from the stacks, a coal which contains that percentage of volatile matter which the furnace equipment will burn as efficiently and smokelessly as possible will receive the proper consideration, as well as the b.t.u., ash and sulphur contents, when deciding on final specifications for purchase.

Oils for the mechanical and power departments are bought on specifications. They are regularly analyzed and tested in the laboratory. The best standard testing instruments were purchased for this purpose and a close check is kept on their chemical and physical properties.

Average daily samples of ashes from each of the company's eight power houses are sent to the laboratory twice per month for analysis. The analyses of feed waters, boiler scale, etc., are also given the required attention to insure the proper introduction of the correct kind and amount of feed-water treatment. Special analyses are made of iron, steel, grate-bars, alloys and building materials.

The company has several CO_2 recorders which are cared for by the laboratory. Daily records of CO_2, draft and flue-gas temperatures are kept and curves are plotted to show the efficiency of each fireman. Instruction books on combustion and CO_2 have been placed at the disposal of the firemen and engineers, together with the necessary oral information, to insure their adequate acquaintance with what theoretically happens during the process of air admission and the combustion of the coal.

The laboratory was obtained through the efforts of E. J. Burdick, superintendent of power. The combustion engineer has one assistant.



Detroit Laboratory—Calorimeter in Operation



Detroit Laboratory—Part of Interior

Papers at the C. E. R. A. Convention

Abstracts Are Presented of the Seven Papers Read at the Cedar Point Meeting.

The regular meeting of the Central Electric Railway Association was held at "The Breakers," Cedar Point, Ohio, on Aug. 23-24. The account of the meeting will be found on page 357 of this issue.

The seven papers presented were as follows:

"Overhead Standardization," by A. Schlessinger, superintendent of overhead construction Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.

"Headlights," by C. Dorticos, representative General Electric Company, Chicago, Ill.

"Trailer Car Operation Versus Multiple-Unit Trains," by Clarence Renshaw, engineering department Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.

"Little Things That Count," by J. C. Schade, assistant secretary-treasurer Winona Interurban Railway, Warsaw, Ind.

"Traffic," by J. F. Keys, general passenger agent Detroit United Railway.

"Troubles of a Baggage Agent," by O. E. Anthony, baggage agent Traction Terminal Station, Indianapolis, Ind.

"Insurance," by Henry N. Staats, insurance expert Central Electric Railway Association and American Electric Railway Association.

Abstracts of these papers follow:

OVERHEAD STANDARDIZATION

BY A. SCHLESSINGER, SUPERINTENDENT OVERHEAD CONSTRUCTION TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION COMPANY

We have been experimenting long enough with different types of overhead construction appliances and it is now time to compile and adopt standard specifications. In this I believe railway men will have the hearty co-operation of manufacturers of and dealers in overhead material. At present to meet the demand they must carry in stock large quantities of different types of fittings. This is not desirable from a commercial point of view. Moreover, the larger the quantity manufactured the lower the cost. Hence a greater demand for a few fittings, rather than a limited demand for many of different designs, will naturally result in a reduction in cost of production.

To the practical interurban operator the defects in the overhead construction on some of the early roads are apparent. As a rule poles were not long enough and the location of the line was changed from one side of the track to the other at nearly all curves. In some cases this was done so as not to obstruct the view around the curve, but more frequently to avoid setting additional poles or braces. This plan, of course, decreased first cost, but after a line had been in operation for some little time it was often found necessary to make changes and set additional poles for span construction, thus increasing rather than decreasing the first cost.

In some cases the poles have been set too close to the track and do not give sufficient clearance to the larger type of cars now used, and cross-arms have not been properly located to take care of the additional wires which are usually required after a line has been in operation for a few years. The steel strand wire used for spans and guying has also been too light, with the result that the spans became slack and poles out of line.

Two trolley wires were generally used. It is hard to find anyone that knows just exactly why, but there are a number of traction men who know that the cost of the second wire, ears and hangers, if put into additional feeder capacity, would give greater efficiency and reduce the cost of maintenance.

The following are briefly a few forms of material and methods of construction which are pretty well established and have been generally adopted in more recent construction, and that I believe are worthy of consideration in future overhead work.

TYPE OF CONSTRUCTION

Bracket construction should be used on single-track lines and center-pole construction on double-track lines, as it costs less to install and maintain than double-pole span construction, makes a better looking line and is practically as substantial. Span construction should be used only on city streets, turnouts and on all curves of short radius.

POLES

These should be either cedar or chestnut, not less than 8 in. in diameter at the top and 14 in. in diameter at the butt. Where transmission wires are carried on the poles which support the trolley wires they should not be less than 40 ft. in length. Thirty-foot poles of the same top and butt dimensions may be used in connection with the higher poles for span construction when the elevation of the trolley wire does not exceed 20 ft.

POLE SPACING AND SETTING

A spacing of 100 ft. on tangents and not less than 50 ft. on curves is generally adopted and appears to meet all requirements.

The poles should be set 6 ft. in the ground, 7 ft. 6 in. from the center of the track to the face of the pole. They should have a 6-in. rake away from the track at a height of 24 ft. above the rail for bracket line and of 12 in. to 24 in. for span construction, depending on local conditions.

BRACKETS

The flexible-type suspension brackets 9 ft. in length should be used on tangents and from 10 ft. to 11 ft. in length on curves of long radius.

The assembled bracket should be composed of what is known commercially as 1½-in. "C" tubing; a pole-end socket with a solid back or with a hole cast in the back smaller in diameter than the tubing; a ½-in. supporting rod 18 in. longer than the tubing and with thread 6 in. long on the pole end only; an intermediate span support to be located 3 ft. 6 in. from the outer end of the bracket; an end casting to be provided with a hole instead of an eye-bolt; ½-in. x 14-in. galvanized welded eye-bolt through the pole, and a ⅜-in seven-strand cable.

TROLLEY WIRE

No. 0000 grooved wire has many advantages. The only disadvantage is the lack of a suitable splice, one that will withstand the strain and still be small enough to prevent a hammering effect due to the trolley wheel passing over the splice at high speed. In lieu of a proper splice a No. 000 grooved wire will fulfil the requirements.

HEIGHT

Trolley wire should be 20 ft. above all rail except at steam railroad crossings, where 22 ft. elevation is required by State law, or when steam-railroad equipment is handled on the interurban line. A 20-ft. trolley over highways is at a safe distance and is easier to maintain than if it were higher, because light repairs can be made with a small stepladder on top of freight cars; furthermore, this is generally the height of trolley wire in cities and is about the best height for the proper working of the trolley base and pole generally used.

EARS

Twelve-inch ears with a ⅝-in. stud clinched in groove of wire can be used throughout. However, a six-screw clamp

ear with length over all of 14 in. gives excellent results on curves. The ears should not be soldered to the wire, except possibly on curves, and then only enough solder should be used to prevent sliding.

HANGERS

Either the round top or the West End type of hangers, sherardized and with a 5/8-in. stud, are suitable for straight line. On curves extra heavy pull-overs, galvanized or sherardized, with a 5/8-in. stud and either composition or wood strain insulators, depending on local conditions, should be used.

FEED SPANS

Ordinary feed-in taps should be avoided, as the cost is nearly as much as feed spans and they are much more difficult and expensive to maintain. A No. 00 seven-strand bare-copper cable on mast arms with insulated struts and feed-in hangers makes a substantial and efficient connection between feeder and trolley. These spans should be installed every 1000 ft.

LIGHTNING ARRESTERS

Arresters should be installed every 1000 ft. and should be located on the same poles as the feed spans. A good ground connection can be obtained by means of a 3/4-in. x 8-ft. galvanized-iron pipe driven in the ground and an additional connection to rail.

GUYING

Guy wire should not be smaller than 3/8-in. seven-strand galvanized-steel cable and should have either a composition or a wood strain insulator between the pole and the ground. For ordinary strains use 5/8-in. x 6-ft. galvanized anchor rods, with 1/4-in. x 3 1/2-in. square galvanized washers and half a tie buried from 4 1/2 ft. to 5 1/2 ft. below surface of the ground, depending upon strain.

On reasonably heavy strains use galvanized pole shims and guy hooks, also Crosby clips or guy clamps.

STRAIN GUYING

Strain guying on trolley appears to be more of a custom than an advantage. The writer has in mind a line of approximately 68 miles in length on which it was decided to install strain guys 1000 ft. apart. After some 20 miles of this work was completed it was found that trolley breaks were more frequent and in fact there was 50 per cent more trouble on this section than on more than double the amount of line on which there were no strain guys.

CROSS-ARMS

It is very important that arms be located on poles so as to give maximum clearance for wires, especially for telephone and signal purposes. Care should be exercised to obtain good timber free of knots, sap and wind shakes. They should be delivered unpainted and dipped in wood-preserving compound before using.

Arms supporting high-voltage porcelain insulators should be 4 3/4 in. wide by 5 3/4 in. high, the length depending on the number of wires carried and the spacing necessary.

Arms supporting feeder, telephone and signal wires may be 3 1/4 in. wide and 4 1/2 in. high, the length also depending on the number of wires to be carried. All arms should be bolted to poles, using 3/4-in. machine bolts for extra heavy arms and 5/8-in. machine bolts for the light arm. All bolts and other hardware should be either galvanized or sherardized.

BRACES

On extra heavy high-tension arms 3/16-in. x 1 1/2-in. one-piece galvanized angle-iron braces are preferable. These should be fastened to the bottom of the arm and to the poles by means of 1/2-in. x 4-in. galvanized lag screws. On the lighter arms either the small one-piece angle-iron brace fastened to the arm with two 3/8-in. x 3-in. lags and to pole with 1/2-in. x 4-in. lag, or the flat braces in pairs, bolted to arm and lagged to pole, will suffice.

TELEPHONE AND SIGNAL CIRCUITS

No. 10 bare iron or copper wire on poles on right-of-way in the country where wires properly clear foreign wires and trees, and weatherproof insulated wire on poles or spans in towns, are suitable for telephone circuits. These circuits should be transposed at least every 1000 ft. A rolling transportation with both wires tied to a single large-type transposition insulator gives best results. Loose connections and splices make noisy and weak talking lines. It is therefore important to make good joints and use copper twist connectors only.

For signal circuits No. 10 weatherproof copper or copper-clad wire is preferable.

TELEPHONE INSULATORS

Insulation is an important factor in the operation of telephone lines, especially when carried on same poles with transmission wires. Unless good insulators, porcelain preferred, made for a working voltage of not less than 6000 volts, are used, the lines may pick up a considerable amount of leakage current from the high-tension circuits and make the telephone line noisy and difficult to hear or talk over.

TELEPHONE EQUIPMENT

There is a difference of opinion regarding the relative advantages of telephones located in booths at sidings and portable telephones on cars with jack boxes on poles at sidings and approximately every mile between sidings. Of course, both plans have their advantages, but when the telephones are located in booths out on the line it is necessary to have one at each siding, including the ones that are not used for scheduled meeting points. Sometimes trains do not use these sidings for several months and the trainmen do not have occasion to use the telephone. Consequently the condition of the instrument is not known until it is needed and then it is quite likely to be out of order, whereas the car telephone is frequently used and its condition is always known. Furthermore, if it should get out of order it can be replaced with another portable set at one of the terminals or at the dispatcher's office without delay to the train.

Where jack boxes are used at each siding there should be two so located that trainmen may communicate with the dispatcher from the car without fouling switch points. Where there is a commercial telephone line in addition to the regular dispatcher's line an additional jack box should be connected thereto at all sidings for use in case of trouble on the dispatcher's line.

Test switches should be installed in all substations and junction points, and occasionally at other stations where employees are on duty. These will enable the dispatcher or linemen to locate quickly the section of the line in trouble.

The dispatcher's telephone switchboard is usually made up with small knife-blade switches, which wear and work loose quickly and cause poor connection and noisy and poor talking lines. The cord and plug-type board is more convenient and offers more combinations and greater flexibility in the operation for the dispatcher, but unless this type is specially designed and built to withstand burn-outs or breakdown in insulation considerable trouble may be experienced in case telephone wires become crossed with higher voltage wires.

It is therefore necessary to get away from the standard telephone apparatus and to use equipment of more rugged design with increased insulation. This is easily done, but the manufacturers call it special and the price we must pay for it is entirely out of proportion to the price of standard equipment. This seemingly excessive price has a tendency to limit the demand for the equipment most suitable for electric railway service. The demand for the standard apparatus is practically unlimited and it can be built for a lower first cost. But its use results in increased maintenance expense, and this, I believe, strengthens the theory that only through standardization can electric railways secure the material most suitable for their service at a reasonable price.

HEADLIGHTS FOR INTERURBAN SERVICE

BY C. DORTICOS, GENERAL ELECTRIC COMPANY

In the early trolley systems the incandescent headlight was standard and adequate, but with the advent of larger cars and higher schedule speeds a more powerful headlight became necessary. To meet this condition several types of inclosed carbon lamps were placed on the market and soon came into general use. This type of lamp (see Fig. 1) consisted of a cylindrical casing inclosing a solenoid mechanism which controlled a clutch by which the upper or positive carbon was separated from the lower, which was attached directly to the frame. The carbons are connected in series with the resistance, and for dimming "in town" service a wire mesh screen was hooked over the door, or, as in a large number of cases where the screen became lost, a piece of newspaper would answer. An improvement later introduced was the installation of incandescent lamps in the same frame to be used for dimming purposes.

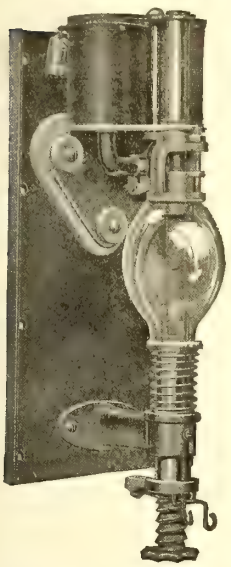


Fig. 1—Mechanism of Form "B" Headlight

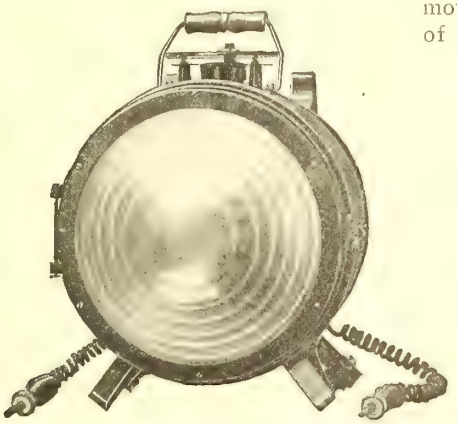


Fig. 2—Headlight with Semaphore Lens and Spherical Reflectors

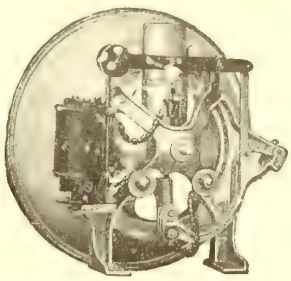


Fig. 3—Mechanism of Luminous Arc Headlight

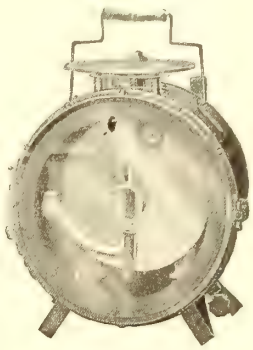


Fig. 4—Lamp Equipped with Special Reflecting Mirror and Chimney Shield

The ever increasing mileage and still further increase in speed soon necessitated an increased track illumination. To meet these conditions the General Electric Company developed the luminous arc headlight, adapting as its light source the principle embodied in the luminous arc lamps for street lighting, more than 60,000 of which are in use in the principal cities of this country. This headlight has high efficiency, long burning electrodes with consequent economy of operation and simple and rigid mechanical construction. The basic principle of this lamp, six different types of which have been developed for railway service, is as follows:

The mechanism (see Fig. 3) is of the non-regulating type and is designed to strike an arc of fixed length. Slow electrode consumption provides opportunity for sufficient natural interruptions of the circuit, incidental to regular operation, to maintain the arc within safe voltage limits. This insures a simple and stanch construction, suitable for all classes of service. The moving elements of the mechanism are mounted on a sliding galvanized iron frame which is secured to the casing by means of a wing-nut and stud. Contact is made at the back of the casing to terminals on the back of the frame. Thus the lamps may be easily removed for repair or inspection. One of the characteristics of the luminous arc is its reduced luminosity when reversed. Advantage is taken of this feature for dimming purposes inside of city limits. By simply throwing a switch the motorman is enabled to secure intense or radically diminished illumination at will.

A solid convex heat-resisting glass window is provided for the doors of all lamps, reliance being placed solely upon reflectors for light distribution, but when extreme concentration of the beam is required the railway semaphore signal lens is introduced. The latter is, in fact, a molded plano-convex lens with a series of circular sections so arranged as to avoid excessive weight and to secure the best optical results. It is exceptionally strong and has the advantage, due to its long focus, of remote location with respect to the arc. Consequently it is affected but slightly by heat radiation from the arc.

The positive electrode, or anode, is a stationary copper forging, covered by a non-oxidizing metal sheathing. The life of this electrode is from 2000 hours to 3000 hours. The negative electrode, or cathode, consists of a thin welded steel tube containing an efficient mixture of iron oxide and other suitable ingredients and attains a life of fifty to seventy-five hours.

Following is a brief description of the different forms of headlights made by the General Electric Company for railway service.

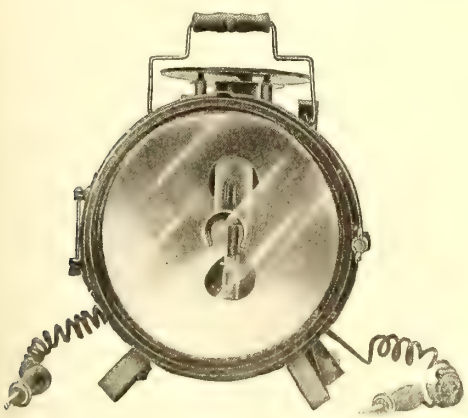


Fig. 5—Lamp with Parabolic Reflector and Shield for Cutting Out Undesirable Rays of Light

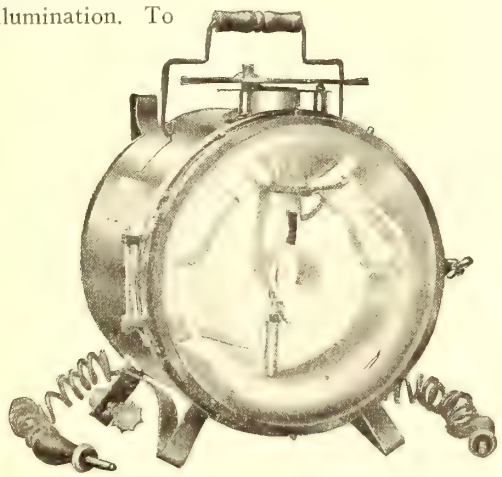


Fig. 6—Lamp Similar to Fig. 4, but with Two Incandescent Lamps for Subdued Lighting

Fig. 2 illustrates a luminous arc headlight with semaphore lens and spherical reflector. This headlight is known as the form D-6 and is the most popular type. It is also furnished as the form D-7 with incandescent lamps as the dimming feature. This form gives the extreme concentrated beam above referred to. It is the latest development in the field of interurban car lighting and is admirably suited for the purpose. The motorman is enabled to pick out objects within the small intensely concentrated zone of light at a distance of approximately 2000 ft., and as it is estimated that an interurban car running at 60 m.p.h. can be brought to a stop within 1750 ft., the use of this lamp is attended with an ample factor of safety.

Fig. 5 shows the form D-1 headlight with parabolic reflector and chimney shield for cutting out undesirable rays. This lamp, known as the D-3, is also furnished with an incandescent lamp as a dimming feature. It is recommended where wide distribution of light is desired and is especially useful on roads having a large number of curves.

In Figs. 4 and 6 there are shown forms D-2 and D-8 equipped with Mangin mirror and a chimney shield similar to that previously described in connection with the form D-1 lamp. When a company desires a beam of moderate width to carry a long distance and to illuminate brightly the roadbed directly up to the front of the car this lamp has much to recommend it. The form D-2 headlight may be reversed for dimming, while form D-8 is fitted with two 110-volt, 16-cp incandescent lamps for the purpose. I believe that the different forms which have been described will meet all the different conditions of service.

TRAILER OPERATION VERSUS MULTIPLE-UNIT TRAINS

BY CLARENCE RENSHAW, WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY

The wide variations in the traffic which a railway must handle at different hours and on different days present a most difficult problem for its management. The traffic apparently demands that the cars be operated on a variable headway, but safety and economy incline toward uniformity. If the cars could only be gradually expanded and contracted, like that piece of hand baggage, the "telescope," formerly so popular among rural travelers, both requirements could be satisfied and such cars ought to be in great demand by interurban roads. Unfortunately, the manufacturers of electric railway equipment have not yet been able to produce cars of exactly this type. They have been able to produce cars in which, starting with a given size, the capacity can be doubled, then increased 50 per cent, then 33⅓ per cent, and so on. These have been used for years on a number of roads under the name of "multiple-unit trains," and it is only lack of acquaintance with their advantages which prevents their rapid increase.

A full realization of the advantages of multiple-unit operation can be obtained only on roads having ample substation capacity and a liberal feeder system. These are usually found either where a third-rail is used as a source of power supply or else where the single-phase system is employed. Almost every road should be able to operate trains of two or even three cars, however, if the size of the cars is properly fixed.

VARIATIONS IN TRAFFIC CARED FOR ON MULTIPLE-UNIT LINES

The extent of the variations in traffic which must be cared for at times is indicated by Fig. 1. This shows the number of passengers carried on each trip of a certain interurban line for Saturday, June 3, and Tuesday, June 6, 1911. It shows also how the crowds were cared for by the use of two and three-car trains. The traffic for these two days is typical of that for any clear Saturday during the summer and any ordinary weekday.

The road from which these figures were obtained is single-track and is approximately 25 miles long. The cars are operated at half-hour headway during most of the day, and as a rule make twelve or fifteen flag stops per trip. The run is made in forty-five minutes. A most interesting feature of this operation is the fact that no addition is made to the train crew when two-car trains are operated. The cars have end doors for passing from one to the other and a motorman and a conductor are able to handle easily the heavy traffic shown. When three cars are used an extra man is added to the crew to assist the conductor. The operation on this road certainly approaches the telescoping car and serves as an excellent testimonial to the multiple-unit system.

A certain line in the coal regions of West Virginia offers a typical example of a somewhat different class. This road is also approximately 25 miles long and single-track. As originally put in operation it employed single cars only, seating fifty-six people and equipped with four GE-73 (75-hp) motors. The cars were provided with type M control, but had straight air brakes and no drawbars, so they could not be coupled together.

After the line had been in operation several years and the traffic had grown beyond all expectations, drawbars were added to the cars and the brakes were changed to automatic so that two-car trains could be run. At the same time some additional cars were purchased. These were made somewhat smaller and lighter than the original cars and were equipped with four Westinghouse No. 306 (50-hp) motors and type HL control. When train operation was started it was found that while it was entirely possible to operate two of the large cars together, it proved to be rather undesirable on account of the load on the substations. With train operation the small cars, however, proved a decided success from the very beginning and have become so popular that several more duplicate equipments have since been purchased. Half of the small cars are provided with baggage compartments and seat thirty-six people. The other half are for passengers only and seat forty-six. A two-car train of the small cars thus provides a baggage compartment and eighty-two seats, as compared with fifty-six seats and no baggage compartment on the single large cars. The train makes the same schedule as the single large cars with equal facility. But on account of the somewhat lower speed gearing of the motors and the reduced resistance of a two-car train it takes very little more power. By operating a single small car, a single large car, or a train of two cars, the seating capacity can be nicely graded to suit the traffic.

Many roads no doubt hesitate to employ multiple-unit trains on account of a supposed inadequacy of substation and feeder capacity. The requirements in these items can be kept within very reasonable limits by proper training of the motormen. Some years ago I made a number of tests on one of the early interurban lines in Indiana. The cars were equipped with two 150-hp motors, or a total of 300 hp each, and were geared for a maximum speed of about 50 m.p.h. Great care had been taken in training the motormen on this line and as a result I was surprised to find that the maximum current per car rarely exceeded 350 amp. On other roads, where less care had been taken in instructing the men, I have noted currents of over 600 amp on cars with only the same horse-power of equipment. It is quite evident from these figures that two-car trains in the hands of the first set of men could have been operated with peaks little or no higher than those caused by single cars in the hands of the second set.

Where multiple-unit trains are employed it is usually not necessary to have either cars or equipment as large as if they were operated singly at all times.

In the effort to avoid the operation of other than single cars the size and equipment of interurban rolling stock has been increased to huge proportions. In many cases these big cars run most of the day with a lonesome dozen

or two passengers for the sake of being able to handle the fifty or sixty who must be provided for on a few special trips. To make proper use of multiple-unit trains a size of car more nearly suited to the average load should be employed and the capacity expanded by coupling up when necessary. With equipments properly proportioned on this basis there are probably few roads where two-car trains could not be run.

USE OF EXTRA CARS AS SECTIONS

Before the days of multiple-unit trains additional capacity was frequently secured by the use of extra sections running on the same time and orders as the regular cars. This arrangement multiplies the difficulties of safe train dispatching very largely and in addition requires complete extra train crews. Extra sections are, of course, sometimes necessary where cars have not been equipped with train control. As a rule, the dangers of this arrangement are recognized and its popularity for high-speed lines is declining.

COMPARISON WITH TRAILER OPERATION

The principal competitor of the multiple-unit train, or perhaps predecessor would be a more proper term, is the combination of a motor car and a trailer. In obtaining extra seating capacity by the use of trailers many people seem to feel that they are, as it were, "putting one over" on their motor equipments and obtaining extra work out of them without their knowing it. In fact, some even seem to believe that just as the work of the motorman is not materially increased by the addition of a trailer, so the work of the motors likewise remains the same. This, however, is far from the fact. It is true that the power taken by a motor car when running at constant speed on level track is increased only a comparatively small amount by the addition of a trailer of the usual proportions, but in starting and accelerating or in propelling the car up grades the tractive effort which the motors must deliver is in almost direct proportion to the weight. In any service where stops are frequent or grades are severe the addition of a trailer means a considerable increase in the load on the motors.

In local service, where flag stops are made also, the greater the number of people carried on any given trip the greater, as a rule, is the number of stops which must be made. Heavy traffic trips where trailers are employed thus necessitate a maximum number of stops on account of the greater number of people carried. Even if the trailer had no weight, the extra number of stops is sufficient to make such trips hard on the motors unless, of course, they are worked much below their capacity when operating without the trailer, and the use of a trailer under such circumstances, at the very time when it imposes the greatest burden on the motors, is frequently a prolific source of worry for the master mechanic, work for the armature winder and business for the spare-part salesman.

EFFECT OF TRAILER OPERATION ON MOTOR TEMPERATURES

Unfortunately, I have no data at hand from tests on interurban roads to show the effect on motors of adding a trailer. Figs. 2 and 3, however, taken from some tests made on single-truck city cars, should serve to illustrate the point.* In these tests a coil of iron wire was carefully calibrated in an oil bath and the relation between its resistance and its temperature accurately determined. A field coil was then made up with the iron wire coil on the inside and this field coil was placed in one of the motors on a car. Leads from the iron wire coil, connected to a portable Wheatstone bridge on the car platform, gave a ready means of measuring the temperature of the motor. Measurements could be made at any time without regard to whether the motors were running or standing still or whether the car was using power or coasting.

The car was put in regular service on several successive days; first, on a route where the cars were operated alone, and later on another route where a trailer was attached to each car during the morning and evening rush. By means of the arrangement described above temperature readings

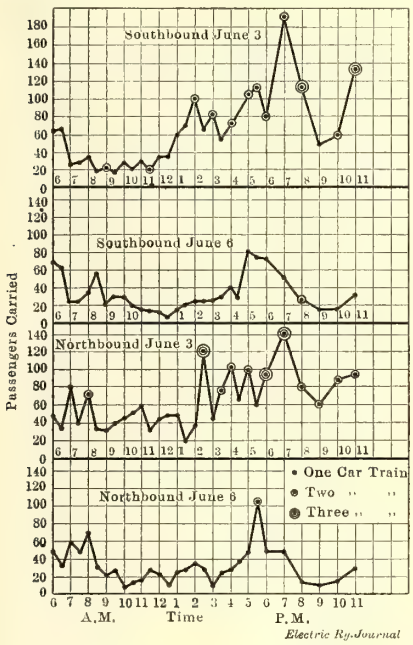


Fig. 1—Passengers per Trip of an Interurban Line

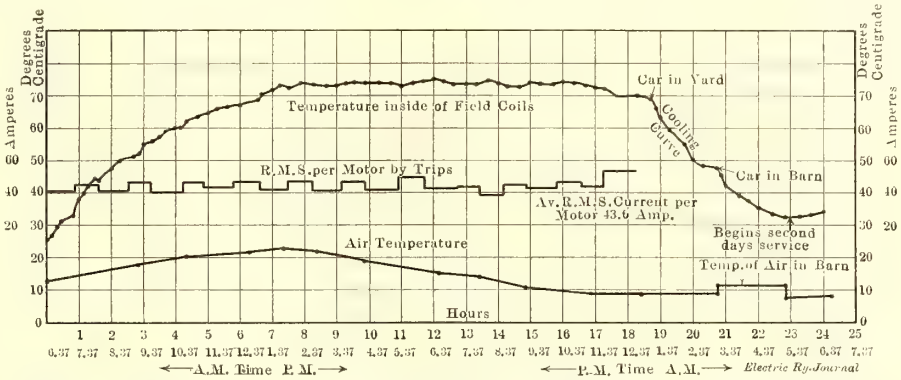


Fig. 2—Temperature and Root-Mean-Square Readings for Runs with Motor Car Only

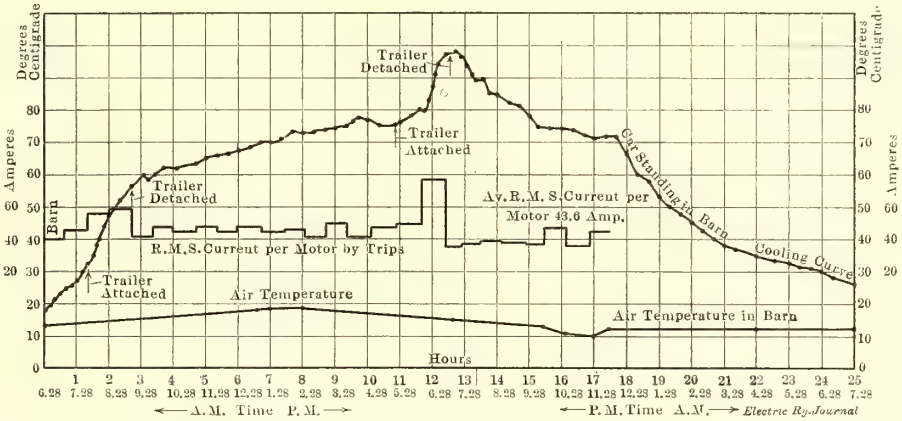


Fig. 3—Temperature and Root-Mean-Square Readings for Same Runs as Shown in Fig. 2, but with Trailer

*The results of these tests were included in a paper read before the American Institute of Electrical Engineers, reported in Vol. XXII, page 279. They were also referred to briefly in a paper prepared for the committee on equipment of the American Electric Railway Association in 1909. The data are so relevant to the present discussion, however, that the writer trusts he will be pardoned for repeating them here. [See also ELECTRIC RAILWAY JOURNAL, Oct. 7, 1909, page 755.]

were taken every five or ten minutes, not only during the day when the car was in operation, but also at night when the car was in the barn and the motors were cooling.

In addition to the temperature measurements, other readings were taken, from which the root mean-square current in the motors, which determines the heating, could be found.

The curves in Fig. 2 show the results obtained in a test with the motor car only. Those in Fig. 3 show the corresponding results where a trailer was hauled for the two trips noted.

It will be seen from Fig. 2 that the temperature of the motors at the start was about 25 deg., because they had not had time to cool off thoroughly from their service of the day before. During the first eight hours the temperature rose gradually until it reached a value of approximately 75 deg. C., at which it remained practically constant until the car was turned in for the night. It will be seen, also, that with the exception of a regular difference between the outbound and inbound trips, due to the lay of the land, the loads on the motors, as shown by the root mean-square current, were remarkably uniform.

Referring now to Fig. 3, we find that the addition of the trailer for the one trip in the morning, when the motors were fairly cool, merely caused the temperature to rise somewhat more rapidly than in Fig. 2, without causing it to reach any higher value. But in the afternoon, when the motors had reached the constant temperature at which they would otherwise have remained, the addition of the trailer for the short space of about an hour and three-quarters raised the temperature from approximately 75 deg. C. to 100 deg. C. Most of this increase took place on the heavy outbound trip during the latter half of the time. A motor, having once reached a high temperature, retains its heat for a long time, and even with the trailer removed and the motors working again at their normal loads a period of approximately two-and-a-half hours was required for the motors to cool down again to their normal running temperature of 75 deg. C. Had the trailer been retained for another round trip it is evident that a much higher temperature would have been reached and a much longer period required to cool again. Even as it was, a temperature of practically 100 deg. C. was reached on a cool October day with an air temperature of 15 deg. C. This means that on a hot summer day the temperature of the motors would have been dangerously close to the softening point of ordinary solder.

The variation in the loads on the motors with and without the trailer are shown by the curve of root-mean-square current. It should be noted that the load on the motors for the two inbound trips with the trailer was approximately 15 per cent and 5 per cent, and that for the two outbound trips 18 per cent and 50 per cent, greater respectively than the greatest load on any trip in the same direction with the motor car only.

OTHER OBJECTIONS TO TRAILERS

In addition to the effect on the motor equipments the use of trailers for rush-hour service has several disadvantages from a transportation department's standpoint. The most important of these is the matter of speed. Handicapped already in making time and maintaining the schedule, on account of the greater number of stops which usually must be made, the heavy trips, where trailers are employed, are delayed still further by the reduction in speed due to the added weight. The inability of a trailer to move by itself also causes some delays in picking it up, dropping it and in shifting or running around it at stub end terminals.

CASES WHERE USE OF TRAILERS IS ADVANTAGEOUS

Although their use for local traffic is attended by the various disadvantages noted above, trailers may be employed, with very good results, for certain other classes of service. It has already been pointed out from Fig. 3 that although the addition of the trailer for the morning trip when the motors were fairly cool caused the temperature to rise more rapidly than it would otherwise have done, the value actually reached was not abnormal. From the general shape of the curve, moveover, it is evident that the trailer might even have been retained for a second round trip without causing the motors to exceed their ordinary normal maximum of 75 deg. C., and had the trailer been attached when the car first left the barn in the morning it might easily have been hauled for three round trips without causing as high a temperature as by hauling it for only one round trip after the motors had become warm. Thus, by taking advantage of the thermal capacity of the motors, attaching trailers only to motor cars which have been out of service for five or six hours and leaving them attached for only a limited number of trips, extra capacity for special occasions can sometimes be obtained without overheating the motors. In certain classes of service also the extra load which would ordinarily be imposed on the motors by the addition of a trailer can be compensated for by a reduction in the number of stops.

In the electrification of a branch line of a certain steam railroad, which I happen to recall, the equipment was designed with the idea that as a rule motor cars only would be used. They were intended to make flag stops about 1 mile apart. It was realized, however, that on certain special trips extra crowds would have to be handled. It was planned on such occasions to have each motor car haul a trailer, but when doing this to have it stop only at the original steam railroad stations, which averaged about 2¼ miles apart. By this reduction in the number of stops the motor cars were able to haul the trailers for any desired number of trips, to make the same schedule speed as when running alone, to impose less load on the motors and still to have even more margin for making up time.

EFFECT OF RECENT IMPROVEMENTS ON TRAILER AND MULTIPLE-UNIT OPERATION

The many improvements in motors and control during the last few years have an important bearing on trailer operation. Interpole motors should not be deliberately overloaded any more than the older types, but their superior commutating ability and the more heat-proof character of their insulation enable greater advantage to be taken of their thermal capacity than was ever before possible. So, too, the use of type HL control permits this to be done safely and the full power of the motors to be utilized without the risk of blowing up the controllers. Even with trailers at their best, however, the multiple-unit train offers many advantages. In the first place, the tractive effort required to operate two motor cars at any given speed on the level is considerably less if they are coupled together in a train than if they are run singly. At the same time, that required to start, to accelerate and to propel them up grades is no greater. On this account two motor cars, when operated as a multiple-unit train, will attain a higher maximum speed and thus have more margin for maintaining the schedule than if operated separately.

Since both cars are able to move independently the making up or separating of trains can be done with a minimum of shifting. At stub end terminals there is no need for any change in the relation of the cars, for either may be used as the leading car. If the motors have been properly applied in the beginning no question of overloading them need be considered in making up trains, since the weight handled per motor remains constant, regardless of the number of cars. On account of this uniform loading motors can be applied to the cars more efficiently, both as to size and gear ratio, than if trailer operation had to be provided for, and smaller motors, geared for lower speed, can be used for a given car and a given schedule. All cars can be alike, so that a less number of spares will give equal margin for emergencies. On account of the

ease with which two-car trains can be made up when necessary, smaller cars can be employed and cheaper operation thus secured.

Many special combinations can be worked out to suit local circumstances. For instance, a road having a main line with a branch at some distance from one terminal can run trains to the junction and split them into single cars for the rest of the route, thus reducing the headway on the main line, as well as effecting a saving in platform labor. Where necessary, a trailer can be added to a train of two motor cars, thus making a three-car train with only half as much extra weight per motor as where the trailer is connected to a single motor car.

In view of these and many other advantages for handling varying crowds and still maintaining a close schedule the employment of trailers, even under favorable circumstances, seems a mere makeshift when compared to the use of multiple-unit trains.

LITTLE THINGS THAT COUNT

BY J. C. SCHADE, ASSISTANT SECRETARY-TREASURER WINONA INTERURBAN RAILWAY, WARSAW, IND.

Before going into the subject assigned me I want to thank the committee for giving me the privilege of writing a paper for this meeting, as it is indeed a pleasure for an ordinary railroad man to break away from car miles, bent armature shafts and high-tension lines and delve into the classics for a few brief moments.

These conventions are the best part of the railroad business, especially to those who attend and take active interest, and every railroad man should make it a point to take an active part in all discussions. If you haven't much to say, say it anyway, as it may help some one else. The man who has lived all his life in that part of the country where cyclone cellars are necessary naturally thinks that the rest of the world lives in cyclone cellars. Bring that man to the city and he is amazed to find human beings dwelling from five to six and eight stories above the ground.

Some railroad people are in the same class with this man. They never get away from their own line. They do not know what is going on in the rest of the world. The primary object of these meetings is to exchange ideas for the general betterment of the service, and I will call attention to some of the little problems that are confronting us every day.

Interurban lines were primarily built for the purpose of handling local traffic, but with the widespread increase of trackage during the last few years some of our more energetic traffic men have been promoting long-distance travel, and from present indications through train service will become popular with the general public. To handle this class of business successfully it will be necessary to standardize equipment and methods of operation, and some roads will be compelled to build additional tracks in congested districts so as to conserve that one important factor in long-distance travel—time. It will also be necessary for interurban companies to follow the practice of steam lines and cut down curves and grades and build belt lines and cut-offs through towns. Suitable locations for passenger and freight stations should not be overlooked, and sites should be purchased now while prices are reasonable.

The time is not far distant when two or three-car train operation will have to be considered. Our present equipment will not permit of our handling crowds of 200 or more with marked satisfaction. Consequently our excursion business has not been developed and our revenues have suffered accordingly. During the month of July six motor cars, transporting six companies of the Indiana national guard, were passed over our line to Ft. Benjamin Harrison, taking six crews and six pilots. This movement should have been handled in two three-car trains with two three-men crews and two pilots, or a total of eight men against eighteen. I believe a profitable excursion business could be worked up if we had the necessary trail cars to handle it.

While the campaign for long-distance traffic is going on let us not forget our local business, which I believe makes up from 90 per cent to 95 per cent of our revenue. Let us show every consideration to the farmer who lives along our lines, and keep our trains on time so that he will not have to wait at some isolated road crossing for a car that is from twenty to thirty minutes late. Some day we are going to get the farmer's freight business, which may not be large in individual instances, but "every little bit helps."

On-time trains are one of the best advertisements a railroad can have. When a train is late hundreds of people are being discommoded and some of the compliments paid your line and management would not look well in print. Our transportation departments should give this matter more thought and consideration. If the power or the equipment is at fault, make an effort to rectify the error. If the schedule is too fast, cut it down, but by all means keep the trains on time.

Clean cars are another very necessary requirement. Schedules should be arranged so that the cars can be swept out at the terminals. They should be thoroughly scrubbed inside and out at least two or three times each week.

The toilet rooms on some of the older type of interurban cars are merely excuses, and some of them mighty poor excuses. If we want toilet rooms on our cars let us have good ones, or none at all.

Imagine yourself in the seat of a dirty car on a hot day, a conductor in a shabby uniform, with dirty hands and a three days' growth of beard on his face, asking for your fare or ticket. This is a condition found on some of our lines. To overcome this have a talk with the shop foreman, and if you find that you do not have enough cars to make the proper lay-overs for cleaning and overhauling, get more cars. The next time you meet a motorman on duty with a three or four days' growth of beard hand him the price of a shave. You needn't say anything—just hand him the money. It will prove to be a good investment and can be charged to "advertising expenses."

The drinking-water proposition on interurban cars will stand considerable improvement. Instead of profiting by the experience of steam lines it seems that we are beginning where they began. It is true that most of our passengers are short hauls, and it would seem that they are not entitled to a 2-mile ride for 5 cents with a drink of pure, cold water thrown in. But we must remember that conditions have changed during the past five years, particularly on those lines that run through dry territory. Instead of giving a 2-mile ride and a drink of water for a nickel, let us give a good cool drink of pure water for 5 cents and throw in the 2-mile ride for "good measure."

Did it ever occur to any of you that electric fans are used everywhere except in interurban cars and in interurban stations? Figuratively speaking, we have electric current to burn, and it seems strange that we cannot find enough to operate electric fans in our cars and stations. It is true that while cars are in motion we get plenty of air, but it gets very hot at passing points and at stations when cars are standing still. Fans don't cost much money and the current consumed would hardly be noticed, and it would seem that a couple of fans in a car would make a hit with the traveling public.

Car lighting is another proposition that should receive consideration. We should all make it a point to bring this matter to the attention of the manufacturers whenever the opportunity presents itself, and by making a concentrated effort results will be forthcoming.

If we want to keep pace with the steam lines we must look after the little things that make travel popular and convenient by the "little things that count," namely: Re-

adjustment of freight rates, standardization in everything, on-time trains, clean cars, decent toilet rooms, and any number of other conditions which seem too small and trivial to claim our attention.

When you have a few days to spare take a ride over your neighbor's line, and if you see anything wrong tell him about it. It might make him mad, but tell him, anyway; he will thank you later. I will venture to say that there are any number of men in this meeting who on their trip to this convention have observed some seeming defect in equipment and operation on the roads over which they have come which would be of interest and benefit to the other members, and to get these observations before the convention I suggest that the program committee set aside an hour at each meeting to give members a chance to talk about these things. The supply men are perhaps in better position to criticise than anyone else, owing to the fact that they do considerable traveling over the various lines, but are naturally a little backward in making their criticisms, fearing perhaps that they might offend the feelings of some good customer. But I want to say frankly that on the part of the company with which I am connected we want you to make your criticisms known. If you do not find it convenient to talk to us about it, we will thank you to write, or, better still, you might offer your criticisms at these meetings for general discussion.

TRAFFIC

BY J. F. KEYS, GENERAL PASSENGER AGENT DETROIT UNITED RAILWAY

One of the important branches of the traffic department is that of special or chartered cars, and as this branch has not, I think, received much consideration at any of the meetings of this association I shall dwell especially upon it.

The chartered-car business is important not only directly from a revenue standpoint, but also as a means of developing both the regular passenger traffic and the express and freight traffic to a considerable degree.

In our folders and printed matter we continually advertise the beauty spots for picnics and other resorts on our lines and offer the services of the representatives of our passenger department in aiding in the selection of places for outings. We keep informed about the accommodations at the different hotels and resorts, some of which are noted for their fish, frog or chicken dinners and others for their liberality in granting concessions, such as the free use of their grounds, stoves and dancing pavilions, etc. The places which are run in a respectable manner are suggested to individuals or committees and many carloads of picnickers and convention delegates are taken out in chartered cars for a day's or evening's outing.

We have a large, beautiful parlor car, "Yolande," with kitchenette and dishes for twelve persons. This car has a set of twenty wicker chairs for a small party, or fifty leather chairs for a larger party, and is kept busy on our interurban lines with Detroit business alone. Circulars have been distributed broadcast in Detroit and vicinity descriptive of the car and containing views of it. A special crew has been detailed to operate the "Yolande" and parties are assured of every courtesy from it. The conductor is a negro, and besides his other duties makes himself useful in heating coffee, etc., serving luncheon and looking generally to the comfort of his passengers.

We have also done considerable business with funeral parties and have two large black cars for this purpose. Regular crews are detailed for these cars and are familiar with the different routes to cemeteries. These cars originally were advertised in the newspapers, and circulars descriptive of them have been placed in the hands of all undertakers. The result is that the cars are out practically all the time and quite often are used for one funeral in the morning and another in the afternoon. Our funeral cars have forward compartments with panels which drop down to permit the loading of the coffin and floral pieces. In these compartments are accommodations for the pallbearers. The rear compartments are reserved for the family and friends. From now on we shall have to compete with the auto-hearse, but I believe that the low rates which we charge for the funeral cars will enable them to hold our share of the business.

We have but recently completed a series of weekly trips to forty different towns and cities on our system, made by the Wholsalers and Manufacturers' Association of Detroit for the purpose of meeting the proprietors of the various business houses in those towns. These trips were arranged by the chairman of the trades promotion committee of the association and our passenger department, and ten highly successful trips were conducted. From two to four cars were chartered for each trip. The various firms were supposed to be represented by at least one of the proprietors, and it was thoroughly understood that no business was to be solicited and no bills were to be collected. It was purely a trades promotion movement in the interests of Detroit business houses, and, from the warm reception received in all cities and towns visited and the entertainment given, it cannot but redound to the interests of the firms represented. Our passenger, publicity and freight departments were all represented on these trips and we made it our business to become acquainted with every man on each trip, as well as to meet the prominent men in the various places visited. In this way we were able to make more friends for our companies and in so doing will get more business, both freight and passenger. We were also able to straighten out or explain away some grievances that had been nursed for some time. In some cases merchants explained that their orders went to cities farther away because quicker deliveries were made, and this was the cue for our freight department representatives to get busy and solicit the business for our lines.

I have gone rather deeply into the details of these particular trips for the reason that I believe that such trips can be worked up to good advantage by other companies, especially to increase their freight and express business and also their passenger traffic, because the proprietors of the big firms must appreciate the number of calls their representatives can make in a day, at a small expense, by patronizing the electric lines.

Railway properties having city lines such as ours have an advantage over their competitors in working up business in that they have the facilities for advertising, which the others have not. Only last Thursday we ran a very successful excursion from Flint to Orion and return, carrying the grocers and butchers to the number of about 800 in thirteen chartered cars. In spite of very keen competition and low rates we were able to take this business from the railroads and maintain our regular rates by springing a few good talking points at the last minute in the way of advertising the excursion. At the cost of $1.50 for 100 we had banners printed reading, "Grocers and Butchers' Picnic at Lake Orion, August 16th." We agreed to carry these banners on every city car in Flint for a week prior to the picnic, for which about fifty banners were required. We also agreed to give the committee fifty banners to be carried on the grocery, delivery and bread wagons in Flint. Although these were valuable mediums for getting the people out, it cost practically nothing. This party, on the going trip, was handled between 7 a. m. and 8 a. m. and was taken back on cars leaving hourly from 5 p. m. until 11 p. m., so that old and young were taken care of practically at their own convenience. The excursion was such a success that we were assured by the executive committee of the organization that we should have the business next summer.

The secret of the success of electric railway properties

is largely the frequency and convenience of the service and, like regular trains, chartered cars may be operated at practically any time and between any points.

I have endeavored in the foregoing to show where and how chartered-car business may be got and to emphasize the fact that all traffic departments derive benefits to a considerable extent therefrom. It is a well-known fact that the more people travel the more they wish to travel.

THE TROUBLES OF A BAGGAGE AGENT

BY O. E. ANTHONY, BAGGAGE AGENT TRACTION TERMINAL STATION, INDIANAPOLIS, IND.

The troubles of a baggage agent are many and frequent. Many times a day we have passengers come to the baggage room who do not know what is meant by the term "baggage," as specified by the rules of the Central Electric Traffic Association, as well as by the statutes of many States. That is, they ask us to check such articles as baskets of fruit, musical instruments, cases of beer and various other things not coming under the term "baggage." This causes much trouble and it takes valuable time to explain the matter to the passenger, for explain we must or offend him.

Then, again, agents along the various lines who do not understand the rules thoroughly will check articles not classed as baggage, and when the passenger wishes to recheck such articles at our station, and we refuse to do so, he often becomes very indignant. This annoyance could be lessened to a great extent by a campaign of education among the agents at the smaller stations, for it seems that most of the trouble originates there, due no doubt to the fact that the agent acts as both ticket and baggage agent, as well as freight agent, and is kept very busy, especially at train time. The passenger under these circumstances usually insists that we must recheck his baggage, although it has been wrongfully checked by the agent at the starting point.

Commercial traveling men, as a rule, do not cause us much trouble. They are usually acquainted with the rules and do all they can to assist us in handling their baggage quickly. However, there are exceptions to this rule. A majority of commercial men carry excess baggage, and frequently, when in a hurry to get baggage out on a certain car, we accept the statement of the traveling man as to the amount of excess he is carrying. On numerous occasions we have found these statements to be incorrect, whether made so purposely or not I do not pretend to say. I think it a fair estimate to state that seven out of ten will make a correct statement, while the other three will make a false statement. Whenever a traveling man makes a false statement and we detect it before his baggage leaves the station we attach a C. O. D. check to the baggage to cover the excess. This all takes time, when time is valuable.

The traffic rules provide that each passenger shall be entitled to carry 150 lb. of baggage free. It often happens that a traveling salesman having excess baggage will attempt to have it checked out on the ticket of himself and a friend whose destination happens to be the same. This attempt is made to avoid paying excess and is against the rules. We refuse to check such baggage when we detect it in time. However, when there are two men traveling together and working out of the same trunks, it is allowable and perfectly regular under our rules to check 150 lb. of baggage for each ticket. But it often requires diplomacy and good judgment to find out whether this is true or whether the passenger is trying to impose on you and to avoid at the same time offending the passenger.

Another constant source of trouble comes from passengers who have baggage checked in coming to the baggage room within a very few minutes of the time they desire to leave and asking to have their baggage checked out immediately on a certain car, usually due to leave in from three to five minutes. We lift their old checks and issue new ones, but when we go to attach the checks to the baggage we find that there is a storage charge. Of course, we have to revert again to the C. O. D. check, which causes delay, and the baggage frequently misses the car on which the passenger departed.

There is also a great deal of trouble wth C. O. D. checks attached to incoming baggage from points on various lines where the agents are not familiar with the rules relating to C. O. D. checks. They frequently send us baggage with only a C. O. D. check attached, or sometimes with two checks attached, but frequently these checks do not state the amount to be collected, the originating station or whether the C. O. D. item is for excess or storage. This causes a great amount of trouble and the patron usually gets very angry, as it means delay, and the only way of adjusting the matter is to communicate with the agent at the starting point. This leads me to make the suggestion again that a campaign of education be conducted among the local agents, especially at the smaller stations. It would also be well to conduct such a campaign among the traveling public, by printing the rules governing the handling of baggage in timetables and folders and also by bulletins or posters placed in all the stations along the various lines. I understand some of the roads are printing the rules in folders and timetables, but the practice should be universal.

TERMINAL BAGGAGE ROOM
INDIANAPOLIS

RECORD OF BAGGAGE CHECKED OUT, AND COLLECTIONS FOR EXCESS C. O. D. AND BAGGAGE STORAGE

T. H. I. AND E. TR. CO.				I. U. T. CO.				I. AND C. TR. CO.				I. C. AND S. TR. CO.				I. C. AND W. TR. CO.				I. N. C. AND T. ELEC. R. CO.			
HOTEL OR TRANSFER CLERK'S CHECK	BAGGAGE CHECK	STATION	AMOUNT	HOTEL OR TRANSFER CLERK'S CHECK	BAGGAGE CHECK	STATION	AMOUNT	HOTEL OR TRANSFER CLERK'S CHECK	BAGGAGE CHECK	STATION	AMOUNT	HOTEL OR TRANSFER CLERK'S CHECK	BAGGAGE CHECK	STATION	AMOUNT	HOTEL OR TRANSFER CLERK'S CHECK	BAGGAGE CHECK	STATION	AMOUNT	HOTEL OR TRANSFER CLERK'S CHECK	BAGGAGE CHECK	STATION	AMOUNT

Form Used in Indianapolis Terminal to Record Baggage Checked Out and Collections for Excess, C.O.D. and Baggage Storage

Very often, since interline tickets have been placed on sale, we have trouble with interline baggage checked on these tickets, due generally to the fact that the agent checking the baggage does not route it at all, or, if he does, does not route it correctly. This trouble and inconvenience only occur where there is more than one line running out of a junction to the destination. The baggage

A passenger will often purchase a ticket to some point at which he wishes to stop over and then present the ticket to us with the request that we check his baggage to another point farther on. The rules prohibit this being done, and as a result the passenger sometimes becomes annoyed.

Again, we have considerable trouble with passengers who, after purchasing a ticket and checking their baggage, decide for some reason not to make the trip as first contemplated. They come to the baggage room and ask us to cancel the baggage stamp so that they can get their money refunded on the ticket. This cannot be done under the rules, for, as a general thing, the baggage has already left the station. Passengers usually endeavor to do this in an effort to have their baggage transported free, assuming that after the baggage has left the station they can present ticket and have money refunded, which should not be done.

check should invariably be routed like the ticket, and as much care should be taken in doing this as in preparing the ticket, for unless the routing appears on the check we have absolutely no way of telling what line to send the baggage over from the junction. This only impresses upon the writer the necessity of all agents becoming thoroughly familiar with all rules and routes.

We also have a great deal of trouble with people whose baggage is delayed for one, two or three cars. They cannot understand, it seems, why their baggage is not at its destination at the moment they arrive and seem to think it is all the fault of the baggage agent. Hence, as a rule, the agent has to take a severe "combing" from the angry passenger.

It frequently happens that baggage received, checked from other stations, or baggage received at the baggage room from local deliveries is not substantial. We must, and do, refuse to accept such baggage, and this generally means a long argument with an indignant patron, which is very trying, especially when we are in a rush—and it seems that these things always happen when time is the most valuable. The rules do not permit the checking or rechecking of such baggage.

In my opinion, the agent at junction points should retain and hold all lifted free checks for ten days or two weeks, as in case of mismatched checks, missent or lost baggage, so that it can be more quickly located. For illustration: A piece of baggage is checked to a junction point from some station on one of the lines, and a passenger presents his check at the junction baggage room with the request that it be rechecked to a station on another line. His original claim check is lifted, the new check given him and the lifted check is sent the next morning to the auditor of the issuing road. In the meantime the baggage may have been missent, either from originating station or perhaps from a junction point. In the latter case the fact that the original checks are not on hand for reference causes inconvenient delay to the agent in undertaking to trace by telephone and much annoyance to the patron, who cannot understand the situation.

The system of checking baggage from residence to destination is of great benefit to the traction roads and is conducive to the encouragement of patronage. This, of course, can be done only in conjunction with reliable transfer companies and cannot be undertaken except where intelligent men are employed by such companies.

One of the great troubles of an agent is in tracing mismatched and lost baggage. We have installed a system of records which is of great assistance in such cases. This record consists of a checking sheet, divided into several columns or spaces, one space reserved for each road running into the junction point. Each of these spaces is again divided into four divisions, two of which are for the numbers of the checks, one is for the name of the station to which the baggage is checked and the last column is for the amount of excess. For illustration: Assume that a passenger desires to recheck his baggage over a line other than the one upon which it has arrived. We lift his original check and issue him a new one. The number of the lifted or original check is placed in the first column, the number of the new check is placed in the second column, the name of the town to which the baggage is checked is placed in the third column and the amount of excess, if any, in the last column, all being under the line of road on which the passenger departed from the junction. Suppose the passenger, after arriving at his destination, finds upon presenting his check that the wrong baggage has been forwarded. The forwarding agent being advised by the agent at the destination point as to the number on the passenger's claim check and the number of check on the baggage, in case of mismatch, we refer to the checking sheet and ascertain the number of the check under which the passenger's baggage arrived at our station. We take this number and look over the baggage on hand and find if the baggage with the original check number is still there. If so, it is easily straightened out. But suppose the baggage at the destination of the passenger has the proper check, but is not the right baggage. After the forwarding agent has been advised as to the check number held by passenger, we go to the check sheet and find the number of the check lifted, and then it is no trouble to find if the baggage is in the baggage room. But suppose the baggage we are looking for has been sent out under another check and is not in the house. We go to the check sheet and ascertain exactly where it was sent and the number of the check under which it was forwarded and the difficulty can usually be adjusted in a few hours.

I have enumerated several of the many troubles of a baggage agent, and I wish to say that none of these troubles is imaginary and that most of them occur many times every day. We deal with all kinds of people, some of whom are not accustomed to traveling and are not familiar with our baggage rules, and it takes time and the exercise of much patience to explain these rules—time that may cause a delay in forwarding the baggage of another passenger.

I should like to make some suggestions as to how to remedy every trouble of every baggage agent on earth, for we have these troubles daily, and many I have been unable to remedy, but I feel that I am not prepared to advise others, except always to preserve one's temper, to be courteous under all circumstances and to practise every known virtue. I have been on both sides,—that is, of the public and the agent—having been a commercial traveler for ten years, and in both of these callings I have learned that a soft answer turneth away wrath.

However, I wish to insist upon the fact that a campaign of education among the baggage agents generally, and the traveling public so far as possible, would help matters materially and assist to make the life of the baggage agent worth living.

INSURANCE

BY H. N. STAATS, INSURANCE EXPERT AMERICAN ELECTRIC RAILWAY ASSOCIATION AND CENTRAL ELECTRIC RAILWAY ASSOCIATION

Insurance is a contract whereby, for a consideration called a premium, one party undertakes to indemnify the other against loss. I wish to emphasize that there is but one party, namely, the present fire insurance companies, that undertakes to indemnify the great electric railway interests of this country against fire loss. I will admit that this one party is financially responsible, having from premiums paid by the electric railway companies money enough to pay all the losses of all the electric railway companies in the United States and in addition a considerable part of the losses of more hazardous property. This one party makes all the rules and regulations for all the people all the time. It formulates the contracts, compiles the forms, dictates the conditions, organizes the rating bureau and establishes the rates or premiums that must be paid by you for indemnity.

Where in this business world will you find another party that has such absolute control over its business as the old-line stock fire insurance companies have of the electric railway insurance business of this country? In all other lines of business there is competition; but, so far as I can learn, there is only one party at the present time to which the electric railway companies can apply for indemnity against loss by fire, and for this indemnity you are paying a big premium.

What is a premium? Webster says that a premium is "insurance money paid to underwriters." Webster also gives another definition: "A premium is a prize to be won by competition." What we need in this insurance business

is competition, and every member company of this association can help create competition and in so doing save the larger part of the money that is now being paid in high insurance premiums.

INSURANCE STATISTICS

About $1,000,000,000 represents the value upon which insurance should be carried. The rates of insurance on this class of properties range from 15 cents per $100, covering the less hazardous properties, protected with the most scientific means for preventing fires, to $3 on each $100, covering the most hazardous properties of this class. It is a conservative estimate that the present average rate on buildings and contents, including rolling stock, is 75 cents per $100 of insurance carried. One billion dollars at this average rate makes a yearly premium of $7,500,000. Electric railway and electric light interests are closely allied and should co-operate in a plan for obtaining their insurance at actual cost, or as near cost as possible.

W. H. Blood, Jr., the insurance expert of the National Electric Light Association, estimates that the average rate paid by the electric light and power companies of the country is 1 per cent and that the total annual premiums in 1907 were $3,305,000. He believes a demand for a reduction from the present rates to be legitimate. From these data of Mr. Blood we can conservatively place the amount paid by electric light and power companies for indemnity against fire loss for 1911 at $3,500,000. Add to this amount the premiums paid by electric railway companies for 1911, $7,500,000, and we have a grand total of $11,000,000.

In 1905 reports obtained from more than 400 electric railway companies indicated that during the previous ten years the losses sustained by them from fire were less than one-third of the premiums paid for insurance, and that there has been great profit to the insurance companies in the insuring of electric railway properties.

During the past five years rates of insurance have been materially reduced, but the amount of insurance carried by electric railway companies has been very greatly increased, so that the additional premiums will offset to a very considerable amount the reduction made in rates. At the same time these same properties have been greatly improved from a fire insurance standpoint. The electric railway companies have expended more that $3,500,000 for automatic sprinkler equipments in their properties; many car-storage houses and car shops have been erected of slow-burning construction; the companies have appointed inspectors among their employees whose duty it is to safeguard the properties by eliminating in every reasonable way the hazards that go to create a fire; plans have been originated for safeguarding cars stored in car yards, and a general interest has been shown on the part of executive officers of traction companies in the subject of the insurance of their properties. All of this tends to lessen the hazards and make this class of property more desirable.

Many electric railway companies have established their own insurance funds, and are carrying a part of their insurance. I believe the time is coming when all their insurance will be cared for in this way.

Electric railway companies and electric light companies should be placed in a class by themselves, establish their own insurance funds and pay their own losses. They should not be called upon to help pay a loss on any other class of property.

Greater interest in this subject of insurance is now shown by electric railway and electric light associations, through their committees on insurance and by the appointment of insurance experts to aid the member companies, than ever before. I am confident that a foundation has been laid upon which electric railway and light companies of this country will at no distant date build an insurance organization of sufficient financial strength to insure against loss every electric railway and every electric light property of this country at cost, and that the average cost will not exceed 20 cents on each $100 worth of property.

I strongly urge upon every electric railway company to protect its valuable interests with the most modern and scientific means to prevent and to extinguish fires. This is a duty that you owe not only to yourselves, but to the public you serve.

ADDITIONAL EXHIBITORS AT ATLANTIC CITY CONVENTION

The exhibit committee of the American Electric Railway Manufacturers' Association announces the following additions to the list of exhibitors at the Atlantic City convention to which spaces have been assigned:

Blake Signal & Manufacturing Company, Boston, Mass., (228-230)
Cooper Heater Company, Dayton, Ohio, (223)
D. & W. Fuse Company, Providence, R. I., (236)
James H. Denton & Company, New York, (208)
Electric Railway Equipment Company, Cincinnati, Ohio, (419)
Gold Car Heating & Lighting Company, New York, (217)
Holland Trolley Supply Company, Cleveland, Ohio, (414)
Heany Fire-Proof Wire Company, New York, (418)
Lord Manufacturing Company, New York, (416)
Lobdell Car Wheel Company, Wilmington, Del., (253)
Massachusetts Chemical Company, Walpole, Mass., (234)
McCord Manufacturing Company, Detroit, Mich., (330)
Philadelphia Holding Company, Philadelphia, Pa., (332-334-336)
Railway Motor Car Corporation, Philadelphia, Pa., (412)
John A. Roebling's Sons Company, Trenton, N. J., (225-227)
Sangamo Electric Company, Springfield, Ill., (417a)
Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., (345)
Standard Motor Truck Company, Pittsburgh, Pa., (209-211-213-215)
Universal Trolley Wheel Company, Springfield, Mass., (343)
Vixen Tool Company, Philadelphia, Pa., (270)

The preliminary list was published in the ELECTRIC RAILWAY JOURNAL of Aug. 5, and the number following each exhibitor's name in the list above refers to the number of the space occupied by him, as shown on the diagram in the previous article.

The exhibit committee says that with these additional exhibitors all of the space for which arrangements were made on the Pier has been assigned. This is a condition which has never occurred before at this time of the year in the history of the association and indicates that the exhibit at Atlantic City this year will be the largest in the history of the association. Steps are being taken by the exhibit committee to secure more space. The committee also announces that there will be no 110-volt direct current on the Pier; there will be 220-volt and 550-volt direct current, as in the past, and also three-phase, 50-cycle alternating current.

AVIATION FLIGHTS AT ATLANTIC CITY

The entertainment committee of the Manufacturers' Association has arranged with the Curtiss Exhibition Company, of which Glenn H. Curtiss is vice-president, to give exhibition ights of hydro-aeroplanes at Atlantic City during convention week for the benefit of the delegates at the convention. It is expected that these flights will take place on Oct. 12 and 13, weather permitting. The Curtiss Exhibition Company includes several street railway companies among its clients and has given aviation exhibitions at a number of street railway parks during the summer.

A recent trolley trip from Waukegan, Ill., to Boston, taken by Prof. J. E. Baggett, of the former city, covered 1512 miles and consumed seventy-eight hours. The trip from Albany to New York City was made by steamer, but otherwise the journey was by electric railway. The route was by way of South Bend, Ft. Wayne, Toledo, Cleveland, Rochester, Syracuse, Utica, Schenectady, thence by Albany to New York, to New Haven, Hartford, Springfield and Worcester. The total cost of the trip was $24.59.

Cedar Point Meeting of the Central Electric Railway Association

A Full Report of the Discussion of Papers and Social Events of the Summer Meeting of the Association, Which Was Held at Cedar Point, Near Sandusky, Ohio, August 23 and 24.

A most enjoyable summer meeting was held by the Central Electric Railway Association at Cedar Point, near Sandusky, Ohio, on Aug. 23 and 24. The meeting was attended by more than 100 railway men and guests, and a number of ladies were also present.

SPECIAL CARS

H. E. Chubbuck, vice-president Illinois Traction System and president of the Illinois Electric Railways Association, and with him ten other officials of the McKinley system, were the guests of the Central Electric Railway Association and made the trip to Cedar Point in the office car of Mr. Chubbuck. Besides Mr. Chubbuck the party included C. F. Handshy, general superintendent; G. W. Quackenbush, traffic manager; Dr. H. M. Bascon, chief surgeon; E. W. Fowler, chief clerk to vice-president; F. G. Buffe, manager department of publicity, all of the Illinois Traction System; Robert Morrison, general superintendent Wichita (Kan.) Street Railways; L. E. Gould, Western editor Electric Railway Journal; J. A. Kucera, business manager Electric Railway Journal; C. L. Henry, president Indianapolis & Cincinnati Traction Company, and A. A. Anderson, general manager Springfield (Ill.) Consolidated Railway. The car traveled 604 miles from St. Louis, Mo., to Sandusky, Ohio. From St. Louis to Danville, Ill., it ran over the tracks of the Illinois Traction System. At Danville it was switched to the tracks of the Cleveland, Cincinnati, Chicago & St. Louis Railroad and was hauled as a coach in a regular passenger train to Crawfordsville, Ind. Here it was switched to the tracks of the Indianapolis, Crawfordsville & Western Traction Company for the trip to Indianapolis. The party reached Indianapolis on Monday night and left on Tuesday morning over the Indiana Union Traction Company's line for Peru, Ind. From Peru the run to Ft. Wayne was made over the line of the Ft. Wayne & Northern Indiana Traction Company and from Ft. Wayne to Lima, Ohio, over the Ohio Electric Railway tracks. At Lima the new terminal station was inspected, after which the car left over the Western Ohio Railway for Findlay. From Findlay to Fostoria the tracks of the Toledo, Fostoria & Findlay Railway were used and from Fostoria to Sandusky the run was made on the tracks of the Lake Shore Electric Railroad. The distance traveled from Indianapolis to Sandusky was 290 miles and the run was made in eleven hours and thirty-seven minutes, including the stop at Lima and waits at junction points.

The Indiana Union Traction Company also ran a special train consisting of a motor car and trailer from Indianapolis to Cedar Point and brought about fifty people.

WEDNESDAY AFTERNOON SESSION

The first business session of the meeting was called to order by President Peck at 2 p. m. on Aug. 23. Secretary Neereamer read the minutes of the last meeting held at St. Joseph, Mich., which were approved. President Peck congratulated the Central Electric Railway Association on having present at the Cedar Point meeting the presidents of three other electric railway associations, namely, Arthur W. Brady, president American Electric Railway Association; H. E. Chubbuck, president Illinois Electric Railways Association, and James A. Anderson, president Canadian Electric Railway Association. Mr. Peck said that Mr. Brady needed no introduction to the members, but he thought that they would like to hear from Mr. Chubbuck and Mr. Anderson.

Mr. Chubbuck said that he was glad to have an opportunity to thank the Central Electric Railway Association for the courtesies extended through him to the Illinois Electric Railways Association and the Illinois Traction System. He had found recently that under the present by-laws of the Central Electric Railway Association the Illinois Traction System could become a member only in a partial way. Steps would be taken to have the Danville, Urbana & Champaign division of the Illinois Traction System make application for membership in the Central Electric Railway Association immediately on his return to Illinois. When the physical connection between the Indiana lines and the Illinois lines was completed the Illinois Traction System as a whole would join the Central Electric Railway Association and take an active part in its work.

Mr. Peck said that the connection of the Illinois Traction System with the lines in Indiana, Ohio, Michigan and Kentucky would mark an important step in the progress of electric interurban railway development. It would materially improve the earning capacity of all of the connecting lines and would greatly strengthen the influence of the Central Electric Railway Association.

C. Dorticos, General Electric Company, then read a paper on "Headlights for Interurban Service," which will be found in abstract on page 349.

In reply to R. M. Hemming, Ohio & Southern Traction Company, who referred to the necessity for standardizing headlights and attachments, Mr. Dorticos said that the luminous arc headlight and Form B headlight would operate with the same resistance sets, but the luminous arc headlight could not be operated in this way at its full efficiency. The three-lead resistances for the General Electric and the Crouse-Hinds headlights were practically the same. He appreciated the important work which the standardization committee of the Central Electric Railway Association was doing in formulating standards for headlight apparatus.

H. N. Staats, insurance expert of the American and the Central Electric Railway Associations, next read a paper on insurance, which is printed in abstract on page 356.

Arthur W. Brady called attention to one fact which stood out prominently in Mr. Staats' paper. The figures for premiums and losses paid for old-line insurance could be based only on data obtained in 1905. Later figures were not available. There was a definite relation between the fact that only one-third of the premiums had been paid back to the companies and that reductions in premiums had taken place. Mr. Brady considered insurance engineering in line with the timely work of efficiency engineering. If the railroads secured results from the collection of statistics in 1905 it would be desirable to continue the collection of insurance statistics and he understood that to be an important part of the work which Mr. Staats would do for the association. Improvement in insurance methods and the reduction in premiums and losses which would follow constituted an important method or means for widening the gap between receipts and expenditures.

Mr. Staats said that the cost of obtaining and maintaining business by the old-line insurance companies was from 38 per cent to 42 per cent of the premiums. Associated electric roads could inspect their own properties at much lower figures. The Factory Mutual Insurance Organization of New England operated for less than 10 cents on

each $100 premium paid. This included paying all losses. They returned 85 per cent to 95 per cent of the premiums paid in. The electric railways could do even better, because their property was scattered more widely. The monitor nozzle system installed in open yards ought to bring the cost to 20 cents in place of 60 cents as now charged. The insurance bureau will have its own inspectors.

R. A. Crume, Dayton & Troy Electric Railway, said that the electric railways in Dayton, Ohio, had been considering carrying their own insurance. They had paid large premiums for ten years, but fortunately had had no losses.

A paper on "Overhead Standardization" was next read by A. Schlessinger, superintendent overhead construction Terre Haute, Indianapolis & Eastern Traction Company. This paper is printed in abstract on page 347.

J. E. Cochran, Ohio Electric Railway, said that little improvement had been made in overhead construction in the past few years even though the service and the size of cars had been greatly increased. Many roads needed more feeder capacity.

A general discussion followed on lightning arresters.

H. L. Garbutt, Westinghouse Electric & Manufacturing Company, advised against the universal grounding of lightning arresters to the track rails.

Mr. Schlessinger said that a rail connection was desirable because in many cases a pipe ground was inefficient.

R. N. Hemming had found the rail connection necessary. He had tried zinc and coke grounds, but they were inefficient, as were also pipes installed in dry ground. Later he grounded his arresters through the rails and trouble ceased. Thorough inspection was essential if good results were to be obtained.

W. D. Hamer, Electric Service Supplies Company, said that all arresters should have two grounds and thus protect against the inefficiency of one or the other. The rail ground was advisable, especially on well ballasted track, since the static would distribute itself over the rails and assist equalization.

Mr. Cochran had charge of arresters on 250 miles of track and used two kinds of arresters, one grounded to plates alone and the other to both plates and track. One type of arrester evidently was designed to care only for the static and was injured by the trolley current flowing when it was grounded to the rail. Thirteen years ago he installed 300 arresters and on ten of these arresters he provided counters attached to the armatures. He kept a record of the number of discharges to learn the characteristics of the arresters. The greatest number of discharges on one arrester in a single storm was six in one afternoon. Each arrester recorded from forty to 120 discharges during the season. Those arresters were connected to both earth and rail.

E. J. Burdick, Detroit United Railway, said that the arresters on his road formerly were bonded to the rails, but trouble from trolley current following discharges occurred until the rail grounds were removed. The present ground is a pipe 7½ ft. long.

Mr. Schlessinger mentioned a section of cross-country high-tension line which was located in the "lightning belt" and gave much trouble until the 33,000-volt arresters were replaced by 44,000-volt arresters and a ground wire was installed at the top of the poles.

Mr. Dorticos said that good insulation had much to do with protecting motors from lightning discharges. He spoke of the rapidly increasing use of aluminum-cell arresters for car work.

Mr. Burdick said that the Detroit United Railway installed arresters wherever they could receive attendance, placing some of them at carhouses.

Mr. Hamer said that about 75 per cent of the arresters which his company repaired had been damaged because of poor grounds.

Mr. Burdick favored the use of two overhead trolleys placed at a height of about 18 ft. 6 in. If placed higher too great tension was required in the trolley pole. The use of two trolleys did away with overhead pans at sidings. If one wire broke the other would keep the brackets from running back. Cars could also be operated on the remaining trolley wire.

George Whysall, Columbus, Marion & Bucyrus Railway, said that he had moved 20 miles of second trolley wire to the pole and used it as a feeder, thus reducing the expense of maintenance 55 per cent. When two wires were used neither of which was over the center of the track the wheels wore unevenly. Cars could proceed past a break by holding the pole on the feed wire.

F. W. Coen, Lake Shore Electric Railway, said that his company had just been taking down double trolley wires and replacing them with one heavier wire. Thus better contact was obtained for heavy service.

Charles L. Henry, Indianapolis & Cincinnati Traction Company, described a freak lightning accident which had occurred on his line. Four telephone wires were carried on a cross-arm at the top of 40-ft. poles set 100 ft. apart. Lightning struck the wires and burned off three of them midway between poles.

A brief discussion followed on catenary trolley construction for direct-current roads. At the close of the session President Peck called attention to the work of the advertising department of the Illinois Traction System. Samples of this company's advertising literature were distributed among the members.

THURSDAY MORNING SESSION

The first paper read at the session on Thursday morning was by J. C. Slade on "Little Things That Count." There was no discussion on this paper, which is abstracted on page 353.

O. E. Anthony next read a paper on "The Troubles of a Baggage Agent." This paper will be found abstracted on page 355.

President Peck read a letter from E. C. Carpenter, claim agent Indiana Union Traction Company, recommending that all member companies of the association send in each month to the secretary of the association a statement of over and short baggage, using a special blank showing check numbers and a description of the baggage. Mr. Carpenter's letter was referred to the Central Electric Traffic Association.

There was no discussion on the paper on "Traffic," by J. F. Keys, which is abstracted on page 354.

Clarence Renshaw then read a paper on "Trailer Operation Versus Multiple-Unit Trains," which is printed in abstract on page 350.

H. A. Nicholl, Indiana Union Traction Company, said that his company operated trailer cars on certain runs. They required 25 per cent more power than a single-motor car and they were necessarily a makeshift. However, it was his opinion that their operation was the best solution of the problem on several runs where the traffic was more than could be handled by a single car. They had no difficulty in maintaining schedule speed. It was expensive to equip existing motor cars with motors and control apparatus suitable for multiple-unit service. Trailer operation required only one extra brakeman.

C. E. Morgan, Indianapolis, Crawfordsville & Western, said that he had just installed trailer service on his road and was now obtaining power and motor temperature data. The trailer-car train ran on a limited schedule without excessive heating of the motors. The power consumption was only 18 per cent more than for a single car.

E. F. Schneider, Cleveland, Southwestern & Columbus Railway, said that his company was not permitted to operate trailers into the city of Cleveland. In order to obtain a car of large seating capacity he was now rebuilding a car 57 ft. 6 in. long and making it of the front-entrance

type similar to the "near-side" cars in Buffalo. It will have a seating capacity of seventy-two.

E. J. Burdick, Detroit United Railway, described a test made to determine the power consumption of a motor car and a freight trailer on level and hilly track. On level track one motor car required 90 watt-hours per ton mile. With one trailer car the power consumption was 71 watt-hours per ton mile of train load.

Mr. Hall, electrical engineer Dayton & Troy Electric Railway, said that trailer cars gave good service on suburban runs. His company used trailers on Sunday and Monday morning on the limited trains which were operated through from Dayton to Toledo. He did not believe that the question of trailer cars versus multiple-unit operation could be settled without taking into account the local conditions. If the traffic required trains of two or more cars regularly, then the question arose whether to use a motor car of high capacity with a trailer or two motor cars and multiple-unit control. The latter involved a heavy investment in motors and control apparatus. If the traffic was moderately heavy, then it might be more profitable to use a high-power motor car and a trailer, thus avoiding excessive cost of electrical equipment.

The next meeting of the association will be held at Louisville, Ky., on Nov. 23.

SOCIAL FEATURES

On Wednesday afternoon a game of water baseball was played by teams representing the supply men and the railway men. The teams lined up as follows:

Supply Men	Railway Men
Catcher—E. C. Folsom	Catcher—C. E. Morgan
Pitcher—Elmer Smith	Pitcher—L. M. Burgé
First base—W. H. Bloss	First base—G. K. Jeffries
Second base—Miles Lambert	Second base—J. F. Keys
Shortstop—M. T. Kirschke	Shortstop—L. M. Clark
Third base—W. D. Hamer	Third base—R. H. Rifenberick
Right field—J. Seymour	Right field—W. H. Fowler
Center field—Fred Hornstein	Center field—J. F. Starkey
Left field—H. L. Garbutt	Left field—J. B. Crawford
Substitute—C. P. Billings	Substitute—Fred Buffe

The final score was 8 to 5 in favor of the railway men.

On Wednesday evening the supply men were the hosts at a whitefish dinner at which the attendance was about 175.

COMPENSATION FOR CARRYING UNITED STATES MAIL

The subject of compensation for carrying United States mail was considered in Washington on Aug. 9 at a conference in which the following participated: Edgar S. Fassett, Albany, chairman of the committee of the American Electric Railway Association on this subject; A. R. Piper, general freight agent Brooklyn Rapid Transit Company, a member of the committee; Gen. George H. Harries, representing the association; Mr. Holladay, acting second assistant postmaster-general, and Mr. Hornaday, superintendent of the division of miscellaneous transportation.

The recommendations formulated by the committee as to rates for this service were presented to the postal authorities as follows:

"For pouch service. From one to three pouches handled on passenger cars a minimum of 3 cents per car mile; for each additional pouch 1 cent per pouch per mile.

"That the rate for railway post-office service on city lines be 1½ cents per linear foot per car mile.

"That the rate for railway mail service on interurban lines be the maximum compensation given to steam railroads for like service."

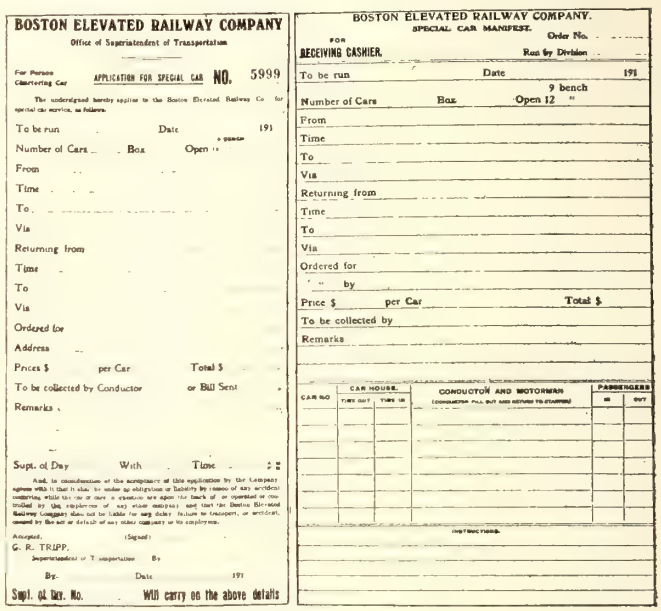
It was agreed that the officials of the Post Office Department should present the matter to the Postmaster-General at an early date and communicate with the committee in sufficient time for a report to the association at the convention to be held at Atlantic City in October.

HANDLING CHARTERED CAR SERVICE IN BOSTON

BY EDWARD DANA, ASSISTANT TO SUPERINTENDENT OF TRANSPORTATION, BOSTON ELEVATED RAILWAY

Many street railway companies fail to realize the opportunities of the chartered or "special" car business. They care for all such as voluntarily comes their way, but do not exert themselves to as great an extent as they should to build up a substantial revenue from this source. More and more, however, will far-sighted managers, as the margin between income and expenditure is narrowed by the lengthening of the average haul, turn to this service as a consistent revenue producer.

This sort of business is, moreover, highly desirable for several reasons. It affords an opportunity in most cases to utilize men and equipment when the regular service is not


BOSTON ELEVATED RAILWAY COMPANY
Office of Superintendent of Transportation
APPLICATION FOR SPECIAL CAR NO. 5999
To be run Date 191
Number of Cars Box Open
From
Time
To
Via
Returning from
Time
To
Via
Ordered for
Address
Prices $ per Car Total $
To be collected by Conductor or Bill Sent
Remarks
Supt. of Day With Time
Accepted. (Signed)
G. R. TRIPP,
Superintendent of Transportation By
By Date 191
Supt. of Div. No. Will carry on the above details

BOSTON ELEVATED RAILWAY COMPANY.
SPECIAL CAR MANIFEST.
Order No.
FOR RECEIVING CASHIER. Run by Division
To be run Date 191
Number of Cars Box Open 12 9 bench
From
Time
To
Via
Returning from
Time
To
Via
Ordered for
" by
Price $ per Car Total $
To be collected by
Remarks
CAR HOUSE. CONDUCTOR AND MOTORMAN PASSENGERS
CAR NO. TIME OUT TIME IN (CONDUCTOR TO FILL OUT AND RETURN TO STARTER) IN OUT

Figs. 1 and 2—Boston Special Cars—Application Blank and Manifest

under the maximum strain. Thus it enables men at the foot of the extra list to secure better wages. Several important things must be considered in connection with supplying this service. Inasmuch as the rates, although reasonable, are arranged to be profitable, patrons have a right to expect more than they do of the regular service and the company should endeavor in every way to fulfil this expectation and thus have well-satisfied customers. The crews should be neat in appearance. The cars should be

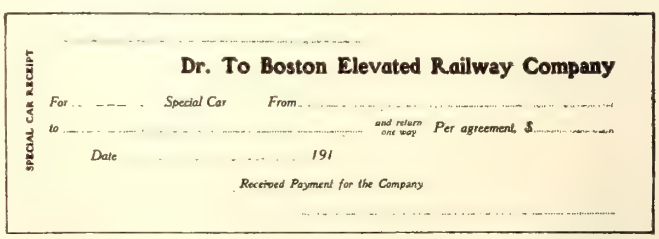

SPECIAL CAR RECEIPT
Dr. To Boston Elevated Railway Company
For Special Car From
to and return one way Per agreement, $
Date 191
Received Payment for the Company

Fig. 5—Boston Special Cars—Receipt for Payment

as clean as it is possible to have them and in perfect repair, with all loose and noisy parts adjusted. Last, but not least, the service should be rendered as called for on the contract, the cars being at the designated points exactly on time, barring, of course, the unexpected. Even then street inspectors should exert every effort to extricate specials from any blocks or breakdowns which they have encountered. The following is the system of insuring against a

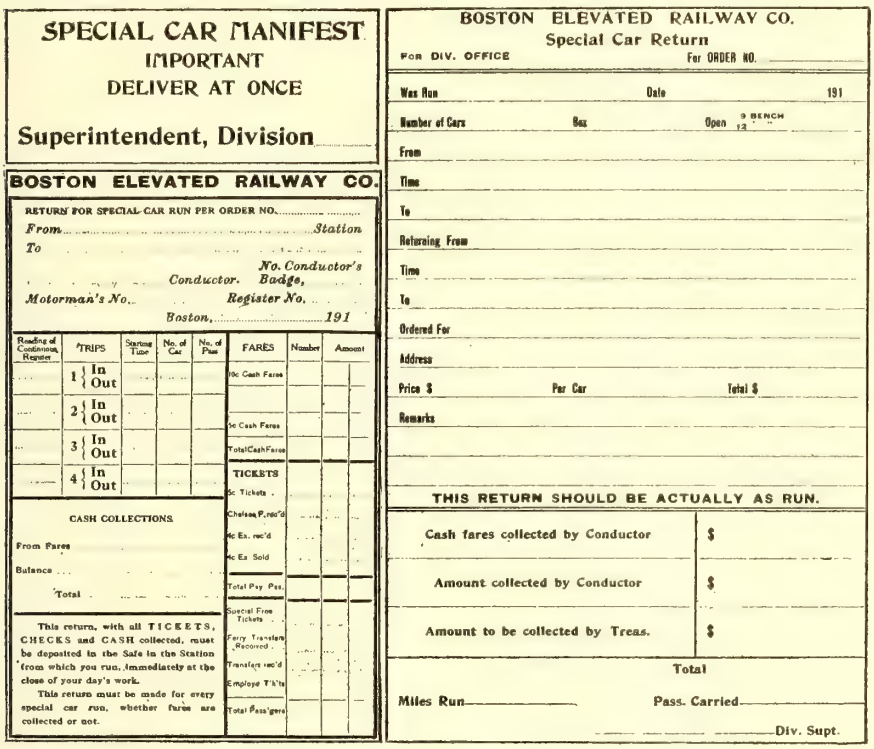
failure in this service followed by the Boston Elevated Railway.

A special car order (Fig. 1) is drawn and signed by the party ordering the car at the office of the superintendent of transportation. This form is in duplicate (yellow and white). The person who charters the car retains the original and the duplicate remains on file in the transportation office. The duplicate is then given to a stenographer who makes seven copies of Fig. 2, special car manifest. After verification, these manifests are forwarded in special envelopes, Fig. 3, as follows: One to the superintendent of the day, one to the receiving cashier, one to the division in which the trip terminates, and four to the division running the car. These four are further distributed after necessary detail instructions have been entered, as follows: One remains in the division office, one to the starter at the carhouse, one to the conductor assigned, and one to the inspector in charge of the starting.

Upon receipt of the four copies the division telephones to the transportation office and verifies the order. This fact is noted on the duplicate order on file there. This is the first check. The division also notifies all divisions through which the car is to pass and verifies the receipt of the manifest from the transportation office in the division where the trip terminates.

Upon the day the car is scheduled to run the superintendent of the day telephones directly to the starter at the carhouse a short time before the pulling-out time and verifies the fact that all necessary arrangements have been made. The conductor in charge of the car fills in the necessary information on the manifest and returns it to the starter. He also makes out a special day card, Fig. 4, which he turns in in the same way as his regular work. If he receives the money he signs a receipt, Fig. 5.

The starter returns the conductor's manifest and his own to the division office and from this the return is made up on Fig. 6. The return is distributed as follows: One remains in the division office, one goes to the superintendent of transportation, one to the auditor and one to the receiving cashier. At the transportation office the return is checked with the original order and the auditor holds the return as a check on the receiving cashier. Fig. 7 is a graphic chart of the routine followed in handling a special car.



SPECIAL CAR MANIFEST
IMPORTANT
DELIVER AT ONCE

Superintendent, Division.....

BOSTON ELEVATED RAILWAY CO.

RETURN FOR SPECIAL CAR RUN PER ORDER NO.....

From.....Station

To

Conductor. No. Conductor's Badge,

Motorman's No. Register No.

Boston,.....191

Reading of Continuous Register	TRIPS	Starting Time	No. of Car	No. of Pass	FARES	Number	Amount
	1 In / Out				10c Cash Fares		
	2 In / Out				5c Cash Fares		
	3 In / Out				Total Cash Fares		
	4 In / Out				TICKETS		
					5c Tickets		
					Chelsea P. rec'd		
					4c Ex. rec'd		
					4c Ex. Sold		
					Total Pay Pas.		
					Special Free Tickets		
					Ferry Transfers Received		
					Transfers rec'd		
					Employe T'k'ts		
					Total Pass'gers		

CASH COLLECTIONS

From Fares

Balance

Total

This return, with all TICKETS, CHECKS and CASH collected, must be deposited in the Safe in the Station from which you run, immediately at the close of your day's work.

This return must be made for every special car run, whether fares are collected or not.

BOSTON ELEVATED RAILWAY CO.
Special Car Return

FOR DIV. OFFICE For ORDER NO.

Was Run Date 191

Number of Cars Box Open 9 BENCH 12

From

Time

To

Returning From

Time

To

Ordered For

Address

Price $ Per Car Total $

Remarks

THIS RETURN SHOULD BE ACTUALLY AS RUN.

Cash fares collected by Conductor	$
Amount collected by Conductor	$
Amount to be collected by Treas.	$
Total	

Miles Run Pass. Carried

Div. Supt.

Figs. 3, 4 and 6—Boston Special Cars—Envelope, Conductor's Return Slip and Office Return Slip

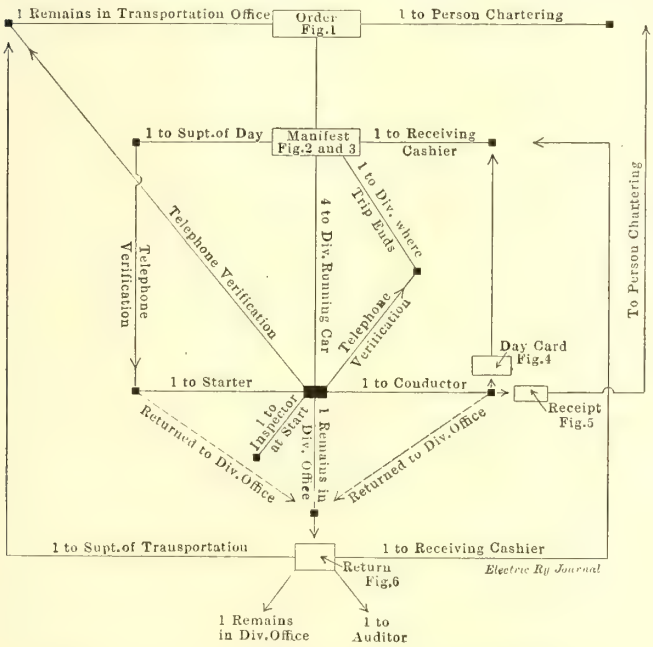


Fig. 7—Boston Special Cars—Diagram Showing Method of Issuing Orders

The rates are based upon actual running time and a table showing the rates between some fifty-four important points has been computed. A charge is made if a car is held more than ten minutes, amounting to the wages cost plus 25 per cent. There is also a charge of $2 for all cars started after 10 p. m. or returning after midnight. Special parlor cars are provided at increased rates, but the demand for such is hardly sufficient to warrant the investment on urban properties. The business during a year is about $25,000. Upon a single day as many as 200 special cars have been operated by the Boston Elevated Railway Company without failure.

FARES FOR VACUUM CLEANERS

On Aug. 3 the Denver City Tramway issued the following bulleting to the trainmen:

"Numerous inquiries have been coming in as to whether or not vacuum cleaners should be transported upon the cars. Conductors will hereafter permit only the small size vacuum cleaner to be carried. These cleaners weigh approximately 50 lb. or 60 lb. A 5-cent fare will be charged for the same and registered. *NO TRANSFER WILL BE ISSUED FOR A VACUUM CLEANER.* Should a passenger attempt to board a car with one of these machines, conductor will inform him of this order, so that he may be fully apprised before taking his seat. The cleaners must be carried to the rear of the car and out of the way of passengers.

"On the Golden and Leyden lines west of Berkeley any passenger carrying a vacuum cleaner will be required to pay one full cash fare for the same in addition to his own. Such fare will be registered as a regular cash transaction."

INTEREST OF EMPLOYEES IN MILWAUKEE FARE CASE

A brief presenting the claims of the employees of the Milwaukee Electric Railway & Light Company to consideration in the fare case now pending before the Railroad Commission of Wisconsin has been filed with the commission. The petition was presented by John Humphrey, chairman of the Board of Arbitration and Conciliation of Wisconsin. It asks the commission to take into consideration the effect which an order instituting a 3-cent street railway fare in Milwaukee would have on the effort being made by the men to secure higher wages and better hours.

The petition declares that trainmen in Milwaukee are forced to work longer hours and are paid less on the average than employees of similar properties in other cities. It is also stated that many of the men work long hours and receive no overtime for holidays. The petition says that the Legislature has fixed the hours of labor for the employees of steam railroads but not for trainmen on street railways, whose work is as responsible. Besides this, the men say that they need the protection of the State and that public safety demands better working conditions. In part the petition adds:

"It appears to your petitioners that while the Wisconsin Railroad Commission is conserving the interests of the public on the one hand, and inquiring into the interests of the public service corporations no less upon the other, it should, as a matter of public policy, consider the question of a reduction of fares or rates with particularity from the viewpoint of the employees of the public service corporations. They believe, moreover, that there should be an impartial investigation into the affairs of the Milwaukee Electric Railway & Light Company to determine whether the employees of this company are entitled to an increase of wages, and what provision, if any, has been made to insure them a living wage in the future.

"If the Wisconsin Railroad Commission were to make the investigation we seek, and were to announce its findings, your petitioners would gladly let their case rest with the public. Your petitioners believe that this investigation and report, when made, would prove of great assistance in establishing a desirable public policy for publicity, not only in regard to the relations of public service corporations with their employees, but with reference to the relations of all employers and employees of the State of Wisconsin."

Extracts from street railway franchise ordinances passed in other cities, referring to arbitration of labor disputes, are given and also comparisons of wages paid in various communities. The petition continues:

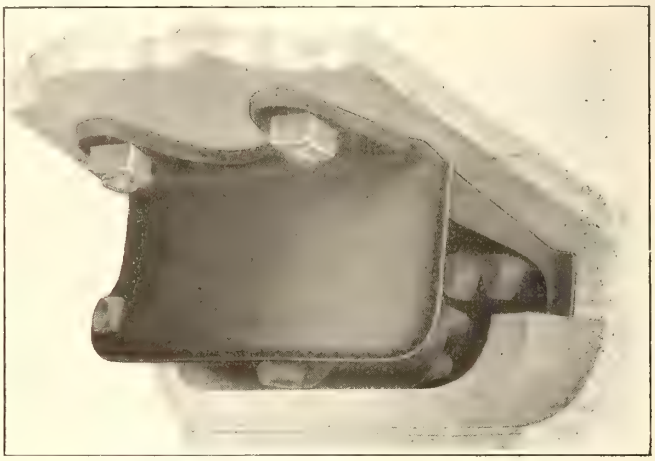
"The wages in the entire industry, but especially those of car men, are low. It would seem that if public utility regulation perpetuates the wages now paid, the regulation would be detrimental to the interests of the street railway employees of Wisconsin. As a rule, the car men work seven days a week and 365 days a year, with the exception of off days taken at their own expense."

It is also alleged that the wages of the men have not kept pace with increased cost of living and that the remuneration is far below that of laborers engaged in other lines of work.

J. D. Mortimer, vice-president and general manager Milwaukee Electric Railway & Light Company, is quoted as stating that the employees had nothing to do with the brief presented by Mr. Humphrey. He said that even should the commission decide to reduce the fares the representatives of the company would continue to exert every possible effort to maintain wages at the present high standard, advancing them as rapidly as possible from time to time and following the practice of the last fifteen years in this respect. Mr. Mortimer added that the argument advanced by Mr. Humphrey was anticipated by the brief submitted by counsel for the company to the Railroad Commission.

ANTI-FRICTION SIDE BEARING

The accompanying illustration shows an anti-friction side bearing for electric railway cars which has been developed by A. Stucki, Pittsburgh, Pa. Bearings of this design are now in service on about a dozen electric railways, among them the Philadelphia Rapid Transit Company, which has been using them on elevated cars for over one and one-half

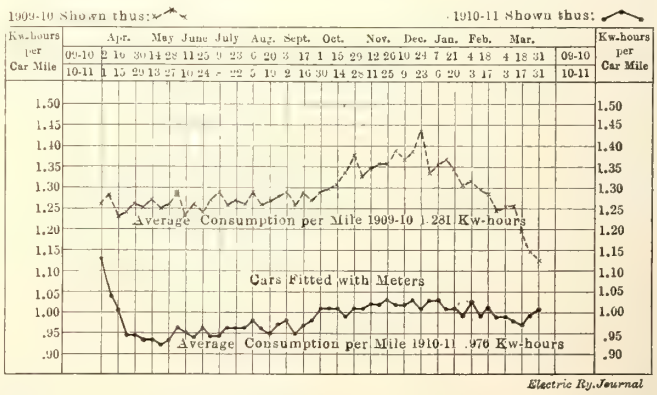


Side Bearing in Position

years past. This bearing is made of cast steel throughout and consists of two pieces only. The roller is very large and does not depend on journals for a rollway, as it simply turns on itself with the frictionless quality of a rolling pin. The bearing operates noiselessly without periodic lubrication. It can be made for any travel desired. Even with so great a travel as 24 in. the housing is comparatively short because the roller rolls on the top as well as the bottom surface. This feature is quite an advantage in locating motors, brake levers and other under-car equipment. It is stated that the ordinary truck side bearing plate with turned-up ends will work well with this bearing and at the same time eliminate the need for safety chains. Another design of this bearing is especially adapted for cars where a small side bearing is essential. The roller is very large and remains in the proper position, whether the body bolster is up or down, so that no sliding can take place. This saves the roller from wear and also makes a noiseless, frictionless bearing.

ENERGY SAVING ON THE CROYDON TRAMWAYS DUE TO THE INSTALLATION OF CAR METERS

Some interesting data on economies in energy consumption attained by installing car meters to check motormen



Effect of Current Checking Meters Installed on Croydon Tramways

are presented by T. B. Goodyer, tramway manager, in the report on the Croydon (England) Corporation Tram-

ways, for the year ended March 31, 1911. Mr. Goodyer states that after the installation of these meters the consumption of energy for traction, car lighting and corrugation removal purposes was 2,220,257 kw-hours, a saving of 668,464 kw-hours as compared with the preceding year. This improvement meant the use of 0.976 kw-hour per car mile, or 0.305 kw-hour less than in the preceding year. The cost of electrical energy per car mile was cut down from 1.684 pence (3.368 cents) to 1.441 pence (2.882 cents), a reduction of 24.77 per cent, equivalent to an actual saving of £4,985 ($24,227.) The importance of this saving to the Croydon system can be appreciated from the statement that the tramway department's payment for energy supplied for traction and way building purposes by the electrical department amounted to £16,092 ($78,207), equivalent to 25.23 per cent of the total operating expenses of the street railway system. The data given in the report were accompanied by a set of curves as reproduced in the accompanying illustration. The meters installed are of the C. H. type, which has recently been introduced to American electric railways by Wonham, Sanger & Bates, New York.

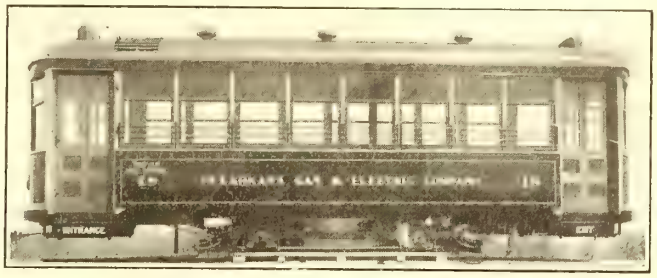
PLAIN ARCH ROOF CARS FOR FREEPORT, ILL.

The four single-truck motor cars recently built for the Freeport (Ill.) Railway & Light Company by the Danville Car Company present another instance of departure from the ordinary monitor deck. These new cars are 33 ft. long over the vestibules, 21 ft. long over the end plates and 8 ft. 4 in. wide over the yellow poplar sheathing. The bottom and vestibule platforms are of wood reinforced with steel. The vestibule floors are 6 in. below the car floor. The platform sills are of white oak reinforced with steel extending along the main sills to the bolsters and bolted to the side and end sills. The two doors at each side of each vestibule are fitted with shields to prevent passengers from standing on the step when the doors are closed and the car is in motion. As shown in the platform view, a rectangular railing serves as a barrier between the entrance and exit body doors. Double flooring with building felt between is used except in the aisle, where single flooring is laid with oak flooring strips screwed into and flush with the floor.

The interior of all doors, sashes, panels, moldings, etc., is of cherry, varnished and rubbed down to a smooth dead finish. The ceiling is of varnished maple veneer. All seating is of The J. G. Brill Company's longitudinal type upholstered in rattan. All side windows are arranged to drop and are made for use with storm window sash. Each car body is mounted on a single truck of 9-ft. wheel base and 30-in. diameter wheels. The two 40-hp motors per car are geared for a maximum speed of 30 m.p.h. Among the miscellaneous fittings on these cars are automatic drawbars, trolley retrievers, fenders, headlights and hot-air heaters.

SINGLE-TRUCK ARCH ROOF CARS

Three 21-ft. motor car bodies of the type illustrated have just been built for the Texarkana Gas & Electric Company, Texarkana, Tex., by the St. Louis Car Company. These cars are arranged for double-end operation and have open bulkheads for prepayment collection of fares. They are built with arch roofs, steel underframes and steel side girders. The bodies weigh about 10,000 lb. each. The general dimensions are as follows: Length over the corner posts, 21 ft.; length over the vestibules, 30 ft.; length over the bumpers, 30 ft. 8 in.; width over the posts, 8 ft. 3 in.; width over all, 8 ft. 7 in.; height from bottom of side sill to top of roof, 8 ft. 6 in.



Single-Truck Car for Texarkana

The principal members of the underframe are two side girders made of steel plate ⅛ in. thick and 30 in. deep, reinforced at the top and bottom by plates and angles. The exterior of the cars below the belt rail is sheathed with steel and the vestibules are also lined with steel. The side openings are inclosed with double doors opening outwardly and operated simultaneously with the folding step by a lever arrangment from the motorman's or conductor's stand. The interior finish of these cars is cherry above the arm rest. Below the windows the side girder plates are painted and grained to match the cherry finish.

The car contains fourteen type K St. Louis seats and two longitudinal seats. Ventilation is provided by six Globe ventilators. The cars are heated with Consolidated car heaters.



Plain Arch Roof Car for Freeport, Ill.

AVIATION MEET AT ROCKFORD, ILL.

The aviation meet conducted by the Rockford & Interurban Railway at Rockford on August 4-6 was very successful. The exhibits were furnished by the Curtiss Exhibition Company, New York, who were represented by two aviators, Messrs. Ward and Havens. These aviators undertook several fancy flights as well as straight runs, among which was one to Beloit and return, and much entertainment was given. A charge for admission to the grounds of 50 and 25 cents was made, and it is estimated that 12,000 people were in attendance.

News of Electric Railways

Complaint Against Chicago & Oak Park Elevated Railroad Dismissed

The Railroad & Warehouse Commission of Illinois has recently dismissed the complaint of William N. Golden, of Chicago, against the Chicago & Oak Park Elevated Railroad, in which it was alleged, first, that the defendant road has failed to complete its entire road, as authorized by its charter, in ten years from the date of issue, in violation of the statutes of Illinois; second, that the defendant road does not ring a bell or blow a whistle at least eighty rods before reaching a crossing, in violation of the statutes of Illinois; third, that the defendant road does not furnish an axe, saw, sledge hammer, etc., for each car, as required by the statutes of Illinois; fourth, that the defendant road is guilty of discrimination in rates prior to July 1, 1907, and entered into a contract unlawfully with the city of Chicago, town of Cicero, and so discriminated in violation of the laws of Illinois; fifth, that the defendant road starts its trains or cars without signaling in Chicago and in Oak Park, in violation of the law; sixth, that the defendant's cars are not equipped with automatic couplers, in violation of the laws of Illinois.

In its finding the commission said in part:

"As to the first allegations, this commission has no jurisdiction to make an order in relation thereto and the road being substantially completed, as shown by the record, the commission holds there is no such failure to comply with the conditions of its charter as would justify the commission to direct a suit to be brought to forfeit the charter of the defendant road.

"As to the second allegation, while it may be in the letter of the law, it is not within the spirit of the law it seems to the commission to require roads similar to this one to place upon their car a bell, as required of steam roads on their locomotives, or to blow a whistle, as is required of steam roads, at least within eighty rods of the crossing, and hence the commission dismisses this charge as unnecessary to enter any order in relation to it at this time.

"As to the third allegation, the record shows that the defendant company does not furnish for each of its cars an axe, saw, sledge hammer, etc. While the language of the act of 1874 is broad, yet the detail of the act, together with the date of the same, clearly indicates that the Legislature could not have had in mind electric railways operating within cities, as no such cars were running at that time. The object of the section is plain, namely: In case of accident or collision in the country upon a steam road where such things are inaccessible, to enable employees or other persons available to assist in releasing passengers who, as a result of the accident, have been confined in the cars. This reason could not, with any degree of necessity, apply to the road in question, and for this reason the commission deems it unnecessary at this time to make an order requiring the respondent road to equip its cars with such articles.

"As to the fourth allegation, there is no testimony in the record whatever to justify this charge or to require the commission to take any action in relation thereto.

"As to the fifth allegation, the commission feels that the evidence is not sufficient to justify any action upon its part in relation to the same, and that the city of Chicago or village of Oak Park, if there is a manifest violation of law, which the record does not show to our satisfaction, is amply able to take care of that matter as coming clearly within its jurisdiction.

"As to the sixth allegation, the record shows that the cars of the defendant road are not equipped with automatic couplers. The act in regard to safety appliances on railroads is entitled: 'An act to promote the safety of employees and travelers upon railroads by compelling common carriers engaged in moving traffic by railroads between points in the State of Illinois to equip their cars with automatic couplers and continuous brakes, and their locomotives with driving wheel brakes, and for other purposes.'

"Section 1 clearly indicates that it could not apply to an electric interurban car. The same may be truthfully said of Section 2. And street cars are specifically exempted from the provisions of the act by Section 6. The act in regard to the inspection of safety appliances on railroads is entitled: 'An act providing for the inspection of equipment and operation of safety appliances on railroads engaged in moving traffic between points in the State of Illinois.' The language of Sections 1 and 4 of said act clearly indicates that it was not intended to apply to electric cars. The last-mentioned act was passed in order to enforce the provisions of the first act, and in our opinion has no application to railroads operating by electricity. That being true, the commission is not required to make any order in relation thereto. In this view of the law, the commission is sustained by the opinion of Attorney General Stead rendered to this commission Jan. 22, 1906.

"While a large number of the charges made by the petitioner in the petition and in the brief are not sustained by the testimony in every particular, they are of such a character that the commission has instituted an investigation of a number of these charges upon its own motion and will enter a proper order in relation to the subject matter of such investigation as soon as such investigation is complete, if the charges are proved to be true."

Progress on the Boston & Eastern Railroad

Plans for the construction of the Boston & Eastern Electric Railroad from Boston to Beverly and Danvers, via Chelsea, Revere, Lynn and Salem, are being matured. On Aug. 14 a hearing was held before the Selectmen of Danvers, at which strong sentiment in favor of the new line was expressed. The company presented plans for its route in that town and with several minor modifications the plans met with popular approval. A hearing will be held by the Aldermen of Salem on Aug. 25 and by the city officials of Beverly on Aug. 29. Informal conferences with the city officials have already been held in Chelsea and Revere. Plans for the tunnel under Boston Harbor have been filed with the Boston Transit Commission and the Massachusetts Railroad Commissioners. Both of these boards must pass upon them. The route asked for is under Central Wharf and Central Street to India Square, thence up Water Street as far as Congress Street, where the company proposes to have its station, one approach being through Post Office Square and another from Liberty Square.

The road is designed to serve suburban and interurban traffic and it is proposed to run trains at intervals of fifteen minutes during the day in either direction between Boston and Peabody, Salem, Danvers and Beverly, and at ten-minute intervals between Boston and Lynn. Alternating trains would be express, making but two stops between Boston and Lynn. The other trains would make eight stops and require seven minutes more than the express trains. The running time from the Boston terminal to City Hall, Lynn, is set at fourteen minutes. The present steam railroads make the trip in from twenty to thirty-five minutes. The running time to Peabody Square is figured at twenty-two minutes, to Danvers twenty-eight minutes, to Salem nineteen minutes and to Beverly twenty-three minutes. There would be nineteen stations on the whole line. Rates for fare have been determined as follows between Boston and and the points named:

COMMUTATION RATE (FIVE-TRIP TICKETS).

		Single Fare.
Revere and Chelsea	6 cents	8 cents
Lynn	12 "	15 "
Peabody and Salem	17 "	20 "
Danvers and Beverly	22 "	25 "

Special workingmen's tickets would be issued at a reduced rate.

The population of the territory traversed is 310,000, the density of population in the territory being 3600 per square mile as against 405 per square mile in the whole State. The project was first advanced in 1906. In August of that year application was made to the Railroad Commission for a certificate of public convenience and necessity. On Sept. 18, 1907, the commission made a finding stating that a new and different service was needed in the densely crowded territory northeast of Boston. It was, however, opposed to the route proposed and urged that any road built

should have an entrance to Boston under the harbor instead of by way of Sullivan Square, Charlestown, as originally planned. On Oct. 14, 1907, plans were filed by the company showing the route changed as outlined by the commission's suggestion. Nov. 17, 1908, after eight public hearings, the Railroad Commission made a decision stating that public convenience and necessity had been shown and that the new plan developed by the petitioners would afford the additional facilities demanded in the territory referred to. A certificate, however, was withheld on the ground that there was no law under which a tunnel could then be built, the commissioners stating that the petitioners must have recourse to the General Court to make the decision effective.

The Boston & Eastern consequently petitioned the Legislature for legislation allowing the company to build the tunnel. On April 6, 1909, the Legislature instructed the Railroad and Transit commissions to hear the case and report jointly upon the desirability of building the tunnel. After hearings the joint board reported, recommending a delay of one year pending the maturing of the general plans for Boston's transportation development. The Legislature finally passed an act allowing a tunnel to be built and the Governor signed the act. Last summer six public hearings were held by the Railroad Commissioners on the question of issuing a certificate of exigency, but the commission refused to make any decision upon the matter until the Legislature acted upon several questions pertaining to the project. The Boston & Eastern Railroad asked for reconsideration of this refusal on the ground that the majority of the board made a manifest error in law, that the refusal was based on reasons upon which counsel for the petitioners had no chance to argue and that the petitioners' rights under the decision of public convenience and necessity had been ignored. The commission heard the petition for reconsideration, but did not change its mind. Since then the Legislature has granted the road a certificate of exigency. The plans for the tunnel are the same as those submitted to the commission in 1908.

The act requires that the tunnel be built without cost to the city and that it shall accommodate the traffic of other traction companies if any such company desires to use it. The tunnel becomes the unincumbered property of the city of Boston after forty years.

Municipal Street Railway in San Francisco Not to Fulfil Its Promises

The San Francisco *Chronicle* says editorially in the issue of Aug. 4, 1911:

"The advocates of the Geary Street Municipal Railway promised great things, and they cannot complain if they are held strictly to their promises and condemned if they fail to make good in all of them.

"To begin with, they were to get rid, once and forever, of the 'unsightly poles' and 'the miserable nuisance of overhead trolley wires' and give us a 'really up-to-date road' with underground contact.

"Not only that, but the trolley poles, which—when they began to talk trolley—they said were to be so delightfully handsome as to be really adornments to the street, are about the worst-looking poles ever set up in the city.

"Next, there were to be seats for every passenger and cars enough to run to allow seats for all, regardless of rush hours.

"Now that is given up—although, without transfer privileges, there is likely to be room enough in the cars—and the management is glorifying itself because there are to be porcelain pendants instead of leather to hold up the strap-hangers.

"The construction of the road was to show a marvel of economy, and yet the only job finished—setting the poles—shows a cost of $9 a pole, as against in the neighborhood of $3, for which they could have been set by contract.

"The greatest number possible of men will be employed for the longest possible time at the highest possible wages.

"And when, sometime in the future, the road is finished and under 'municipal operation' we shall see it shunned by the people who own it because riding on any other line in the city will be more agreeable.

"It was folly for the city to undertake the building of a railroad which as an isolated unit would not be undertaken by private capital on any terms, but with all the accumulated experience at command there is but one reason why a really model road should not be rapidly and economically constructed."

New York Transit Affairs

The Public Service Commission of the First District will hold a hearing on Sept. 14 on the form of contracts for Sections Nos. 7 and 9, which are to be readvertised for competitive bidding. The contract for Section No. 7, which extends from Fortieth Street under Lexington Avenue to Fifty-third Street, was awarded to Charles H. Peckworth, who repudiated his bid last week. Section No. 9, which extends from Sixty-seventh Street to Seventy-ninth Street, is also to be readvertised because only one bid was received for this section last October.

Counsel for the Admiral Realty Company, which recently tried unsuccessfully before Supreme Court Justice Ford to obtain an injunction restraining the Bradley Construction Company from beginning operations on the Lexington Avenue branch of the new subway, gave notice to the Public Service Commission on Aug. 21 of an appeal.

Plans for rapid transit extensions in the Borough of Queens are to be submitted to the Public Service Commission of the First District this week for approval. They were prepared by Leonard C. L. Smith, consulting engineer to Borough President Gresser. The plans will ask for the adoption, as part of the rapid transit system of the city, of the extension of the Second and Third Avenue elevated lines across the Queensboro Bridge and the extension of elevated lines from the Queensboro Bridge plaza to Woodside and Corona.

Value of Electric Railway Properties in Washington.

A statement issued by the Washington State Tax Commission shows the following values for electric railways:

Olympia Light & Power Company	$256,330
Seattle Electric Company	14,347,987
Seattle, Renton & Southern Railway	907,953
Everett Railway, Light & Power Company	2,172,343
Whatcom County Railway & Light Company	1,729,460
Grays Harbor Railway & Light Company	806,359
Tacoma Railway & Power Company	3,580,323
Pacific Traction Company	132,779
Washington Water Power Company	3,611,526
Loyal Railway Company	14,964
Vancouver Traction Company	146,356
Seattle-Everett Traction Company	1,331,420
Yakima Valley Transportation Company	402,453
Walla Walla Valley Railway	1,009,455
Total	$30,449,708

Value of Electric Railway Properties in Wisconsin.

The Wisconsin State Tax Commission has announced the following values for electric railways:

Milwaukee Electric Railway & Light Company	$24,200,000
Milwaukee Light, Heat & Traction Company	6,650,000
Milwaukee Northern Railway	1,650,000
Sheboygan Railway & Electric Company	865,000
Green Bay Traction Company	705,000
Eastern Wisconsin Railway & Light Company	775,000
La Crosse & Onalaska Street Railway	20,000
La Crosse City Railway	460,000
Menominee & Marinette Light & Traction Company	240,000
Southern Wisconsin Railway	850,000
Duluth Street Railway	875,000
Total	$37,290,000

Developments in Toledo Situation

The ordinance enacted recently by the City Council of Toledo, Ohio, providing for the payment of rental at the rate of $250 per day by the Toledo Railways & Light Company for the use of streets upon which franchises have expired, became effective on Aug. 15. This ordinance calls for the payment of rent from the time the franchises expired, and the aggregate amount claimed by the city is now $70,000. A copy of the ordinance was served upon the company on that day. Suit to recover the amount claimed may be brought under the ordinance in ten days.

City Solicitor Schreiber has prepared an ordinance extending the old ordinances to the term of the longest unexpired franchise, and if the company is willing to accept this and operate the lines affected at a fare of 3 cents, it is said that the claim under the rental ordinance will not be pressed.

This ordinance was drafted in compliance with instructions from the Council. The instructions did not show clearly whether it was the idea of the City Council that this rate should extend over the entire system or merely over the lines affected by the extension. Mr. Schreiber believes that the introduction of the tentative franchise ordinance will force the company to take steps toward a resumption of the negotiations. Mr. Schreiber presented the ordinance before the City Council on Aug. 21. The City Council met as a committee of the whole to consider the ordinance on Aug. 23.

Pennsylvania Car Operators Demand Higher Wages.—Trainmen of the Trenton, Bristol & Philadelphia Street Railway Company have asked an increase in wages from 21 cents to 25 cents per hour. An increase of 15 per cent has been asked by other employees. The railway company has refused to accede to the request.

Pacific Electric Company Opposes Use of Grooved Girder Rails.—Officials of the Pacific Electric Railway appeared before the Council, Pasadena, Cal., to discuss the use of grooved girder rails in place of T-rails on the extension to Pasadena. They said that the grooved rails would cost $17,000 more per mile than T-rails, and that they were unsafe for fast running.

Danger Signals at Grade Crossings for Pacific Electric Railway.—Danger signals of the type recommended by the State Railroad Commission will be installed at the grade crossings of the Pacific Electric Railway, Los Angeles, Cal., the expense to be met jointly by the company and the counties affected. There are 704 grade crossings on the Pacific Electric system.

Minneapolis Traction Line Has Assessment Reduced.—The Board of Equalization of Minneapolis, Minn., at its final session on Aug. 8 reduced the assessment on the property of the Minneapolis & St. Paul Suburban Railway on the South St. Paul line from $100,000 to $35,000. The petition of the Minneapolis Street Railway for a reduction in assessment of $150,000 was denied.

City Council of Kansas City to Petition for Third Receiver for Metropolitan Street Railway.—The lower house of the City Council of Kansas City, Mo., has adopted a resolution requesting the city counselor to petition William C. Hook, judge of the United States Circuit Court, to name a third receiver for the Metropolitan Street Railway, to represent the interests of the people of Kansas City. The resolution asks that Henry M. Beardsley be named as the third receiver.

Use of Streets by Los Angeles Electric Railway to Be Restricted.—In a message of the Los Angeles (Cal.) Board of Public Utilities to the City Council it was recommended that the Los Angeles & Redondo Railway be given until Aug. 31 to discontinue its use of the public streets without a franchise. It was also recommended that the Southern California Hardwood & Manufacturing Company be refused a permit to build a spur track to connect with the Pacific Electric Railway on the ground that an electric railway is not privileged to carry freight.

Pittsburgh Transportation Investigation.—John P. Fox, who is investigating street railway conditions in Pittsburgh for the city, has sent a communication to the City Council in which he refers to the report of Bion J. Arnold on the transportation situation. Mr. Fox says: "As Mr. Arnold's failure to find that a subway would pay in Pittsburgh appears largely due to a reliance on theoretical data, some of it five years old, would it not be well to avoid the same mistake this time, and to use all the actual facts as to existing traffic in order not to reach any erroneous conclusion again? I should be glad to explain the matter fully at any convenient time." The purpose of the letter of Mr. Fox was to induce the Council to provide funds to pay him for services from the middle of May to the middle of July. He stated that he had been informed by the Mayor that the appropriation to employ traction experts had been exhausted, but he continued in order to gather some data required by the legal department. The report of the city comptroller for the fiscal year ended Jan. 21, 1911, says that the city spent $36,718 in the investigation of the street railway situation during the year.

Financial and Corporate

New York Stock and Money Markets

August 23, 1911.

The market on Monday was irregular and its tone was decidedly weak. Stocks rallied in the early trading Tuesday, but the majority of the gains were lost before the close. Trading to-day was exceedingly dull, the volume of transactions being the smallest since the beginning of the present decline. Price changes were few, several of the active stocks showing slight losses at the end of the day. Disquieting advices on the Moroccan question and discussion of railroad retrenchment plans comprised the chief features of interest in the Street. Quotations on the money market to-day were as follows: Call, 2@2¼ per cent; ninety days, 3⅛@3⅝ per cent.

Other Markets

Slight gains were made in the Chicago market on Tuesday, Chicago Elevated preferred selling at 90.

Trading has been narrow on the Philadelphia Exchange during the week and aside from a few transactions in Steel the list has been neglected.

Prices have declined in Boston since last report and further losses were made in the copper shares in to-day's market.

Very little business is being done on the Baltimore Exchange and to-day's market was devoid of interest.

Quotations of traction and manufacturing securities as compared with last week follow:

	Aug. 16.	Aug. 23.
American Light & Traction Company (common)	a296	a296
American Light & Traction Company (preferred)	a106½	a106½
American Railways Company	*44½	a45
Aurora, Elgin & Chicago Railroad (common)	*44⅜	a44
Aurora, Elgin & Chicago Railroad (preferred)	*87	a87
Boston Elevated Railway	126½	a127½
Boston Suburban Electric Companies (common)	*15	a14
Boston Suburban Electric Companies (preferred)	*75	a75
Boston & Worcester Electric Companies (common)	*13	a12½
Boston & Worcester Electric Companies (preferred)	*56	a56
Brooklyn Rapid Transit Company	*74⅝	73¾
Brooklyn Rapid Transit Company, 1st ref. conv. 4c	*86¾	86¾
Capital Traction Company, Washington	a131	a128¾
Chicago City Railway	a190	a190
Chicago & Oak Park Elevated Railroad (common)	*3	a3
Chicago & Oak Park Elevated Railroad (preferred)	*5	a5
Chicago Railways, ptcptg., ctf. 1	*97	a98
Chicago Railways, ptcptg., ctf. 2	*30¾	a29½
Chicago Railways, ptcptg., ctf. 3	a12	a11½
Chicago Railways, ptcptg., ctf. 4	*7½	a7
Cincinnati Street Railway	130	*130
Cleveland Railway	*99⅞	a100¼
Columbus Railway (common)	82	*82
Columbus Railway (preferred)	95	*95
Consolidated Traction of New Jersey	76	a76
Consolidated Traction of N. J., 5 per cent bonds	a105	a105
Dayton Street Railway (common)	a25	a25
Dayton Street Railway (preferred)	a101	a101
Detroit United Railway	a75	a70
General Electric Company	151	a154
Georgia Railway & Electric Company (common)	154	a159
Georgia Railway & Electric Company (preferred)	92	a93
Interborough Metropolitan Company (common)	a15½	15
Interborough Metropolitan Company (preferred)	a42	41¾
Interborough Metropolitan Company (4½s)	77½	*77⅜
Kansas City Railway & Light Company (common)	a19	a19
Kansas City Railway & Light Company (preferred)	44	41
Manhattan Railway	a137	a138
Massachusetts Electric Companies (common)	19	a18
Massachusetts Electric Companies (preferred)	89½	a89
Metropolitan West Side, Chicago (common)	*27½	*27½
Metropolitan West Side, Chicago (preferred)	*75	*75
Metropolitan Street Railway, New York	*15	*15
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	69½	a72
Northern Ohio Light & Traction Company	*50½	*50½
Northwestern Elevated Railway (common)	*30	*30
Northwestern Elevated Railroad (preferred)	*70	*70
Philadelphia Company, Pittsburgh (common)	53	52
Philadelphia Company, Pittsburgh (preferred)	44	42½
Philadelphia Rapid Transit Company	23	23
Philadelphia Traction Company	85½	85
Public Service Corporation, 5% col. notes (1913)	a94	94
Public Service Corporation, ctfs.	a107	107
Seattle Electric Company (common)	a110½	a111⅛
Seattle Electric Company (preferred)	*103	a103
South Side Elevated Railroad (Chicago)	95⅜	95½
Third Avenue Railroad, New York	*8½	a9
Toledo Railways & Light Company	*6½	
Twin City Rapid Transit, Minneapolis (common)	a107	a108½
Union Traction Company, Philadelphia	51	50¾
United Rys. & Electric Company (Baltimore)	18	*18
United Rys. Inv. Co. (common)	31½	a35
United Rys. Inv. Co. (preferred)	60	a65
Washington Ry. & Electric Company (common)	a44⅛	a43
Washington Ry. & Electric Company (preferred)	a85⅛	a90
West End Street Railway, Boston (common)	88	a88
West End Street Railway, Boston (preferred)	88	*88
Westinghouse Elec. & Mfg. Co.	65½	a67
Westinghouse Elec. & Mfg. Co. (1st pref.)	114	a114

a Asked. *List sale.

Albia (Ia.) Interurban Railway.—Reynolds, Davis & Company, New York, N. Y., are placing at 98 and interest first mortgage 6 per cent gold bonds, dated June 1, 1910, and due serially June 1, 1913-1930, inclusive, but subject to call after June 1, 1913, at 101 and interest. The Albia Interurban Railway owns and operates the electric light, power and steam-heating plants in Albia, together with 10 miles of electric street and interurban railway running over private right-of-way except in Albia and reaching the mining towns of Hocking and Hiteman.

American Railways Company, Philadelphia, Pa.—Bioren & Company and Newburger, Henderson & Loeb, as syndicate managers, announce to holders of the $2,435,500 American Railways Company collateral trust 5 per cent bonds, due Dec. 1, 1911, that the syndicate has purchased from the company $2,500,000 new collateral trust convertible 5 per cent bonds, dated Aug. 1, 1911, and maturing Aug. 1, 1931, and issued for the purpose of refunding the maturing bonds. The syndicate advises holders of the maturing bonds that $1,500,000 of the latter will be received for exchange, in the order of application for refunding, on and after Aug. 28, 1911, on the basis of 100½ and interest for the maturing bonds and 96½ and interest for the new bonds.

Bangor Railway & Electric Company, Bangor, Maine.—Directors have approved a plan for the reorganization of the company in connection with the Bangor Power Company, which has recently acquired all the properties and franchises formerly owned and operated by the Bodwell Water Power Company, the Veazie Lumber Company and the Penobscot Realty Company. The properties and franchises of the three companies named and of the Bangor Railway & Electric Company are to be placed under one management and control, either by actual merger or by stock ownership, and the combined enterprise will be represented by the outstanding capitalization of the Bangor Railway & Electric Company as follows: Bonds, including present bonds of the Bangor Railway & Electric Company and its underlying companies, also $750,000 of new bonds, $3,350,000; preferred stock 7 per cent cumulative (new issue), $1,500,000; common stock (heretofore $1,500,000), $2,000,000. This plan will require an increase in the capital stock of the Bangor Railway & Electric Company to $3,500,000, of which $1,500,000 is to be 7 per cent cumulative preferred stock and $2,000,000 common stock. The present stockholders of the Bangor Railway & Electric Company will receive for each share of stock held one share of new preferred and one share of new common. A special meeting of stockholders will be held on Aug. 26, 1911, for the purpose of voting upon the plan which has been outlined above and increasing the capital stock.

Boston (Mass.) Elevated Railway.—Directors of the West End Street Railway, Boston, Mass., on Aug. 18 issued a second circular to stockholders in which they answered the objections of the West End stockholders' protective committee to the proposed consolidation with the Boston Elevated Railway. They gave as their principal argument for consolidation the claim that the stock received in the transfer will be safer than stock in the West End system itself, and in support of the claim they give the opinion of John C. Gray that under the act the Boston Elevated cannot issue any stock, either before or after consolidation, that will have priority over or equality with either the first or second preferred stock issued in accordance with the act, except by the consent of two-thirds of the holders of the said stocks.

Chicago (Ill.) Elevated Railways.—Stockholders of the Northwestern Elevated Railroad held a special meeting on Aug. 21 and ratified the proposal authorizing an issue of $25,000,000 first mortgage bonds. The trustees of the Chicago Elevated Railways voted nearly all of the company's capital stock. The bonds will be turned over to the trustees and held as security against money advanced to retire about $19,000,000 of 4 per cent mortgage bonds on Sept. 1, and to liquidate floating debt.

Northern Ohio Traction & Light Company, Akron, Ohio.—W. R. Kimball, president of the Cuyahoga River Power Company of Akron, Ohio, has filed a protest with the Ohio Public Service Commission against an issue of preferred stock sold recently by the Northern Ohio Traction & Light Company, Akron, Ohio. In the protest it was stated that part of the stock was sold to a director at less than par. At a hearing before the Ohio Public Service Commission, on Aug. 21, Charles Currie, general manager, and Will Christy, first vice-president, testified that $1,000,000 of the authorized stock had been sold to W. E. Hutton & Company, Cincinnati, last March. As the public utilities law did not become effective till July 1, the commission holds that this transaction was not illegal.

Ohio Valley Electric Railway, Huntington, W. Va.—The American Railways Company, Philadelphia, Pa., has acquired about 98 per cent of the capital stock of the Ohio Valley Electric Railway, operating the local and interurban lines between Guyandotte, Ashland, Ky., Coal Grove and Ironton, Ohio; also all of the capital stock of the Consolidated Light & Railway Company, Huntington; Citizens' Light & Ice Company, Huntington; Ashland Electric Light & Power Company, Ashland, Ky., and Ironton Electric Company, Ironton, Ohio. The improvements contemplated by the new owners include an increase of the power generating station at Kenova by the addition of two 1000-kw turbines, the rebuilding of the substation at Huntington, adding 300 kw to the capacity, and an addition of 150 kw to the capacity of the substation at Cliffside. It is also planned to double-track the main line for a distance of about 8 miles if the proper ordinances can be secured from the city of Huntington. A new high-tension line giving a duplicate line from the power station at Kenova to Huntington is being constructed.

Railway & Light Securities Company, Boston, Mass.—Common stockholders of record Aug. 1, 1911, are offered the right to subscribe at par ($100 per share) for the $1,000,000 new 6 per cent cumulative preferred stock (callable at 125 and accrued division) at the office of the secretary and treasurer, F. J. B. Huntoon, 60 State Street, Boston, on or before Sept. 1, 1911, to the extent of one share for each share of common held. Subscriptions are payable in full at once.

Toronto (Ont.) Railway.—Stockholders ratified on Aug. 14 the proposed increase in the authorized stock from $8,000,000 to $12,000,000 and also the payment of a stock dividend of $1,000,000 to holders of record Aug. 25 in the proportion of one share for every eight shares held on that date. Stockholders of record Aug. 25 will be allowed to subscribe for $2,000,000 stock at par in the proportion of one share for every four shares held on terms to be announced later. The certificates for the stock dividend will be issued on and after Sept. 15.

United Railways & Electric Company, Baltimore, Md.—The $195,000 outstanding car trust notes, series C, and the $340,000 car trust notes of series B, that mature subsequent to Oct. 1, 1911, when $85,000 are due, have been called for payment at 102½ and interest on Sept. 30.

Winona (Minn.) Railway & Light Company.—Judge Charles A. Willard in the United States District Court at Milwaukee on Aug. 15 appointed Howard Morris, of Milwaukee, receiver for the company on application of the Old Colony Trust Company, of Boston, trustee of the mortgage.

Winnipeg (Man.) Electric Railway.—The negotiations for the sale by the Winnipeg Electric Railway of its railway, power and lighting system to the city of Winnipeg have been suspended temporarily. A conference was held at Winnipeg on Aug. 11 between President MacKenzie and Mayor Evans and the special committee having charge of the negotiations. It is stated that the Mayor and aldermen declared that the city, before committing itself to purchase the company's property and plant, would require a thorough audit of every department. President MacKenzie replied that no audit would be permitted because the company would not think of allowing the city to go into the details of its business so long as the city was not bound in any way to purchase. All to which he could possibly agree was that if the city first passed the by-laws through the necessary stages and bound itself to purchase if the audit showed that the company earnings came up to the requirements already set forth by the Mayor, the company would permit an audit to be made to show that the earnings for the last six months met all the conditions named by the city. The negotiations were then temporarily suspended for ten days until after the return of President MacKenzie.

Dividends Declared

Brooklyn (N. Y.) Rapid Transit Company, quarterly, 1¼ per cent.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis., quarterly, 1¾ per cent., preferred.

Elmira Water, Light & Railroad Company, Elmira, N. Y., 2½ per cent., preferred.

Georgia Railway & Electric Company, Atlanta, Ga., quarterly, 2 per cent. common.

Rochester Railway & Light Company, Rochester, N. Y., quarterly, 1¼ per cent., preferred.

Terre Haute Traction & Light Company, Terre Haute, Ind., 3 per cent., preferred.

MONTHLY ELECTRIC RAILWAY EARNINGS

CAPE BRETON ELECTRIC COMPANY.

Period.			Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Surplus
1m.,	June,	'11	$27,427	$15,029	$12,398	$6,153	$6,245
1 "	"	'10	25,755	14,990	10,765	6,144	4,627
12 "	"	'11	330,596	170,307	160,289	73,741	86,548
12 "	"	'10	308,419	170,395	138,024	74,083	63,941

COLUMBUS ELECTRIC COMPANY.

1m.,	June,	'11	$43,779	$18,732	$25,047	$14,900	$10,147
1 "	"	'10	37,295	17,859	19,435	17,615	1,820
12 "	"	'11	605,840	205,095	400,745	281,624	119,121
12 "	"	'10	409,697	210,486	199,212	171,291	27,921

GALVESTON ELECTRIC COMPANY.

1m.,	June,	'11	$43,830	$31,519	$22,312	$8,612	$13,700
1 "	"	'10	31,553	90,648	11,905	6,751	5,154
12 "	"	'11	407,854	220,457	187,397	99,494	87,893
12 "	"	'10	360,940	231,497	129,443	78,052	51,391

GALVESTON-HOUSTON ELECTRIC COMPANY.

1m.,	June,	'11	$134,934	$77,537	$57,398	$25,076	$32,322
1 "	"	'10	109,083	67,028	42,056	17,729	24,327
12 "	"	'11	1,416,149	827,791	588,358	304,992	283,756
12 "	"	'10	1,242,948	762,457	480,492	268,846	211,646

NORFOLK & PORTSMOUTH TRACTION COMPANY.

1m.,	June,	'11	$2,091,617	$1,212,405	$879,203	$743,529	$135,633
1 "	"	'10	1,920,841	1,110,489	810,351	777,217	33,135

NORTHERN TEXAS ELECTRIC COMPANY.

1m.,	June,	'11	$136,062	$68,276	$67,786	$25,244	$42,542
1 "	"	'10	120,964	64,701	56,263	20,162	36,101
12 "	"	'11	1,540,192	805,228	734,964	271,585	463,379
12 "	"	'10	1,350,515	729,162	621,352	215,216	406,136

SAVANNAH ELECTRIC COMPANY.

1m.,	June,	'11	$59,958	$41,565	$18,363	$18,352	$11
1 "	"	'10	53,610	35,596	18,014	18,007	7
12 "	"	'11	662,047	442,584	219,463	218,278	1,185
12 "	"	'10	611,836	398,559	212,877	212,444	433

SEATTLE ELECTRIC COMPANY.

1m.,	June,	'11	$433,701	$242,969	$190,732	$115,347	$75,385
1 "	"	'10	44,676	261,337	186,339	108,705	76,634
12 "	"	'11	5,551,611	3,104,191	2,447,420	1,334,685	1,112,735
12 "	"	'10	5,885,590	3,463,580	2,522,011	1,285,845	1,236,166

TAMPA ELECTRIC COMPANY.

1m.,	June,	'11	$56,813	$31,192	$25,621	$6,895	$18,726
1 "	"	'10	49,895	29,308	20,587	4,533	16,054
12 "	"	'11	615,365	327,038	288,327	76,609	211,718
12 "	"	'10	615,182	351,219	263,963	55,299	208,664

WHATCOM COUNTY RAILWAY & LIGHT COMPANY.

1m.,	June,	'11	$32,165	$17,236	$14,929	$10,965	$3,964
1 "	"	'10	30,460	18,220	12,240	8,473	3,768
12 "	"	'11	428,159	217,754	210,395	122,554	87,841
12 "	"	'10	418,219	237,765	180,454	101,565	78,889

Frank Hagerman, counsel for the Metropolitan Street Railway, Kansas City, Mo., has made the following explanation of the withdrawal of service on the intercity viaduct and of the reasons why the company could not meet the demands of the viaduct company for toll dues at present: "The month's rent due prior to the receivership has been ordered paid by the court with the obligations to others for current operations. All such bills will be paid at the same time, but the Viaduct company cannot, under the order, be paid, as it demands, in preference to or before other creditors of like class. The receivers have always been willing, and, of course, must and will pay such sums as the court says are reasonable for use of the viaduct made by them. The claim, therefore, is as good as gold. They will not, however, as demanded, adopt the old contract, which runs to June 1, 1925, and requires the payment of 20 per cent of all that is earned from every passenger who crosses the viaduct, no matter how far he rides, especially when there are other lines over which passengers may be transported without any further charge. Because of the failure of the receivers to meet the foregoing impossible demands made by it the Viaduct company conceives it has a right to cancel the contract and exclude the receivers from the use of the viaduct."

Traffic and Transportation

Order of New Jersey Commission Regarding Transfers in Newark

The order of the Board of Public Utility Commissioners of New Jersey regarding the transfer system of the Public Service Railway in Newark becomes effective, by its provisions, on Sept. 5. The board orders compliance with the ordinance passed by the Board of Street and Water Commissioners on Aug. 1, 1894. In part the decision says:

"We find that the Public Service Railway is legally bound to give a transfer to any passenger paying the fare of 5 cents upon any of its cars, such transfer entitling the passenger to a continuous ride in either direction on any street railway line intersecting with or connecting with the line upon which said transfer was given; and we do further find that the requirement to give such transfers may not be restrictive or delimited to a line that may take the passenger without further change to his ultimate destination, but that transfers must be given on any intersecting or connecting line that advances the passenger continuously toward his ultimate destination even though a re-transfer is required to bring him to his ultimate destination.

"The plain fact appears that the Public Service Railway has failed to render literal compliance with binding ordinances bearing upon the matter of transfers. Such failure it seeks to justify on two grounds. It contends that the language of the ordinance can be construed so as to permit such action on its part. It contends, also, that operating necessities require such action. Both of these contentions are, in our judgment, without foundation.

"Such ordinances as require transfers for 'a continuous ride,' or such a resolution of the Common Council as that of Dec. 5, 1890, which (if not wholly supplanted by the later ordinances of the street and water commissioners of July 19, 1894), required the giving of transfers from 'all places at which the said roads cross or intersect,' cannot bear the construction placed upon them by the respondents. A 'continuous ride' means a ride that enables the passenger to continue upon his journey by means legally available. It may allow one transfer or more. And if the carrier is under an obligation, as in this case the carrier is, to 'give to any person who has paid his fare of 5 cents on any such car a transfer ticket which shall entitle such person to a continuous ride in either direction on any street railway line intersecting with or connecting with the line upon which such transfer was given,' the carrier has no right to restrict transfers to certain designated lines which may carry the passenger without further change of cars to his destination.

"We dissent *in toto* from the contention of the company that a 'coincident line is not a connecting line.' Coincident trackage for lines which eventually diverge from the coincident trackage implies in the very nature of the case that the lines are 'connecting with' each other.

"If there was reasonable doubt as to the meaning of these terms as employed in the several ordinance provisions under consideration, the fact that over a long period of years the several companies affected thereby, including the respondent, placed a practical construction thereon in operation of the lines inconsistent with the construction now contended for by respondent, and in accord with the conclusion herein reached as to the intent thereof, would impel the resolving of such doubt in favor of the construction herein adopted.

"The arguments advanced by the respondent upon operating grounds are as follows: Service would be delayed if a passenger chose to take a transfer that would require him to board more than one car other than the one he originally boarded; unrestricted transfers would augment the number of stolen return trips; an unnecessary waste of electrical energy would be occasioned by such a system of transfers. These contentions, even if unqualifiedly valid from the operating standpoint, do not exempt the carrier from the legal obligations resting upon him.

"We are not satisfied that all such restrictions as are now without legal warrant imposed by the company in the giving of transfers are expedient or advantageous to the public or to the carrier. The requirements now imposed sometimes compel the passenger to take an indirect route.

"There is also reason to believe that some crowding upon cars might be avoided if the present illegal restrictions upon transfers were done away with.

"The contention of the respondent that unless limitations were imposed upon the issue of transfers there would be increased opportunity for dishonest patrons to obtain a return journey for a single fare, this board cannot entertain. Appropriate limitation of the duration of transfers, different colored transfer slips and other devices, among them the detection and prosecution of such offenses, are the proper remedies in the absence of municipal consent to the delimited issue of transfers. Because some dishonest passengers may be enabled by unlimited transfers more easily to steal a ride is no reason why the vast majority of honest patrons should be deprived of rights legally their own.

"Similarly, the respondent's averment that transfers permitting the holder to make a retransfer are impracticable is overthrown by the company's employment of identification slips for exactly this retransfer system now issued on the South Orange line to Maplewood.

"There is one additional feature of this case which ought, we feel, to receive notice in this opinion. When the change in the transfer system was made no notice thereof was posted in the cars. To withhold transfers legally due is unwarrantable, even if done mistakenly; but to initiate such a partial withdrawal of transfers previously given, with no notice to such effect posted in the company's cars, violates most unjustifiably the obligation which the carrier owes the public."

B. S. Josselyn on Courtesy

In an address made to the heads of the departments of the Portland Railway, Light & Power Company, Portland, Ore., recently B. S. Josselyn, president of the company, said in part:

"Be gentlemanly in all your dealings with the public. The acts of all, whether trainmen, linemen or those in the general offices, are held by the public to be the acts of the company. I mean that whatever you do or whatever you say the general run of the public seems to regard as the official act of the company itself.

"I am not ready to analyze for you just why this should be so, but I am ready to say that in a measure it is so. If we accept this as a basis, then it certainly is the duty of every member of the company's large family to act strictly in accord with the desires of the actual owner and representative of the company. In other words, you must do those things which you would do if you were the mind which directed the operations of the company.

"Do not construe my meaning with reference to the issuance of certain orders for the operation of the company, but rather as to your conduct as gentlemen—the matters that pertain to your ethical side, as it were. In your connection with the public you should treat it with the utmost consideration as to its rights and as to its privileges. Right in this line lies the future of our success, in a measure. When you walk down the street, or if you are on the car, or if you are in the home of some friend, good words for the good deeds of the company will go a long way toward popularizing with the public what too frequently is an unpopular institution in this country, namely, the street railway corporation.

"We can all be publicity agents for this cause. What greater task can be placed in the hands of any set of men than to be trusted with the lives of hundreds of thousands of men and women daily in carrying them from their homes to their places of business? In the performance of this work it devolves upon everybody to do his duty to the utmost.

"For these reasons I believe that all of us, when we go out into the public and meet our friends and our new acquaintances, should be ready and willing to explain to them how earnestly and sincerely we are endeavoring to do this to the best of our ability.

"The publicity which you can put forth to the best advantage is the publicity of a salesman. You are primarily engaged in selling car tickets and electric lights. You may be busy over the books of your office, or you may be engaged in figuring out power factor, yet you are selling the product of this company. Therefore, your attitude toward every man you meet marks to a degree the success with which we sell our product. In other words, your public appearance, your smiles and your cheerful words are important factors in the disposal of our product.

"I will conclude with this advice: Give every man a cheerful greeting. Tell all that we aim to please; and act within the rights granted to us under our charter. If you do you plant the seeds of good-will, which will bear an abundant harvest for yourselves and for the company, too."

Conditions Governing Free Transportation in New Jersey

A memorandum issued by the Board of Public Utility Commissioners of New Jersey lays down rules on which free transportation may be given by public carriers. A summary of the findings of the board is as follows:

"First—Free transportation, or transportation at less than regular rates, may be legally afforded by a carrier where such transportation is of assistance in facilitating the administration of charities and thus in line with the public policy of this State.

"Second—Reduced rates of fare for intrastate trips to school teachers are prima facie discriminatory, and therefore illegal, unless there is a municipal contract with the carrier entitling the school teacher as a municipal employee to such reduced rate of fare.

"Third—There is no universal presumption in favor of the legality of railroad companies according to intrastate traffic the same free transportation specifically permitted to certain kinds of intrastate traffic by the interstate commerce act.

"Fourth—Persons engaged by railroad companies to perform special services may be allowed free transportation for intrastate journeys in this State only when the companies in all such cases avoid all illegal discrimination and when each company either universally grants such free transportation in said circumstances or universally abstains from granting such free transportation in such said circumstances."

Near-Side Stops in Kansas City, Mo.—The Metropolitan Street Railway of Kansas City, Mo., has begun the practice of stopping cars only on the near side of crossings except where physical conditions prevent.

Transfer Abuses Corrected in Sacramento.—The Sacramento (Cal.) Electric, Gas & Railway Company has made changes in its transfer system so as to eliminate the abuse of round trips on one fare, which were possible on several lines under the former system.

Report on Interurban Collision Near Milton, Wash.—A. W. Perley, inspector of railroad trackage and equipment for the Public Utilities Commission of Washington, has filed a report on the recent collision on the Puget Sound Electric Railway at Milton, holding the crew of the extra train responsible for the accident.

Seattle Transfers Must Be Used at Point Indicated.—An opinion has been furnished to Superintendent of Public Utilities A. L. Valentine, of Seattle, Wash., by Assistant Corporation Counsel Howard D. Hughes that the Seattle Electric Company is not required to carry any passenger who presents a transfer at any other point than that at which the transfer was issued.

Buffalo & Lake Erie Traction Company Increases Wages.—An agreement has been made by the Buffalo & Lake Erie Traction Company and its trainmen by which the following sliding wage scale will be adopted: For the last five months of this year, 21 cents, 22 cents and 23 cents per hour, according to length of service. From Jan. 1, 1912, trainmen will receive 22 cents, 23 cents and 24 cents per hour, and from Jan. 1, 1913, they will receive 23 cents, 24 cents and 25 cents per hour. The old scale has been 19 cents, 20 cents, 21 cents and 22 cents per hour.

Commission Orders Improvement in Car Service on Long Island.—The Public Service Commission of the First District has ordered the New York & Queens County Railway, Long Island City, N. Y., to provide daily, beginning on Aug. 24, except Sundays or holidays, a sufficient number of seats during each half-hour period to provide for all its passengers or to observe a specified schedule.

Boston Elevated Railway Submits Plans for Changes at Sullivan Square Station.—Plans for changes in the station

of the Boston Elevated Railway at Sullivan Square, so as to permit the operation of eight-car trains, have been submitted to the Massachusetts Board of Railroad Commissioners. On Aug. 15 a hearing was held on the subject. No opposition developed and the board took the matter under advisement.

Amendment of Minneapolis Ordinance Desired.—The Twin City Rapid Transit Company, Minneapolis, Minn., will ask the City Council to amend the ordinance passed recently so as to allow thirty-five persons to stand instead of twenty-four. A joint investigation is planned by the Council and the railway in order to ascertain the possibility of the operation of cars on a two-minute schedule over the important streets between 5:40 and 6:30 p. m.

Campaign Against Transfer Abuse by Central Pennsylvania Traction Company.—The Central Pennsylvania Traction Company, Harrisburg, Pa., has decided to enforce the newly enacted State law which prohibits the gift of transfers by passengers. The company has posted notices in its cars warning passengers of a purpose to prosecute any and all offenders. The company has been a sufferer financially from this practice in the past, and is determined to break it up.

Order Regarding Operation in Buffalo.—The Public Service Commission of the Second District of New York has ordered the International Railway, Buffalo, N. Y., to revise its orders requiring the operation of cars on Main Street when passing over special work in either direction at Main Street and Utica Street, so as to reduce the speed to not to exceed 1 m.p.h. The company is further ordered to replace the special work by new equipment, the new work to be fully completed on or before Oct. 1, 1911.

Passengers Compelled to Buy Interstate Tickets.—A public hearing will be given by the Board of Public Utility Commissioners of New Jersey in Jersey City, on Sept. 1, on the question of whether the steam railroad companies may refuse to sell tickets to Camden, Jersey City and Hoboken. Since the commission suspended operation of the increased fares until Oct. 3, railroad companies have refused to sell tickets to those cities, compelling passengers to purchase transportation to New York and Philadelphia, making the journeys interstate instead of intrastate.

Express Service Between Oakland and Hayward.—The Oakland (Cal.) Traction Company has established express service between Oakland and Hayward. Three through cars leave Hayward every morning except Sunday, and a like number leave Thirteenth Street and Washington Street, Oakland, every evening. From Hayward the cars make no stops to take on or leave passengers east of Elmhurst, and from Oakland no stops are to be made west of Elmhurst. The cars run at twenty-minute intervals. They leave Hayward at 6:34 a. m., 7:14 a. m. and 7:34 a. m., and leave Oakland at 5:20 p. m., 5:40 p. m. and 6 p. m.

Discussion of City Traffic Matters at Dallas, Tex.—Edward T. Moore, local manager of the Dallas Electric Corporation, Dallas, Tex., was present at a meeting of the City Plan and Improvement League on Aug. 8, called for the purpose of discussing desired improvement in general traffic. The question of the congestion on Lamar Street was taken up and it was agreed that the street should be widened and that franchises should be secured to permit the railway to use other streets in conjunction with the Lamar Street route. It was also agreed that car stops should be uniform, either on the near side or the far side of the crossing

Automobiles Affect Interurban Traffic.—Interurban lines operating in the central West are feeling the loss of business to privately owned automobiles, which are rapidly increasing in number. In one town of 8,000 inhabitants in northern Indiana there are thirty-five machines. This town is near a city of 20,000 people. Until the last year the interurban company operating through both places derived a very gratifying revenue from the town. Now owners of machines go to the city in their autos and invite their neighbors to accompany them, and the company loses not only the business of the owners but that of many persons besides.

Panama-Pacific Traffic Plans.—Charles N. Black, vice-president and general manager of the United Railroads, San Francisco, Cal., is quoted as follows in regard to the traffic plans of the company with reference to the Panama-Pacific Exposition: "It is too early yet to formulate just what will be done. There are no immediate extensions of lines contemplated for the exposition travel. The only line that it is proposed to extend at present, and on this some little work has already been done, is the Hayes and Masonic line out beyond the Affiliated Colleges into the Upper Sunset district. There is some problem over raising the fund guaranteed and that is causing a little delay."

Entrance of Interurban Lines to Chicago.—The Aurora, Elgin & Chicago Railroad, as described recently in the Electric Railway Journal, now operates to the center of Chicago over the tracks of the Metropolitan West Side Elevated Railway, and within a short time it is expected that the Chicago & Milwaukee Electric Railroad will secure an entrance to the "loop" district over the lines of the Northwestern Elevated Railroad from Evanston. It is reported that the pending changes in operation which shortly are to be made for the consolidated roads will not require negotiations with the city, because it is desirable to postpone such negotiations until the final plans are prepared for the merger of the surface lines with the elevated railways.

The Heart of Maryland Route.—The Frederick (Md.) Railroad has issued a very attractive folder, "The Key to the Heart of Maryland." The cover is in colors, decorated with a heart in red and a key inclosed in a border representing a chain. The folder itself is printed in brown and red, the text being in brown and the title of the company, "Frederick Railroad," in red at the top of each page and the slogan, "The Heart of Maryland," in red at the bottom of each page. The headings and the initial pieces are in black, the initials being inclosed in an outline heart in red. In the center of the folder there is a cross-page bird's-eye view of Frederick. There is a map showing the route of the Frederick Railroad and the lines which connect with it. At the back of the folder there are timetables and complete information for patrons of the line.

Decision in Regard to Charge for Transfers.—On the petition of the Middlesex & Boston Street Railway for permission to charge 1 cent extra when issuing transfers to connecting lines of the system, the Massachusetts Railroad Commission has ordered: "After a public hearing upon the application the board requested, and has now received from the company, a tabulation of its operations for the year ending June 30, 1911. This statement is preliminary to its annual return, to be filed later under the provisions of law. While an examination of this statement discloses a better financial condition of the company, we have not before us sufficient information to make a final order in the premises. Without, therefore, granting the petition for any specific time, the company is authorized to continue the withdrawal of free transfers until further notice by the board."

"Traction Parks for Summer Larks."—The advertising department of the Illinois Traction System, which is in charge of Fred G. Buffe, of Peoria, Ill., has just issued a sixteen-page illustrated folder entitled "Traction Parks for Summer Larks," which describes the many attractive resorts on this system. The advantages of the observation parlor car and sleeping-car services are also presented attractively. The folder contains a map of the system and a condensed timetable of limited trains. All trains to which observation cars or sleeping cars are attached are indicated in red in the timetable. It is noted that ten limited trains are operated daily for the 175-mile run between St. Louis and Peoria. These are in addition to the regular Peoria-St. Louis local trains and the other limited trains which operate between Springfield and St. Louis. Seven trains give through service between Danville and St. Louis, 230 miles. Two of these trains have observation parlor cars. The schedule speed of the limited observation car trains is 27 m.p.h. The new folder describing the parks and trains contains many advertising phrases such as "The road of good service," "See Illinois first," "Summertime is travel time," "Watch the automatic block signal work," "A Traction trip leaves pleasant memories," "Illinois Traction is the road of satisfaction," "You can sleep on the Illinois Traction System sleeping cars," "Travel Traction—satisfaction," "Electricity means cleanliness," "Travel is perfection under Illinois Traction protection."

Personal Mention

Mr. W. F. Cox has been appointed chief engineer of the Vicksburg (Miss.) Traction Company, to succeed Mr. Thomas Hunt.

Mr. B. S. Hinckley has been appointed purchasing agent of the Portsmouth (N. H.) Electric Railway, to succeed Mr. C. N. Chavalier.

Mr. G. K. Smith has been appointed auditor of the Northampton Traction Company, Easton, Pa., to succeed Mr. M. E. Kerney.

William H. Snyder has been elected treasurer of the Bucks County Electric Railway, Newtown, Pa., to succeed Mr. H. H. Harrison.

Mr. John E. Potter has been elected president of the Westmoreland County Railway, Pittsburgh, Pa., to succeed Mr. Joseph Keeling.

Mr. Arthur K. Brown has been elected vice-president of the Oak Bluffs (Mass.) Street Railway to succeed Mr. Andrew H. Highlands.

Mr. William Reid has been elected secretary of the Emigration Canyon Railroad, Salt Lake City, Utah, to succeed Mr. Leslie G. Young.

Mr. A. A. Coupland has been appointed auditor of the Muskogee (Okla.) Electric Traction Company to succeed Mr. William A. Drake.

Mr. H. C. Quisenderry has been elected president of the Lincoln Railway & Light Company, Lincoln, Ill., to succeed Mr. W. H. Schott.

Mr. F. William Rudall has been elected vice-president of the Westmoreland County Railway, Pittsburgh, Pa., to succeed Mr. Stephen Stone.

Mr. C. B. Brooks has been elected treasurer of the Sandusky, Norwalk & Mansfield Railway, Norwalk, Ohio, to succeed Mr. J. W. Frink.

Mr. O. C. Harrington has been appointed roadmaster of the Denver & Interurban Railroad, Denver, Col., to succeed Mr. A. W. Duncan.

Mr. Owen Sanders has been elected secretary of the Sandusky, Norwalk & Mansfield Railway, Norwalk, Ohio, to succeed Mr. J. W. Frink.

Mr. G. G. Watson has been appointed superintendent of the Ontario & San Antonio Heights Railroad, Ontario, Cal., to succeed Mr. A. W. Burt.

Mr. C. F. Thompson has been elected vice-president of the West Side Electric Traction Company, Charleroi, Pa., to succeed Mr. J. K. Tener.

Mr. J. Cortlandt Bacon has been appointed superintendent of the railway department of the Augusta Railway & Electric Company, Augusta, Ga.

Mr. Charles H. Carpenter has been appointed superintendent of the Oak Bluffs (Mass.) Street Railway to succeed Mr. Clarence Stewart.

Mr. Frank Samuelson has been appointed acting auditor of the Metropolitan Street Railway, New York, N. Y., to succeed Mr. H. W. Brown, deceased.

Mr. S. A. Culbertson has been elected president of the Pascagoula Street Railway & Power Company, Pascagoula, Miss., to succeed Mr. Charles T. Ballard.

Mr. W. K. Page has been appointed master mechanic of the Western New York & Pennsylvania Traction Company, Olean, N. Y., to succeed Mr. William Enser

Mr. C. V. Weston has resigned as president of the South Side Elevated Railroad, Chicago, Ill. Mr. Weston will remain temporarily on the board of directors of the company.

Mr. J. S. Hambleton has resigned as general manager of the State Belt Electric Street Railway, Pen Argyl, Pa., to become general manager of the Wilmington Southern Traction Company, Wilmington, Del.

Mr. F. L. Richards, superintendent of St. Louis terminal of the Illinois Traction System, has had his jurisdiction extended to include the 100 miles of line between the McKinley Bridge at St. Louis and Springfield.

Mr. J. V. H. Torner has resigned as shop foreman of the Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis., to become connected with the electrical department of the Sanitary District of Chicago.

Mr. Earl L. Mosely has resigned as chief engineer of the Grand Junction & Grand River Valley Railway, Grand Junction, Col. He was presented with a gold watch and fob by the officials and employes of the road.

Mr. H. E. Rodenhouse has been appointed assistant superintendent of the Western division of the Pacific Electric Railway, Los Angeles, Cal. Mr. Rodenhouse has been connected with the company for the past ten years.

Mr. B. I. Kilpatrick has resigned his position as master mechanic of the Slate Belt Electric Street Railway to become master mechanic of the Wilmington & Southern Traction Company, Wilmington, Del., in the capacity of master mechanic.

Mr. W. G. Davidson has been elected treasurer of the Spokane & Inland Empire Railroad, Spokane, Wash., vice Mr. H. B. Ferris, resigned. Mr. Davidson is now secretary and treasurer of the company and Mr. Ferris holds the title of comptroller.

Mr. J. T. Funk, superintendent of the Louisville (Ky.) Railway, has been appointed a member of a special committee on convention and excursions of the Louisville Commercial Club. A number of special meetings will be held during the State Fair in Louisville next month, and the committee to which Mr. Funk has been appointed will be charged with the work of arranging for these meetings.

Mr. Walter N. Cargill, who for eleven years has been superintendent of power stations for the Bay State Street Railway, in Lynn, Mass., has resigned his position to become connected with Stone & Webster, Boston, Mass. In recognition of his long term of service with the company, the officials of the road gave a complimentary dinner at the Hotel Brenton, Mayhan, on Aug. 16, at which Mr. Cargill was presented with a gold watch chain.

Mr. W. H. Newhouse, who has resigned as purchasing agent of the Louisville & Northern Railway & Lighting Company, the Louisville & Southern Indiana Traction Company, and the United Gas & Electric Company, New Albany, Ind., has become connected with the Yager & Newhouse Coal Company, Louisville, Ky. As previously stated in the Electric Railway Journal, Mr. Newhouse will be succeeded at New Albany by Mr. C. H. Dallow.

Mr. L. E. Butler, who has been appointed superintendent of motive power of the Evansville & Southern Indiana Traction Company, Evansville, Ind., was graduated from the University of Michigan in 1906 and served as an apprentice with the General Electric Company in 1907. During the following year Mr. Butler had charge of the sanitary district power station at Lockport, Ill., and was also connected with the Commonwealth Edison Company at the Fisk Street Station in Chicago. Mr. Butler also had charge of work for the Lounsbery Construction Company, which operates in Chicago and vicinity.

Mr. Thomas R. H. Daniels, who has been chief engineer of the Birmingham Railway, Light & Power Company, Birmingham, Ala., since May 1, 1911, began his railway career in 1898, when he entered the employ of the Rhode Island Company, Providence, R. I., as assistant engineer on track work. He resigned from that company in 1904 to become assistant engineer with Westinghouse, Church, Kerr & Company, New York, on the construction of the terminal station of the Pennsylvania Railroad in New York City. In 1906 Mr. Daniels severed his connection with that company to take charge of track work as assistant engineer with the United Railroads of San Francisco, and two years later he resigned to become engineer for the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind. He held that position until May 1, 1911, when he became chief engineer for the Birmingham Railway Light & Power Company.

Councilman A. E. Burke, who was a conductor on the street railway lines in Cleveland for many years, has announced that he will introduce an ordinance in the City Council after the summer vacation to provide for a pension fund for employees. He would assess the men a small amount, the money to be handled by the company.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Salt River Valley Electric Railway, Phoenix, Ariz.—Chartered in Arizona to build a 60-mile electric railway to connect Phoenix, Ingleside, Scottsdale, Tempe, Mess, Chandler, Alhambra, Glendale and Peoria. Construction will begin about Oct. 15. The repair shops will be located at Phoenix and the company will probably furnish power for lighting purposes. Capital stock authorized, $600,000. Capital stock issued, $200,000. Officers: F. M. Winter, president; Jacob Kleck, vice-president; C. C. Lewis, secretary; J. M. Swetman, treasurer; J. C. Harwood, purchasing agent, and W. S. Furman, general counsel, all of Phoenix. [E. R. J., Aug. 5, '11.]

***Chilliwack (B. C.) Tramway.**—Incorporated in Canada to build an electric railway within the municipal limits of Chilliwack.

***Etowah Valley Railroad, Dahlonega, Ga.**—Application for a charter has been made in Georgia by this company to build an electric railway from Ball Ground through Creighton to the northern boundary of the State in Towns County, via Forsyth, Lumpkin, Dawson and White Counties. The company will also furnish energy for lighting and heating purposes. Capital stock authorized, $15,000. Incorporators: G. R. Glenn, H. D. Gurley, John H. Moore, T. J. Smith, J. M. Brooksher, J. E. Tate, H. Head, J. F. Sargent, W. H. Jones, B. F. Anderson, W. B. Townsend and Craig R. Arnold, all of Dahlonega.

Evansville, Henderson & Owensboro Traction Company, Evansville, Ind.—Application for a charter has been made in Indiana by this company to build a 10-mile electric railway between Evansville and Henderson, with a branch to Owensboro, via Zion, Hebbardsville, Curdsville and Sorgho. The company has leased from the Illinois Central Railroad a 6-mile line between Henderson and Evansville, which will be electrified and prepared for immediate use. Cars will be ferried over the Ohio River by a gasoline boat capable of carrying two cars. Capital stock, $100,000. Incorporators: W. H. McCurdy, A. F. Karges, M. S. Sonntag, D. E. Cadick, W. A. Carson, Charles C. Tennis, C. H. Battin, Christ Kanzler, John M. Funke, Philip Speck, William A. Koch. [E. R. J., Oct. 30, '10.]

Oklahoma City & Eastern Railroad, Oklahoma City, Okla.—Chartered in Oklahoma to build an electric or steam railway between Oklahoma City and Henryetta, a distance of 90 miles. Capital stock, $3,000,000. Directors: J. J. Johnson, Charles Hoopes, W. J. House, F. S. Combes and M. L. Spitler.

Dallas Southern Traction Company, Dallas, Tex.—Application for a charter has been made in Oklahoma by this company to build a 100-mile electric railway to connect Dallas and Waco, via Hutchins, Wilmer, Ferris, Waxahachie, Forreston, Italy, Milford, Hillsboro West and Days Lake. A 35-mile branch will be built to Ferris to Corsicana via Ennis. Surveys have been made and construction will soon be begun. Capital stock $2,000,000. Directors: Edwin S. Webster, Elliott Wadsworth, Russell Rob, Marshall M. Phinney, Boston; Edwin T. Moore, Dallas; David Daly, Edwin B. Parker, C. R. Wharton, J. H. Tallichet, Thomas H. Botts, W. A. Stevens, Raymond Neilson and H. A. Van Easton, all of Houston. [E. R. J., July 29, '11.]

FRANCHISES

Berkeley, Cal.—The Oakland Traction Company has received a franchise from the City Council for a single or double-track extension in Berkeley.

Los Angeles, Cal.—The Los Angeles Railway has asked the City Council for a franchise on Vernon Avenue and Jefferson Street in Los Angeles.

San Luis Obispo, Cal.—Walter G. Lincoln has received an electric railway franchise from the Board of Supervisors in the city and county of San Luis Obispo. [E. R. J., July 22, '11.)

Watts, Cal.—The Pacific Electric Railway, Los Angeles, has asked the City Council for a franchise over certain streets in Watts, in order that a line may be built to Homer Junction connecting the Redondo line and the Long Beach line.

Turners Falls, Conn.—The Connecticut Company has asked the Selectmen for a franchise to relocate its tracks in Turners Falls.

Marengo, Ill.—The Woodstock and Sycamore Traction Company has received a railway franchise in Marengo.

Gary, Ind.—The Gary, Hobart & Eastern Traction Company has asked the Board of Works for a franchise on Thirty-seventh Street in Gary.

Burlington, Ia.—The People's Gas and Electric Company has received a franchise from the City Council to double-track its North Hill line from the terminus of the double track on Fourth Street to Osborn Street in Burlington.

Louisville, Ky.—A franchise providing for a line on Sixth Street south of Hill Street has been passed by the General Council of Louisville and signed by the Mayor The franchise will be advertised and sold. It will enable the Louisville Railway, the prospective purchaser, to extend its Sixth Street line for a distance of one-mile from the present terminus of the line. A steel viaduct will be erected at the intersection with the tracks of the Louisville & Nashville Railroad. The cost of this will be shared by the Louisville Railway and a manufacturing company located at that point.

***New Orleans, La.**—Frank Brinker and H. S. Armstrong, representing the South Claiborne Avenue Improvement Association, New Orleans, will ask the City Council for a franchise for a line on South Claiborne Avenue to Melpomene, Rampart, Julia, Carondelet and Canal Streets. The committee will submit the proposed franchise to the New Orleans Railway & Light Company.

Brockton, Mass.—The Bay State Street Railway has asked the City Council for a renewal of its franchise in Brockton.

Danvers, Mass.—The Boston & Eastern Railroad has asked the Board of Selectmen for a franchise in Danvers.

Eveleth, Minn.—The Mesaba Electric Railway, Duluth, has received a franchise from the City Council for a franchise in Eveleth. The City Council of Virginia has also granted this company a similar franchise in Virginia. Oscar Mitchell, president. [E. R. J., Aug. 19, '11.]

***Hastings, Minn.**—The Hastings Construction Company has received a franchise from the Dakota County Commissioners for an electric line through Dakota County.

Trenton, N. J.—The Morris County Traction Company has obtained the approval by the Board of Public Utility Commissioners of an ordinance passed by the borough of Chatham, authorizing the laying of a double-track line on Main Street, in Chatham.

Little Falls, N. Y.—The Little Falls & Johnstown Railway has received a franchise from the Board of Aldermen to build its line between Little Falls and Johnstown. This 28-mile railway will connect Little Falls, St. Johnsville, Ephratah and Johnstown. J. L. Hess, 103 Park Avenue, New York City, president. [E. R. J., July 29, '11.]

Rock Hill, N. C.—The North Carolina Traction Company, Danbury has received a fifty-year franchise from the City Council in Rock Hill.

***Lorain, Ohio.**—The Village Council of Lorain has passed an ordinance granting a twenty-five-year franchise for the construction of an electric railway in Lorain.

Sewickley, Pa.—The Beaver Valley Traction Company, New Brighton, has asked the Council for a franchise in Sewickley.

Watertown, S. D.—Ferris Brothers have received a twenty-year franchise from the City Council to build an electric railway in Watertown and extend it to Lake Kampeska. [E. R. J., Aug. 12, '11.]

Weston, W. Va.—The Clarksburg & Weston Electric Railway, Clarksburg, will ask the City Council for a franchise in Weston.

TRACK AND ROADWAY

Calgary (Alta.) Municipal Railway.—Many improvements are being planned by this company to extend and double-track its lines in Calgary and in East Calgary.

Ft. Smith Light & Traction Company, Ft. Smith, Ark.—An extension will be built by this company to Van Buren as soon as the new bridge across the river is completed.

Jonesboro, Ark.—Preston Hatcher, Jonesboro, is organizing a company to construct an electric interurban line to connect Jonesboro and Nettleton. The Johnson Construction Company, Memphis, Tenn., has been engaged to furnish estimates on the cost of construction. [E. R. J., Sep. 3, '10.]

Northern Electric Railway, San Francisco, Cal.—It is reported that this company will spend $1,000,000 on an extension of its line from Yuba City to Colusa. All right-of-way has been secured and franchises obtained. The company is having soundings made in the Sacramento River at Meridian, where a large combination bridge is planned by this company and the Counties of Sutter and Colusa.

***Berlin Street Railway, Meriden, Conn.**—This company has been organized to build an electric railway between Meriden and Berlin, with a branch line from Berlin to New Britain. Construction will be begun at an early date. Capital stock, $50,000. Officers: H. M. Kochersperger, president; J. T. Kelly, New Haven, secretary, and C. J Danaher, attorney.

Shore Line Electric Railway, New Haven, Conn.—This company placed in operation on Aug. 14 its new branch between Guilford and Foxon.

St. Petersburg Railway & Electric Company, St. Petersburg, Fla.—Plans are being perfected by this company to begin work soon on its extension from St. Petersburg to Coffeepot Bayou.

Illinois Central Electric Railway, Canton, Ill.—Preliminary arrangements are about completed and in a few days contracts will be let and construction will be begun on the extension of this line from Norris to Farmington.

Springfield Northwestern Interurban Railroad, Springfield, Ill.—The organization of this company, which proposes to build an electric railway between Springfield and Petersburg, via Andrew, Cantrall, Athens, Tice and Old Salem, has been perfected. The company has $15,000 capital stock. The following were elected directors: Homer J. Tice, Greenview; R. Y. Kincaid, Athens; E. D. Keys, W. F. Workman, Ralph N. Baker, Frank Reisch, Jr., and S. E. Prather, Springfield. [E. R. J., Aug. 12, '11.]

Evansville & Chrisney Railway, Evansville, Ind.—Surveys are being made and as soon as they are completed this company will let contracts for the construction of its line between Chrisney and Lynnville, via Booneville. J. P. Chrisney is interested. [E. R. J., Mar. 11, '11.]

Capital Circuit Traction Company, Indianapolis, Ind.—It is reported that trust deeds have been filed by this company in favor of the Farmers' Trust Company, Indianapolis. Bids for the construction of the second division between Lebanon and Sheridan will be ready soon. John A. Shafer, Indianapolis, is in charge of construction. [E. R. J., Mar. 11, '11.]

Southwestern Traction & Power Company, New Orleans, La.—During the next ten weeks this company will award contracts to build 19 miles of new track. Its interurban line will extend from Spanish Lake to the lower corporate limits of Jeanerette at St. Mary's Parish line. It will also build its tracks in New Iberia. F. W. Crosby, Tenegre Building, New Orleans, president. [E. R. J., July 8, '11.]

Portland (Maine) Railroad.—Tracks are being laid by this company in Portland from Morrills Corner to Woodfords, via Forest Avenue, over which the cars of the Portland, Gray & Lewiston Railroad are to enter Portland.

Plymouth & Sandwich Street Railway, Manomet, Mass.—Work will soon be begun by this company on its line between Plymouth, Bourne and Sandwich. It will begin at the terminal of the line near Manomet and extend 12 miles to Sandwich. Locations have been secured by the company in Bourne and Sandwich. Plymouth has voted to subscribe $50,000 for this project and it is expected that Bourne and Sandwich will also have financial interests in the railway. This new line will form a link in a through route between Boston and the entrance to the Cape Cod Canal, now being built between Sandwich and Buzzards Bay.

Worcester (Mass.) Consolidated Street Railway.—Work has been begun by this company establishing the lines of new track locations, the franchises for which have been approved by the Railroad Commissioners.

Saginaw, Mich.—The franchise recently granted to Alex. J. Groesbeck, Detroit, by the City Council of Bay City was ratified at a special election on Aug. 15. The right-of-way has been secured between Saginaw and Bay City and the terminal carhouses will be erected at Bay City. This road, according to announcement, will give service inside the city where the city lines do not operate. Power will be furnished from the Au Sable hydroelectric plant.

St. Louis & Jennings Railway, St. Louis, Mo.—This company has awarded the contract for the construction of its railway to the Fruin-Colman Construction Company. The line will extend from the end of the Union-Florissant line to West Walnut Manor in St. Louis, to be operated as an extension of the Bellefontaine and the Union Avenue lines between Walnut Park and West Walnut Manor. [E. R. J., Aug. 12, '11.]

Interurban Construction Company, Hastings, Minn.—Surveys have been completed and most of the right-of-way secured by this company on its line from the end of the Twin City Rapid Transit Company's line at Inver Grove, via Hastings to Cannon Falls, and Rochester. Officers: A. T. Stebbens, Rochester, president; Edward Feldhauser, St. Paul, vice-president, and W. L. Sonnag, St. Paul, general manager. [E. R. J., Aug. 19, '11.]

Twin City Rapid Transit Company, Minneapolis, Minn.—C. G. Goodrich, president of this company, states it is prepared to build the new Johnson Street line, and to extend the Bryant Avenue line to Fiftieth Street; the Twentieth Avenue north to Broadway and Second Street N.E. line, and extend either Cedar Avenue or Bloomington Avenue line to Thirty-eighth Street in Minneapolis. The company will ask for no concessions from the City Council in return for this work.

Northern Ohio Light & Traction Company, Akron, Ohio.—This company has secured the right-of-way over the old hydraulic race from the corner of Federal Street and North Main Street in Akron with a view to building a high-level track to carry its cars across the Cuyahoga Valley. These improvements are to be made within a few years, but officers of the company say they have formulated no definite plans for them. They are preparing to carry out their plans and the purchase was necessary.

Tri-State Railway & Electric Company, East Liverpool, Ohio.—The Weirton branch of this company will be placed in operation by Sept. 1. It will extend from Steubenville to Weirton.

Springfield & Xenia Railway, Springfield, Ohio.—Plans are being made by this company for the construction of an extension of its Washington Street line in Springfield across the esplanade to the Arcade, where the new union traction station is to be located.

***Ottawa, Ont.**—It is reported that a new company is in process of organization to build an electric railroad between Ottawa and points on the Gatineau River. The intention is to reach all the summer resorts between Ottawa and Farmpoint, including Chelsea, Kirk's Ferry, Kingsmere, Cascades, and Farmpoint.

Port Arthur & Ft. William Electric Railway, Port Arthur, Ont.—This company will extend its Arthur Street branch ½ mile in Port Arthur.

Toronto (Ont.) Railway.—About 10 miles of the 15 miles of new track under construction by this company in Toronto are now completed. The 1½-mile line from Spadina Avenue to Ossington Avenue of the Harbord Street line will soon be placed in operation.

Oregon Electric Railway, Portland, Ore.—Plans have been completed and work will soon be begun by this company on its extension from Portland to Eugene. The company has placed in operation its new line through Portland to the North Bank depot on Eleventh and Hoyt Streets.

Duquesne & Dravosburg Street Railway, Duquesne, Pa.—Right-of-way is being secured by this company to build an extension from Duquesne to Carrick, via Bull Run and Lincoln Place.

Hanover & McSherrystown Street Railway, Hanover, Pa.—An extension will be built by this company from Hanover to Abbottsville. Right-of-way has been secured and construction will soon be begun.

American Railways, Philadelphia, Pa.—This company, which has acquired the property of the Ohio Valley Electric Railway Company and the Consolidated Light & Railway Company, Huntington, will double-track the main line, a distance of 8 miles, if it can secure franchises from the City Council of Huntington.

Sunbury & Northumberland Electric Railway, Sunbury, Pa.—It is reported that this company is preparing plans to build an extension from Sunbury to Milton, Montandon and East Lewisburg. It will join with the Lewisburg, Milton & Watsontown Passenger Railway at East Lewisburg.

Waynesburg & Blacksville Street Railway, Waynesburg, Pa.—This company advises that it has begun the construction of its 16-mile electric railway between Waynesburg, Spraggtown and Blackville. Capital stock, authorized, $250,000. Capital stock, issued, $84,650. Officers: William M. Laws, Waynesburg, president; W. R. Hawkins, vice-president; R. E. Kent, secretary and treasurer, and J. G. Sampsell, chief engineer. Headquarters: People's National Bank Building High Street, Waynesburg.

Watertown (S. D.) Electric Railway.—This company advises that it will probably begin this fall on the construction of its electric railway in Watertown. The company will purchase power from the Watertown Light & Power Company and also use its repair shops. Capital stock, authorized, $100,000. Officers: W. J. Ferris, La Crosse, Wis., president; Robert Ferris, Yankton, S. D., vice-president; J. W. Ferris, Watertown, secretary and general manager, and C. H. Bell, Watertown, superintendent. [E. R. J., Aug. 12, '11.]

Johnson City (Tenn.) Traction Company.—This company has begun the extension of a 1-mile line from the city limits to the Tennessee State Normal School. It is reported that the improvements are being made in connection with the proposed extension from Jonesboro to Johnson City, for which a bond issue will probably be made at Jonesboro.

St. Louis, Brownsville & Mexico Railway, Brownsville, Tex.—Plans are being made by this company to build an electric railway between its station in Brownsville and the station of the Rio Grande Railway in Brownsville.

Corpus Christi Street & Interurban Railway, Corpus Christi, Tex.—It is reported that plans are being considered by this company for the extension between Corpus Christi and Ingleside.

Mineral Heights Traction Company, Greenville, Tex.—Construction has been begun by this company on its 3-mile electric railway between Greenville and Mineral Heights. A. R. Nicholson, president. [E. R. J., May 27, '11.]

Galveston-Houston Electric Railway, Houston, Tex.—The steel viaduct at the southern city limits of Houston for the use of this company is practically completed, the work of tracklaying across the structure being finished and the rails connected up with the balance of the line at both ends of the bridge. The work on the line between Galveston and Houston is completed except the 3 miles at the causeway.

San Antonio (Tex.) Traction Company.—During the next few weeks this company will rebuild about a mile of track in San Antonio with 87-lb. grooved girder rails, replacing 60-lb. T rails. The company is in the market for about 1600 6-ft. steel ties.

Sherman, Tex.—It is reported that the Board of Trade of Paris is giving its official support to the proposed interurban electric railway that is to be constructed between Sherman and Paris. The sum of $10,000 has been subscribed toward a total fund of $30,000 to pay the cost of the preliminary survey. The people of Sherman have subscribed $10,000 and the remaining $10,000 is being raised along the route. [E. R. J., Aug. 19, '11.]

Utah & Salt Lake Electric Railway, Salt Lake City, Utah.—This company has approved the surveys made by its engineers and plans to begin the construction of its 70-mile electric railway between Salt Lake City and Payson within a few months. Stephen Chipman is said to be interested. [E. R. J., July 29, '11.]

***Lynchburg, Va.**—Business men of Lynchburg and Campbell County are considering plans to construct an electric line from Madison Heights, Amherst County, to Altavista. It is reported that considerable capital has been subscribed for this purpose.

Washington & Old Dominion Railroad, Richmond, Va.—The route of this electric railway has been practically decided upon It will extend from just below Dominion Heights to Falls Church. Surveys have been nearly completed and it is stated that this company is negotiating with the Southern Railroad for the purchase of the old Bluemont Railroad. Charles M. Henckley, president. [E. R. J., May 13, '11.]

Bellingham-Skagit Railway, Bellingham, Wash.—Work has been begun by this company at Mount Vernon. Arrangements are being made for the construction of an 800-ft. trestle. It has been definitely announced that the road will cross the Skagit River 2 miles north of Mount Vernon on its own bridge. This line will eventually connect Bellingham, Burlington, Mount Vernon, Sadro and Woolley. E. C. Macey is in charge of construction.

Kittitas Railway & Power Company, Cle Elum, Wash.—Contracts will soon be awarded by this company to build its 38-mile railway between Roslyn and Cle Elum, via Ronald and Janesville. H. N. DeWolfe, Box 656, Tacoma, secretary. [E. R. J., Jul 22, '11.]

***Seattle, Wash.**—Plans are being made by this city to build a 3-mile electric railway from Raglan Station to Cedar Lake. [E. R. J., Mar. 25, '11.]

Twin City Electric Company, South Bend, Wash.—Work has begun by this company in Raymond on its line between Raymond and South Bend. R. Fulcher, San Francisco, has charge of the construction. [E. R. J., July 8, '11.]

Wenatchee Valley Railway & Power Company, Wenatchee, Wash.—Surveys are being made by this company between Wenatchee and Cashmere. This is part of a plan to build a 50-mile electric railway between Wenatchee and Leavenworth. [E. R. J., July 22, '11.]

Grafton (W. Va.) Traction Company.—Work has been begun by this company on the construction of its new concrete bridge to cross the West Side in Grafton. When the bridge is completed the company's Walnut Street line will be extended about 1½ miles.

***Mount Morris & Morgantown Street Railway, Morgantown, W. Va.**—This company has secured most of its right-of-way and will soon award contracts for the construction of the line between Mount Morris, Maidsville and Randall. It will connect with the Morgantown & Dunkard Valley Railroad at Randall. Officers: Aaron Garlow, Morgantown, president; J. W. Rogers, Mount Morris, treasurer, and W. I. Pomeroy, Mount Morris, secretary. [E. R. J., Aug. 5, '11.]

Waupaca Electric Light & Railway Company, Waupaca, Wis.—This company advises that it will soon build several extensions of its lines in Waupaca. One branch will be to the Wisconsin Veterans' Home and the other will extend to the Waupaca-Green Bay Railway line in Waupaca.

SHOPS AND BUILDINGS

Georgia Railway & Electric Company, Atlanta, Ga.—This company has awarded the contract to build a new car shop in Atlanta to George A. Clayton. The structure will be 140 ft. x 240 ft. and of fireproof construction. The cost is estimated to be about $50,000.

Southwestern Traction & Power Company, New Orleans, La.—During the next ten weeks this company will award contracts for the construction of repair shops in New Iberia.

Boston (Mass.) Elevated Railway.—It is reported that this company expects to begin work at once on the con-

struction of its new elevated terminal station at Main, Center and Middlesex Streets in Malden.

Piedmont Traction Company, Charlotte, N. C.—Bids are asked for by this company for the construction of its stations and freight buildings along the route. W. S. Lee, Charlotte, vice-president.

Northern Ohio Traction & Light Company, Akron, Ohio.—The old Webster, Camp & Lane machine shops, now used by the Wellman-Seaver-Morgan Company, have been purchased by this company, and it is said that they will be converted into a terminal station for all the interurban roads entering Akron.

New Castle & Beaver Falls Street Railway, Beaver Falls, Pa.—It is reported that this company plans to build a passenger and freight station in Wampum.

Philadelphia (Pa.) Rapid Transit Company.—It is reported that this company is considering plans for the opening of freight stations at different points along Market Street between Front Street and Sixty-third Street, in Philadelphia. The company has received permits for the construction of two buildings in Philadelphia. One structure will be located on East Letterly Street and will be 65 ft. x 93 ft., of brick construction. The cost is estimated to be about $33,000. The other building will be a one-story brick lumber storage house, 65 ft. x 56 ft., and will be erected on East Cumberland Street.

Roanoke Railway & Electric Company, Roanoke, Va.—This company will soon build a new carhouse and repair shops in Roanoke.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—Negotiations are being made by this company for the purchase of the Racine theater to be used for carhouse purposes.

Sheboygan Light, Power & Railway Company, Sheboygan, Wis.—The contract for the erection of a new carhouse 123 ft. x 80 ft. in Sheboygan has been awarded by this company to Ackerman & Son. The structure will be 123 ft. x 80 ft. The company has begun work remodeling its office building in North Eighth Street and Pennsylvania Avenue in Sheboygan.

POWER HOUSES AND SUBSTATIONS

Wilmington & Philadelphia Traction Company, Wilmington, Del.—Construction has been begun by this company on the new addition to its Brandywine power station on Buena Vista Street, adjoining No. 1 plant nearest to Market Street in Wilmington. Work is progressing rapidly.

Augusta-Aiken Railway & Electric Company, Atlanta, Ga.—A 3000-hp turbine is being installed by this company at its new power house addition in Augusta.

Metropolitan Street Railway, Kansas City, Mo.—This company has purchased from the General Electric Company a 15,0000-kw steam turbine generator to be installed at its main power house at Second Street and Grand Avenue in Kansas City.

Cincinnati (Ohio) Traction Company.—This company will soon build a two-story substation inside its present car house on Reading road, Mount Auburn.

American Railways, Philadelphia, Pa.—This company, which has taken over the Ohio Valley Electric Railway, Huntington, W. Va., will increase the power generating station at Kenova by the addition of two 1000-kw turbines. The company will rebuild the substation at Huntington, adding 300 kw to its capacity, and add 150 kw to the capacity of the substation at Cliffside.

Johnson City (Tenn.) Traction Company.—This company is enlarging its power house. A new boiler room is being built and additional boilers will be installed.

Nashville Railway & Light Company, Nashville, Tenn.—A site on First Avenue and Second Avenue, in Nashville, has been purchased by this company on which it expects to build an addition to its power house.

Union Utilities Company, Morgantown, W. Va.—Plans are being considered by this company for the construction of new substations in order to provide current for the new lines in and about Morgantown. It is estimated that the substations will cost about $10,000 each.

Manufactures & Supplies

ROLLING STOCK

Rockford & Interurban Railway, Rockford, Ill., is in the market for eight trucks.

Sioux City (Ia.) Service Company is building six 44-ft. pay-as-you-enter cars in its own shops.

Emporia (Kan.) Street Railway has ordered four open cars from the American Car Company.

Chicago (Ill.) Railways has ordered 600 Brill 27-GE-2 trucks without wheels from the American Car Company.

Third Avenue Railroad, New York, N. Y., has ordered four long cab storage battery snow sweepers from The J. G. Brill Company.

Monmouth, Macon & Southern Railroad, Monmouth, Ill., has ordered a 55-ft. gasoline motor car from the McKeen Motor Car Company.

Ontario & San Antonio Heights Railroad, Ontario, Cal., has ordered three combination motor car bodies from the G. C. Kuhlman Car Company.

Kentucky Traction & Terminal Company, Lexington, Ky., has ordered six Brill 27-MCB-2 trucks without wheels from the American Car Company.

Rome Railway & Light Company, Rome, Ga., has ordered two 20-ft. 8-in. closed motor cars mounted on Brill 21-E trucks from The J. G. Brill Company.

Muskogee (Okla.) Electric Traction Company has ordered ten 21-ft. 3-in. closed motor cars mounted on Brill 21-E trucks, from the American Car Company.

Detroit (Mich.) United Railways has ordered fifty 31-ft. 3-in. closed pay-as-you-enter motor car bodies from the G. C. Kuhlman Car Company. This item confirms the report published in the Electric Railway Journal of Aug. 19, 1911.

Central Pennsylvania Traction Company, Harrisburg, Pa., noted in the Electric Railway Journal of Aug. 19, 1911, as having purchased several cars, has ordered six 25-ft., semi-convertible, pay-within motor car bodies, mounted on Brill 39-E trucks, from The J. G. Brill Company.

Connecticut Company, New Haven, Conn., noted in the Electric Railway Journal of May 20, 1911, as having ordered thirty-three straight-side closed motor cars from the Wason Manufacturing Company, has specified the following details for these cars:

Seating capacity.....44	Conduits, flexible and iron pipe
Weight (car body only), 16,500 lb.	Couplers...Ry. Co. standard
Bolster centers, length..19 ft.	Curtain fixtures, National Lock Washer
Length of body..30 ft. 8½ in.	Curtain material...pantasote
Over buffers.....41 ft. 3 in.	Gongs ..... Dedenda
Width over sills...8 ft. 1¼ in.	Hand brakes .....Peacock
Over all.....8 ft. 4½ in.	Headlights, Smith incandescent
Height, rail to sills.....33 ft.	Motors ..... four
Sill to trolley base..8 ft. 8 in.	Paint..Ry. Co.'s Std. yellow
Body ..... wood	Sanders ..... Kilbourn
Interior trim .....mahogany	Seats, style.....longitudinal
Headlining ..... birch	Seating material.....rattan
Roof.....square deck	Steps .....Stanwood
Underframe ..... composite	Ventilators, swinging deck sash
Bumpers.....7-in. angle iron	
Car trimmings.....bronze	

TRADE NOTES

United States Steel Products Company, New York, N. Y., has opened an office in Toronto, Ontario, under the management of F. C. Bunke.

Titan Steel Casting Company, Newark, N. J., is receiving bids for the construction of an addition to its plant. Additional cranes will also be installed.

Allis-Chalmers Company, Milwaukee, Wis., has announced that its Scranton plant will be entirely closed down by Jan. 1, 1912, and that the hydraulic department will be taken to Milwaukee and the sugar machinery department to Chicago. C. L. Glasgow has been appointed Montreal district sales manager of Allis-Chalmers-Bullock, Ltd.

McKeen Motor Car Company, Omaha, Neb., reports that it has shipped one standard 70-ft. gasoline motor car to the Oregon Short Line Railroad, Ogden, Utah. This is the third car delivered to that railway and is the one hundred and twenty-seventh McKeen motor car to be placed in service.

C. P. Lindsley, president of the Lindsley Brothers Company, manufacturers of western cedar poles and cross arms, Spokane, Wash., is making an extended inspection trip to the company's pole yards, which are located in northern Idaho, northeastern Washington and British Columbia. The British Columbia headquarters are at Nakuso, on Arrow Lake.

Gano Dunn, who for some years has been first vice-president, chief engineer and a director of the Crocker-Wheeler Company, has resigned from that company in order to accept an important engineering and executive position. Mr. Dunn will sail shortly for Europe to attend, as president of the American Institute of Electrical Engineers, the meeting during the Turin Exposition of the International Electrotechnical Commission, to be held on September 7, 8 and 9, and also the following meeting of the International Electrical Congress.

Western Electric Company, New York, N. Y., has made selling arrangements with the National Tube Company, Pittsburgh, Pa., to handle the Shelby seamless cold-drawn steel trolley poles for the entire country. The company has completed arrangements whereby it will soon open a new house at Richmond, Va., where a complete stock of telephone apparatus and supplies, power apparatus and general electrical supplies will be carried. H. W. Hall, formerly manager of the Denver house, will have charge of the Richmond organization, and with him will be associated specialists on the various lines handled.

Wonham, Sanger & Bates, New York, report the receipt of orders for H-B life guards from the United Traction Company, Reading, Pa., and the Erie & Suburban Railway, Buffalo, N. Y. The company has received repeat orders from the following companies: Houston (Tex.) Electric Company, Kentucky Traction & Terminal Company, Lexington, Ky.; People's Railway, Dayton, Ohio; Northern Texas Traction Company, Ft. Worth, Tex.; Southwestern Interurban Railway, Arkansas City, Kan.; Savannah (Ga.) Electric Company. The Philadelphia (Pa.) Rapid Transit Company has been supplied with 1000 H-B life guards since June. The fifty near-side cars for this company as well as the sixty near-side cars of the International Traction Company being built by The J. G. Brill Company will also be equipped with H-B life guards.

Prepayment Car Sales Company, New York, reports that the pay-as-you-enter system is attracting a great deal of attention abroad and a number of the leading tramway companies are investigating this system of fare collection. One of the first lines to be equipped for a thorough try-out of the pay-as-you-enter system is the Gateshead & District Line of the British Electric Traction Company and it is probable that the system will also be installed on the Potteries & District Tramway Company's lines. The subject has also recently been considered by the Tramways and Light Railways Association, having been brought to the attention of that association at its last meeting through a paper by Gerald J. H. Hooghwinkel entitled "A Few Reasons Why Electric Traction in England Remains Stationary." An abstract of this paper was published in the Electric Railway Journal of July 29.

ADVERTISING LITERATURE

Barrett Manufacturing Company, New York, N. Y., has published a revised edition of its specifications for roofing.

Hess-Bright Manufacturing Company, Philadelphia, Pa., has issued an indexed file for the classification of its data sheets.

Standard Steel Works Company, Philadelphia, Pa., has issued an illustrated catalog of rolled-steel rings, shells and ring dies.

Jeffrey Manufacturing Company, Columbus, Ohio, has issued an illustrated bulletin describing its single roll coal crushers.

Dayton Manufacturing Company, Dayton, Ohio, has issued several circulars describing its car hardware and other specialties.

Niles-Bement-Pond Company, New York, N. Y., has issued a 28-page illustrated catalog describing its heavy engine and gun lathes.

National Carbon Company, Cleveland, Ohio, has published an illustrated review of the various commutator slotting devices on the market.

Frank Ridlon Company, Boston, Mass., has issued its August list of new and second-hand motors which it has on hand for immediate shipment.

Chester Graphite Company, Chester Springs, Pa., has issued a booklet describing the use, method of application and giving prices of its flake graphite.

Root Spring Scraper Company, Kalamazoo, Mich., has issued a descriptive catalog showing the methods of installation and operation of its track scrapers.

Ohio Brass Company, Mansfield, Ohio, has issued No. 4, Vol. 6, of the O. B. Bulletin describing installations of its electric railway and mine haulage material.

Perry, Coffin & Burr, Boston, Mass., bankers, are mailing a booklet which shows the growth in population of cities in the United States and the population of foreign cities.

C. W. Hunt Company, New York, N. Y., is distributing a 16-page illustrated booklet giving specifications of its electric storage battery and trolley locomotives for industrial use.

Electric Railway Improvement Company, Cleveland, Ohio, has issued a 28-page illustrated booklet describing its electric copper-welding outfits for the installation of rail bonds.

W. N. Matthews & Brother, St. Louis, Mo., have issued an illustrated booklet with detachable return order postal describing its guy anchors. The company has published an illustrated booklet describing the Matthews fuse switch.

Chandler Brothers & Company, Philadelphia, Pa., have issued a circular containing a special study of the Philadelphia (Pa.) Rapid Transit Company. The circular contains a table showing the number of passengers carried each year for a ten-year period, also a table showing the high and low quotations of P. R. T. stock for the past five years.

H. W. Johns-Manville Company, New York, N. Y., is distributing a new 400-page electrical supplies catalog, No. 15, which illustrates and describes the electrical products of the company. The catalog contains many additions to the company's line of electrical supplies, among which are J-M fibre conduit, for telephone, lighting, railway and electrical purposes; J-M linolite system of illumination for general lighting, third-rail insulators, high-tension porcelain insulators, incandescent lamps and lighting arresters.

General Electric Company, Schenectady, N. Y., has issued Bulletins Nos. 4849, 4866, 4867, 4868 and 4872. Bulletin No. 4849 is a catalog of motor-generator sets ranging in capacity from 95 kw to 7000 kw. Bulletin No. 4866 is an illustrated catalog of Thompson horizontal edgewise instruments for switchboard service. Bulletin No. 4867 is a descriptive catalog of electric locomotives for switching and light freight service. Bulletin No. 4868 is a catalog of rotary converters in capacities ranging from 25 kw to 2500 kw, and contains a table of a complete list of rotary sales to April 5, 1911. Bulletin No. 4872 is a descriptive catalog of transformer oil-drying and purifying machines. The company has also issued Bulletins Nos. 4837 to 4843, inclusive, describing its different types of circuit breakers.

NEW PUBLICATIONS

The Universal Directory of Railway Officials, London.—Compiled by S. Richardson Blunderstone, editor of *The Railway Engineer.* The Directory Publishing Company, Ltd., London. New York: A. F. Walker, 140 Liberty Street. 723 pages. Price, $3, postpaid.

This is the seventeenth annual edition of this directory, and includes the names of the companies and the companies' officials, and a short description of the equipment of steam railroads in all parts of the globe and of the tramways in the United Kingdom operated by mechanical power. There are also a personal index of all of the railway officials mentioned in the directory, an index to the main railways and an index to the countries.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVIII NEW YORK, SATURDAY, SEPTEMBER 2, 1911 No. 10

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.
HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.
CURTIS E. WHITTLESEY, Secretary and Treasurer.
TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

HENRY W. BLAKE, Editor.
L. E. GOULD, Western Editor.
Associate Editors:
RODNEY HITT, FREDERIC NICHOLAS, WALTER JACKSON.
News Editors:
G. J. MACMURRAY, FRANK J. ARMEIT.

CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1021 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Thursday, 9 A. M., of the week of issue.

Copyright, 1911, by MCGRAW PUBLISHING COMPANY.

Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, SEPTEMBER 2, 1911.

CONTENTS.

Fall and Winter Traffic Promotion..... 377
Welding Armature Shafts..... 377
The Glasgow Strike..... 378
The Philadelphia Announcement..... 378
Popularizing Data on Accidents..... 378
High Voltage and the Fire Hazard..... 379
Classification of Car Failures..... 379
Improving Old Plants..... 380
A New Type of Electric Locomotive..... 381
New Shops at Rockford, Ill..... 382
Electric Locomotive with Permutators in France..... 385
Advertising for Traffic by London Underground Railway..... 387
San Francisco Method of Welding Broken Armature Shafts..... 388
Testing Coal in London..... 390
German Accident Statistics..... 391
Hungarian 1650-Volt D. C. Railway..... 392
Co-operative Plan for Philadelphia Carmen..... 393
Long Journey of Illinois Traction Office Car..... 395
Efficiency of Sanded Tracks in Sidings..... 397
Performance of Illinois Traction Block Signals..... 398
Transformer Substation in Boston..... 398
Hearing on Transfers in New York..... 399
Census Data on Cross Ties Purchased in 1910..... 400
Three-Coupon Transfer in Louisville..... 400
New Cars for Electrified Gasoline Line..... 400
750,000-Volt Testing Transformer..... 401
Electric Railway Legal Decisions..... 402
London Letter..... 404
News of Electric Railways..... 405
Financial and Corporate..... 407
Traffic and Transportation..... 408
Personal Mention..... 410
Construction News..... 411
Manufactures and Supplies..... 414

Fall and Winter Traffic Promotion

After Labor Day the summer traffic season begins to wane. Vacationists return to their homes and offices, children look forward to the opening of school, and the time devoted to pleasure riding and being out of doors is encroached upon by other occupations and amusements. With the first frost the open cars are taken off and the traffic department rests on its oars. Yet there still remain several weeks of delightful weather when the autumn foliage and cool, bracing air attract all the lovers of outdoors. By catering to those who are not content to shut themselves up until the snow flies a moderate but nevertheless profitable traffic can be promoted. There are as many ways of appealing to devotees of fresh air in the fall as in the hot days of summer. Nutting parties, husking bees, overcoat picnics, moonlight trips on frosty evenings, and later perhaps skating parties and winter sports, can be made to produce more than enough revenue to pay for the advertising which would have to be done to acquaint the patrons of the road with the good times to be had out of doors. Most of the summer railway parks at very small expense could be provided with heated waiting rooms for use on cold days, and probably it would not be difficult to induce the restaurant concessionaire to keep open on Saturdays and Sundays, at least to serve hot coffee and light refreshments. Fall and winter pleasure riding cannot be expected to compare in volume with the summer traffic, but it is well worth trying to promote, as it is just as profitable, if on a smaller scale.

Welding Armature Shafts

A broken armature shaft is usually a troublesome and costly repair job which fortunately seldom has to be made on most roads. In San Francisco, where the cars are operated on steep grades, broken armature shafts are of rather frequent occurrence, due probably to the heavy torque exerted by the motors for long periods. Formerly the cost of removing, welding and replacing an armature shaft was from $60 to $70, but the cost of the method of welding without removal of the shaft, described elsewhere in this issue, has been reduced to about $8.50, or a saving of over $5,000 on the 100 shafts which already have been repaired by this method. It is of interest to compare the cost of welding in an oil furnace, as practised in San Francisco, with the cost of welding by electric arc. The Philadelphia Rapid Transit Company has been using the electric arc for welding for more than two years with marked success. Armature shafts have been successfully butt welded and also built up with new metal welded on when they have worn down to minimum diameter. The cost of welding or building up a shaft with the electric arc is said to be less than $3.

including the cost of machining. So far as we know the oxy-acetylene or oxy-hydrogen torch has not been employed for welding armature shafts, but there seems to be no reason why it might not be used in shops owning one of these equipments. The secret of successful welding of steel with steel lies in the composition of the flux and control of the temperature below the critical point of the metal.

The Glasgow Strike

The sudden and complete collapse of the tramway strike in Glasgow, Scotland, three days after the men quit work was one of the incidents of the recent serious labor disturbances in Great Britain. Glasgow's municipal tramway system has long been held up as one of the best examples of municipal ownership of public utilities, but the complete tie-up of the system by a strike of the motormen and conductors proves that municipal ownership is not a panacea for labor troubles. There was another side of the strike, however, which is worthy of comment. The Town Council did not play politics and attempt to end the strike by acceding to unreasonable demands which some months before had been refused. Instead it upheld Mr. Dalrymple, the general manager of the tramways, and insisted that the tramway employees as public servants return to their public duties. With the public, which had been seriously inconvenienced, and the Town Council, which was not seeking political capital, against them, the strikers realized the hopelessness of the struggle and capitulated with a rush to get back their old places. It is pertinent to ask if the fact whether the tramways are owned by the municipality or by private interests should affect the principle laid down in Glasgow that the tramway employees are public servants and therefore are under an obligation to carry on their work loyally and without interruption. This obligation constitutes one of the conditions of employment in railway and every other public utility service no less than in the army, the navy or the police force. Recognition of this principle alike by the employees and by the meddling politicians of some of our American cities would go far toward preventing strikes of street railway employees.

The Philadelphia Announcement

The announcement just issued by the Philadelphia Rapid Transit Company to its conductors and motormen, and published in this issue, is a straight business talk on a subject of vital importance to both. There is too often a feeling among railway companies and their men that questions concerning labor organizations and wages cannot be mentioned above a whisper. But there is no part of the work which is more intimately connected with the efficiency of the service or is more important to the general public. The policy of the Philadelphia Rapid Transit Company in this matter is that it has no objection to labor unions of themselves. It has carried this point so far as to agree to pay the union dues of all of its men and thus relieve the unions from the trouble of collecting assessments, provided such a policy should be desired by a majority of the men. The only return which it asks of them is their efficient service and this, it believes, cannot be secured so long as there are two hostile unions. On the other hand, it is perfectly willing to treat with one union whether known as the Amalgamated association, the Carmen's union, the Red Ribbon order or the Federated league, and it is willing to insure the membership of all of its new employees in such organization by requiring them to join as a condition of their engagement. All that it asks is that the union, whatever its name, should be the choice of the employees as a whole and that the officials of the order should have sufficient hold over the members to carry out all agreements which they may make. Coupled with this announcement is a proposition on the part of the railway company to establish a co-operative arrangement which will guarantee to the men an increase in their wages corresponding with an increase in the gross amount of business done by the company. The proposals are novel certainly so far as a large company is concerned, and as they have been proposed at a time of industrial peace in Philadelphia they should receive consideration on their merits.

Popularizing Data on Accidents

Electric railway companies have long given attention to methods for reducing accidents by training their employees, but determined efforts to secure the co-operation of the public are comparatively recent. It is interesting that work of this character, although along different lines, is being conducted simultaneously here and abroad. An instance of the European campaign is the data on German street railway accidents, abstracted in this issue and now on exhibition at the Dresden International Exhibition of Hygiene. These statistics, which were emphasized by means of large colored charts, overwhelmingly confirm the contention that the carelessness of the public is responsible for most of the street railway casualties. The actual figures quoted are 94 per cent in the case of passengers and 94.8 per cent in the case of non-passengers. There is good reason to believe that a like compilation made in this country would show even higher percentages, owing to the acknowledged greater recklessness of the average American whether walking or riding. The distribution of accidents by months is somewhat paradoxical, because it shows that accidents to passengers are fewer in winter than at other seasons. This unexpected condition shows that dangerous weather conditions are apt to be more than offset when they are so very bad as to make caution imperative. Perhaps the most striking data in the report are those relating to accidents to children. The vast number of young lives lost proves more forcibly than any extended treatise that city children must have better and safer playgrounds than the streets. In a few American cities some progress has already been made in the construction of public playgrounds, but much remains to be done. Electric railway companies could well encourage the playground movement even to the extent, when feasible, of offering the temporary use for this purpose of their own idle land. The greatest opportunity, however, lies in the instruction of the community as a whole and this has been carried on successfully in a number of places. Experience has shown that it may well be begun in the schools, and one reason for this is that it is more easy to teach a child, even in important matters of this kind, than an adult. An older person finds it very difficult to change a long-acquired habit such as getting on and off the cars while in motion.

HIGH VOLTAGE AND THE FIRE HAZARD

The use of very high voltages is spreading country-wide. The benefits of cheap electricity distributed sometimes through more than one state from a single efficient generating station are so great that he would be rash who would set a limit to the expansion of any system or group of transmission lines acceptably serving the public. Grave responsibilities are joined to the operation of lines carrying currents at the potentials now reached, and the art deserves no small amount of credit for the manner in which human life is safeguarded in modern power-plant and substation construction.

Protection against fire has also received the deep study of designing engineers, particularly in the construction of substations in which currents of very high potential are transformed into those of moderate or low voltage. In accomplishing this the two important features of adequate insulation and assured mechanical strength should receive the fullest amount of consideration. Since it makes practically no difference in the electrical behavior of a line whether the circuit is carried directly into a transformer house or oil-switch building or dead-ended on a suitable structure without, with taps to the controlling apparatus, one finds the latter practice growing in favor everywhere. At the substation no less than on the transmission line, therefore, we see a first-class opportunity to utilize strain insulators, jumpers, disconnecting switches, angle-iron framing and other devices planned to secure flexibility of operation without foregoing the standards of mechanical strength which mean so much in dealing with ultra-dangerous voltages.

If land is cheap where such installations are made, too much emphasis cannot be laid upon the importance of allowing ample room for the operation of the equipment. Old as this plaint may seem, it will be seconded without a dissenting voice by the men who spend from eight to twelve hours per day in responsible charge of the service passed through such buildings. By cramping the apparatus into a small area the cost of the outfit per kilowatt may be cut down to half what it must be where liberal space is set aside for handling the plant, but when lightning gets by the arresters and starts an arc between the transformer terminal and the case, with the nearest wall within arm's length and scarcely room available in which to turn around, the chances of trouble from fire or accident are considerably increased. The cost of wiring is less in a small substation, but such economy is but poorly gained if insufficient space is allowed for the apparatus.

A pretty good specification for a fireproof high-voltage substation can be written along the following lines: Incoming circuits dead-ended on suspension insulators, with disconnecting knife switches and taps which provide for the by-passing of the substation if necessary; lightning arresters in separate wing or building of brick or concrete construction; oil switches, if for extreme voltages, also mounted in separate structure containing no inflammable material; rolling steel doorways with padlocks for all independent structures carrying high-potential wiring; wired-glass windows and skylights, concrete floors, brick or concrete walls and roof of tile or reinforced concrete slabs; all interior lower-tension wiring in conduit, with remote control of oil switches for incoming and outgoing services; marble or slate busbar compartments with approved insulating barriers; carriage, track and winch for removing transformers; and the allowance of extraordinary space for the clearance of all high-voltage leads. Let an installation be made in this wise and the fire risk will be cut down to an amount that few owners of existing plants of older design realize.

CLASSIFICATION OF CAR FAILURES

The head of the mechanical department of every electric railway company is confronted with the choice of two policies in the maintenance of his equipment. His ultimate purpose, of course, is to keep the total cost of inspection and maintenance as low as possible and he may decide to do this by adopting either a long or a short interval between the times of periodical inspection. But whichever plan be adopted it is perfectly safe to say that on all roads running different types of equipment an arbitrary and universal period of this kind for all cars, based on time or mileage, will not lead to the best results. There is hardly a city electric railway anywhere which does not have to maintain apparatus of greatly varying reliability and there is an evident economic advantage in determining in advance and as closely as possible the safe running limits of each class of equipment. Some instances of the truth of this statement were clearly brought out in a paper analyzing the methods of reducing car failures in Syracuse, read at the Cooperstown convention of the Street Railway Association of the State of New York by J. P. Barnes, electrical engineer Syracuse Rapid Transit Railway Company. Thus he quoted the extension on that system of the lubrication interval of two modern motors from 500 miles to 3000 miles. Other examples of this kind were noted in the April 1 issue of the ELECTRIC RAILWAY JOURNAL, which contained an article on the Syracuse shops which are used jointly by the Syracuse Rapid Transit Railway Company and the Oneida Railway Company.

While the Syracuse practice is to be commended as assigning to each class of rolling stock an efficiency factor which really means something, it would be very desirable to supplement these data by a more definite understanding of such terms as "car failure," "car defect," "pull-in" and "run-in." These phrases do not mean the same thing on different properties, and even on the same railway the comparative figures of the several carhouses will be misleading if there is no check against the natural tendency of foremen to suppress reports of minor troubles. Hitherto this uncertainty as to the meaning of terms and the accuracy of records has made the monthly car defect chronicle of little value for comparison between companies. For all that it has proved very valuable in arousing among the division heads on individual systems that spirit of emulation which leads to the highest attainable efficiency in their work.

We believe that a more exact basis for general comparisons will be found, first, when the companies are willing to state the amounts actually spent for inspection and repairs per car per month or per car mile operated; second,

when the records make a sharp distinction between a breakdown which requires a car to be helped back to the carhouse and a failure which merely causes inconvenience in operating. Monthly cost records of the kind mentioned are kept by the Third Avenue Railroad, New York, and these are classified according to types of motor equipments, as reproduced in the Electric Railway Journal for May 20. Like practices are followed by some other companies. We cannot, however, recall any street railway whose reports are made out in line with the second suggestion. Would not the situation be clearer if a "pull-in" was defined as a car which must be taken out of service because it cannot proceed by means of its own apparatus, a "run-in" as a car which must be run into the depot because of some equipment trouble which is severe enough to prevent the maintenance of schedule speeds, and a "defect" as any other cause not embraced in the other definitions? Furthermore, following the usage of the Brooklyn Rapid Transit System, all troubles should be broadly divided into "electrical," "mechanical," and "causes beyond the control of the car maintenance department." Thus a pull-in might be due to motors (electrical), brakes (mechanical), broken trolley pole (a defect often due to the line department), etc.

It is not asserted that these definitions would cover the ground fully, but if they were applied and studied in connection with maintenance costs it would be possible to secure a much fairer basis of comparison than is now the case. Certainly, it would be absurd to judge on any other basis the efficiency of two car maintenance departments when one of them utterly ignores in its defect records such items as worn-out register cords, broken glass and other comparatively inexpensive items, while the other conscientiously notes everything even at the risk of getting a bad reputation among other companies.

IMPROVING OLD PLANTS

From the engineering point of view old and relatively inefficient power plants are of lasting interest on account of the opportunities for betterment work which they almost always offer. Rehabilitation is a task beset with many difficulties, particularly where depreciation has been permitted to flourish unchecked for many years. Much discouraging work must be done in attempting to raise the efficiency of a station which would be condemned as obsolete by every standard of modern practice, but there is a brighter side to the problem when it is viewed from the standpoint of the effect of even minor betterments upon the assorted assemblage of apparatus which usually comprises installations of extreme age. There are many cases where the scrapping of a plant and the installation of an entirely new equipment might really be justified, but where, on account of limited funds, such improvements must be postponed indefinitely the best that can be done is to modernize the existing apparatus arrangement, cut down sources of loss so far as possible and frequently readjust auxiliary equipment and relocate machinery for more advantageous operation.

Betterments of the above character are usually made in a piecemeal fashion, but this is no particular disadvantage, because the effect of each improvement may be more readily gaged where the work is carried out in single steps. They can usually be inaugurated in every department from the coal-handling system to the switchboard wiring. Many of the older stations were built in the days when hand firing was practically universal and when two or three handlings of the fuel by barrows manually operated were required between the storage bins and the furnaces. While local conditions dictate the remedy in each case, the general run of improvements includes such work as the installation of narrow gage tracks for the easier handling of coal in small cars, the change of grades to utilize gravity to better advantage in the delivery of fuel to the boiler room, and the installation of small telpher hoists to increase the speed of fuel delivery and reduce the cost of handling per ton. Auxiliary service has been bettered by the relocation of open heaters to give a substantial head in the delivery of water to boiler feed pumps, thereby saving the pumps from possible failures and breakages, with the delivery of water to the boilers at a higher temperature; the inspection and replacement of auxiliary steam pipe covering, installation of by-passes around heaters, stoppage of live steam leaks, examination of losses in pressure in steam piping which feeds main units and auxiliaries, and in the improvement of draft conditions.

In many old stations which are still in service, particularly in the less settled portions of the country, individual stacks are in use in connection with boiler units or batteries. Increasing loads have been handled in such cases either by installing forced or induced draft fans or by making the stack higher. In one instance the steam output of a plant carrying a railway, lighting and power load was increased enough to yield 400 hp additional capacity in boiler service by lengthening the steel stack serving one boiler battery 50 ft. By raising the height of an open feed-water heater 15 ft. above the pumps the temperature of the water supply to the boiler plant was raised from 180 deg. to 212 deg. Other improvements included the installation of new governors on the engines, which facilitated the operation of belted alternators in parallel, and the efficiency of the station was somewhat increased by the simplifying of the switchboard wiring, the original layout being so complex that rapid handling of units was out of the question in times of emergency.

Many plants of the older type carry a diversified load, but are unable to take full advantage of it on account of the inflexibility of the generating equipment. The railway service demands direct current at 550 volts to 600 volts, and other power business is usually handled by separate machinery which cannot be utilized in car operation without the employment of motor-generator sets or rotary converters. It is important to operate the principal steam-engine or turbine units within their economical range of steam consumption, and where separate engines must be run to handle the railway load the fuel consumption of the plant tends to rise unduly unless the power demand of the railway system is considerable. In not a few cases it pays to install a motor-generator equipment to eliminate the separately driven railway generators and to operate the entire plant as a unit on the steam end, rather than to attempt to secure efficient service from engine and generator units which must be operated in isolated fashion. Just as in the central station system steady and long-sustained

loads are desirable, so is it important in plants serving a diversified territory, including street railway, power and lighting business, to endeavor to obtain high load factors at the individual units, thus raising the load factor of the entire station equipment and improving its operating efficiency.

A NEW TYPE OF ELECTRIC LOCOMOTIVE

Elsewhere in our columns we present a brief account of the electric locomotives designed for use by the Paris-Lyons-Mediterranean Railroad, embodying principles of operation so radically new in practice if not in theory that they are worth serious and careful study. The fundamental peculiarity of the locomotives is that they are driven by continuous-current motors supplied with energy from a "permutator" carried on the locomotive and receiving high-tension alternating current from the working conductor. The plan is akin to that proposed some years ago for the utilization of the Ward-Leonard control by furnishing a locomotive with a motor-generator or synchronous converter supplying power to continuous-current driving motors.

The present machine of M. Auvert, who is chief engineer of the Paris-Lyons-Mediterranean Railroad, differs from this primarily in the substitution of the very ingenious permutator, of which M. Auvert is one of the inventors, for the heavy and somewhat cumbersome motor-generator or synchronous converter. The permutator has already been described in these columns, but it is worth while here briefly to notice it.

The permutator is in effect a synchronous converter in which the magnetic field is rotary in the sense in which it is rotary in an induction motor and in which rotating brushes follow this field around a commutator connected to the secondary winding. It is physically much like an induction motor with the rotor fixed and connected to a commutator and brushes circulating around this commutator synchronously with the field. The current derived from the permutator is not a rectified current, but a current commutated in the same sense as in a direct-current generator, in which, of course, the currents in the armature are alternating. Its efficiency is high, in all probability materially higher than that of the ordinary synchronous converter, inasmuch as the moving parts are light and the work done upon them is correspondingly small. Furthermore, the permutator has a material advantage in that it delivers to the commutator a secondary voltage determined by the ratio of the primary and secondary windings, instead of requiring an independent alternating-current transformer and elaborate regulating apparatus, as does the synchronous converter. The chief question regarding the permutator has been the success of the commutation, and this seems now to be satisfactorily established. The rotating brushes are, of course, mechanically speaking, rather a nuisance, but the gain in weight by the use of the permutator is so considerable as to render this objection comparatively insignificant.

The method of control employed in the present locomotives is highly ingenious, consisting of the control of a differentially wound motor brush-shifter by the conjoint effect of the current in the main motors and current controlled by the motorman. The brush-shifting control would seem rather audacious on account of the possibility of sparking, but the fact that it has been adopted in two large locomotive units would indicate that the sparking difficulty, as in the case of ordinary commutating single-phase motors, has been brought within reasonable limits. A good idea of the characteristics of the new locomotives in connection with more familiar types may be had by comparing M. Auvert's figures for his new 2000-hp machine with the single-phase locomotive of the same output built for the Lötschberg line by the Oerlikon Company. The new Auvert locomotive will not exceed 96 tons; the Lötschberg locomotive weighs 90 tons. The tractive effort at the wheel treads is 12,800 kg in the former and 13,000 kg in the latter, thus being practically the same at practically the same speed of 42 km per hour.

The maximum speed of the Auvert locomotive is 75 km per hour as against 70 km for the Lötschberg machine and the former has one 2000-hp motor as against two 1000-hp motors in the other case. It will thus be seen that for all practical purposes the two locomotives are similar in weight and output, as indeed they should be, since each must have transformer capacity sufficient for its motors, this capacity being in the one case in the permutator and in the other in the ordinary regulating transformers.

In both locomotives the motors are mounted above the axles and are connected to the driving wheels by connecting rods. In this respect the latest Auvert machine differs from the one originally designed and built for operation with permutators. No explanation is given for this change and it may be that it was dictated by the general preference for side-rod locomotives, which are the characteristic type of the Continental builders at present. At the same time, it is interesting to note that one of the advantages supposed to be possessed by direct-current motors, that of such compactness that motors of large power may be applied directly to the axles, has been abandoned in this case. It may not be amiss to call attention here to the fact that recent improvements in motor design may change the relative advantages of side-rod connection as compared with direct connection. With the modern methods of insulating and ventilating motors the limits of space for the motive power between the axles and under the locomotive floor are not so formidable as they were, and if a determined effort was made to see what could be done in the way of suspension of large motors from the axles we believe that the results would exceed anything heretofore attempted.

The practical question in comparing the new system with the ordinary single-phase plan is whether the advantages of a continuous direct-current motor over a single-phase alternating-current motor in general operating qualities are sufficient to compensate for the somewhat greater complication involved by using a permutator rather than a static transformer with regulating apparatus, and this question is one which cannot be answered except after considerable experience. At all events the new permutator locomotive appears to be an entirely novel machine possessing some very interesting qualities, while not yet sufficiently tried to determine its ultimate value.

New Shops at Rockford, Ill.

These Shops Are an Example of Modern Standard Shop Construction, Special Attention Being Paid to Fireproofing and Ventilating Features.

The Rockford & Interurban Railway Company, Rockford, Ill., has just completed a new fireproof shop building, the design of which is of interest because of the structural features and the operating methods employed. The shop is located on a fourteen-acre tract of land north of the city on the interurban division running to Beloit. This large



Rockford Shops—Skylights and Ventilators in Roof

area will be used partly for a general material yard for the city and interurban system, which has 107 miles of track and operates 103 motor cars. W. C. Sparks is general manager of the property and L. M. Jacques is master mechanic. The accompanying engravings show the general features of design and the interior and exterior appearance of the new shop building.

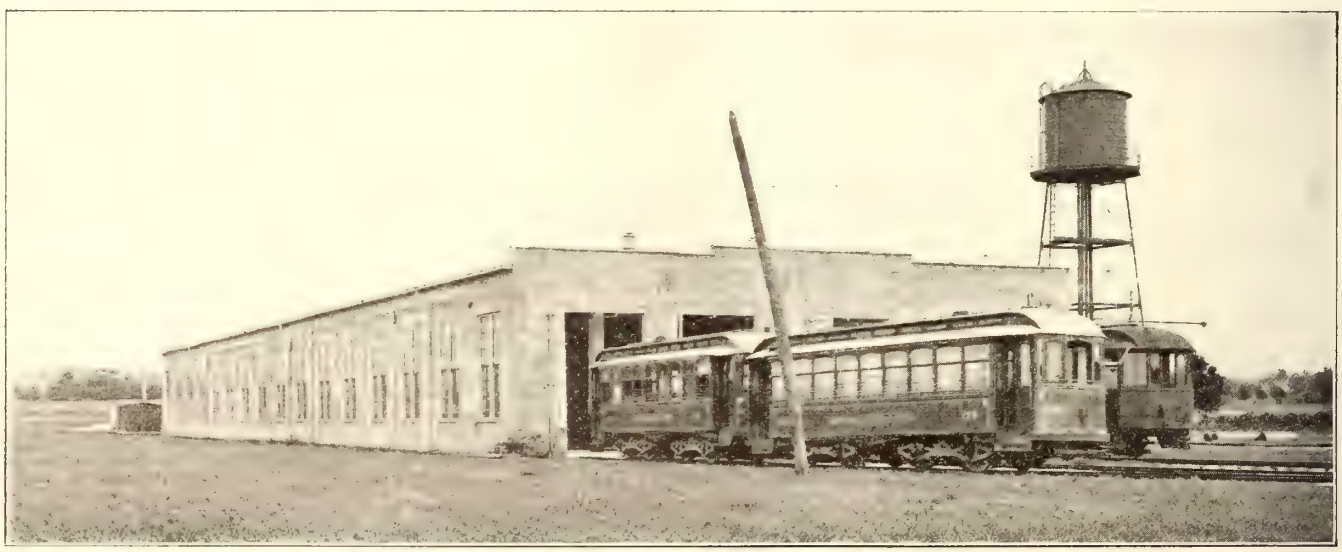
GENERAL ARRANGEMENT

The new shop is a rectangular-shaped structure with a frontage of 75 ft. and a depth of 256 ft. It incloses three tracks extending from end to end of the building and spaced with minimum track centers of 14 ft. 6 in. The largest subdivision is a general repair and truck shop, 143 ft. long by 49 ft. 10 in. wide. At the rear of this general repair shop is a paint shop, 32 ft. 6 in. wide and 112 ft. long. A track aisle leading from the general repair shop extends along the interior partition wall of the paint shop. Facing this track, which is continuous throughout the length of the building, are several utility rooms. Beginning at the front end of the building these rooms are as follows: Office, 24 ft. x 16 ft.; toilet room, 12 ft. x 24 ft.; armature room, 20 ft. x 24 ft.; machine shop, 80 ft. x 24 ft.; carpenter shop, 48 ft. x 24 ft. With the exception of the machine and carpenter shops the subdivisions just mentioned are separated from the main shop by fireproof partition walls. All of the tracks extend through the building, connecting at the front with a ladder track leading to the interurban line and connecting at the rear with storage tracks leading to the material yard.

CONSTRUCTION MATERIALS

All foundation walls and piers are made of concrete composed of a 1:3:5 mixture of Portland cement, sand and gravel. The superstructure consists of a reinforced concrete framework and roof, with brick curtain walls. This structure was designed to carry under test a uniformly distributed live load of 30 lb. per square foot, in addition to three simultaneous concentrated loads on each roof beam adjoining the roof panel under test, the concentrated loads to be 9500 lb. at the center of the panel and 13,500 lb. each, placed at each end of a roof beam and 3 ft. 6 in. distant from a column center. The interior division walls and the exterior curtain walls are built of first-class, hard-burned common brick laid with lime mortar gaged with natural cement and having a header course every sixth course.

The floors throughout the entire building are of concrete 4 in. thick except in the main repair-shop bay and machine shop, where they are 6 in. thick. The concrete used in the floors is composed of one part of cement, three parts of sand and five parts of gravel, and has a top finishing coat 1 in. thick marked off in squares. In the wash room the concrete floor between the rails of each track is sloped to drain openings and the floors of the two track pits also are pitched to center drains. The car pits are of concrete construction waterproofed with Hydrex felt in combination with Hydrex compound and guaranteed by the contractor against leakage. All parapet walls are coped with vitrified soft-glazed tile coping laid in Portland cement mortar. The roof is protected by a four-ply tar-and-gravel covering.



Rockford Shops—Front View Showing Water Storage Tank

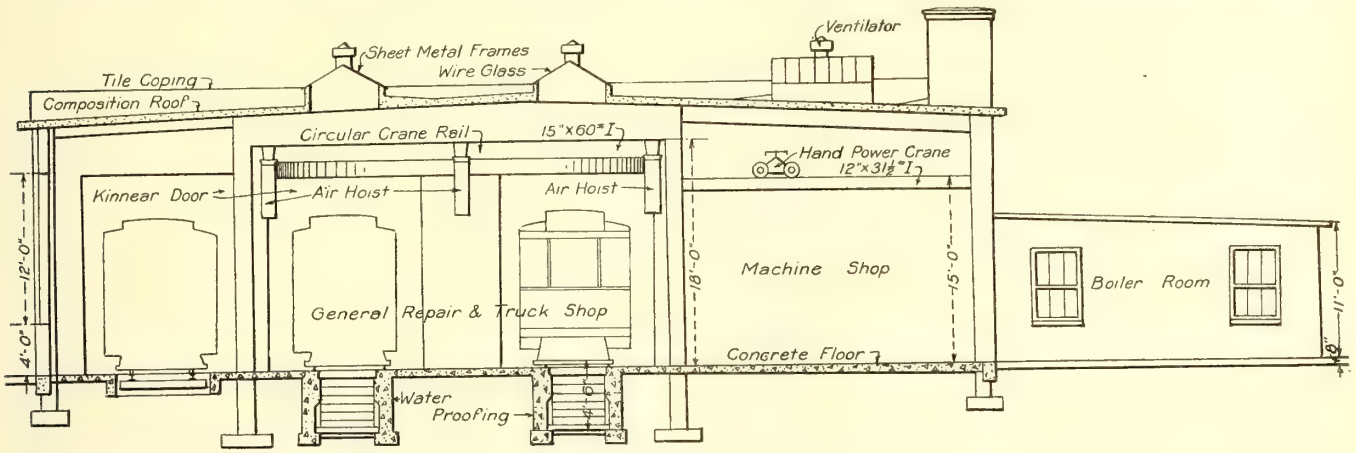
Daylight illumination in the different shop departments is furnished by eighteen skylights, each 6 ft. x 12 ft. These

skylights have metal frames inclosing wire glass and each skylight is surmounted by a Kernschen ventilator designed to withdraw a continuous current of air from the building.

The only combustible materials in the entire shop structure are the wooden window sash, the maple floor in the master mechanic's office and the exterior doors. All interior doors are made of fireproof material. Double-sliding, tin-clad fire doors with automatic release have been installed

REPAIR, TRUCK AND MACHINE SHOPS

The general repair shop and the machine shop are designed to handle the heaviest work which is required by the interurban equipment of this road. Two of the three tracks which extend through the general repair shop have pits extending the full length of the shop. The third track is floored with concrete. The two track pits have heavy concrete side walls in which are recesses inclosing lamps.



Rockford Shops—Cross-Section Through Center

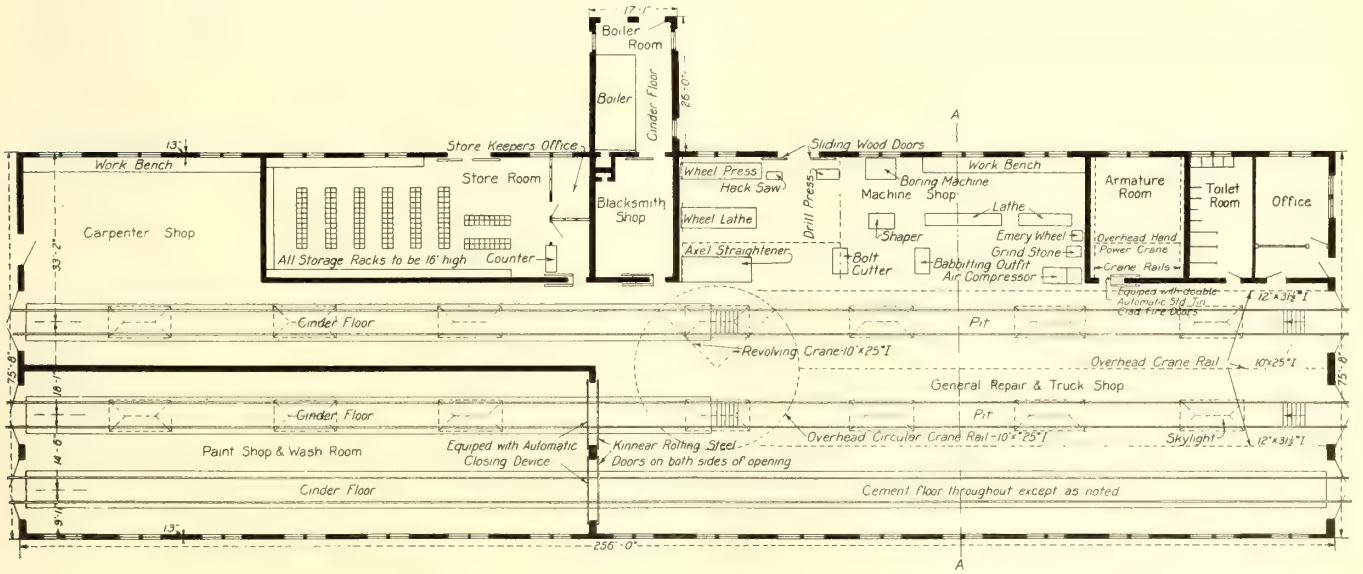
at every opening in the interior partitions, except for the paint shop, where double Kinnear rolling steel doors have been placed at each of the two track openings. The pair of doors on the repair-shop side are hand-operated and those on the paint-shop side are equipped with automatic closing devices.

The sliding fire doors in the interior fire walls are made of three thicknesses of flooring laid diagonally and covered with No. 26 galvanized iron nailed in place. This iron is painted with one coat of Dixon graphite paint before being applied. The doors are hung on sloping tracks and are provided with counterweights, chains and fusible plugs.

After the building was completed the interior walls, Cement steps are provided at both ends of each pit and the floors of each pit are sloped to three drain openings.

As will be noted from the illustrations, the main shop is served adequately by a system of air hoists with I-beam runways. Three runways extend the length of the repair shop and connect at the rear with a circular runway 32 ft. in diameter. The runways support trolleys carrying 14-in. air hoists of Northern Engineering Works manufacture. Each hoist is connected to the shop air supply by an armored hose. Two hoists are provided for each of the three longitudinal runways and two for the circle, in addition to a Triplex chain block, which is also worked on the circle.

The hoists have a lift of 4 ft. and are designed for



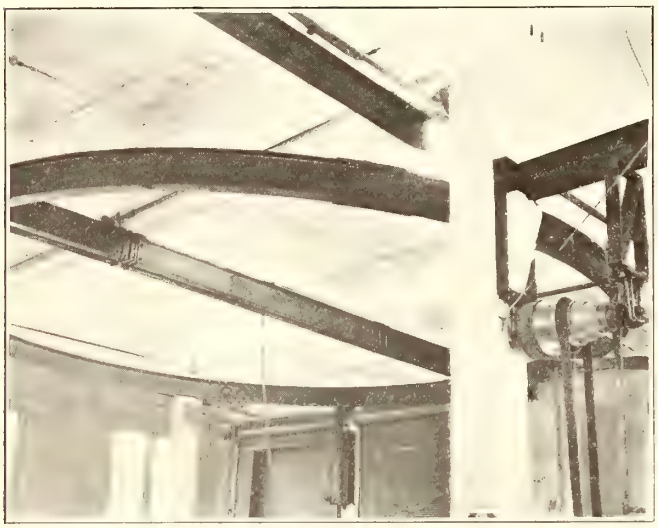
Rockford Shops—Plan Showing Air-Hoist Runways

columns, ceilings, etc., except in the office and toilet room, received two coats of white cold-water paint applied with a spray machine. The general paint work was done with the following materials: Asphalt paint, furnished by the Western Roofing & Supply Company; colors in oil, by the Sherwin-Williams Company; varnish, by the Murphy Varnish Company; Monarch whitewash, by George Fletcher & Company.

handling car bodies and truck parts. With these hoists and the arrangement of runways, as shown in the plan view, the usual operations of truck and body repairs can be handled conveniently with very little manual effort. The air-hoist equipment also provides for transferring heavy work from the general repair shop to the crane serving the wheel section of the machine shop, in which are located a wheel lathe, wheel press and boring mill, all driven by an

electric motor. Similarly the armature shop is served by an overhead crane with which materials can be transferred to and from the air-hoist runway in the main shop.

The supply of compressed air for general shop use and for handling water is furnished by an Ingersoll-Rand electric-drive 10-in. x 10-in. air compressor, provided with an



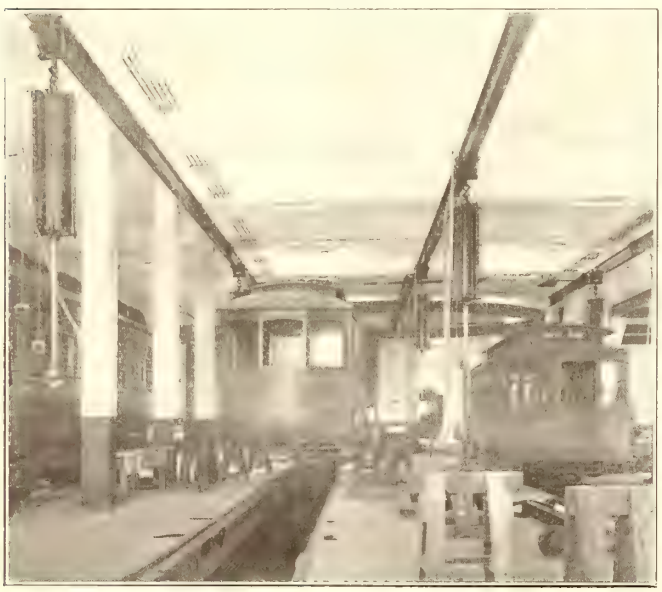
Rockford Shops—Circular Air-Hoist Track

automatic starting and stopping device. Air is stored in a cylindrical tank supported above the compressor.

PAINT, CARPENTER AND BLACKSMITH SHOPS

The paint shop has two through tracks with concrete floors sloped for drainage. The floor space of the paint shop is clear of posts and this section is particularly well lighted by seven groups of large windows and three skylights. It is of sufficient length to hold two large interurban cars on each track. At the present time all of the interurban equipment is being put through the paint shop and the colors of the cars are being standardized, using a light Pullman green with plain gold striping.

The carpenter shop, which is located in the rear of the



Rockford Shops—General Repair Shop

building, has an equipment of modern wood-working tools, all of which are driven from countershafts, which are in turn driven by an electric motor. The carpenter shop is separated from the rest of the shop by fireproof partition walls. A passageway for cars extends between the paint shop and the storeroom.

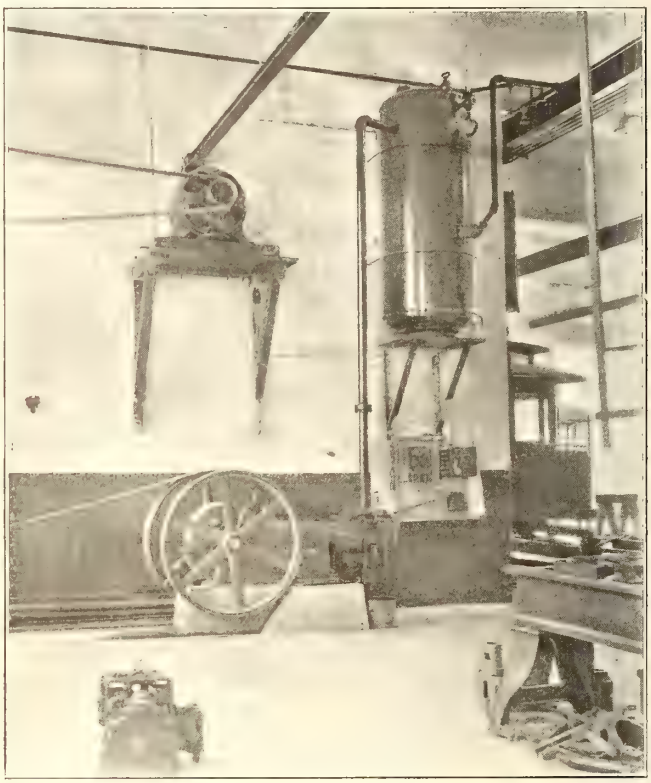
The storeroom has been fitted with wooden furniture and racks 16 ft. high. An office with high partitions and a delivery counter have been set off at the end close to the entrance to the general repair shop. A wide door through the exterior wall provides for receiving heavy materials direct from cars or wagons.

The blacksmith shop adjoins the machine and general repair shops and is entirely separated from these two sections by a fireproof wall having but one opening to the inside of the shop. A monitor skylight with two ventilators provides illumination for the blacksmith shop.

The shop toilet room is equipped with high-grade fittings designed for the convenience of the men. This equipment includes thirty all-steel lockers built by the Lyon Metallic Manufacturing Company.

HEATING AND FIRE PROTECTION

The new shops are heated by hot water provided by a boiler plant inclosed in a separate addition to the shop 17 ft. x 26 ft. in plan. This boiler house has storage space for coal. Its equipment includes a Kewanee low-pressure



Rockford Shops—Air Compressor and Tank

boiler and a centrifugal water circulation pump. The heater pipes throughout the shop generally are supported on the side walls. Radiators are provided in the offices. The heating pipes in the paint shop are supported overhead and each pit is provided with four coils on each side wall. The water supply is obtained from a deep well and water is stored in a 15,000-gal. wooden tank supported on a 50-ft. steel tower. Water is delivered to the tank from the well by an air lift taking its supply from the shop air reservoir. A 4-in. water main extends around the outside of the shop building and connects with four two-way hydrants. Hose connections are also provided in each of the subdivisions of the building. In addition to this fire protection the building is patrolled at night and records of the patrol are made with a Newman Clock Company's outfit.

The structural work of this building was designed by the Witherspoon Englar Company, Chicago.

A company has been formed to build an electric railway in the Crimea from Sevastopol via Yalta to Alushta, a distance of 85 miles.

Electric Locomotive with Permutators in France

This Locomotive Is Equipped with 600-volt Direct-Current Motors Supplied Through Permutators Which Convert the High-Tension Single-Phase Trolley Current.

Some particulars were published on page 1052 of the STREET RAILWAY JOURNAL for Dec. 1, 1906, of the Auvert & Ferrand system of converting alternating currents to direct currents by a machine called a permutator. A permutator is somewhat similar in electrical design to a rotary converter, except that all of the parts are stationary except the brushes, which are revolved about the commutator by an auxiliary synchronous motor so that they keep constantly in step with the magnetic field which revolves around the stationary core. A number of advantages are claimed for this machine over the rotary converter. One is a reduction of bearing friction, and another is greater freedom in design, because no provision has to be made for a heavy rotating element. Mr. Auvert, one of the inventors of the permutator, is chief engineer of the Paris-Lyons-Mediterranean Railroad, one of the principal lines in France, and the machine was designed primarily for use on electric locomotives where the trolley current would be single-phase and the equipment of the locomotive would be direct-current motors. Since the publication of the article mentioned, the Alioth Electric Company of Switzerland has constructed a 150-ton electric locomotive on this principle for the Paris-Lyons-Mediterranean Railway. Recent tests with this locomotive are described in an article by Mr. Auvert in the *Revue Générale des Chemins de Fer et des Tramways.*

The design of the locomotive is shown in the accompanying engravings. It is of the double-unit type, each unit having a bogie truck with wheels 1 m in diameter, and two driving wheels 1.5 m in diameter. On the framework of the locomotive are mounted the following:

One transformer for furnishing the alternating current necessary for the synchronous motors which operate the permutators and for a small auxiliary motor-generator.

One automatic high-tension switch for this transformer.

One main transformer for the permutators.

One automatic high-tension switch for this transformer.

One direct-current circuit-breaker.

Two permutators with brushes capable of being revolved in either direction by a synchronous motor.

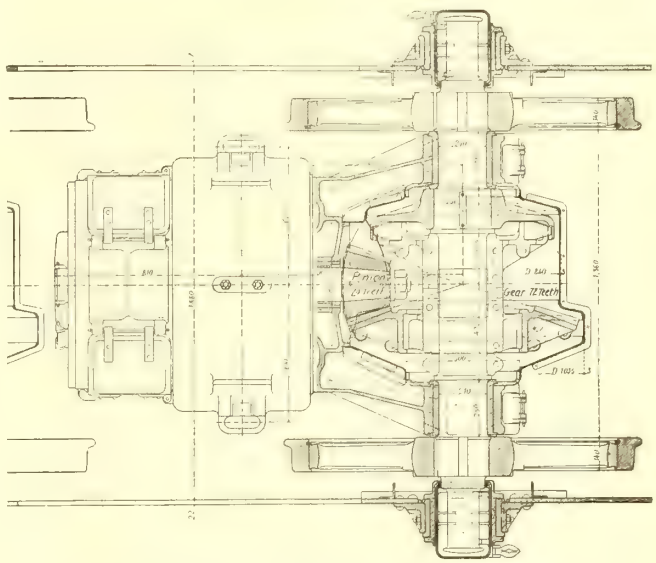
One air compressor equipped with a single-phase synchronous motor.

One auxiliary motor-generator for starting the synchronous motors of the permutators and providing direct current for the auxiliary equipment.

The apparatus for the control of the collectors, high-tension switches and the speed of the driving motors is located in the cab of each locomotive.

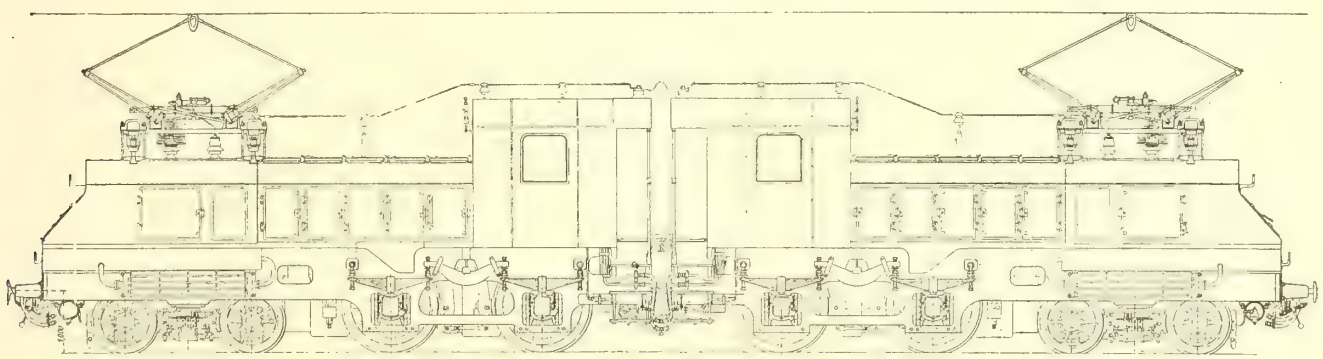
Each half unit is equipped with a Westinghouse pantograph, the two on each half unit being connected in parallel. Each half unit is complete in itself and is identical in equipment with the other. The two units are coupled together at the cab-ends.

The weight of the two complete half units is 136 metric tons (or 149.6 tons of 2000 lb.) divided 18 metric tons on each driving axle and 16 tons on each bogie truck axle.



P. L. M. Locomotive—Plan of Motor, Showing Method of Gearing to Axle. (All Dimensions Are in Millimeters.)

Each driving axle is driven by a 300-volt, direct-current, six-pole, series motor having a 1-hour rating of 400 hp at a speed of 650 r.p.m., corresponding to a speed of the locomotive of about 63 km (40 miles) per hour. The two motors of each half-unit are connected in series. The armatures of these motors are not mounted parallel to the driving axle but are at right angles thereto and are connected to the driving axles by bevel gears as shown in one of the drawings. Each motor is supported over its center of gravity by a yoke with spiral springs.

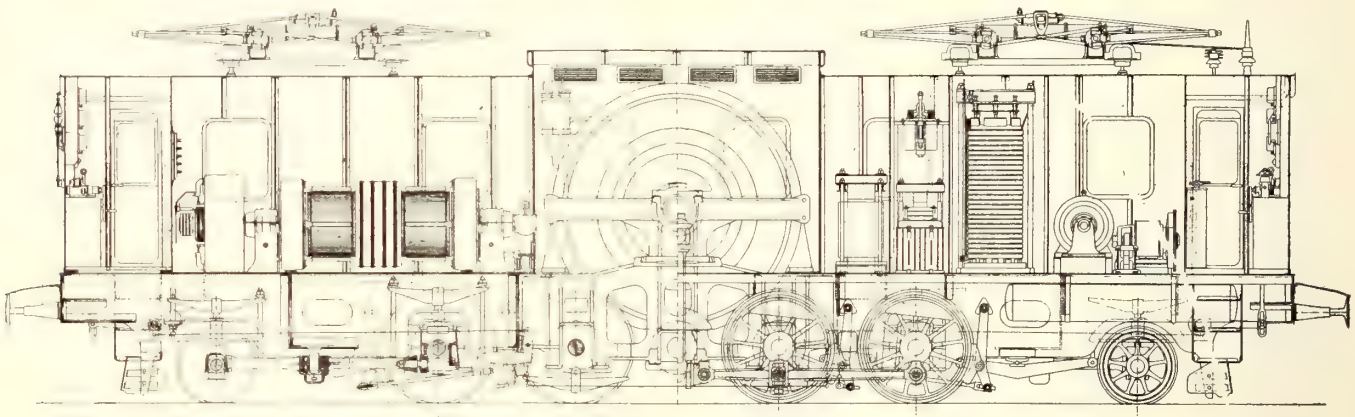


P. L. M. Locomotive—Side View of Double Unit Permutator Locomotive

PERMUTATORS

The permutators, of which there are two on each half-locomotive, differ somewhat from those first brought out by the inventors and described in the article previously mentioned. The two direct-current commutators of each permutator are connected in series instead of in parallel, as in the first machines. The terminal leads of the two per-

mutators are also connected in series. The maximum emf on each direct-current commutator is therefore 150 volts, making a total emf for each half-locomotive unit of 600 volts, when the revolving brush holders are in the position of maximum angular displacement. The normal direct current output is 1200 amp, but this can be exceeded for a short time. The angle of brush displacement on the permutators is regulated by means of a pilot motor, the armature of which is actuated by a small current furnished from the auxiliary motor-generator already mentioned. The field circuit of this motor consists of two windings. One is a fine wire coil, receiving current from the motor generator. This current can be varied in amount by the motorman. The second winding on the pilot motor consists of four turns of a conductor of large section, traversed by the current supplied to the driving motors. The mmfs of the two windings are in opposition. If the ampere-turns in the fine wire circuit are greater than those in the coarse wire circuit, the armature of the small motor will turn so as to increase the angle of displacement of the brushes, and thus increase the amount of direct current taken from the commutator of the permutator. As this current increases the field of the pilot motor becomes weaker and the motor will stop, and when the circuit from the main circuit completely neutralizes that from the motor-generator the pilot motor will stop. If the main circuit current should still further increase, the pilot motor would turn in the opposite direction.



P. L. M. Locomotive—New Type with Single Motor and Connecting Rods

Hence the motorman, by regulating the current in the fine wire coil, controls the current in the driving motors. This system of control permits a smooth acceleration, because the tractive effort is kept constant during the whole period of acceleration. It also has the advantage of automatically limiting the load on the driving motors.

The exciting circuits of these pilot motors in the two half-units of each locomotive are in series, so that they move in synchronism and provide multiple-unit operation of the two half-units.

REVERSING

There is a reversing switch on each half-unit. These switches are operated by compressed air and are interconnected so that they can be operated from either cab. They are also interlocked mechanically with the apparatus for varying the angle of displacement on the permutators, so that it is impossible to reverse the locomotive until the brushes are brought back to the position which corresponds to that of minimum voltage and the current in the permutators has been cut off.

MISCELLANEOUS EQUIPMENT

The high-tension switches are operated by distant control by compressed air. Compressed air is also used for raising and lowering the pantographs, although the pressure of the collector shoes on the overhead wire is supplied entirely by springs.

SINGLE-PHASE CURRENT

The single-phase current is supplied at 25 cycles and 11,500 volts by an overhead catenary. The return circuit is by the rails, which are connected every 150 m (500 ft.) to a return circuit wire of 60 mm² (120,000 circ. mils) section carried on the poles.

TESTS

Some tests of this locomotive were recently conducted on a section of track 7.3 km (5 miles) in length between Cannes and Grasse. The maximum grade was 2 per cent. A dynamometer car was used between the locomotive and the trains, which in the three tests run weighed 198 tons, 245 tons and 246 tons, exclusive of the locomotive. These tests showed (1) a rapid and constant rate of acceleration and (2) a ratio between the mechanical power applied at the peripheries of the wheels and the high-tension power, at full speed, of from 78 per cent to 80 per cent.

The report says further that operation of the permutators, when tested at the shops of the manufacturers as regards efficiency and commutation, had proved satisfactory, but that there was some question as to whether they and the synchronous motors would give equally good results when subject to frequent fluctuations in frequency and voltage. No trouble, however, was found. This may in part have been due to the use of very powerful damping devices connected electrically between the armatures of the two synchronous motors, so that if there was any hunting it was synchronous and did not disturb the operation.

It was also found that considerable tractive effort could be obtained from the locomotive while it stood still, and that the locomotive could exert this effort for some time without any danger to the electrical apparatus. At 11,500 volts and 33.5 amp, corresponding to 385.25 kva and 200 kw, the tractive effort developed was 3875 kg or 8525 lb. At 10,950 volts and 53 amp, corresponding to 580.35 kva and 405 kw, the tractive effort developed while the locomotive was still was 9800 kg or 21,560 lb. The power-factor in the first case was 51 per cent and in the second case was 69 per cent. In both instances the tractive effort noted was excited for two minutes.

NEW LOCOMOTIVE

The results obtained were so conclusive as to the flexibility and high efficiency of permutators for single-phase railway service that Mr. Auvert has designed a new locomotive, embodying the general principles of the present locomotive, but with improvements based upon experience.

This new locomotive is illustrated above. It will have a normal rating on the hourly basis of 2000 hp; a tractive effort at the wheel peripheries of 12,800 kg (28,160 lb.), and a speed at this tractive effort of 42 km (26 miles) per hour. The maximum speed is 75 km (47 miles) per hour.

Each locomotive consists of a single unit supported on four driving axles and two pony axles. Each pony axle is connected to its nearest driving axle by a Zera radial gear. The locomotive will be equipped with only one 2000-hp d.c. motor, which will be connected to the four driving axles by a countershaft and connecting rods. The motor is in the

center of the cab, where it is easily accessible. It is supplied with current from one double permutator and one transformer, which are designed for 15-cycle single-phase current.

The permutator will have four sets of brushes as in the test locomotive, but on account of the low frequency its peripheral speed will not exceed 17 m (56 ft.) per second, which is an important advantage from a practical standpoint. A small auxiliary permutator for automatic starting replaces the motor-generator on the test locomotive. The number of parts on this new locomotive is, therefore, less than one-half of those on the old locomotive, and the length of the body is considerably reduced.

In addition, this plan avoids the necessity of multiple-unit control between the apparatus for changing the direction and maintaining the angle of displacement between the two brushes as in the trial locomotive; hence the accessory equipment is much simplified. This effected a considerable reduction in weight. The total weight of the new locomotive will not exceed 96 metric tons (105 tons of 2000 lb.), of which 72 metric tons will be on the driving wheels and 24 tons on the pony wheels.

ADVERTISING FOR TRAFFIC BY THE LONDON UNDERGROUND RAILWAY

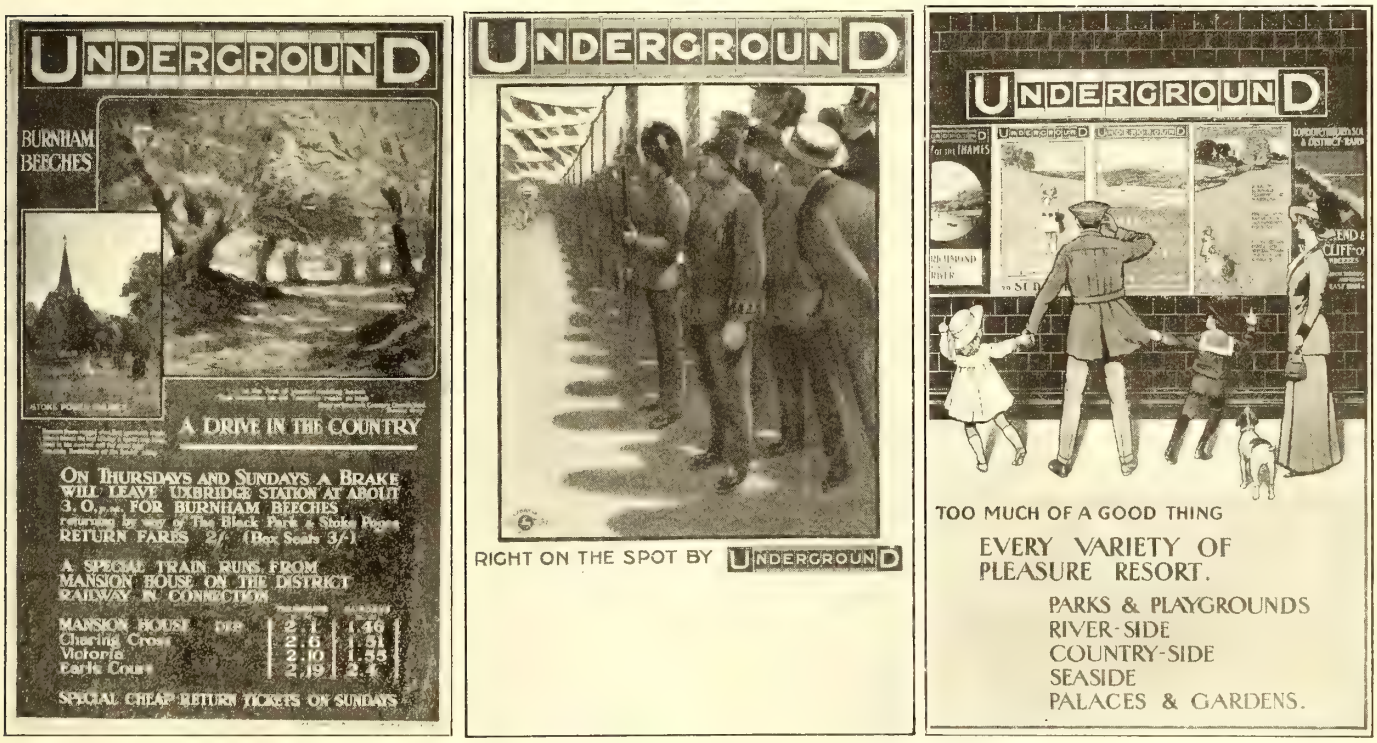
An account was given in the ELECTRIC RAILWAY JOURNAL for Dec. 3, 1910, of the large posters and other advertising literature used by the Underground Electric Railways Company, Ltd., of London, to stimulate traffic on its lines. A great deal of attention is given in these posters to their artistic design and coloring. The latter, of course, cannot be reproduced in the photo-engravings. Another feature of all of the advertising of the company is that, as a rule, each poster or other publication, in addition, advertises some special service or has been prepared for some special class of passengers. Many of the advertisements, for instance, are intended to appeal particularly to sightseers, of which there are always, of course, a large number in London.

Three recent advertisements are presented herewith. One relates to Burnham Beeches and Stoke Pogis Church, both near London and famous through Gray's "Elegy," and both easily accessible from that city by way of the Underground. A second advertisement called attention to the facilities possessed by the road for those who wished to view the coronation ceremonials, and the third reminds the seeker for recreation of the many country and shore resorts which can be reached by the lines of the company. The originals of the posters reproduced measure 24 in. x 40 in., and are pasted on billboards which are mounted inside or just outside the station entrances.

In connection with the coronation ceremonies the company issued for distribution a number of weeks prior to that event a complete program of the ceremonies, with a map showing the routes of the processions and the special train arrangements that had been made for the different days of the celebration.

LEAFLETS FOR ADVERTISING

Another series of advertising was begun by the company about the first of the year. This consisted of leaflets 5 in. x 8¼ in., printed on brown manila paper and issued weekly. The wording is appropriate to the season. Thus that issued on Jan. 4, 1911, during the holiday season, was entitled "The Days of Our Youth." It gave a short sketch of the pantomimes and fairy plays then being given at the different theaters. The leaflet of Feb. 8 reminded the reader that Feb. 7 was Dickens' birthday. It then told of several streets and localities in London which had been made famous by Dickens and the way in which they could be reached by the underground railway. With the coming of spring, country walks were described, and, of course, the occurrence of athletic events and contests was advertised. Notices of such events do not predominate, however, in the advertising publications of the London line as they would be likely to in similar traffic literature in America. Instead the advertisements almost, if not quite, as frequently refer at length to exhibits at the art galleries or at the national museum and even to horticultural displays at the public gardens and similar exhibitions of public interest.



Recent Poster Advertisements of London Underground Railway

San Francisco Method of Welding Broken Armature Shafts Without Removal

A Cheap and Successful Method Which Can Be Used in Any Shop of Moderate Size.

Until the advent of modern welding systems it was not practicable to repair broken armature shafts. In fact, the only remedy was to substitute a new shaft. This meant that the leads had to be disconnected, the commutator drawn off, the coils removed and, in the case of some armature cores, all the laminations taken off one at a time. Of course all of these operations had to be repeated in the reverse order after the new shaft had been installed.

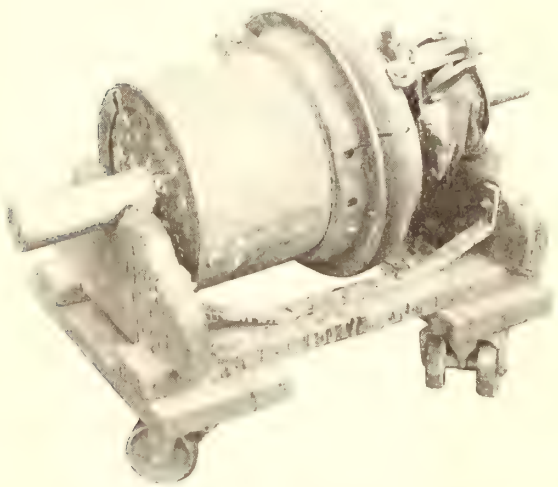


Fig. 1—San Francisco Welding—Ready for Heating

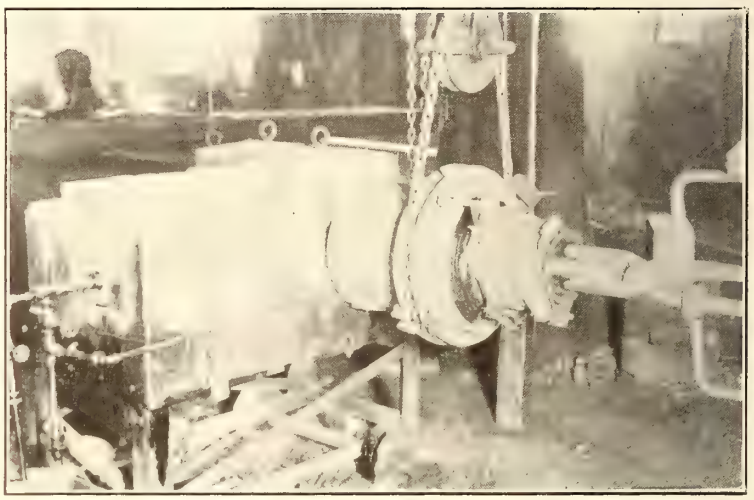


Fig. 2—San Francisco Welding—Complete Armature with Broken End in Oil Furnace

RESULTS OF WELDING SYSTEMS.

The new fuel oil and compressed air method used in the main repair shops of the United Railroads of San Francisco is far superior to the old process in both time and cost. The old plan made the armature useless for three or four days. The new plan, exclusive of turning up the welded shaft in a lathe, requires less than two hours from the time the workmen begin to adjust the protective casing until the armature is ready for the lathe. The old way cost from $50 to $70 per armature. The new way costs $8.50 and has been uniformly successful in giving a permanently satisfactory weld and without any injury to the armature coils. The time taken to test and bake the armature after the welding is no more than that usually required for an armature which has just been rewound.

This surprising improvement has been obtained by using a fuel oil fire under compressed air of 50 lb. pressure instead of the usual coal fire under the draft of a centrifugal blower. The details of the process were worked out by J. M. Yount, master mechanic of the company, and his assistant, W. Hendry, who is a specialist in ironwork.

OPERATING CONDITIONS IN SAN FRANCISCO

In some respects, such as the absence of lightning and snowstorms, electric street railroading in San Francisco is simple when compared with conditions in some Eastern cities. On the other hand, the many steep grades in San Francisco cause other troubles. In particular, these grades minimize the permissible departure from parallelism of the armature shaft and the car axle. The amount of wear that may be allowed in the armature and axle bearings depends on the topography of the line over which the car is operated. The penalty occasionally exacted for excessive bearing wear is a broken armature shaft on a car ascending a steep grade.

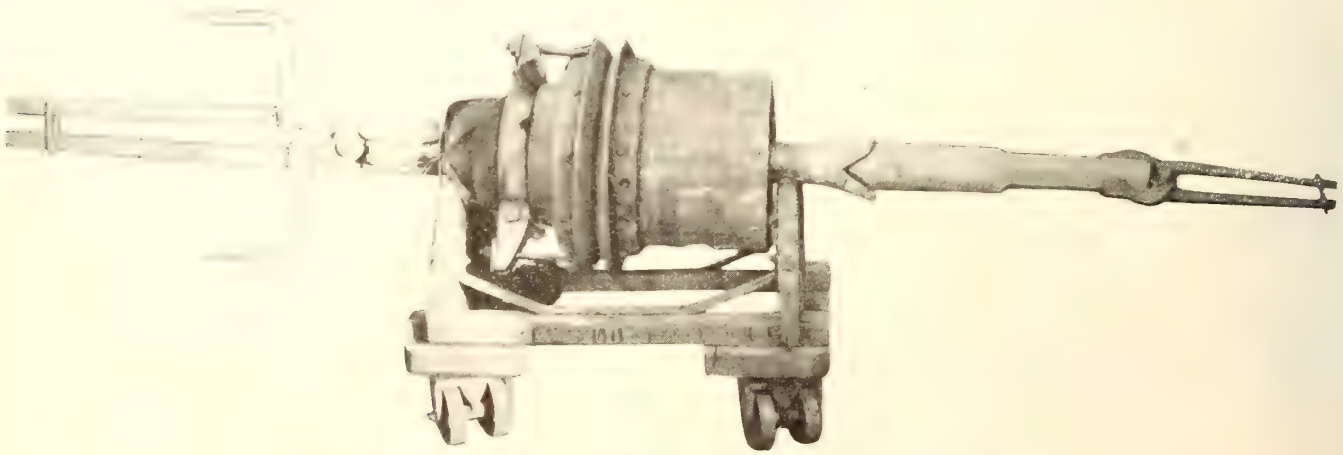


Fig. 3—San Francisco Welding—Type of Weld on Armature Shaft

PREPARATIONS FOR WELDING

When a broken shaft is to be repaired without removal from the armature the coils are protected from injury by the furnace heat by a sheet-iron hood. The space between

the end of the hood and the ends of the armature coils is filled with a heat-insulating mixture of blue clay and asbestos. When near the fire the armature is further protected by a sheet-iron diaphragm or pair of knife plates inserted between the armature and the firebox. These knife plates resemble a pair of shears with long, slender handles and short, square blades of exaggerated width.

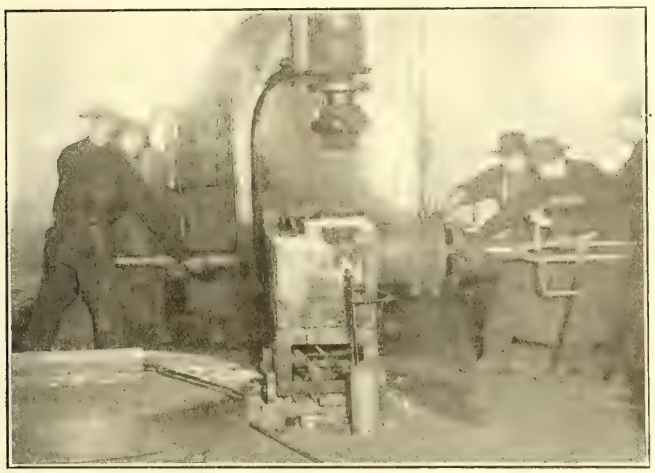


Fig. 4—San Francisco Welding—Driving the Shaft Parts Together at the Final Welding Heat

Semi-circular gaps in their inside edges permit the blades to fit closely around the shaft and prevent the radiation of heat from the furnace.

The armature is still further guarded against burning by a continuous cooling curtain of compressed air which issues from a row of perforations in a U-pipe encircling the shaft. These refrigerating streams of air are released radially over a circular area of about the same size as the cross-section of the hood and in a plane which is parallel to the back of the armature and the side of the furnace. These streams of compressed air become cooler as they expand. They absorb part of the heat radiated from the fire toward the armature coils, alter the direction of another part of it and tend to keep cool that part of the shaft next to the armature core. When the armature leaves the fire a stream of water is played on the shaft, where it emerges

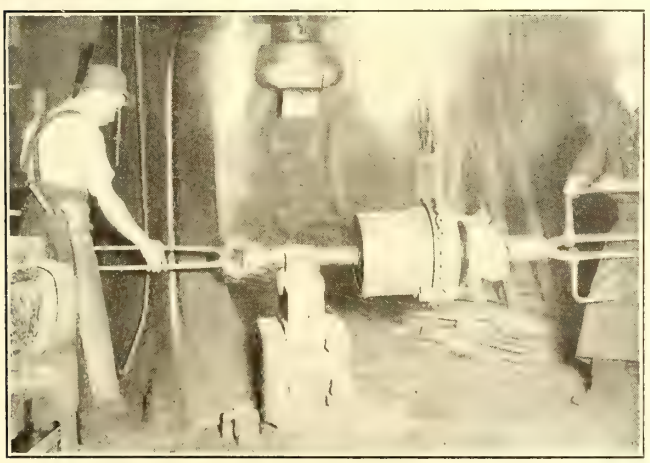


Fig. 5—San Francisco Welding—Completing the Weld in a V-Block Under Steam Hammer

from the hood, to prevent the heat of the red-hot part of the shaft from being conducted to the armature core and injuring the insulation.

For handling heavy armatures easily and rapidly during the several stages of the shaft treatment the protecting hood, as shown in Figs. 2, 4 and 5, is equipped around its center of gravity with a grooved pulley surface or chain wheel made of slot iron from an old cable road. The hood is held firmly in position and prevented from being jarred ahead on the shaft during the "up-setting" part of the work by eye bolts and a "strong-back" which extends across the front of the commutator, as can be readily noted in Figs. 1, 2, 3 and 5. Thus equipped the armature is slung by a short endless chain and a pulley to the end of the differential hoist on a revolving jib crane. In this way the armature can be conveniently and expeditiously brought by the workmen to the fire, to the cooling water spray and tub, to the horizontal swinging upsetting rammer or under the steam hammer as the progress of the work may require.

THE WELDING PROCESS

The stump of the broken shaft of the disabled armature shown in Fig. 1 is 10 in. long, as the break, in most cases, is under the inside end of the pinion. This stump is introduced into the fire through a small aperture in the sheet-iron side of the blacksmith's high-pressure portable oil furnace. This furnace consists of an air-atomized, air-propelled and air-fed stream of liquid fuel which flames forth from the burner. On encountering the baffle formed by the brick-lined sides of the hollow cubical furnace the blaze fills the fire box with an incandescent mass of vapor. The steel shaft is therefore submerged in conflicting waves of flame which are of great intensity and yet are under such control that in ten minutes a 3¼-in. shaft can be brought to a white heat for most of its length with perfect safety.

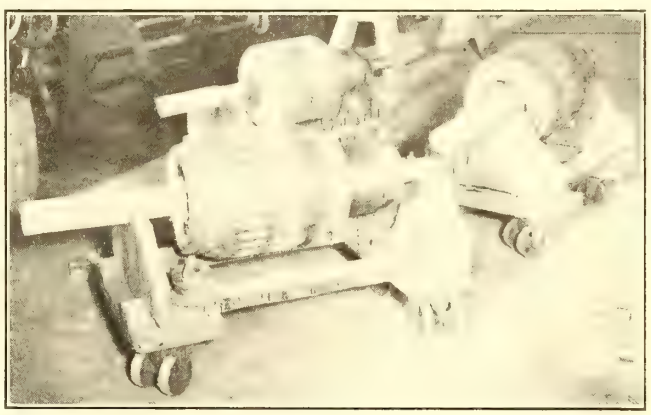


Fig. 6—San Francisco Welding—Armature Shaft Ready for Machining

California fuel oil is used in this furnace. According to J. H. Stott, engineer of steam equipment, this oil has an asphaltum base, a specific gravity of 0.951, or 17.25 deg. Beaumé, a calorific value of 18,700 b.t.u. per pound, weighs 333 lb. per barrel and costs to-day 67 cents per barrel delivered. This product is not a crude oil, but a distillate which has passed through the still once. Its viscosity is lower and its calorific value greater than the crude oil.

When fully heated the shaft is transferred from the fire to the water tub. There it is hosed generously "in the neck" next to the hood while being revolved slowly to prevent the heat from passing to the interior of the core. The shaft is also cooled off partially by hosing at the outer end so that when upset the metal will not mushroom up too abruptly at the extreme end. Next the armature is swung opposite a 100-lb. horizontal suspended rammer. While the armature is held steady by the tongs three men vigorously swing the rammer to meet the swinging red-hot armature shaft end-on until it is upset or swelled for nearly all of its length. This upsetting is for the double purpose of providing ample metal for the weld when under the steam hammer and of permitting the lathe man to take a continuous cut across the full width of the bearing when turning up the shaft.

The upset iron is put into the fire again for its second heat. On coming from the second heat the shaft is taken to the hammer and flattened or drawn down to about one-half of its original thickness. It is then returned for the third heat. Upon being brought out from the third heat the armature is up-ended on the ground on the commutator end of the shaft and the red-hot pinion end of the upset shaft is split down the center to form the scarfs for the proposed weld. Both before and after this splitting the hot steel is given the usual generous hosing at the neck to check the movement of heat to the core. A fourth heat is given the shaft to soften the metal so that the smith can set the scarfs, fitting them exactly to receive the wedge end of the axle piece which is to be welded to the shaft. The shaft is then returned to the furnace for its fifth and final welding heat and is prepared for forging under the steam hammer.

It is interesting for a blacksmith of the old school, who is accustomed to heat metal under a pile of coal, to be able to see through the vent hole how this shaft is heated in the oil furnace. Not only can the smith see the shaft as it changes color and decide on the exact moment to remove it, but he can also sprinkle on the welding flux with a spoon just where he wants it to go. Furthermore, he can do some of his welding in the fire and under his eye.

As soon as the shaft stump with its V-shaped opening in one furnace and the axle piece with its wedge-shaped

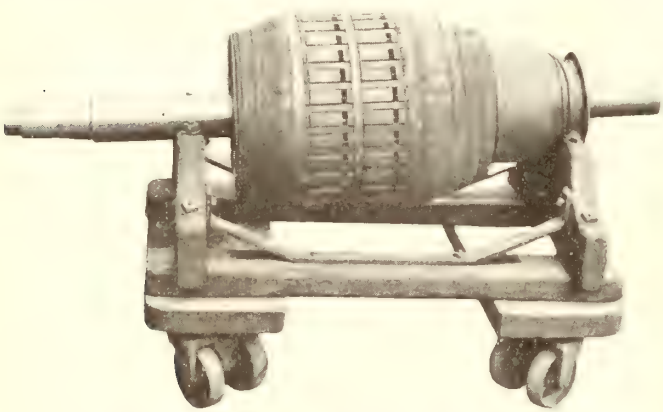


Fig. 7—San Francisco Welding—Completed Shaft

end in another oil fire have reached the proper welding heat and have been sufficiently covered with the welding powder, the axle piece is brought to the furnace, which contains the armature shaft for insertion through an aperture in the opposite wall of the furnace. The wedge enters the V and is firmly driven into place with the rammer shown in Fig. 4. Upon removal from the fire the weld looks, except for color, much as it does in Fig. 3. From this point on, the rest is plain blacksmith work. The shaft is forged, cut off and straightened.

In all five heats are required, as noted—the first for the upsetting, the second for drawing down the end of the shaft, the third for splitting open the shaft end, the fourth for setting and fitting the scarfs and the fifth for the final or welding heat. Sometimes when the scarfs do not forge down to suit the exacting taste of the smith a sixth or wash heat and further forging is given. Five of these welds can be completed in one day of nine hours by one crew when a full day's work on broken armature shafts is presented. This crew consists of a smith and his helpers, who vary in number from two to seven, depending on the nature of the work. These helpers are drawn from the other fires in the shop temporarily and are promptly sent back when their services are no longer required. The largest item of cost is labor and the next one the compressed air used. The item of fuel is almost as trifling as that of welding flux. Up to date more than 100 welds have been made without a failure.

CAUSES OF FAILURE.

The query naturally occurs: To what are these broken armature shafts attributed? Is it bad metal, faulty design or extraordinary conditions? Breaks are not thought to be due to poor steel except in so far as the metal has proved unequal to the extraordinary conditions. The shafts are of the latest design with a taper turn for the pinion similar to that on armatures whose shafts do not break. Still Mr. Yount feels that he has improved the original design by leaving a fillet of metal instead of a sharp angle when cutting down the shaft from the bearing to the taper to receive the pinion. The inside edge of the pinion bore is countersunk to correspond with this fillet. Extraordinary conditions are met as much as possible by limiting the allowable bearing wear on the motors which are operated on heavy grades and by using series instead of multiple speed when ascending grades of 10 per cent to 14 per cent.

TESTING COAL IN LONDON

For the past five years J. W. Towle, resident engineer Underground Electric Railways Company, Ltd., London, has been using the Berthier method of determining the calorific value of the coal used in the Lots Road power station of that company. Every bargeload of coal is tested at the moment at which it arrives at the dock of the company, and the method of testing is so simple that it can be done in about twenty minutes at a cost of between 5 cents and 10 cents. It has been found by the company preferable to any calorimeter test because it gives the company a chance to complain of the coal before it is unloaded, a plan which would not be practicable with the calorimeter test. Although the results secured by the company have rarely been disputed, when such a dispute has occurred independent calorimeter tests have shown that the full value of the coal was practically that shown by the Berthier method. Mr. Towle says that with coals varying largely in their composition the method might be more complicated because different constants would have to be used, but as the company uses only bituminous coal no change in the constant is necessary.

For the convenience of the readers of this paper the following description of the Berthier method from "Engine Room Chemistry," by Augustus H. Gill, is appended:

"Berthier's Method.—This uses as a measure of the heating value the amount of lead which a fuel will reduce from the oxide; that is to say, the heating value is proportional to the amount of lead reduced or oxygen absorbed. One gram of the finely powdered dry coal is carefully weighed out on the horn pan scales and intimately mixed with 60 grams of common litharge (oxide of lead) and 10 grams of ground glass. This mixing can be done with a palette knife on a sheet of glazed paper. This mixture is transferred to a clay crucible of the size of Battersea C, covered with a layer of salt, the crucible covered and heated to redness in the hottest part of the boiler furnace for fifteen to twenty minutes. The crucible is cooled, then broken, the lead button carefully cleansed from the adhering slag and weighed.

"The number of grams of lead obtained, reduced to the basis of that obtained from 1 gram of coal, in case exactly 1 gram of coal was not used, multiplied by 483 gives the number of b.t.u. that will be yielded by 1 lb. of coal. An example will make this clear.

"Weight of coal taken, 1.04 grams.

"Weight of lead button, 31.84 grams.

"$31.84 \div 1.04 = 30.62 \times 483 = 14{,}750$ b.t.u.

"Two other experiments gave 14,500 b.t.u. and 14,550 b.t.u. The same coal gave in the Mahler-Norton bomb 14,200 b.t.u., or 2.3 per cent lower, which it will be observed is as close as almost any calorimeter gives."

GERMAN ACCIDENT STATISTICS

The German Street and Interurban Railway Association (Verein Deutscher Strassenbahn-und-Kleinbahn-Verwaltungen) has prepared an interesting summary of electric railway accidents in Germany during the years 1905 to 1909, inclusive, for exhibit at the International Exposition of Hygiene, which is being held in Dresden. The following is an abstract of the data presented, together with a selection of the most striking charts, the originals of which were prepared in color. The report states that the total route length of the street railways in Germany amounts to 4000 km (2480 miles), of which 3875 km (2403 miles) are electrically operated. The members of the association operate 3772 km (2339 miles). The accident statistics cover the operations of lines having a route length of 3658 km (2278 miles), equivalent to 95 per cent of all the electric street railway mileage in Germany.

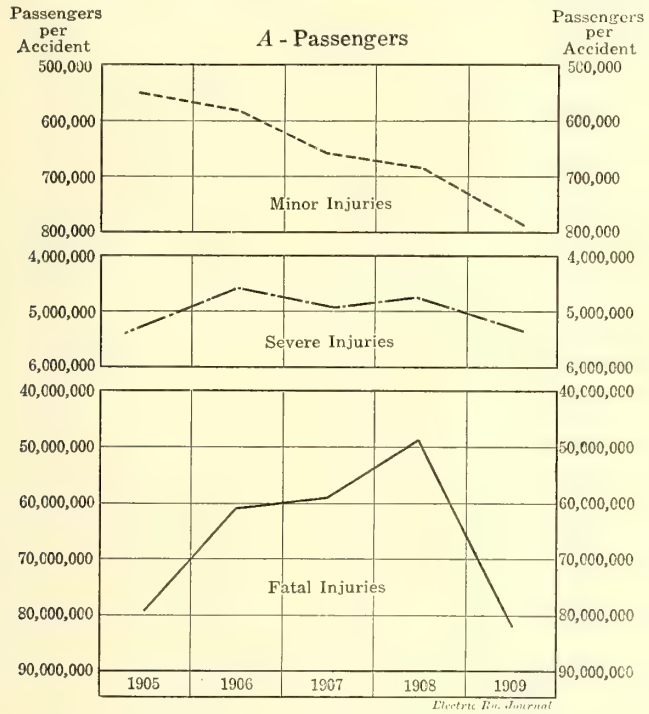


Fig. 1—Accidents per Passenger from 1905 to 1909

The statistics, as gathered by the association, show that injuries are more frequent to passengers than to pedestrians and other non-passengers, but that a greater proportion of the non-passenger accidents are fatal. Thus the percentage of slight injuries was practically equal for both classes, but 6 per cent of non-passengers' injuries resulted in death as compared with 1 per cent of passengers' injuries.

Fig. 1 shows the fluctuations and the number of passengers carried per accident during the five years from 1905 to 1909, inclusive. It will be noted that there has been a great reduction in the number of minor injuries. On the other hand, the severe accidents and fatalities have increased. A set of similar curves (not reproduced) shows that there have been no important changes in the number and classes of accidents to non-passengers on the basis of mileage operated.

Fig. 2 is a chart which shows by differently sectioned areas the division of responsibility for accidents, the proportion of each class of accident and the results to the person injured. In the case of passengers an overwhelming percentage of accidents was due to negligence in boarding and leaving the cars, although some were also caused by leaning beyond the clearance lines of the windows and platforms. Most of the accidents to non-passengers resulted from either negligence in crossing the track or from side-wipes on devil strips, etc. Of every 100 fatal accidents to passengers ninety-four were due to carelessness of the passenger, four to the railway and two to causes beyond the control of both parties. In the case of non-passengers the responsibility for fatal accidents averages as follows: Non-passengers, 94.8 per cent, railway, 4.5 per cent, and other parties, 0.7 per cent.

Fig. 3 is an analysis of accidents to children caused by trespassing on the tracks. This chart indicates that by far the greatest percentage of fatal accidents occurs to children of less than four years of age. In fact, the deaths in this classification of accidents exceed either the minor or severe injuries by 20 per cent or more. These tragic figures are cited to prove the need of giving children some safer playgrounds than the public highways. Similar curves (not reproduced) show that the greatest proportion of platform accidents to adults and of accidents to adult

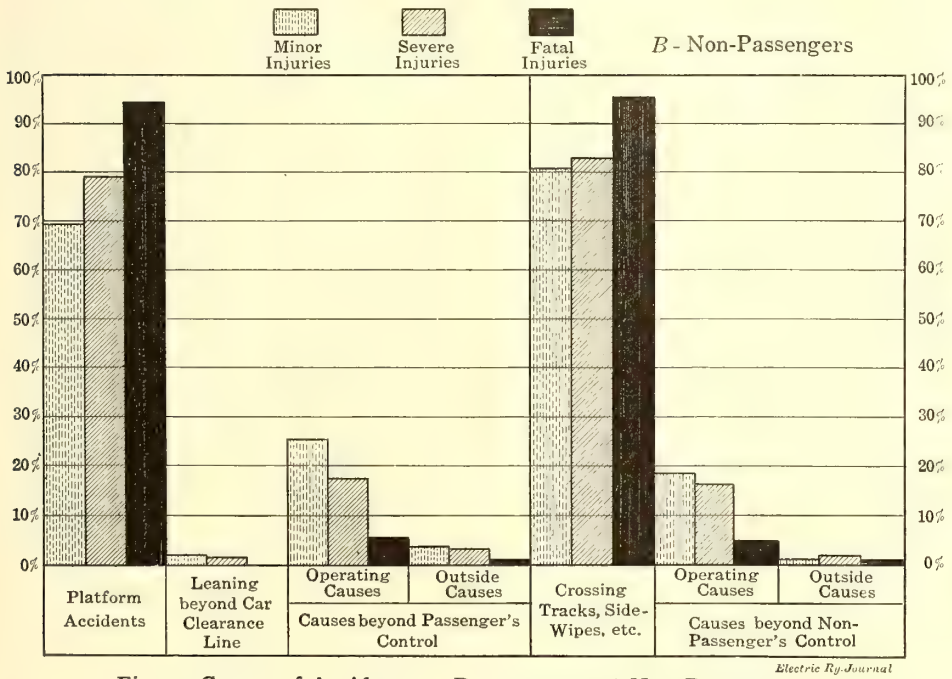


Fig. 2—Causes of Accidents to Passengers and Non-Passengers

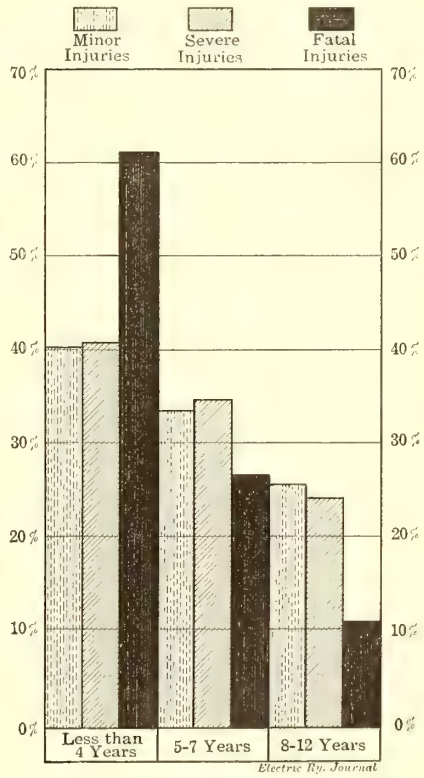


Fig. 3—Accidents to Children

non-passengers occur to people between the ages of twenty-six and forty.

Fig. 4 shows a division of accidents to adult passengers and adult non-passengers arranged according to sex. The comparatively large proportion of boarding and alighting accidents to women may be explained perhaps by the circumstances that in Germany a limited number of street

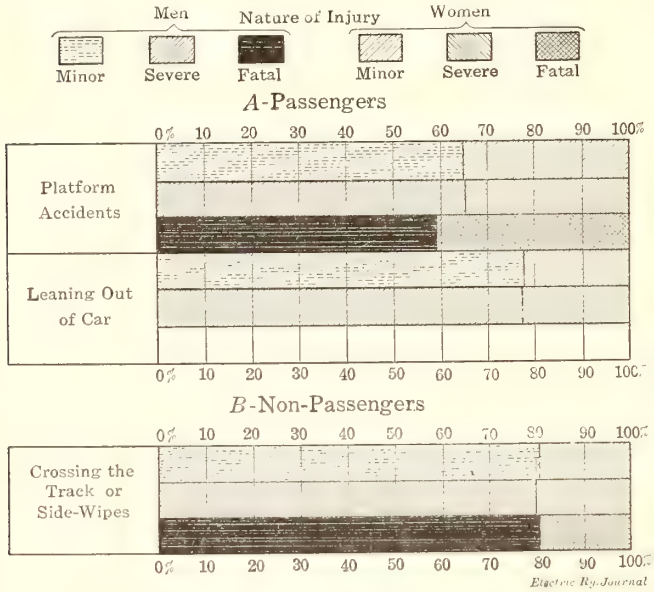


Fig. 4—Accidents to Adults

railway passengers may stand on the platforms, but no one is allowed to stand inside the car. Consequently there is a temptation for a platform passenger, who is standing near the step, to alight before the car stops, and in this women are well known to be less expert than men. In general, however, women are far more cautious than men in avoiding accidents, as is shown by the general comparisons in Fig. 4.

With respect to the distribution of accidents to passengers and non-passengers according to the time of the year, it is a remarkable fact that in both cases the smallest number of accidents occur during the dangerous winter months of December to February. This leads to the conclusion that the presence of ice and snow makes the necessity for caution so apparent to passengers that the number of accidents is actually less than in months with more favorable weather. So far as the non-passengers are concerned the reduction in accidents during the winter months can be ascribed largely to less travel on

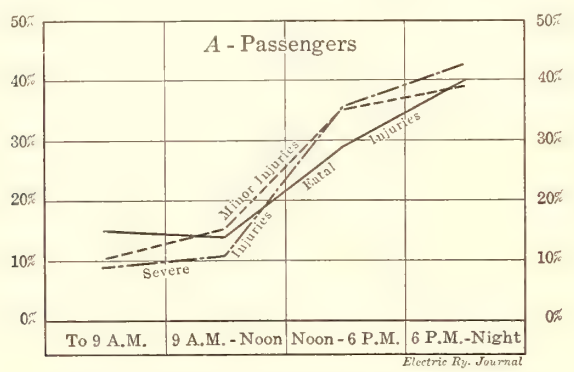


Fig. 5—Time of Accidents to Passengers

the streets. The heavy passenger death rate from September to November is accounted for by fog and rain which causes people to lose their footing in getting on or off the cars.

Figs. 5 and 6 show the proportions of accidents to passengers and non-passengers respectively for different hours of the day. In both classes most of the accidents occur in the afternoon and evening. It is not clear why this should be so in the case of passengers, but so far as non-passengers are concerned it may result from the greater crowding on the streets in the late hours of the day.

In addition to these accident charts others were presented detailing the nature and percentage of each kind

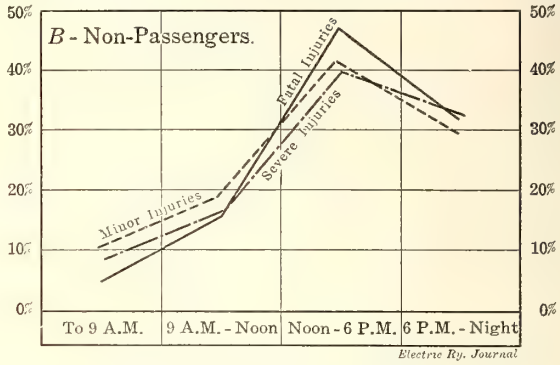


Fig. 6—Time of Accidents to Non-Passengers

of injuries. The charts were accompanied by a description of the efforts made by the street railways of Germany to equip their cars with safety apparatus and to train their employees in accident prevention. It was stated that on an average not more than one-fourth of the accidents to non-passengers could have been avoided or ameliorated by the use of fenders or wheelguards. The report concludes with an appeal to the public to co-operate in the reduction of accidents by the exercise of greater care in boarding and in leaving cars and also in crossing street railway tracks.

HUNGARIAN 1650-VOLT D. C. RAILWAY

On account of increased traffic the management of the Arad-Hegyalja Railway in southern Hungary has recently determined to replace its gasoline-electric cars by a 1650-volt d.c. overhead system. The total length of track operated is 58 kw (36 miles). The gage is 1 m (39.37 in.). During the hours of heaviest traffic motor-car trains will be operated on thirty minutes headway. The motor cars will be of the double-truck type and will carry four 50-hp motors each, connected two in series during running. A motor-generator set on each car will furnish low-tension current for the multiple-unit control, lighting and compressor. The 1650-volt overhead line will be of the catenary type and will be equipped with weights to secure automatic tension adjustment. The Ganz Company, of Budapest, expects to have the line ready for operation early in 1912.

The *Elektrotechnische Zeitschrift* began publishing in its issue for July 27 a tabulation by Franz Stein of all electrically operated lines in Europe exclusive of street railways. The table gives the name and location of the line, the date of opening, the gage, maximum grade, shortest radius of curvature, miles of single track, miles of double track, system of current collection, cross-section and voltage of trolley, motor equipment and trucks per car, average and maximum speeds, seating arrangements of cars, weight of mechanical and electrical equipment, weight per seat, method of motor drive, wheel base of trucks, distance between king bolts, length of cars over buffers. length of car body alone, electrical and mechanical details of car construction and equipment, motor capacities, draw-bar pull (of locomotives), names of manufacturers and references to articles describing the individual roads. It is announced that the complete table will be published in pamphlet form by Julius Springer, Berlin.

CO-OPERATIVE PLAN FOR PHILADELPHIA CARMEN

On Aug. 28 the Philadelphia Rapid Transit Company submitted to its motormen and conductors a proposed co-operative wage plan and arbitration scheme which it has prepared with a view of encouraging team work on the part of the men and avoiding future disputes with labor organizations. The details of the plan were printed in a booklet, a copy of which was given to each motorman and conductor in the employ of the company. No action has been taken on the part of the men as individuals or by either of the two organizations having members in the employ of the company. The text of the proposed plan follows:

"The Stotesbury management, as a result of its investigation of the labor conditions under which its motormen and conductors are now working, during which it received the complaints and suggestions of all men desiring to be heard, is convinced that in order to secure the desired co-operation it is essential that there be a greater degree of team work among the motormen and conductors themselves. This, it is believed, can only be secured by eliminating that constant cause of disagreement due to the fact that there are now two rival labor organizations.

"There should now be such a definite understanding between the men and the management as will insure a lasting peace and the general up-building of the property. The plan determined upon should be concurred in by so large a majority of the motormen and conductors as to thereafter establish that unity of action which is necessary to its greatest success.

"That degree of co-operation which finds its expression in an every-day earnest effort to render more efficient service will be most certainly assured when it has been made clear to the motormen and conductors that they are to receive a fair share of the increased earnings due to the added effort on their part.

"Co-operation being the means by which increased wages and comfort of the men as well as increased returns to the company can be most quickly secured, the measure of the fitness of an employee, or official, to continue in the company's employ must necessarily be largely determined by his willingness to co-operate with the management in its effort to improve the service.

"Discipline must be strictly enforced to insure proper service to the public and justice must be meted out without discrimination.

"The standard of the service must be raised, unnecessary requirements which interfere with the comfort of the men or with service to the public must be removed, and the management must use its best endeavors to increase the wages as rapidly as possible within the amount of 22 per cent of the gross passenger earnings, which is the limit of the company's ability to pay.

WAGES

"By virtue of its published promise of April, 1910, the company is obligated to pay the following wage (in cents per hour) to motormen and conductors in accordance with their period of service:

Effective July 1	1st year	2d year	3d year	4th year	5th year	6th year
1910	22	23	23	23	23	23
1911	22	23	23½	23½	23½	23½
1912	22	23	23½	24	24	24
1913	22	23	23½	24	24½	24½
1914	22	23	23½	24	24½	25

"A pension and death benefit plan is also in force by which the company pays to retiring motormen and conductors who are over sixty-five years of age, and who have been in the service twenty-five years or over, a pension of $20 per month during the remainder of their lives, and in case of the death of a motorman or conductor who has been over two years in the service $500 is paid to surviving relatives.

"The amount actually paid to the motormen and conductors for the year ended June 30, 1911, and the per cent of gross passenger earnings represented thereby, was as follows:

Timetable cost	$4,414,987.78	21.42%
Unearned wages at the rate of $2 per day paid to returning strikers under agreement of April 5, 1910	60,272.64	0.29%
Pensions and death benefits	20,830.00	0.10%
	$4,496,090.42	21.81%

"The wage scale was increased July 1, 1911, in accordance with the company's promise, so that the rate of wages now being paid is as follows:

First year men	22	cents per hour
Second year men	23	cents per hour
Third year men	23½	cents per hour

"Based upon the increase in gross passenger earnings for the month of July 1911, together with the increased efficiency of operation which it is expected will be secured by co-operation, this management will anticipate the increase in wages promised for July 1, 1912, and make the same effective as of Jan. 1, 1912, viz.:

First year men	22	cents per hour
Second year men	23	cents per hour
Third year men	23½	cents per hour
Fourth year men	24	cents per hour

"Similar advances will be made as rapidly as the use of the 22 per cent of the gross passenger earnings makes possible, but in no case later than the dates contained in the company's published promise of April, 1910.

"Co-operation on the part of motormen and conductors by taking a personal interest in raising blockades, maintaining schedules, careful collection and accounting of fares, avoidance of accidents and observance of the company's rules, together with the introduction of improved operating methods and of a large proportion of cars having almost double the seating capacity of those displaced, will, it is confidently expected, make possible such an increasing wage over that contained in the company's published promise as will result in a maximum wage of 28 cents per hour in the year beginning July 1, 1915.

"The graded scale of wages as set forth in the company's published promise of April, 1910, will be extended as soon as the maximum wage therein provided for has been accomplished.

"The old argument against the graded scale, by which it was contended that the company's interest was to dismiss the older and higher-priced men to make room for the lower-priced new employees, has not to be here considered, as the company cannot reduce its cost by any change in the scale of wages paid, it being distinctly obligated and having actually begun July 1, 1911, to set aside in a separate fund 22 per cent of its gross passenger earnings. All payments to motormen and conductors will be made from this fund, and the sum accumulated therein will be added to that increased wage which was promised in the company's published notice of April, 1910.

"This management is desirous of so improving the wage and working conditions as to promote a feeling of satisfaction in the work, which should not only prevent some of the most capable men being drawn to other lines of work, but it is hoped will serve to largely recruit the force from among the sons of its motormen and conductors.

"The increased wage due to co-operation and improved methods of operation, which so far as the motormen and conductors are concerned will be almost entirely brought about by those now in the service, should be paid to them rather than to the men hereafter employed, whose wages at the time of their entering the service are in any case largely governed by the law of supply and demand. The services of the older men should be given prior recognition for the further reason that they may be then able to set aside such a sum during the remaining years of their service, as will, when taken in connection with the pension and death benefit plan now in force, make possible a more

than ordinary provision in their interest and that of their families against old age and final dissolution.

ORGANIZED LABOR

"Two organizations, i. e., the Amalgamated Association of Street & Electric Railway Employees of America and the United Carmen's Association of America, are each represented by a certain membership among the motormen and conductors of this company. The members of each organization are antagonistic to such an extent as seriously to interfere with the operating efficiency of the company.

"This management has no certain knowledge as to the comparative membership of the motormen and conductors in the aforementioned organizations, nor of that number of the motormen and conductors who are not affiliated with either.

"The question as to whether this management will deal with its motormen and conductors as individuals or as an organized body must now be determined. If with its motormen and conductors as individuals the plan as herein outlined will be effective as soon as the fact has been determined. If with an organization, it can only be with such a one as is willing to enter into an agreement in conformity with the plan of procedure herein outlined, and thereafter in good faith co-operate with this management in its efforts to improve the service.

"This management does not take a position either for or against either of the organizations having membership among its motormen and conductors, but is desirous of securing a lasting peace and the earnest co-operation of its motormen and conductors, and that by the path of least resistance. If, therefore, a large majority of the motormen and conductors (say, two-thirds) desire that this management deal with its motormen and conductors as an organized body, no lasting peace or unity of effort can be expected until this demand has been properly met and fairly disposed of. This management cannot, upon the other hand, so interfere with the personal liberty of any man in its employ as to arbitrarily require him to become a member of a labor organization. It can, however, in all fairness pay from the sum representing 22 per cent of the gross passenger earnings that amount which represents the dues of all motormen and conductors in a labor organization if that be the expressed desire of the large majority.

"The desire of two-thirds of the motormen and conductors expressed by secret ballot, under conditions which insure a fair count, may in all justice be considered as binding the minority to bear their share of such a tax.

"This management has, therefore, decided that upon a proper application being made by either or both of these organizations, a vote will be taken under such regulations as well insure a fair election; this management undertaking, upon a confirmative vote of two-thirds of its motormen and conductors, to enter into an agreement with the organization receiving such vote, which agreement shall conform both in substance and detail with the plan herein outlined.

"In the event of an agreement being entered into with the men as an organization, there would be no necessity for the wearing of union badges nor for the disturbing influence of organizers or collectors of dues, for the reason that the amount representing the dues of every motorman and conductor would then be paid directly by the company to the organization.

"Under these circumstances the frequent contention that men were dismissed because of being affiliated with organized labor would be no longer tenable, as the company would under this arangement be paying the dues of the new men when hired as well as those now in the service.

COMMITTEE ON CO-OPERATION

"There will be no grievance committee, but in its stead a co-operating committee, which shall be composed of a representative motorman or conductor from each division, the superintendent of each division, together with the superintendent of transportation, or his representative, representing the management. The superintendent of transportation, or his representative, will act as chairman of this committee, and, in case of an agreement being entered into with either of the organizations aforementioned, a representative of such national or parent organization will also be a member of this committee and will be responsible to this management for the observance in good faith of the spirit and intent as well as the letter of the agreement.

"The meetings of this committee shall be at a stated hour on a stated day in each month for the discussion of ways and means to improve the character of service rendered to the public and the working conditions and wages of motormen and conductors.

"The order of business shall be as follows:

"1. Suggestion and discussion for the purpose of promoting increased efficiency in operation.

"2. Consideration and discussion to the end that proper discipline be administered.

"3. Suggestion and discussion looking to the comfort and increased wage of motormen and conductors.

"4. Miscellaneous business, included in which would be submittal of report, showing per cent of gross passenger earnings paid to motormen and conductors.

"The general complaint now prevailing upon the part of the representatives of the men to the effect that they are not informed as to the shortcomings of a motorman or conductor until after he has been discharged, whereas if they had known in advance they could very likely have by caution made such discharge unnecessary, is here met by such opportunity, and while it is fully intended that the superintendent of transportation, or his representative, will finally decide as to the retention or discharge of any man, the representatives of the men will under this plan be conversant with the facts leading to this conclusion.

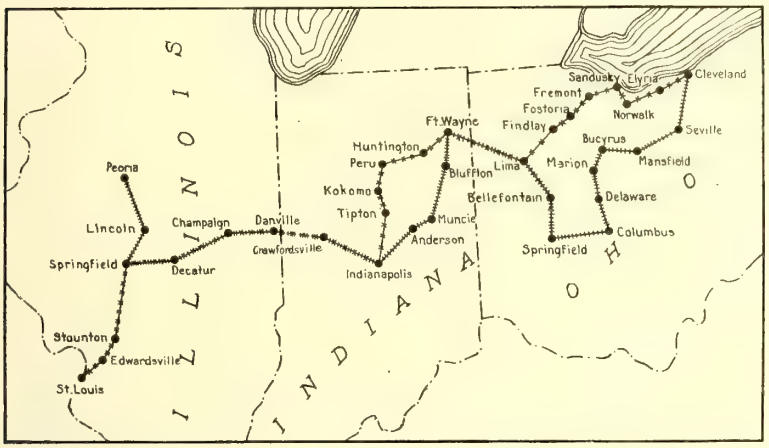
"The representatives of the men upon this committee may, should they question the justice of a decision of the chairman, appeal the matter for final decision to the highest operating official of the company, and in the event of an agreement with either organization, to the highest official of such organization, in which case the highest operating official of the company and the highest official of the organization will meet by appointment and endeavor to arrive at a fair adjustment of the matter. Failing to agree, they shall then select a third person mutually agreed upon whose decision shall be final and binding upon all parties.

"Disagreements over the decisions of the chairman should be most infrequent if, as is expected, both men and management are endeavoring to carry out their undertaking in good faith. This is particularly so because under the plan as herein outlined the interests of both lie in the same direction. As the motormen and conductors will now in any event receive 22 cents out of every dollar collected in payment of fares, it will be to their direct interest to discourage any failure upon the part of conductors to properly account for all fares collected. Dragging the street, running ahead of time or not making every effort to start the cars, in case of blockage of service, all have the effect of reducing the company's gross passenger earnings, and as 22 per cent of this loss now falls directly on the motormen and conductors, their interest is again brought into unity with that of the company."

The annual statistical report of the American Iron & Steel Association, which was issued on July 25, gives the total production of all kinds of rails in the United States during 1910 as 3,636,031 tons, an increase of 20.2 per cent over the quantity rolled in 1909. Of this total 1,884,442 tons were rolled from Bessemer steel ingots, 1,751,359 tons were rolled from open-hearth steel and 230 tons were rolled from iron. Almost 60 per cent of the open-hearth rails rolled weighed over 85 lb. per yard.

LONG JOURNEY OF ILLINOIS TRACTION OFFICE CAR

The office car of H. E. Chubbuck, vice-president executive of the Illinois Traction System, on Aug. 27 completed an interstate trip of 1624.3 miles and was the first electric car to be run from Missouri across Illinois, Indiana and Ohio to Cleveland. The car made the trip under its own power except for a run of about 50 miles between Danville, Ill., and New Ross, Ind. Between these points it was coupled to the rear of a regular passenger train of the Cleveland, Cincinnati, Chicago & St. Louis Railroad. This interesting trip was made by the Illinois Traction officials and their guests on the invitation of E. B. Peck, vice-president and comptroller Indianapolis Traction & Terminal Company and Terre Haute, Indianapolis & Eastern Traction Company. The party attended the Cedar Point meeting of the Central Electric Railway Association.



Illinois Traction Office Car—Map of Route Showing Lines Traversed Eastbound and Westbound

The route of the trip is shown by the accompanying map and table. On the eastbound trip the car was in charge of Mr. Chubbuck and C. F. Handshy, general superintendent Illinois Traction System. Returning it was in charge of George Quackenbush, traffic manager Illinois Traction System; E. B. Peck, president of the Central Electric Railway Association; Fred Buffe, publicity manager, and E. W. Fowler, chief clerk to vice-president Illinois Traction System. C. E. Morgan, general manager Indianapolis, Crawfordsville & Western Traction Company, the "Ben Hur Route," and L. E. Gould, Western editor ELECTRIC RAILWAY JOURNAL, made the entire journey over the Indiana and Ohio lines. Dr. H. M. Bascom, chief surgeon, and R. W. Morrison, superintendent of the Wichita (Kan.) Railway of the McKinley system, and J. A. Kucera, business manager ELECTRIC RAILWAY JOURNAL, made the eastbound trip. Messrs. Peck and Morgan planned the routing of the car.

Among the railway men who accompanied the Illinois Traction car on part of its journey were Charles L. Henry, Indianapolis & Cincinnati Traction Company; A. A. Anderson, Springfield (Ill.) Consolidated Railway; T. F. Grover, G. K. Jefferies, John H. Crall, Mr. Lloyd and M. M. Nash, Terre Haute, Indianapolis & Eastern Traction Company; Douglas Macauley, Montreal, Quebec; F. W. Coen and L. K. Burge, Lake Shore Electric Railway; E. F. Schneider, A. P. Lewis, J. A. Nester and H. Pomeroy, Cleveland, Southwestern & Columbus Railway; John Keyes, Detroit United Railway; R. M. Hemming and F. W. Jennings, Ohio & Southern Traction Company; George Whysall, Columbus, Marion & Bucyrus Railway; J. H. Lahrmer, Columbus, Delaware & Marion Railway; B. J. Jones, Gaylord Thompson, F. J. Moore, H. G. Gilpin and H. F. Dicke, Ohio Electric Railway; A. W. Greenland, Ft. Wayne & Northern Indiana Traction Company; W. H. Forse, F. D. Norveil and E. C. Carpenter, Indiana Union Traction Company.

Car No. 233 of the Illinois Traction System, which made the long trip, is especially well fitted for touring. This car was described in the ELECTRIC RAILWAY JOURNAL for Jan. 29, 1910, page 188. The extreme length of the car over buffer plates is 62 ft.; the width over the car sheathing is 8 ft. 10 in. The extreme width, however, over all projections, including grab handles and sign lamps, is 9 ft. 4 in. The height of the car from top of rail to underside of sill is 3 ft. 5 in. and the height from underside of sill top of roof is 9 ft. 4½ in. The height of the trolley stand over the top of roof is 11 in., making the height of car from top of rail over top of trolley stand 13 ft. 8½ in. The trolley hold-down hook is 15 in. above the top of car, so that height of car over trolley hook is 14 ft. ½ in. The height of the smokestacks from the top of car is 17½ in., making the extreme height of the car over all 14 ft. 3 in. The height from the top of rail to center of coupler is 34 in. The truck centers are 29 ft., and the wheelbase of the trucks is 6 ft. 5 in. The overhang on each end of the car from center of king pin to end of buffer face plate is 11 ft. 6 in. The trucks are arranged to swing in the clear without interference on a 33-ft. center radius curve. The car is equipped with four GE-205 interpole motors, rated at 100 hp each, with 600 volts at the motor terminals, and is geared to 60 m.p.h., based on the above rating. The weight of the car without load is 90,000 lb. The interior of car No. 233 is designed for use as a traveling office and is pro-

DATA ON INDIANA AND OHIO TRIP OF ILLINOIS TRACTION CAR NO. 233

Aug.	Trip	Road	Miles: Trip	Miles: From St. Louis	Time: Trip	Time: From St. Louis	M.p.h. for trip	Kw-hours: Trip	Kw-hours: Car-mile	Watt-hours ton-mile
19	St. Louis to Danville	Ill. Traction	230.0	230.0	8:00	8:00	27.75	554	2.41	51.9
21	Danville-New Ross	Big Four	52.1	282.1	2:09	10:09	24.23	Steam		
21	New Ross-Crawfordsville	Ben Hur	11.4	293.5	—:21	10:30	32.57	24	2.10	45.3
21	Crawfordsville-Indianapolis	Ben Hur	44.6	338.1	1:30	12:00	29.73	90	2.02	43.5
22	Indianapolis-Peru	Ind. Union Trac.	75.1	413.2	2:45	14:45	27.35	320	2.39	51.4
22	Peru-Ft. Wayne	Ft. W. & Nor. Ind.	58.5	471.7	2:15	17:00	26.00			
22	Ft. Wayne-Lima	Ohio Elec.	63.9	535.6	2:30	19:45	25.56	130	2.03	43.7
22	Lima-Findlay	Western Ohio	32.8	568.4	1:25	21:10	23.17	80	2.44	52.5
22	Findlay-Fostoria	Tol., Fost. & Find.	15.0	583.4	—:35	21:45	25.73	40	2.66	57.3
22	Fostoria-Fremont	Fost. & Fremont	21.2	604.6	—:46	22:31	27.68	50	2.36	50.7
22	Fremont-Sandusky	Lake Shore	23.0	627.6	—:46	23:17	30.03	60	2.61	56.2
24	Sandusky-Norwalk	Lake Shore	27.1	654.7	1:12	24:29	22.58	105	3.88	83.5
24	Norwalk-Rockport	Clvd. & So. West.	49.4	704.1	1:53	26:22	26.28	160	3.24	69.7
24	Rockport-Kamms	Clvd. & So. West.	1.8	705.9	—:06	26:30	18.00	8	4.44	95.6
25	Kamms-Bucyrus	Clvd. & So. West.	103.5	809.4	4:44	31:14	21.92	365	3.52	75.7
25	Bucyrus-Marion	Col., Mar. & Bucy.	19.5	828.9	—:34	31:48	34.45	50	2.56	55.1
25	Marion-Columbus	Col., Del. & Mar.	48.6	877.5	1:55	33:43	25.36	150	3.08	66.3
25	Columbus-Springfield	Ohio Elect.	45.7	923.2	1:50	35:33	24.96	150	3.28	70.5
25	Springfield-Lima	Ohio Elect.	65.6	988.8	2:36	38:09	25.23	180	2.74	58.9
26	Lima-Ft. Wayne	Ohio Elect.	63.6	1052.4	2:06	40:15	30.29	150	2.36	50.7
26	Ft. Wayne-Bluffton	Ft. W. & No. Ind.	25.1	1077.5	—:55	41:10	27.41	80	3.18	68.4
26	Bluffton-Ind. Limits	Ind. Union Trac.	94.4	1171.9	3:36	44:45	26.66	280	2.97	63.9
26	Ind. Limits-Ind. Terminal	Ind Trac. & Term.	3.1	1175.0	—:17	45:02	10.95	15	4.84	104.2
26	Ind. Term.-New Ross	Ben Hur	33.0	1208.0	1:10	46:12	28.30	70	2.12	45.7
26	New Ross-Danville	Big Four	53.0	1261.0	2:00	48:12	26.50	Steam		
27	Danville-Peoria	Ill. Traction	205.4	1466.4	7:15	55:27	28.33	475	2.33	50.2
	Totals		1466.4		55:27			3586		

vided with a forward observation room, a large dining room and office, kitchen and serving room, toilet saloon and a large rear observation platform. Berths of Pullman size are provided for six people. From fourteen to twenty people were served with meals on each day of the trip, the regular porter having one assistant on this trip.



Illinois Traction Office Car—Attached to Rear End of Steam Train

This car is equipped with a number of recording instruments as follows: Sangamo trip and recording wattmeter, Weston ammeter, Weston voltmeter, Warner speedometer, train line and reservoir air gages and a standard ship's chronometer.

The speedometer gives a continuous indication of the speed of the car and also shows trip and total mileages. This instrument was manufactured specially for car use and in appearance is similar to an automobile speedometer, except that it is larger. It is driven from the tread of one of the forward car wheels. A 5-in. steel wheel supported by a tension arm bolted to the upper truck frame is held against the wheel tread by a coil spring. This friction wheel drives a flexible shaft which extends up through the car floor to the speedometer, which is mounted with the other instruments on the mahogany panels forming the motorman's inclosure. The instrument records the speed and total distance moved in either direction which the car may be run.

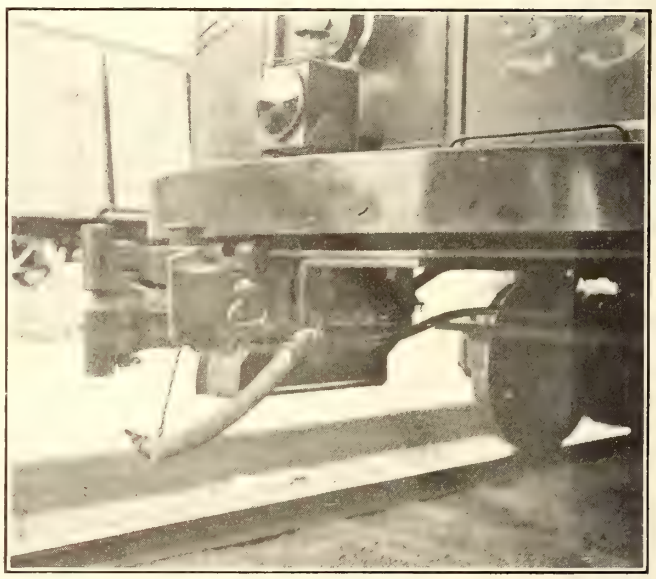
At each junction point on the journey a record was made of the miles run on the trip from the last junction point, the total elapsed time and kw-hours consumed. These data are given in the table on page 395. The energy consumed on each road was read to the nearest 10 kw-hours. The table shows the continuous route of the car from St. Louis, Mo., to Rockport, a suburb of Cleveland, and return via Columbus and Lima, and Indianapolis to Peoria, Ill. This round-trip mileage was 1466.4 miles, in addition to which side trips totaling 157.9 miles were made. The total journey thus was 1623.4 miles. Of this distance 105.1 miles were run on the steam road, making the total distance via electric railways 1519.2 miles. Deducting the side trips from this, there remains 1361.3 miles, the distance traveled on electric railways in making the round trip without side trips. The average speed for the continuous journey was 26.44 m.p.h. The energy consumption on the electric railway mileage was 2.634 kw-hours per car mile. Assuming the weight of the car with load as 93,000 lb., the watt-hours per ton-mile were 56.21.



Illinois Traction Office Car—On Siding at New Ross

In connection with the foregoing figures it should be remembered that the time shown for the various trips includes that consumed in waiting for exchange of pilots and obtaining orders at junction points. The maximum speed was reached on a side trip from Indianapolis to Crawfordsville and return over the "Ben Hur Route." On this trip a speed of 72 m.p.h. was reached and maintained for several minutes. The run between Indianapolis and Crawfordsville, 42 miles, was made in 47 minutes, including slowing down for one interlocking and flagging over a railroad crossing.

No difficulty was experienced in handling the car at any point on the route and it was not damaged in any way. Before being set on the steam road siding at Danville the car was subjected to M. C. B. inspection. Previously the coupler heads had been anchored in the central position by heavy yokes bolted to the radius bar. The couplers and platforms as well as steps and grab handles on all Illinois Traction cars are designed to pass M. C. B. inspection. The charge for handling the electric car on the steam train for the 50-mile run was $15 plus full fare for each passenger. The Illinois Traction System is an associate member of the American Railway Association. On the eastbound trip when the train which hauled the electric car from Danville reached New Ross the car was left on the station siding about 75 ft. from the track leading to the "Ben Hur Line." No trolley wire was available so the car was moved about 200 ft. by means of a jumper cable which was held on the trolley base and connected to the trolley feeder cable.



Illinois Traction Office Car—Coupler Blocked to Prevent Side Movement

The newly constructed division of the Mount Hood Railway & Power Company between Montaville and Bull Run, Ore., was transferred to the operating department on Aug. 3. The company has filed passenger and freight tariffs covering its entire operating lines with the Oregon Railroad Commission and the Interstate Commerce Commission.

THE EFFICIENCY OF SANDED TRACKS IN SIDINGS FOR CAR RETARDATION

In an article in two recent numbers of the *Deutsche Strassen-und-Kleinbahn-Zeitung*, Dr. Köpcke, Dresden, Germany, discusses the depth of sand required on rails to secure sufficient retardation to stop a car. He considers this plan advisable, with derailing switches, in restricted areas where steep sidings are not practicable.

He states that his earliest experiments showed that 5 cm (2 in.) to 8 cm (3.2 in.) of sand on the rail offered a resistance equivalent to one-twelfth to one-eighth of the wheel pressure or axle loading. To reduce the danger of the sand layer unseating the wheel tread and thus interfering with the guiding quality of the flanges, the derailing tracks of this character have been built with some retaining means for keeping the sand properly spread. On sand-covered straight track the guiding value of the flanges is not entirely lost because the sand is gradually compressed to a thickness of say 15 mm (6 in.). However, to insure permanent effective action, both on curved and tangent track, guard rails should be provided together with some other metal sections for preventing the displacement of the sand.

A cross-section through one-half of a sanded track at Dresden is shown. In this case the running rails had to serve also as retaining sections owing to the fact that this standard-gage track is installed between platforms only 3.1 m (10 ft. 2 in.) apart. This restriction limited the space between the running rail and the "sand" rail to 132 mm (5 in.). Clearance conditions also made it necessary to have the top of the running rail 43 mm (1.7 in.) higher than the "sand" rail.

The determination of a coefficient f for rolling friction in a given sanded track is based on observing the distance s which a car or axle traveling at a known velocity per second v runs before coming to rest. Let the mass of the body be represented by M and its weight (mass $\times$ gravity) by Mg. Its kinetic energy $\frac{Mv^2}{2}$ will be equivalent to the friction overcome in traveling the sanded distance s. Consequently $\frac{Mv^2}{2}$ equals $Mgfs$ or $s = \frac{v^2}{2gf}$, or $f = \frac{v^2}{2gs}$. The retardation per second G is expressed as $G = fg$. The conditions during the running time t on the sanded track are like those for a freely falling body, namely, $s = \frac{Gt}{2} = \frac{fgt}{2}$ and, since $v = fg$, $s = \frac{vt}{2}$ and $v = \frac{2s}{t}$.

The initial velocity, v, is therefore twice as great as the average velocity over the sanded track, so that by substituting this value $\frac{2s}{t}$ in the expression $f = \frac{v^2}{2gs}$, there is derived the coefficient of friction $f = \frac{2s}{gt^2}$. It will be seen from this that no special speed measurement is required, nothing more in fact than the running time on the sanded track and its length.

The energy of wheel rotation should be added to the energy of the forward movement of the total mass M. This can be done most conveniently by adding a percentage. The rotative energy of a pair of wheels is assumed to be equivalent to the addition of 400 kg to the weight of the car. The following percentage, therefore, would have to be added to the weight of a two-axle freight car weighing empty 5000 kg:

$$\frac{2 \times 400 \times 100}{5000} = 16 \text{ per cent.}$$

For a loaded car weighing 15,000 kg complete, the increment would be 5.33 per cent, so 1.053 $\times$ 15,000 kg would be the mass.

The percentage of grade is to be subtracted from or added to the value of f, according to whether the train is ascending or descending the sanded track.

FIRST PROBLEM

When a loaded four-wheel car came to rest at the bottom of a sanded track having a 1 per cent grade, it was noted that the distance traveled by both axles was 91 meters and the running time, 15 seconds. What was the value of f?

From the previous expression for f we have:

$$f = \frac{2 \times 91}{9.81 \times 15^2} \times 1.053 + 0.01 = 0.09683$$

The entering speed is

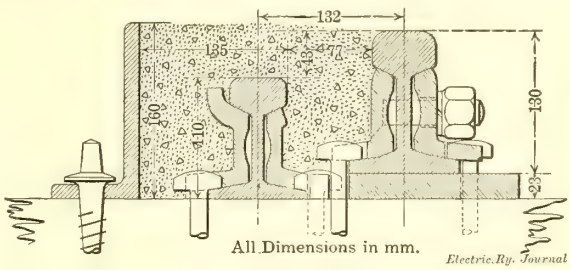
$$v = \frac{2 \times 91}{15} = 12.1 \text{ meter-seconds} = 43.6 \text{ km an hour.}$$

NOTE—9.81 is value of g in meters per second per second.

It is hardly necessary to add that in the case of trains it is necessary to consider the distances traveled by each pair of wheels. It is possible to insert the distance traveled by the center of gravity of the train when the train is uniformly loaded.

SECOND PROBLEM

For incoming trains from Gorlitz the Dresden terminal has a sanded stub terminal 64 meters long. Assuming the total length of a locomotive and tender to be 16 meters and their combined weight 75 tons, while the average weight



Half Cross-Section of Sanded Derailing Track at Dresden-Altstadt, Germany

distribution of a passenger train is 2.5 tons per meter, how great is the resistance of the sanded track when $f = 0.1$?

In the first place, the length of the train is 64 — 16 = 48 meters; its weight 48 $\times$ 2.5 = 120 tons; the distance covered by the center of gravity of the train $\frac{64 - 16}{2} = 24$ meters; the distance covered by the center of gravity of the locomotive and tender is $64 - \frac{16}{2} = 56$ meters. Therefore, the retarding effort is $A = 0.1$ (75 tons $\times$ 56 meters + 120 tons $\times$ 24 meters) = 708 ton-meters. The train mass velocity v to be thus destroyed (adding 6 per cent to the train mass for the energy of its rotating masses, or [120 tons + 75 tons] 1.06 = 206.7 tons) is

$$v = \sqrt{\frac{2 \times 9.81 \times 708}{206.7}}$$

$$= 8.195 \text{ meter-seconds} = 29.5 \text{ km an hour.}$$

The New Zealand government has made its first move toward exercising the unlimited powers of regulation of tramways that it recently obtained by the passing of an amending tramway act through Parliament. The new law makes it possible for the Minister of Public Works to impose all regulations affecting tramway operation. Very small scope is left to authorities in their future choice of plant equipment, almost every item being placed on the compulsory list. One regulation stipulates that the gap on car lightning arresters shall be 1/32 in., and minute directions for valves, details of sanding gear, etc., are laid down. The engineer of the Wellington tramways has advised his council that it will cost the system £75,000 to comply with the regulations.

PERFORMANCE OF ILLINOIS TRACTION AUTOMATIC BLOCK SIGNALS

The automatic block signal installation of the Illinois Traction System, as described in the Electric Railway Journal for June 24, 1911, page 1105, has been in operation since April 20 on the Peoria, Bloomington & Champaign division. The signals on the Springfield & Northeastern and the St. Louis, Springfield & Peoria divisions were put in operation late in June. During the month of July a total of ninety-six automatic block signals were in operation on the Illinois Traction System, and these signals operated 99.9813 per cent perfectly. Other data regarding the performance of the signals for June and July appear in the accompanying table. The totals include only the July results.

Referring to the thirty-nine signals on the Peoria, Bloomington & Champaign division, it is noted that on the average each signal moved 106.4 times per day in June and 90.8 times per day in July. This reduction in

Illinois Traction System Signal Department—Monthly Report.

	Month of June.	July, 1911.			Total for
Division.	P.B.&C.	P.B.&C.	S.&N.E.	St.L.S.&P.	July.
No. of signals	39	39	17	40	96
No. of movements	124,530	109,775	21,315	51,104	182,194
No. of failures	9	15	4	14	33
No. of trains stopped	19	26	12	6	44
Minutes delayed	37	54	30	22	106
Movements per failure	13,837	7,318	5,329	3,650	5,521
Movements per train stopped	6,554	4,222	1,776	8,517	4,141
Movements per min. delayed.	3,365	2,033	710	2,323	1,718
Per cent perfect	99.9927	99.89608	99.9812	99.9726	99.9813
Failures chargeable to:					
Signal department	1	2			2
Blown fuse	1		2		2
Defective apparatus	3	4	1	4	9
Track department		2			2
Power department	4	5	1	8	14
Overhead department		1			1
Operating department					
Broken wire					
Miscellaneous					
Creditable failures		1		2	3

Records for June report:
1—Signal department; loose wire.
3—Defective apparatus; relay contacts and lightning.
4—Power department; defective bonding.
Remarks for July report:
9—Defective apparatus; bad motors, relays, etc.
14—Power department; bonding, power being off.
2—Signal department; loose collar on signal, old bond wire not removed.
2—Track department; damaged insulated joint, shunted track while placing ties.
1—Overhead department; guy wire on 2300-volt line.
3—Creditable failures; reported down with train in block.
2—Blown fuses.

the number of signal movements of 15.6 less movements per day in July was due largely to a rearrangement of the train schedules. The Peoria, Bloomington & Peoria division of the Illinois Traction System extends from Peoria eastward through Mackinaw Junction to Bloomington. From Mackinaw Junction the Springfield & Northeastern division extends southward through Lincoln to Springfield, there connecting with the St. Louis, Springfield & Peoria division. The section of the Peoria, Bloomington & Champaign division between Mackinaw and Peoria is an especially busy piece of single track because it handles all the passenger and freight business operating on one line between Peoria, Bloomington and Decatur and on another line between Peoria, Springfield and St. Louis. The headway between trains on the line between Peoria and Mackinaw was so short in June that the signals slowed the handling of trains to a certain extent and thus the plan of operation was changed. Since the first of July all passenger trains which leave Peoria for Bloomington and Springfield at the same time now operate in multiple as far east as Mackinaw Junction, where they are divided to follow the separate roads to destination. This combination of cars into multiple-unit trains for operation over the most heavily traveled piece of single track has reduced the number of train movements and increased the speed of operation and track capacity. While the traffic handled in July was greater than that in June, the number of signal movements, as earlier stated, was approximately 15 per cent less.

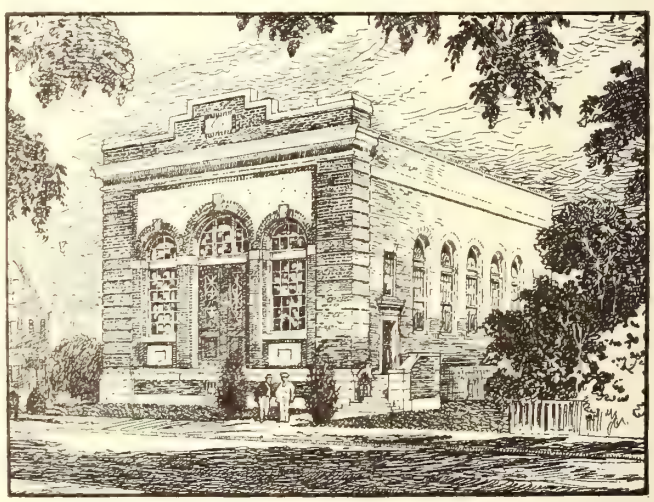
In July the signal department and the department of trolley and transmission lines were consolidated and placed under the charge of John Leisenring, signal engineer. Thus an economy in maintenance of signals is to be expected as compared with the maintenance of automatic signals on a steam road.

For a new installation on a cross-country interurban railroad the performance record is excellent. It will be noted that the power department was responsible for the largest number of signal failures. These are occasioned by the power being off the transmission line and by defective bonding. All such failures, of course, caused the signals to go to the "stop" position, and so provided maximum safety.

It is interesting also to note that when the signals were first installed they acted as most efficient rail-bond detectors, and whenever a bond became loose, thus opening the track circuit, the signals at both ends of the circuit automatically were set to "stop." Although the signal territory has recently been rebonded and the bonds carefully tested, the signal system, which requires a continuous return through each rail, often indicates open circuits at night, even though none was indicated in the daytime. Careful examination showed that the contraction of the rails due to the lower temperature at night caused some of the bonds to open the circuit.

TRANSFORMER SUBSTATION OF BOSTON ELEVATED RAILWAY

Six transformer substations are in process of construction for the Boston Elevated Railway Company. They are in the following suburban districts of the city: Cambridge, Brookline, Malden, Arlington, East Boston and Roslindale. All are of similar architectural style, being constructed of brick, stone and concrete. The dimensions of the several



Brookline Substation, Boston Elevated Railway, from Architect's Sketch

buildings are about 50 ft. in width by 80 ft. in length, with a height of 50 ft. to the top of the ornamental front. The face of the buildings will have an imposing and large doorway for use in taking large parts of machinery in and out. These doorways will be surmounted by latticed windows over which there will be a large arch. The cables will enter the building in all cases by underground conduits.

The accompanying sketch of the Webster Street station in Brookline is from the drawing of Peabody & Stearns, architects. The Stone & Webster Engineering Corporation is the constructing engineer for the building.

HEARING ON TRANSFERS IN NEW YORK

At the hearing in regard to the question of fares upon connecting or intersecting lines of street railway in New York before Commissioners McCarroll, Maltbie and Eustis, of the Public Service Commission, First District, on Aug. 18, 1911, Commissioner McCarroll said: "Having considered the letters that were laid before it, the commission feels that it is ready to announce that the rates arrived at would not be satisfactory to the commission. Of course, we assume that the action submitted to the commission was taken after consideration on the part of the companies. Not that I want to foreclose the situation; the commission will proceed to take the evidence that may be offered to show the ground upon which the rate proposed by the companies was arrived at."

William D. Guthrie, of counsel for the Third Avenue Railroad, asked an adjournment, as the accountants of that company were still at work upon data which the company desired to offer in evidence. He said that the accountants had reported that, while on the Third Avenue Railroad there was a decrease of 10,000,000 transfers the year following the abolition of the universal transfers, there was a large increase in revenue passengers, a large increase in the operating profit and a very large decrease in the operating cost. It involved a great deal of work to separate the totals of each company in order to show the result of the operation of free transfers between the cross-town lines and the long-haul lines.

Commissioner Eustis said that as the evidence of the witnesses of the commission stood the companies did not benefit in a monetary way by the abolition of the free transfers. Commissioner Maltbie thought that the companies must have ready a justification for the rates which they proposed and that an adjournment was unnecessary. In reply Mr. Guthrie said:

"The practical men report that the cost of rendering the service, as they figure it, is a certain figure, and that the present net revenue is a little more than 4 cents with the transfers that are now granted. From that they naturally figure that if a large number of transfers were added to those now granted the cost of rendering the service would be increased, the average return per passenger would be materially reduced, and if the return per passenger was materially reduced the operation would necessarily result in a loss to the company. We expect to demonstrate the result, but it requires an immense mass of proof."

At the hearing on Aug. 22 A. F. Weber, chief statistician of the commission, explained tables prepared by him which showed the results of operation of the street railways in Manhattan for the fiscal years 1907 to 1910, inclusive. In referring to the figures which he presented Mr. Weber said that the number of paid fares on the surface lines in 1910 was only about 2,000,000 more than in 1907. In the same four years the increase of passengers in the subway had been 110,000,000, while the increase on the elevated lines had been 20,000,000.

George W. Linch, receiver of the Second Avenue Railroad, described the routes operated by that company, mentioning the points where transfers are given. The average revenue per passenger on the company's Second Avenue line during the six months ended June 30, 1911, taking transfers into account, was 4.73 cents; on the First Avenue line, 4.84 cents; on the Eighty-sixth Street line, 4.66 cents; on all the lines, 4.74 cents. Excluding all taxes and all interest on capital employed in operation and all allowance for depreciation, but including rents of property employed in operation not owned by the Second Avenue Railroad, the cost per passenger during the six months ended June 30, 1911, on the Second Avenue main line was 3.72 cents; on the First Avenue line, 4.67 cents; on the Eighty-sixth Street line, 4.67 cents. The average on all lines was 4.11 cents. The total number of car miles operated by the company for the six months ended June 30, 1911, was 1,807,219, and the average revenue per car mile for the whole system, 23.95 cents. The period of six months ended June 30, 1911, showed the best results from the point of operating revenue of all half yearly periods since Mr. Linch had been receiver of the company.

Brainard Tolles, of counsel for the Second Avenue Railroad, explained that both the Metropolitan Street Railway and the Second Avenue Railroad had a franchise on Eighty-sixth Street and Avenue A, east of Second Avenue. Each was running on its own franchise and neither was using the line of the other. The physical ownership of the tracks did not carry with it any obligation to exchange transfers so long as each ran on its own franchise.

At the hearing on Aug. 23 F. T. Wood, assistant to the general manager for the receivers of the Metropolitan Street Railway, explained a comparison of operating statistics of the Metropolitan Street Railway, from July 1, 1910, to Dec. 31, 1910, with the period from July 1, 1907, to Dec. 31, 1907, which had been offered in evidence by Joseph P. Cotton, of counsel for the receivers of the company. The figures for 1907 were not for all the lines, but only for that portion of the system which corresponded to the present system. Mr. Wood took the six months ended Dec. 31, 1907, because that was the last semi-fiscal year period before the unlimited free transfer system was curtailed, and took the last six months of the calendar year 1910 because that was the last corresponding period after the transfer privilege had been curtailed.

On a basis of daily comparison of passengers carried during the two periods, the figures indicated that during the period when the transfer privilege was curtailed the lines involved carried 42,913 more revenue passengers each day and 60,026 fewer transfer passengers than they did each day during the six months ended Dec. 31, 1907. This gain in revenue passengers was also accompanied by a reduction in car mileage operated of 3323 miles a day on the average in the last six months of 1910 as compared with the last six months of 1907. In other words, the loss of transfer passengers was made up by a corresponding gain of revenue passengers. The curtailment of the transfer privilege also lessened the number of transfer abuses.

A table was introduced by Mr. Wood as evidence comparing the revenue passengers and transfer passengers of each of the operating systems in the borough of Manhattan for the six months from July to December, 1907, and the corresponding period of 1910, the purpose being to bring before the commission the question of how far the discontinuance of transfers had affected the lines of the Metropolitan Street Railway and how far it had affected other lines. This table showed revenue passengers, transfer passengers, percentage of increase and decrease, miles operated, percentage of increase and decrease and the average fares per passenger. The tabulation showed that the transfer privilege of the Second Avenue, Central Park, North & East River Railroad and the Twenty-eighth & Twenty-ninth Streets Crosstown Railroad was cut down 90 per cent, the Third Avenue Railroad 47 per cent and the Metropolitan Street Railway about 16 per cent. The average fare per passenger for the period in 1907 was 3.203 cents, while in 1910 it was 3.461 cents. Mr. Wood said that as soon as the privilege of transferring was extended there was a tendency to take advantage of the retransfer feature. Consequently, many people who formerly were free passengers two or three times now took a direct route to their destination instead of going via crosstown lines two or three times, thus tending to turn travel along the most direct route.

The hearing has been adjourned until Sept. 13.

The municipality of Tokio, Japan, has purchased the local tramway system from the Tokio Railway Company. The price paid was $32,082,000 in gold.

CENSUS DATA ON CROSS TIES PURCHASED

A preliminary statement showing the number of cross ties purchased by steam and electric railroads during the years 1910, 1909, 1908 and 1907 was issued on Aug. 24 by Census Director E. Dana Durand. The report was prepared under the direction of William M. Steuart, chief statistician for manufactures, by J. E. Whelchel, expert special agent. The data have been compiled in co-operation with the Forest Service of the Department of Agriculture, and form one of the series of annual reports containing statistics in regard to the lumber and timber industries.

The steam and electric railroads of the United States purchased 148,231,000 cross ties during the calendar year 1910, paying therefor, at point of purchase, $75,889,000, as compared with 123,751,000 in 1909, 112,467,000 in 1908 and 153,703,000 in 1907, costing $60,321,000, $56,282,000 and $78,959,000 respectively. The number purchased in 1910 was an increase of 20 per cent over 1909 and 32 per cent over 1908. These percentages indicate that the year 1910 was one of greater activity in railroad projection and construction than any other year since 1907. Of the total purchases of cross ties during 1910 electric railways purchased 8,635,000, or 5.8 per cent. The steady increase in the number of cross ties reported as purchased for new track is noteworthy. The total for this purpose in 1910 was 22,255,000, as against 16,437,000 in 1909, 7,431,000 in 1908 and 23,557,000 in 1907; the total for 1910 exceeding that for 1909 by 35.4 per cent, for 1908 by 199.5 per cent and nearly equaling that for 1907, the largest ever recorded. Largely as a logical result of the greater demand for cross ties during 1910 the average cost per tie at point of purchase advanced to 51 cents, the same figure reached in 1907, as compared with 49 cents in 1909 and 50 cents in 1908.

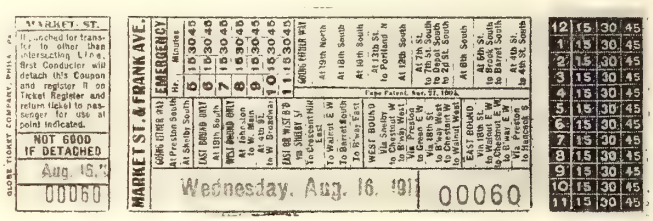
In 1910, as in preceding years, oak was the principal kind of wood used for cross ties. The number of oak cross ties formed 46.1 per cent of the total for 1910, as compared with 46.2 per cent in 1909, 42.8 per cent in 1908 and 40.2 per cent in 1907.

A substantial increase in 1910 over 1909 is shown in the number of Southern pine cross ties reported; the increase in the cut from this species over 1909 being 22.8 per cent, as against an increase of 20 per cent in the total number of cross ties reported from all woods. Douglas fir also showed for 1910 over the preceding year a larger increase, namely, 28.2 per cent, than the increase in the total purchase from all woods. On the other hand, chestnut, cedar and cypress, with increases over 1909 of 17.1 per cent, 7.8 per cent and 17.6 per cent, respectively, were bought in relatively smaller quantities. While the bulk of the cross ties were cut from the six woods mentioned during each of the four years and while combined they contributed 85.5 per cent of the total in 1910, 85.3 per cent in 1909, 86.5 per cent in 1908 and 87.2 per cent in 1907, a remarkable and significant showing in connection with the figures for 1910 is noted with reference to certain woods which hitherto have been utilized as cross-tie material to only a very limited extent. The increase in the number of cross ties over 1909 reported as cut from elm was 451.7 per cent; gum, 328.8 per cent; birch, 323.3 per cent; spruce, 121.5 per cent, and mesquite, 114.9 per cent. A very large percentage of the cross ties cut from these woods was given some preservative treatment, thus increasing their life to or beyond that of untreated cross ties made from the more commonly used or standard cross-tie woods. The growing scarcity of these last-mentioned woods, however, tends to increase their cost and accounts largely for the introduction of substitutes cut from cheaper species. The drift in this direction is clearly brought out by a comparison of the figures relating to treated cross ties during the past four years. In 1907 the number of cross ties reported as having been given some preservative treatment was 19,856,000; in 1908, 23,776,000; in 1909, 22,033,000, and in 1910, 30,544,000, the number for 1910 showing an increase over that for the preceding year of 8,511,000, or nearly 39 per cent.

THREE-COUPON TRANSFER IN LOUISVILLE

The Louisville Railway Company has recently put in operation a new system of transfers which was devised at the time the number of transfer points was increased. The company now gives transfers at practically every intersection of its lines, the only exceptions being at points where it is possible for passengers to "loop."

The new transfer used has some novel features and is illustrated herewith. It has two coupons. One is the

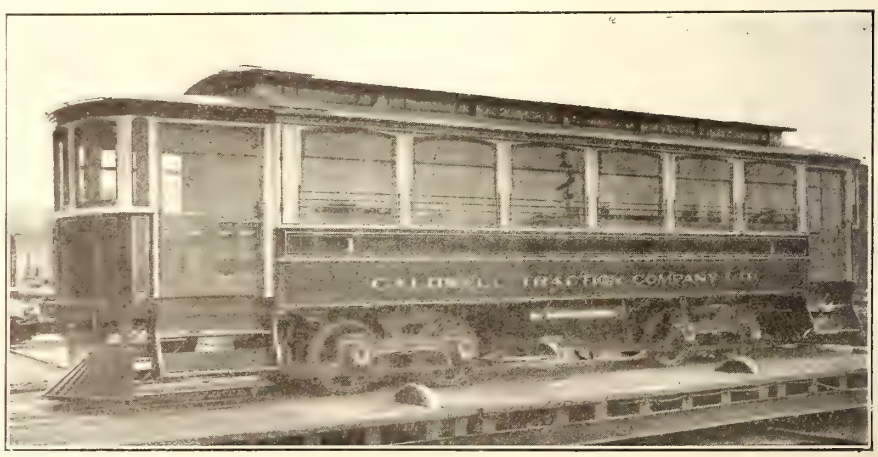


New Transfer at Louisville

usual p. m. coupon. The other is a special coupon designed to prevent the necessity of the issue of a transfer on a transfer. When a passenger has to use two connecting lines the conductor on the car on which he pays his fare issues the transfer illustrated and punches the final destination. The conductor on the second car collects the left-hand coupon and the conductor on the third car collects the transfer. The ticket also has an emergency space.

NEW CARS FOR ELECTRIFIED GASOLINE LINE

The Caldwell Traction Company, Ltd., of Caldwell, Idaho, has been operating a 7-mile line with a gasoline car and recently purchased from the St. Louis Car Company



Car for Caldwell Traction Company

two cars of the type illustrated, which have replaced the gasoline car service. The Caldwell Traction Company enjoys the distinction of being an electric railway which, although small, has no interest-bearing indebtedness. W. R. Sebree is president and owner of the new road.

The new cars are designed for double-end service and

have reversible cross seats. The bodies have six extra large windows on each side, are provided with 6-ft. vestibules having folding doors at the steps and are mounted on St. Louis Car Company's No. 47 improved trucks. M. C. B. type radial couplers and locomotive type pilots are installed. The bottom framing consists of 4-in. x 7¾-in. yellow pine sills connected by cross sills of oak. Between the side sills and the subsills are ⅜-in. x 11-in. steel plates extending the full length of the body, which is 28 ft. long. The length of the car over all is 41 ft. Westinghouse air brakes, Consolidated electric heaters and four Westinghouse 101 B-2 motors are installed. The inside finish of the cars, including molding, sash and doors, is mahogany in its natural color. The car builder supplied its standard type of window guards, vertical wheel brakes, summer platform gates, sand boxes, seats and trimmings.

750,000-VOLT TESTING TRANSFORMERS.

The increasing demand for high-voltage power transmission apparatus has made it necessary to produce potentials much in excess of the highest rated transmission voltages, both for the purpose of insulation testing and the investigation of high-voltage phenomena. Two 500-kva, 750,000-volt testing transformers have recently been built at the Pittsfield works of the General Electric Company. One of these transformers is for permanent use at the Pittsfield factory, where it will aid particularly in the research and investigation of corona and other phenomena in connection with transformers, oil circuit-breakers, insulators, etc. The full ratings are as follows:

K 60-500-1100/2200-750,000.

K 60-500-500/1000/2000-750,000 (for Pittsfield).

They are oil-insulated and follow an adaptation of the vertical-core type used generally on high-voltage transformers. The low-tension winding consists of long cylindrical coils placed next to the core on each leg. The high-tension winding consists of a number of double-section circular disk coils with conductor wound one turn per layer. The terminal coils, which are at the top of each stack, have smaller outside diameters than the coils lower down so that greater distance is provided between these coils and other parts.

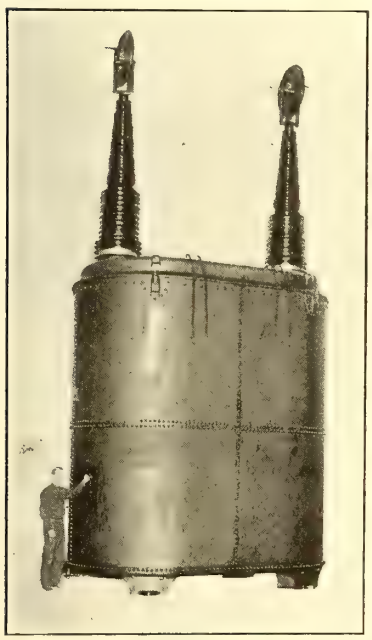
The insulation between high-tension and low-tension windings consists of a number of pressboard cylinders which divide the space into a number of generous oil ducts, greatly assisting in the circulation of oil and increasing the dielectric strength. The insulation between the two stacks of high-tension coils consists of a number of flat pressboard barriers with oil ducts between. The insulation material used is especially treated to give high insulation resistance and low specific capacity.

The supports for the high-tension coils are unique in that they consist of metal upon which the winding directly rests and to which they are electrically connected. These metal supports act as shields to the terminal coils, protecting them from any discharge which may be induced to ground. While there is a metal shield at both the top and bottom of each stack, the windings are supported only at the bottom, where the metal shield rests upon heavy porcelain insulators attached to the iron framework of the transformer.

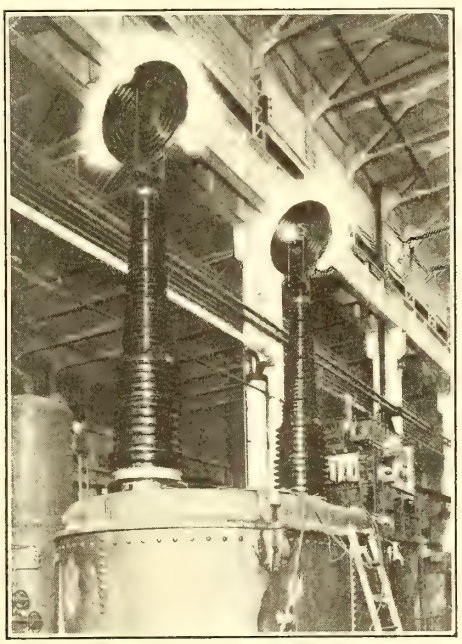
The tanks are constructed of heavy wrought iron with riveted seams and are provided with substantial cast-iron feet. The cover is of cast iron.

Both high-tension and low-tension leads are brought out through the transformer cover. The low-tension leads follow the usual construction of flexible leads passing through porcelain bushings. The high-tension leads are of the sectional filled type which consist of rings of insulating material filled with a semi-viscous compound. To obtain sufficient creeping surface on the outside of the leads collars are assembled between the annular sections.

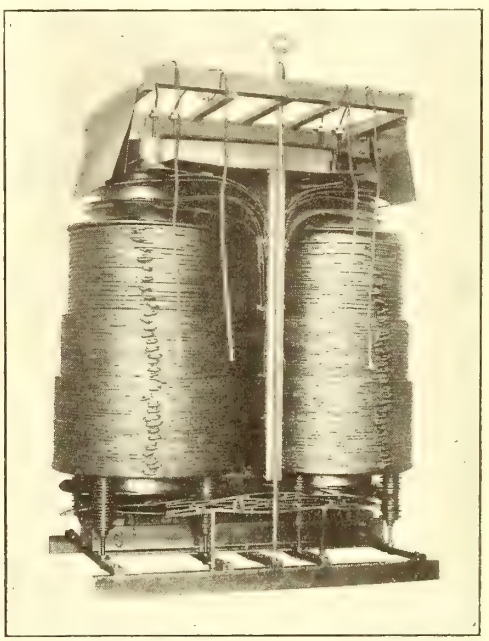
Tests for corona have been taken at night with the transformer operated at normal voltage by ratio, both high-tension terminals free. While the protective reactances on the top of the high-tension leads showed considerable corona, very little was noted elsewhere on the transformer or leads. One of the accompanying views shows the corona developed during a test of the transformer at 600,000 volts.



Exterior View of Testing Transformer



600,000-Volt Corona Test of Transformer



Core, Coils and Frame of Testing Transformer

The approximate weights and dimensions are as follows:

Dimensions: Floor space, 8 ft. x 13 ft.; height to top of cover, 15½ ft.; total height including protective reactances and spark-gap, 28 ft.

Approximate weights: Weight of core, 13,150 lb.; weight of copper, 1100 lb.; weight of tank and cover, 14,000 lb.; total weight, less oil, 28,250 lb.; weight of oil, 7000 gal., 50,400 lb.

ELECTRIC RAILWAY LEGAL DECISIONS

LIABILITY FOR NEGLIGENCE

Illinois.—Setting Down Passenger.

After a car has stopped at a street crossing, a passenger desiring to leave it may assume it will not start till he has had reasonable time to leave it in safety. (Moore v. Aurora, E. & C. R. Co., 92 N. E. Rep., 573.)

Indiana.—Duty to Alighting Passengers.

Where a street car conductor signaled the car to stop and it had slowed in response to the signal as if to stop at a regular stopping place, it was the duty of the conductor to see that before he started the car forward none of the passengers was in a position of peril caused by the conditions thus brought about. Since in such case a passenger may assume that the car will remain standing long enough to enable all that desire to alight to do so safely, the stopping of the car a reasonable time is not sufficient. (Louisville & Southern Indiana Traction Co. v. Korbe, 90 N. E. Rep., 483.)

Indiana.—Frightening Horses on Highway—Liability.

Where a person is in imminent peril, one who having knowledge of his condition acts so as to increase it is negligent; and hence where a railroad's servant in charge of an electric car, having seen that a horse on an abutting highway was frightened by it and was liable to do damage, failed to stop his car, although able to do so safely, and increased the horse's fright, thereby causing an accident, the company is liable for his negligence. (Effinger v. Ft. Wayne & W. V. Traction Co., 93 N. E. Rep., 855.)

Kentucky.—Horses on Highway.

Where the servants of a street railway company in charge of a car see that its approach frightens a horse on the street they must use ordinary care not to increase its fright, and if they have reason to believe that the approach of the car frightened the horse it is negligence to move it nearer. (Owensboro City R. Co. v. Wall, 133 S. W. Rep., 1145.)

Kentucky.—Master and Servant in Repair Shop.

A car repairer who, after placing a car over a pit to repair it, was called away by the master and on his return fell into the pit, from which, without his knowledge, the car had been removed through the negligence of the master, did not assume the risk of the resulting injury. (Lexington Ry. Co. v. Cropper, 133 S. W. Rep., 968.)

Massachusetts.—Injuries to Person Crossing Track—Failure to Look and Listen.

Though there is no absolute rule of law requiring a traveler to look and listen before crossing an electric street railroad track, the circumstances might be such that a failure to look and listen properly will show negligence. (Ferguson v. Old Colony St. Ry. Co., 90 N. E. Rep., 535.)

Michigan.—Persons on Interurban Track—Duty of Motorman.

It is not gross negligence for a motorman of an electric car running on its own right-of-way in the country not to stop his car when he sees a person, who sees him, on the track 400 ft. or 500 ft. away, where by taking a single step that person would be out of danger, and he has the right to assume that that person will step out of the way of danger before the car reaches him. (Levy v. Houghton County St. Ry. Co., 129 N. W. Rep., 683.)

Missouri.—Care Required of Motorman.

An instruction in an action against a street car company for killing a boy on the track, that it was the motorman's duty "to stop said car within the shortest time and space possible with the means at his command upon the first appearance of danger to" decedent, was not erroneous as requiring the exercise of the highest degree of care while the law only required the exercise of ordinary care. (Kaiser et ux. v. United Rys. Co. of St. Louis, 135 S. W. Rep., 90.)

Missouri.—Injuries to Children—Care Required—Damages.

Where a motorman of a street car sees a child leaving an alley and starting across the street, it is the motorman's duty to slacken speed and get the car under control, with the brakes ready for instantaneous use, so that, if the child without exercising the care of a grown person attempts to cross the track, the motorman will be in a condition at least to lessen greatly the chances of collision.

In an action for death of plaintiff's eight-year-old son, who was killed by defendant's street car, a verdict allowing plaintiffs $4,000 was not excessive under Rev. St. 1899, Sec. 2864, as amended by Laws 1905, p. 135 (Ann. St. 1906, p. 1637), providing that in such an action defendant shall forfeit as a penalty not less than $2,000 nor more than $10,000, in the discretion of the jury. (Childress et ux. v. Southwest Missouri R. Co., 126 S. W. Rep., 169-70.)

Missouri.—Negligent Operation—Humanitarian Doctrine.

Under the humanitarian rule the negligence of a party run down by a street car cannot prevent his recovery if the exercise of ordinary care by those in charge of the car causing the injury could have avoided the injury. (Parrish v. Metropolitan St. Ry. Co., 126 S. W. Rep., 767.)

New Hampshire.—Offer to Pay Claim in Damage Suit.

In an action against a street railway company for injuries from a collision, evidence of defendant's voluntary offer to pay plaintiff's claim in full was competent as an admission of liability. (Altman v. Boston & N. St. Ry. Co., 78 Atl. Rep., 616.)

New Jersey.—Street Railroads—Duty of Persons Using.

A person using the public highway must be observant of the presence of cars or vehicles which have the right to use the same street, and, while a pedestrian or driver of a vehicle has a right to pass over or drive over the track of a trolley road, he must exercise care to see that it is safe for him to do so. (Pfrom v. Public Service Corporation of New Jersey (two cases), 76 Atl. Rep., 1083.)

New York.—Collision—Negligence—Presumption.

Where a street car motorman dashed into a wagon on the track from the rear, in the face of a lighted lantern hanging from the rear axle, and the motorman gave no explanation of his conduct in exculpation, it would be presumed that he saw the lantern and ran into the wagon regardless thereof. (Swift & Co. v. New York & Q. C. Ry. Co., 120 N. Y. Sup., 203.)

New York.—Limitation of Actions—Injury from Negligence—Complaint.

The complaint against a street surface railroad for personal injury from a hole in the part of a street which, by Railroad Law (Consol. Laws, Chapter 49, Section 178), it is required to keep in a good and safe condition, alleging the injury was due to defendant "suffering" said hole to be and remain, states a cause of action for negligence within the three-year limitation prescribed by Code Civ. Proc., Section 383, though, if the railroad created the hole, it would be liable for the injury as the creator of a nuisance and the six-year limitation of Section 382 would apply. (Hayes v. Brooklyn Heights R. Co., 93 N. E. Rep., 469.)

New York.—Injuries Due to Wrong Signal Given by Non-employee.

Where a passenger was injured owing to the starting of the street car while she was alighting, the carrier was liable, though the signal to start was given by a passenger; the same passenger having previously given starting signals, which was known to the conductor, who at the time of the accident was paying no attention to the passenger but was engaged in counting transfers. (Blair v. Brooklyn, Q. C. & S. R. Co., 126 N. Y. S., 466.)

New York.—Care Required at Street Intersection.

As the ordinary right-of-way of a street surface railroad does not exist at intersecting streets, its right and those of vehicles on the intersecting street being equal, a motorman of a street car must exercise reasonable care to have it under control as it approaches the crossing. (Huther v. Nassau Electric R. Co., 126 N. Y. S., 1105.)

Pennsylvania.—Injury to Passenger from Passing Wagon.

Where an injury to a passenger on a street car is caused by a collision between the side of the car while on its own track and a wagon, not under the control of the street railway company, no presumption of negligence arises in favor of the passenger against the street car company. (Blew et ux. v. Philadelphia Rapid Transit Co., 76 Atlantic Rep., 17.)

Pennsylvania.—Injury to Servant—Proximate Cause.

Where a motorman is injured by a horse running into the front of a street car and crashing through the glass, the company is not liable because of a defective air brake, where the evidence fails to show any connection between the working of the brake and the accident. (Layton v. Union Traction Co., 76 Atlantic Rep., 18.)

Washington.—Snow on Street Car Steps.

That snow and ice had accumulated on the steps of a street car by being brought in on the feet of passengers between the time a passenger boarded it and slipped in getting off is not evidence of negligence. (Caywood v. Seattle Electric Co., 110 Pac. Rep., 420.)

Washington.—Right to Assume That Automobile Will Leave Track.

A motorman may assume that an approaching automobile will be turned off the track until the danger of a collision is imminent. (Pantages v. Seattle Electric Co., 104 Pac. Rep.. 629.)

Washington.—Defect in Street—Violation of Franchise Ordinance—Liability for Injuries—Damages.

An ordinance granting to a street railway company a franchise to operate a street railroad may require it to maintain and keep in repair the portion of the street occupied by its tracks and it is liable for injuries to a traveler through its failure to comply with such requirement.

Where a man of sixty-four, in good health, earning with his team $4 per day, sustained a compound, comminuted fracture of the left ankle and the lower part of the right leg, the bones being crushed into fragments, protruding through the flesh, it appeared that the process of healing was not complete at the trial six months after the injury, that the injury was permanent, and that he would be able only to get around by the use of a stiff shoe, with the aid of a crutch, and that he was confined to his bed about three months, a verdict for $5,500 was not excessive.—(Kincaid v. Walla Walla Valley Traction Co., 106 Pac. Rep., 918-9.)

CHARTERS, ORDINANCES, FRANCHISES

Delaware.—Paving Streets—Liability.

The charter of a street railroad company (12 Del. Laws, C. 406, Sec. 7) provides that the company shall keep the pavement in good repair within the rails and for 3 ft. on each side thereof. Under a subsequent agreement the street railway company agreed to pave a certain street for 2 ft. on each side of its tracks, and between 1893 and 1895 the city paved the street and was paid by the street railroad company the cost of paving for 2 ft. on each side of its track. In 1904 the city brought suit for the amount due for paving the other 1 ft. on each side of the track. Held, that the action was on an implied assumpsit arising out of defendant's alleged breach of duty imposed by statute, was not on the statute and was governed by limitations in Rev. Code 1852, amended in 1893, p. 888, C. 123, Sec. 6, providing that no action of assumpsit and no action on the case shall be brought after three years from the accruing of the cause of such action. (Mayor, etc., of City of Wilmington v. Wilmington City Ry. Co., 76 Atlan. Rep., 965).

Indiana.—Maintenance of Fences on Right-of-Way.

In proceedings to condemn land for an electric railway right-of-way, the court instructed that the statute provides that when private ways are maintained over the right-of-way of the plaintiff the owner shall, if said right-of-way is fenced, erect and maintain substantial gates in the line of such fence or fences and keep the same securely fastened and closed when not in use by himself or employees, and that in assessing damages the jury might take into consideration these obligations upon the part of the landowner, but such obligations as an element of damages must be confined to the costs and vigilance required "to maintain" the same. Held, that the instruction was not objectionable because there was no direct evidence as to what it would be worth or how much vigilance would be required to keep the gates closed, as evidence upon such incidental matters as the costs and vigilance necessary to keep the gates closed would not have been proper, and the instruction did not direct the jury that they might consider such items in estimating damages, but they were told merely to take into consideration in determining damages the costs and vigilance required to maintain the same, and the instruction is not objectionable as introducing uncertain and speculative items into the consideration of the jury. (Indianapolis & C. Traction Co. v. Wiles et al., 91 N. E. Rep., 729.)

Missouri.—Interference with Access to Private Property.

Right of an owner of property abutting on a public highway to have free access to his property over the adjacent highway is as sacred as his right to the property itself, and the use of the highway is a property right of which he cannot be deprived by a railroad company without just compensation, and, though the county court authorizes it to build its tracks across the highway, yet, if in constructing its roadbed thereon in front of his property by making the roadbed and grade of its track above the level or grade of the highway it impairs the usefulness of his property by interfering with access thereto, the company is responsible to him for the loss to the extent of its diminished value. (Robinson v. Springfield Southwestern Ry. Co., 126 S. W. Rep., 994.)

Missouri.—Street Railroads—Regulations—Charter Provisions—Rights of Property Owners.

A street railway company whose franchise requires efficient service can be compelled to render such service by the city if it fails to do so.

A provision of the charter of a street railway company prohibiting the operation and construction of a line on a certain street without the consent of abutting property owners does not give such owners rights greater than those of the general public, or authorize them to interfere with the reasonable maintenance and operation of the line other than as members of the general public.

An ordinance containing an agreement between the city and a street railway company which reserved to the city the right to regulate the re-routing of all car lines was not contrary to public policy, nor unlawful.

If the re-routing of a street car line by a city so as to require a change of cars where none was formerly required will not prevent efficient service on the line and subserves the interest of the general public, property owners abutting thereon cannot enjoin the re-routing because of any depreciation in the value of their property caused thereby. (Heidegger et al. v. Metropolitan St. Ry. Co. et al., 126 S. W. Rep., 990.)

New York.—Interference with Trolley Wires in Streets—Removal of Buildings.

Where plaintiff, a street railway company holding a franchise for the maintenance of its trolley system along the streets of a city, had in its employ competent electrical linemen and inspectors able to raise or lower its wires along the street, so as to permit the removal of a building along the street, and defendant, desiring to move the building, offered to reimburse plaintiff for all the expense incidental to the moving of the wires and for all damages caused thereby, plaintiff was not entitled to restrain such interference with its wires on the theory that the removal would cause irreparable damage for which it had no adequate remedy. (Western New York & P. Traction Co. v. Stillman, 124 N. Y. S., 246.)

New York.—Consent of Property Owners—Nature.

The consent of owners of property bounding a street to the construction of a street railway therein, executed in the usual form, is not a mere license to be revoked at will, nor is it revoked by a transfer of the property, and it is sufficient to defeat an equitable action to restrain the maintenance of the railroad by a grantee of the consenting owner, where the road was in operation at the time of his acquisition of title, though the consent had not been recorded. (Carswell v. Hudson Valley Ry. Co., 125 N. Y. S., 25.)

New York.—Construction of Additional Track by Elevated Road.

An elevated road entered upon a street in the city of New York under a franchise giving it the right to build a structure in front of plaintiff's premises sufficient to carry three tracks and thereafter built the structure and laid two tracks thereon. Held, that its subsequent installation of a third track and the increasing size and frequency of its trains did not constitute an additional burden beyond the rights acquired by the user. (Gerken et al. v. Interborough Rapid Transit Co. et al., 125 N. Y. S., 32.)

LONDON LETTER

(From Our Regular Correspondent)

On Aug. 12, 1911, part of the employees of the Corporation Tramways of Glasgow, Scotland, went on strike to enforce their demands for shorter hours and an extended holiday—a working week of fifty-one hours and seven days' holiday with pay. The conditions under which the men worked were a fifty-four hour week with five days' holiday each year, while the wages of qualified conductors were 33s. per week and of motormen 33s. with a bonus of 1s. per week for freedom from accident. The corporation offered to consider the demand six months hence, but a ballot of the men was taken, with the result that 1667 voted to strike immediately and only 171 for delay. The tramway department had available the 700 men who were not on strike, together with some 200 inspectors, timekeepers and men in other grades who had qualified in past times as motormen and conductors. As the city resumed business the number of cars available proved wholly inadequate, and great inconvenience was caused to all classes. Meanwhile additional men were being secured to take the place of the strikers, but the fresh arrivals aroused renewed outbreaks of disorder. A deputation of the strikers endeavored to prevail upon the tramway employees at the power station to join them, but the electricians refused to go out. On Aug. 14 the tramways committee decided to leave the dispute to be dealt with by the general manager. On the same day the men met and passed a resolution in favor of arbitration by the Board of Trade. Contemporaneously the strike weakened, and men continually dribbled back for reinstatement. This was done as far as seemed reasonable, but in many cases new men had been taken on to fill the vacancies. By Aug. 15 the strike had collapsed and the men had returned to work, with the exception of those whose places had been filled.

It has been announced that the date upon which the Wirral Railway must, at the latest, under the act of Parliament, begin the construction of the new terminus at Seacombe occurs about twelve months hence. Upon the notification comes a repetition of the report as to the complete electrification of the company's system, together, of course, with new rolling stock and improved stations. It is estimated that when the plan is put into effect it will be possible to travel between New Brighton and Liverpool in less than twenty minutes.

One of the most important proposals before the London County Council is the consideration of a bill providing, among other things, for a tramway from Farringdon Road, E. C., near the Metropolitan Railway Station, down Farringdon Street to near the Memorial Hall. If this is carried out electric tramway cars will run from all parts of North London to within a few yards of Ludgate Circus. Another projected line is intended to connect Hampstead and Islington, and a third to extend the tramways from Norton Folgate, E., to Liverpool Street station. The council has before it tenders for laying tramways over the bridge now being built over the Metropolitan Railway at King's Cross to connect Pentonville Hill, N., with Gray's Inn Road, W. C.

The long-promised scheme of capital reorganization of the British Electric Traction Company has now been issued. The total amount of capital is unchanged, but the existing preference and ordinary shares are to be exchanged in certain proportions for new first preference, second preference, preferred ordinary and deferred ordinary shares on a par basis. There has thus been no attempt to write off the admitted large depreciation of assets, the contention of the directors being that this depreciation is mainly due to insufficiency of profits and would disappear if earnings were better.

The report of the Dublin United Tramways, Ltd., for the six months ended June 30, 1911, states that the amount available for division is £51,159, out of which it is recommended that dividends be paid for the half year at the rate of 5 per cent per annum, less income tax, on both the preference and ordinary shares; that a sum of £4,000 be set aside toward the renewal of cars and £2,000 toward accident insurance reserve, leaving £9,564 to be carried forward.

By the completion of the new electric tramway from Bacup to Shawforth, built by the Bacup Corporation at a cost of £24,000, a through service between Rochdale and Bacup is possible, running past the famous Healey Dell and affording the final link in a continuous 100-mile radius connecting by electric car Stockport, Manchester, Oldham, Rochdale, Rossendale, Accrington, Blackburn, Darwen, Bolton, Bury, etc. The section between Bacup and Shawforth will be leased by Bacup to Rochdale Corporation for fifty years and then it will be handed over to Bacup.

The Town Council of Edinburgh has appointed a deputation to inspect the trackless trolley system at Leeds..

The Board of Trade inspection of the new extension of the Lenarkshire tramways from Motherwell to New Stevenston recently took place, and the new route has been opened to the public. The new extension is by way of Carfin Road and Jerviston Road to New Stevenston, and the work included the erection of a new bridge over the River Calder at Motherwell, at a cost of £7,000, one-half of which was paid by the Motherwell Town Council.

The report of the Central London Railway shows that the capital expenditure during the half year has been £51,463, of which £38,864 was on the Liverpool Street extension, £7,348 expenses of the issue of preference stock, and £2,617 cost of the high-level subway with the City & South London Railway at Bank Station. The receipts show a decrease of £8,230 and the expenses a decrease of £3,420, making a net decrease on the half year of £4,810. Important changes in the staff entailed compensation to officers who have been retired, and this item figures in the account for £3,316. The decrease of 658,909 in the number of passengers carried is attributed to the large increase in motor-omnibus competition and to the weather. The construction of the Liverpool Street extension is progressing rapidly, and arrangemens have been made with the contractors whereby the work will be expedited six months.

Some details of the proposed conversion of the East London Railway to electric traction have been made public. At the half-yearly meeting Lord Claude Hamilton stated that the estimated expenditure was £65,000, and it was hoped that the Great Eastern Railway would incorporate clauses in one of its own bills authorizing the raising of this sum of money. The extra working expenses are put at £3,000 per annum, which the lessee companies are willing to bear. With regard to the interest upon the £65,000, which at 4 per cent amounts to £2,600 per annum, the East London Company will pay this after it has received the minimum rent of £30,000 per annum, and also the extra sum to which it is entitled when the gross receipts exceed £53,000 per annum. The District Railway will supply the current from Lot's Road, and the Metropolitan Company will supply the rolling stock.

The Brighton, Hove and District Railless Traction bill, which has passed the House of Lords, has now also been passed by a House of Commons committee. The bill proposes to empower the Brighton & Hove United Omnibus Company to work its cars between Kemp Town and Rottingdean by the trackless trolley system. J. B. Hamilton, manager of the Leeds Tramways, said the route was well adapted for trackless traction.

The Leicester Tramways Committee announced an extension of the transfer-ticket system, to go into effect on Aug. 28. There will be "inner" and "outer" transfer routes, and all the transfer tickets will be of the 1d. denomination, and issued only at request. On the outer route the general effect will be to enable passengers to travel from one terminus to another, via the nearest junction, or to the end of an overlapping stage on the circuit route, and the "inner" transfer will give transit between the three principal railway stations.

The House of Lords Select Committee, presided over by Lord Newton, has rejected the Greater London Railway bill. The bill originally proposed the construction of a railway from Feltham to Tilbury, running in a semicircle around the northern outskirts of London. Evidence on the proposal was heard for eighteen days by a committee of the House of Commons, which allowed the bill to proceed, after curtailing the length of the line, cutting off the portion from Feltham to Northolt, at the western end, and the portion between Ilford and Tilbury, on the eastern end.

A. C. S.

News of Electric Railways

Opinion on Initiative and Referendum Laws in Columbus

City Solicitor Weinland, of Columbus, Ohio, to whom the Crosser municipal initiative and referendum law was submitted for an opinion in regard to its emergency provisions, holds that even appropriations for salaries of city officials and employees may be subject to delay of sixty days in order to allow the people time to vote upon them in case 15 per cent of the qualified electors sign a petition to that effect. The Crosser law provides for the initiative in regard to grants to public-service corporations, and also in regard to general ordinances. In case 30 per cent of the qualified voters petition the City Council to pass a certain ordinance and favorable action is not taken upon the ordinance without amendment within sixty days, it may then be placed before the people for a vote at the next general election. If a majority of the votes cast upon the question is in the affirmative the proposal becomes a law. Only 15 per cent of the qualified voters are necessary to petition for a referendum vote upon any franchise measure passed by a city council, and one section prohibits the Council from rushing a measure relating to franchises through on a three-fourths vote as an emergency. Such a vote would constitute an emergency in the case of other questions as the law is construed by some, although City Solicitor Weinland does not agree with this construction. His opinion follows:

"This act not only provides for initiative and referendum on all ordinances relating to the grant of franchises and rights to the streets, but in very plain language requires every ordinance and act of the Council in the exercise of the powers granted it by the Legislature to remain inoperative for a period of sixty days, during which time a referendum may be demanded by the petition of 15 per cent of the electors of the city.

"The last section of the act in question pretends to give the Council some little power to put a measure in force immediately, if it finds and declares the same to be an emergency, but even this emergency provision is a farce, since the Council is prohibited from passing as an emergency measure any ordinance involving the expenditure of money.

"Accordingly I regret to be compelled to advise you that action upon all ordinances of Council passed since June 14, 1911, will have to be suspended for a period of sixty days from the date of passage."

Traffic Changes to Be Effected by Cambridge Subway

By the opening to traffic, late this year, of the Cambridge subway and the extension of the elevated structure from the North Station, Boston & Maine Railroad, in Boston, to Lechmere Square, Cambridge, the University City will be brought within the radius of rapid transit development in Boston and its suburbs. Hitherto the surface car lines connecting Cambridge with Boston have been the only street car means of travel. They are confined to three lines—one line from Bowdoin Square, Boston, through Cambridge Street, a congested, narrow street, and across West Boston bridge. A second line is operated from Park Street subway station via Boylston Street, Harvard Bridge and Massachusetts Avenue; this line is by no means a direct one; in fact, it describes three sides of a rectangle. The third route is by way of Lowell Street to East Cambridge and is made slow of operation on account of its passing through a part of the Boston & Maine freight yards, where traffic is constantly subject to delays.

The subway will bring Harvard Square, Cambridge, within eight minutes of Park Street. The subway is rapidly nearing completion. It represents a cost of $8,000,000. Between Harvard Square and Park Street there are but two stations, in Central and Kendall Squares. This line will carry trains with an equipment similar to that now in use in the Elevated Railway's Washington Street tunnel and on the elevated structures.

The elevated structure will benefit East Cambridge primarily, and from its terminus in Lechmere Square the surface cars which it is designed to carry will radiate in several directions, embracing Cambridge and Somerville. This elevated line will form a continuation of the present Tremont Street subway. The line will be carried across the Charles River on a new concrete bridge which is being built above the dam that impounds the river in the Charles River basin.

Bids for Borings Along Proposed Rapid Transit Lines in New York

The Public Service Commission began advertising on Aug. 29, 1911, for bids to make borings along the lines of proposed rapid-transit railroads, the bids to be received at the office of the commission until noon on Sept. 12, 1911. Borings are required in advance of the making of plans for new subways and river tunnels. The borings now called for are to be made at the following points:

In Manhattan—Under Seventh Avenue from Fourteenth Street to Fifty-ninth Street; in Fifty-ninth Street from Seventh Avenue to Second Avenue; in Sixtieth Street from Fifth Avenue to Second Avenue; in Broadway from Fourteenth Street to Forty-second Street.

In Brooklyn—In East Ninety-eighth Street and Livonia Avenue; in Nostrand Avenue; in Stuyvesant Avenue and Utica Avenue.

In Manhattan and Brooklyn—Under-river crossings, from Old Slip, Manhattan, under the East River, to Pineapple Street, Brooklyn; from Whitehall Street, Manhattan, under the East River, to Montague Street, Brooklyn; from the Battery, Manhattan, under the East River, to Atlantic Avenue, Brooklyn.

The Public Service Commission of the First District of New York has made public a report on the progress of work on the Fourth Avenue subway in Brooklyn. By this report it appears that 1,400,000 cu. yd., or 80 per cent of the entire excavation, has been done. Taking the work as a whole, approximately five-eighths of the contract value has been performed to date. There are six contracts, the price of which aggregates $15,886,381.20.

The Question of Franchise Expirations in Toledo

The streets in Toledo, Ohio, on which the city claims that the franchises of the Toledo Railways & Light Company have expired follow: Adams Street, from Michigan to Ashland; Ashland Avenue, from Ashland to Collingwood; Broadway, from Morris to Colburn; Cherry Street, from Summit to Superior; Cherry Street, from Erie to Bancroft; Collingwood Avenue, from Ashland to Central; Collingwood Avenue, from Detroit to Cherry; Detroit Avenue, from the western city limits to Cherry Street; Detroit Avenue, from Monroe to Delaware; Dorr Street, from Washington to the city line; Delaware Avenue, from Collingwood to Detroit; Eleventh Street, from Monroe to Washington; East Broadway, from Starr to Earl; Lagrange, from the western city line to Bancroft; Monroe Street, from Ontario to Auburn; Maumee Avenue, from North Railroad Avenue to Broadway; Main Street, East Toledo, from Front to Starr; St. Clair Street, from Cherry to Orange; St. Clair Street, from Knapp to Maumee; Summit Street, from Cherry to Elm.

Almost every line in the city is affected at some point by these expirations, and the portions in question constitute the property upon which the city demands a rental of $250 a day from Nov. 10, 1910, when, it is claimed, the franchises expired. The franchises in the business district will not expire for from one to two years.

The ordinance which provides for the rental mentioned went into effect on Aug. 25, 1911, and City Solicitor Schreiber declared that if within twenty-four hours the company did not pay the $70,000 in rentals which have accumulated since the expiration of the franchise he would ask the court to enjoin the company from operating its cars over the portions of the lines named. A copy of the ordinance was left at the company's office on Aug. 15, 1911, ten days before it went into effect. Albion E. Lang, president of the company, returned to the city from Vermont on Aug. 24. He

stated that he had not had time to study the rental proposition or prepare a reply to it, nor had he had an opportunity to digest the 3-cent-fare ordinance proposed in place of the rental.

At a hearing on the 3-cent-fare ordinance on the evening of Aug. 23 Rathbun Fuller, attorney for the company, addressed the committee of the Council of the Whole. He stated that it would be impossible for him to express himself on the ordinance before giving it careful study. Mr. Fuller said that he believed it useless to endeavor to adjust matters with a short-term franchise. The difficulty with such an arrangement was that the company would have trouble in financing improvements. He suggested that time be given the company and members of the Council to study the ordinance, and it was decided to print and distribute the ordinance in anticipation of another hearing. One of the clauses in the ordinance provides for the complete control of operation, schedules and routes.

Suit was filed by the city on Aug. 28, 1911, to oust the Toledo Railways & Light Company from sections of eighteen streets where franchises are claimed to have expired and over which cars are being operated. A permanent injunction is sought by the city.

Illinois Utility Committee in Massachusetts.—The delegation of Illinois legislators appointed to investigate methods of public-service regulation in various States and to report to the Illinois Legislature of 1913, with recommendations for changes in existing methods in Illinois, consulted with the members of the Massachusetts Railroad Commission and the Massachusetts Gas & Electric Light Commission in Boston on Aug. 24, 1911.

No Third Receiver at Kansas City.—In accordance with a resolution of the City Council of Kansas City, Mo., John G. Park, counsel of that city, visited Judge Hook, of the United States Circuit Court at Kansas City, at Plum Lake, Wis., to ascertain whether the judge would entertain the request of the Council that a third receiver be appointed for the Metropolitan Street Railway. On his return Mr. Park said: "Judge Hook very earnestly informed me that he could not consider such a thing. He said it would reflect upon the present receivers, in whom he has confidence."

Arbitration Agreement Adopted in Des Moines.—The proposed new agreement between the Des Moines (Ia.) City Railway and its employees, to which reference was made in the Electric Railway Journal of Aug. 19, 1911, page 320, was adopted after modification in some of its provisions by agreement on Aug. 23, 1911, between the officers of the company and the representatives of the men. A grievance committee of the men is to pass on all suspensions before the cases of employees are taken up with the management. The new agreement becomes effective on Oct. 11, 1911.

August Outing of New England Street Railway Club.—Plans were made to hold the August outing of the New England Street Railway Club at New Bedford, Mass., on Thursday, Aug. 31, rain or shine. It was proposed to go from the South Station, Boston, to New Bedford by special train. After inspecting the property of the Union Street Railway at New Bedford it was proposed to travel by special cars to Ft. Phoenix, Fairhaven, where a clambake was to be served and a baseball game played between the railway and supply men. Returning to New Bedford those in attendance at the outing were to go by steamer across Buzzard's Bay, the return to Boston to be made by special train from New Bedford at 6:10 p. m.

Public Service Commission Favored for Washington.—It is asserted that at a poll taken in the special session of Congress just ended a majority in both the Senate and the House favored a public service commission to supervise all public utility corporations in the District of Columbia. The bill creating the public service commission will be prepared by the District committee of the House, of which Representative Ben Johnson, of Kentucky, is chairman. It recently became known that the District committee of the House decided before the special session adjourned to make a special order of the public service commission matter and not wait for the report on District affairs which will be rendered under the Oldfield resolution. The committee hopes to report to Congress about Jan. 1, 1912, and submit at the same time the draft of a public service commission measure.

Consideration of Detroit Municipal Ownership Measure Postponed.—On account of the absence of Alderman Glinman his measure for municipal ownership was not taken up by the committee on charter and city legislation of the City Council of Detroit, Mich., during the week ended Aug. 26, 1911. It seems likely that further consideration of the measure will be postponed until additional information is obtained about the revival of the plan of M. D. Folling to acquire control of the majority of the stock of the Detroit United Railway and have it taken over by the city under the proposed charter amendment. Mr. Folling stated that he was working to secure options on the stock. The par value of the outstanding stock is $12,500,000 and the price is between 70 and 73. Mr. Folling evaded a discussion of plans for the construction of new north and south lines under municipal ownership.

The Question of Fare on Interurban Cars in Cleveland.—Street Railway Commissioner Dahl, of Cleveland, Ohio, has prepared an ordinance to be introduced in the City Council of Cleveland which will declare all interurban cars to be express cars. The Tayler grant provides that a fare of 5 cents may be charged on express cars within the city limits, and the Dahl ordinance, if passed, will make it impossible to compel the interurban companies to operate their cars at a lower fare. It will also forestall a suit that was started recently to compel them to accept 3 cents, the present rate of fare of the local company. A reduction of the city fare on the interurban cars would result in a loss to the Cleveland Railway Company, which receives a certain proportion of this income for the use of its tracks and power. Mr. Dahl feels that nothing should be done to interfere with this income and that those who use the interurban cars in the city instead of the cars of the Cleveland Railway should be willing to pay the higher fare.

Conference of Governors.—The annual conference of governors will be held in the New Monmouth Hotel, Spring Lake, N. J., beginning Sept. 12, 1911. Special sessions will be held to consider the subjects of employers' liability and workingmen's compensation and the State control of public utilities. It is expected that Sept. 13 will be given up to a discussion of the subject "Employers' Liability and Workingmen's Compensation," with Governors Charles S. Deneen, of Illinois, and Eugene N. Foss, of Massachusetts, making the opening addresses. "The Right of the States to Fix Intrastate Traffic Rates" will be considered in papers by Governors Herbert S. Hadley, of Missouri, and Chester H. Aldrich, of Nebraska. "State Control of Public Utilities" will be the subject on Sept. 15, the principal papers being by Governors Francis C. McGovern, of Wisconsin, and Beryl F. Carroll, of Iowa. The acceptances received indicate that there will be thirty-seven governors in attendance, or four more than there were in attendance at the original conference in Washington called by Mr. Roosevelt.

Evening Technical Courses of Polytechnic Institute, Brooklyn.—The College of Engineering of the Polytechnic Institute, Brooklyn, N. Y., has issued a pamphlet describing the evening technical courses for the term 1911-1912. Courses are offered in chemistry, civil engineering, electrical engineering and physics, mechanical engineering and mathematics. The work offered in electrical engineering and physics includes a series of lectures upon electric railway engineering and high-tension transmission practice by Dr. C. P. Steinmetz, to be given on Nov. 9, Nov. 23, Dec. 7, Dec. 21, Jan. 11, Jan. 25, Feb. 8 and Feb. 29. The subjects of the lectures follow: "The General Traction Problem; Urban, Suburban, Rapid Transit, Trunk Line, Freight and Elevator Service," "Time Speed Curves and Train Efficiency," "Motor Characteristics and Motor Efficiency," "Gear Ratio and Total Efficiency of Locomotion," "Direct-Current Railroading; 600 Volts—1200 Volts—Higher Voltages," "The Generating and Transmission System," "Single-Phase Alternating-Current Railroading; the Generating and Transmission System," "The Three-Phase Motor and Three-Phase System; General Discussion of Electric Railroading."

Financial and Corporate

New York Stock and Money Markets

August 30, 1911.

Sharp declines have taken place during the week throughout the list. At the opening to-day many issues reached the lowest levels this year. Sales at these prices were few in number, however, and trading for the rest of the day was irregular though on an upward scale. More than half of the transactions were in Union Pacific and United States Steel. The principal topics of interest are the labor troubles on the Harriman roads and their influence on foreign exchanges. The money market remains quiet and little change is expected until the financing of crops becomes more pronounced. Quotations to-day were: Call, 2¼@2½ per cent; ninety days, 3@3¼ per cent.

Other Markets

Business in Chicago to-day was on a very narrow scale. Prices declined slightly in the majority of issues.

Traction shares have been very dull in Philadelphia, and the only item of interest in this connection has been the co-operative plan submitted to employees of the Philadelphia Rapid Transit by the management, this being regarded as a favorable sign of plans to put the system on a more stable plane.

Slight advances were made to-day in Boston, but there was little selling pressure and trading was light.

The Baltimore market is very quiet and trading is in limited volume. Prices remain steady.

Quotations of traction and manufacturing securities as compared with last week follow:

	Aug. 23.	Aug. 30.
American Light & Traction Company (common)	a296	a296
American Light & Traction Company (preferred)	a106½	a106½
American Railways Company	a45	a45
Aurora, Elgin & Chicago Railroad (common)	a44	44¾
Aurora, Elgin & Chicago Railroad (preferred)	a87	87
Boston Elevated Railway	a127½	a127½
Boston Suburban Electric Companies (common)	a14	a14
Boston Suburban Electric Companies (preferred)	a75	a75
Boston & Worcester Electric Companies (common)	a12½	a13
Boston & Worcester Electric Companies (preferred)	a56	a56
Brooklyn Rapid Transit Company	73¾	75½
Brooklyn Rapid Transit Company, 1st ref. conv. 4c	86¾	*86¾
Capital Traction Company, Washington	a128¾	a130½
Chicago City Railway	a190	a190
Chicago & Oak Park Elevated Railroad (common)	a3	a3
Chicago & Oak Park Elevated Railroad (preferred)	a5	a5
Chicago Railways, ptcptg., ctf. 1	a98	90
Chicago Railways, ptcptg., ctf. 2	a29½	a27¼
Chicago Railways, pctptg., ctf. 3	a11½	a10
Chicago Railways, ptcptg., ctf. 4	a7	*7
Cincinnati Street Railway	*130	*130
Cleveland Railway	a100¼	*100¼
Columbus Railway (common)	*82	*82
Columbus Railway (preferred)	*95	*95
Consolidated Traction of New Jersey	a76	a76
Consolidated Traction of N. J., 5 per cent bonds	a105	a105
Dayton Street Railway (common)	a25	a25
Dayton Street Railway (preferred)	a101	a101
Detroit United Railway	a70	a70
General Electric Company	a154	a153
Georgia Railway & Electric Company (common)	a159	a165
Georgia Railway & Electric Company (preferred)	a93	92
Interborough Metropolitan Company (common)	15	a14½
Interborough Metropolitan Company (preferred)	41¾	a43¼
Interborough Metropolitan Company (4½s)	*77⅜	79
Kansas City Railway & Light Company (common)	a19	a19
Kansas City Railway & Light Company (preferred)	41	*41
Manhattan Railway	a138	a138
Massachusetts Electric Companies (common)	a18	a17¾
Massachusetts Electric Companies (preferred)	a89	a88¼
Metropolitan West Side, Chicago (common)	*27½	27
Metropolitan West Side, Chicago (preferred)	*75	*75
Metropolitan Street Railway, New York	*15	*15
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	a72	a70
Northern Ohio Light & Traction Company	*50½	*50½
Northwestern Elevated Railway (common)	*30	*30
Northwestern Elevated Railroad (preferred)	*70	*70
Philadelphia Company, Pittsburgh (common)	52	51
Philadelphia Company, Pittsburgh (preferred)	42½	42½
Philadelphia Rapid Transit Company	23	a22⅝
Philadelphia Traction Company	85	a85
Public Service Corporation, 5% col. notes (1913)	94	a94
Public Service Corporation, ctfs.	107	a106½
Seattle Electric Company (common)	a111⅛	111
Seattle Electric Company (preferred)	a103	103
South Side Elevated Railroad (Chicago)	95½	95⅜
Third Avenue Railroad, New York	a9	a8
Toledo Railways & Light Company	*6½	a7
Twin City Rapid Transit, Minneapolis (common)	a108½	a106
Union Traction Company, Philadelphia	50¾	50⅛
United Rys. & Electric Company (Baltimore)	*18	a18
United Rys. Inv. Co. (common)	a65	*35
United Rys. Inv. Co. (preferred)	a35	a35
Washington Ry. & Electric Company (common)	a43	a44½
Washington Ry. & Electric Company (preferred)	a90	a89
West End Street Railway, Boston (common)	a88	a88
West End Street Railway, Boston (preferred)	*88	100
Westinghouse Elec. & Mfg. Co.	a67	a64½
Westinghouse Elec & Mfg. Co. (1st pref.)	a114	*114

a Asked. *List sale.

Earnings in Philadelphia for July

At the meeting of the executive committee of the Philadelphia (Pa.) Rapid Transit Company, held on Aug. 23, 1911, the report of the company for July, 1911, was presented. Following the meeting T. E. Mitten, who has been acting as chairman of the board in the absence of E. T. Stotesbury, made public the report of earnings and a summary of the proceedings of the meeting. Mr. Mitten said:

"The report of operation for July was presented and accepted by the committee, who, appreciating the desirability of prompt and full publicity, ordered that a copy be supplied to the press. The report of operation for each succeeding month will hereafter be given to the press following the regular meeting of the directors, which occurs upon the third Monday of each month."

The report for July, 1911, compared with July, 1910, follows:

July	1911	1910
Gross passenger earnings	$1,776,020	$1,706,654
Receipts from other sources	80,795	65,299
Total receipts	$1,856,815	$1,771,953
Operating expenses	1,144,766	1,082,201
Net earnings	$712,049	$689,752
Fixed charges	737,289	734,241
Deficit	$25,240	$44,489

Austin (Tex.) Street Railways.—The Austin Street Railway has called for payment at 105 and interest on Oct. 1, 1911, at the office of the Equitable Trust Company, New York, N. Y., all of the $350,000 outstanding first mortgage 5 per cent gold bonds issued by it dated April 1, 1903. An equal amount of first and refunding bonds is reserved to provide for their retirement.

Boston (Mass.) Elevated Railway.—The stockholders of the Boston Elevated Railway on Aug. 24, 1911, by a vote of 107,552 shares out of 107,584 cast, approved the act to provide for the merger of the company with the West End Street Railway.

Chicago (Ill.) Elevated Railways.—C. H. Wacker, Byron L. Smith, William R. Linn, Charles H. Hulburd, T. J. Lefens and William V. Kelley have resigned as directors of the South Side Elevated Railroad and Samuel Insull, Henry A. Blair, Ira M. Cobe, B. I. Budd, William A. Fox and J. H. Gulick were elected in their places. Charles V. Weston resigned as president of the company. Mr. Insull was elected chairman of the board, and B. I. Budd was elected president. Mr. Budd is president also of the Metropolitan West Side Elevated Railway and the Northwestern Elevated Railroad.

Chicago & Milwaukee Electric Railroad, Chicago, Ill.—A statement of the earnings of the Chicago & Milwaukee Electric Railroad for the six months ended June 30, 1911, has been issued by the receiver. Compared with the same period of 1910 the statement shows as follows: Gross revenue for 1911, $405,776, as against $390,807 for 1910; net revenue for 1911, $112,539, as against $52,805; other income for 1911, $7,680, as against $6,710; interest on receiver's obligations for 1911, $33,805, as against $31,325; taxes for 1911, $25,500, as against $24,500; balance 1911, $60,914, as compared with $3,690 in 1910.

Cincinnati (Ohio) Traction Company.—The Cincinnati Traction Company has sold to the Fifth-Third National Bank, Cincinnati, $220,000 of 5 per cent equipment notes, the proceeds of which will be used to pay for fifty new double-truck cars to be put into service soon.

Fort Dodge, Des Moines & Southern Railroad, Boone, Ia.—Judge Smith McPherson, of the District Court of the United States for the Southern District of Iowa, has authorized the receivers of the Fort Dodge, Des Moines & Southern Railroad to sell as scrap that part of the company's line from Des Moines Junction to Goddard. The receivers are negotiating for the sale of the line between Colfax and Newton to the Inter-Urban Railway, Des Moines.

Nevada County Traction Company, Grass Valley, Cal.—John Martin, president of the Nevada County Traction Company and the California Midland Railroad, and his associates have secured an option on the majority holdings of stock of Mrs. S. A. Kidder in the Nevada County narrow-

gage railroad, which extends from Colfax to Nevada City, 20½ miles.

San Francisco, Vallejo & Napa Valley Railway, Napa, Cal.—Suit has been brought against the San Francisco, Vallejo & Napa Valley Railway by the Mercantile Trust Company, San Francisco, Cal., which desires the appointment of a receiver, the company having defaulted in the payment of interest due in June, 1911, on the bonds.

Syracuse, Lake Shore & Northern Railroad, Syracuse, N. Y.—The Public Service Commission of the Second District of New York has received an application from the Syracuse, Lake Shore & Northern Railroad, asking for an order approving an increase of its preferred stock from $1,000,000 to $1,500,000. The additional preferred stock is to be used to pay obligations incurred to the Ontario Construction Company. The construction of the railroad between Fulton and Oswego was completed in July, and the entire line from Syracuse to Oswego is now in operation.

Union Railway, Gas & Electric Company, Springfield, Ill.—E. W. Clark & Company, Philadelphia, are offering for subscription at 93 and interest a block of 5 per cent collateral trust gold bonds of the Union Railway, Gas & Electric Company, of 1909, due July 1, 1939. Of these bonds $4,000,000 was issued originally, but $1,000,000 of this amount was converted into preferred stock, leaving $3,000,000 outstanding. The bonds are convertible into 6 per cent cumulative preferred stock at any interest period on thirty days' notice to the company, and are redeemable at par and interest on any interest date.

Virginia Railway & Power Company, Richmond, Va.—It is reported that negotiations have been entered into for the purchase by the Virginia Railway & Power Company of the property of the Roanoke Railway & Electric Company and the Lynchburg Traction & Light Company, which are now controlled by the American Railways Company, Philadelphia. Besides its properties in Richmond, the Virginia Railway & Power Company also controls the street railway and electric-light plants in Norfolk and Portsmouth, the Norfolk & Portsmouth Traction Company having been merged with it recently.

Dividends Declared

American Railways, Philadelphia, Pa., quarterly, 1½ per cent.

Louisville (Ky.) Traction Company, 2½ per cent, preferred; quarterly, 1 per cent, common.

Whatcom County Railway & Light Company; $3, preferred.

MONTHLY ELECTRIC RAILWAY EARNINGS

CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY.

Period.			Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Surplus.
1m.,	July,	'11	$109,251	$57,951	$51,300	$30,240	$21,060
1 "	"	'10	102,184	55,567	46,619	29,794	16,825
7 "	"	'11	633,521	360,182	273,339	210,516	62,824
7 "	"	'10	580,577	344,931	235,587	208,558	27,030
EAST ST. LOUIS & SUBURBAN RAILWAY.							
1m.,	July,	'11	$195,688	$102,833	$92,855	———	———
1 "	"	'10	210,844	106,159	104,686	———	———
7 "	"	'11	1,287,407	690,457	596,951	———	———
7 "	"	'10	1,330,197	712,223	617,974	———	———
MILWAUKEE LIGHT, HEAT & TRACTION COMPANY.							
1m.,	July,	'11	$172,887	$47,101	$125,786	$78,894	$46,892
1 "	"	'10	171,332	44,877	126,456	77,546	48,910
7 "	"	'11	977,349	278,561	698,787	500,069	198,719
7 "	"	'10	913,825	262,300	651,525	488,549	162,977
MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY.							
1m.,	July,	'11	$422,917	$223,452	$199,466	$129,906	$69,560
1 "	"	'10	400,922	207,659	193,263	116,659	76,603
7 "	"	'11	2,873,180	1,526,084	1,347,096	858,822	488,275
7 "	"	'10	2,684,139	1,445,281	1,238,858	783,080	455,778
MONTREAL STREET RAILWAY COMPANY.							
1m.,	July,	'11	$437,771	$231,068	$206,703	$72,088	$134,615
1 "	"	'10	398,846	215,224	183,623	58,459	125,164
7 "	"	'11	3,876,711	2,246,208	1,630,504	475,973	1,154,531
7 "	"	'10	3,490,647	2,021,516	1,469,131	419,547	1,049,584
NORTHERN OHIO TRACTION & LIGHT COMPANY.							
1m.,	July,	'11	$278,431	$141,003	$137,428	$44,321	$93,107
1 "	"	'10	262,020	131,938	130,082	43,357	86,725
7 "	"	'11	1,501,107	838,026	663,081	310,428	352,653
7 "	"	'10	1,349,355	756,168	593,187	303,274	289,914
TWIN CITY RAPID TRANSIT COMPANY.							
1m.,	July,	'11	$10,067	$337,555	$372,512	$140.079	$232,433
1 "	"	'10	682,612	318,594	364,018	140,113	223,905
7 "	"	'11	4,492,019	2,266,349	2,225,670	980,554	980,554
7 "	"	'10	4,254,860	2 066,722	2,198,137	981,254	981,254

Traffic and Transportation

Transfer Decision Causes Complications in Seattle

Upon the petition of the Seattle, Renton & Southern Railway, Seattle, Wash., Federal Judge C. H. Hanford on Aug. 22, 1911, modified the injunction against Seattle and the patrons of the company by ordering the company to exchange transfers with the Seattle Electric Company upon payment by passengers of an additional fare of 3 cents. The Seattle, Renton & Southern Railway is directed to issue receipts for the additional 3 cents, which sum will be refunded if the court decides that transfers shall be exchanged upon a 50 per cent basis. The Seattle, Renton & Southern Railway is also commanded to issue receipts for the additional 5-cent fare demanded at Kenyon Street. The court order follows:

"The Seattle, Renton & Southern Railway shall interchange transfers with the Seattle Electric Company upon the following terms and conditions, to wit: That all passengers of the Seattle, Renton & Southern Railway demanding a transfer to the lines of the Seattle Electric Company shall be entitled to such transfer upon the payment of 3 cents in addition to the amount of the regular fare; and all passengers boarding the cars of the Seattle, Renton & Southern Railway at proper transfer points and tendering a transfer slip issued by the Seattle Electric Company to the Seattle, Renton & Southern Railway shall be entitled to passage on the cars of the Seattle, Renton & Southern Railway to all points north of Kenyon Street upon the payment of 3 cents. All persons receiving or surrendering said transfer slips shall be entitled to receipts for the payment of said additional 3 cents in substantially the following form:

"'This receipt for 3 cents is given under order of the Circuit Court of the United States for the western district of Washington, Northern Division, rendered on Aug. 22, 1911, in Cause No. 2012.

"'If upon final determination of said cause the Seattle, Renton & Southern Railway is obliged to interchange transfers with the Seattle Electric Company upon a basis of the division of the 5-cent fare paid of 50 per cent, then, in such event, the company will take up and pay to the purchaser hereof the sum of 3 cents. Otherwise this receipt is void and of no effect.'"

In the petition the Seattle, Renton & Southern Railway set forth that divers and certain persons resident along the line of the railway had on Aug. 22 boarded cars and refused to pay a fare unless given a transfer or a receipt. The railway company, says the petition, being bound by the injunction, which it feared to disobey, thereupon refused to issue the receipts or transfers, which resulted in delaying and tying up the service for four hours.

As recited in the company's petition, the people of the Rainier Valley on Aug. 22, despite the injunction of the federal court, refused to pay two fares from south of Kenyon Street, and those north of that street demanded transfers for their 5 cents.

Transfers Used to Secure Co-operation of Passengers

The Portland (Ore.) Railway, Light & Power Company is printing hints on the backs of transfers in order to obtain the co-operation of passengers. The following have appeared:

"It is easy to do.—A favor granted to-day, however small, may come back to you a thousandfold to-morrow. It is a small matter. It is easy to do and will help you out in the end, for you may be wanting the favor to-morrow. If you can get along with one seat please do not use two."

"Be careful of the little ones.—Trainmen must not frighten children into jumping from the car when it is still in motion even though they be in the act of stealing a ride. Slow down the car and put the little ones off with care and gentleness."

"Move up a little.—When you sit down in a seat please do not try to occupy more space than is necessary. Move up just a little and give the standing passenger a chance to rest. When the car is crowded do your part as a gentleman

or a lady and kindly remember that 'one good turn deserves another.' You may be standing next time."

"Two ladies got on the Heights car. One said, 'Why don't you read the back of the transfer to-day?' The transfer was read, and amid much laughter from the women, they went up to the far end of the car and sat down."

"A pleasant smile and cheerful disposition smooths the way for good service. The conductor appreciates courtesy. Benjamin Franklin once said: 'Kind words are paid for in good deeds.'"

"Instructions to trainmen. Rule 9. When old, infirm or crippled people board the train you must be very careful not to start until such persons have been seated or have reached some position where they will not fall when the train starts. Trainmen are requested to give the old and infirm every attention possible for their accommodation and convenience. To the old mankind owes a debt of gratitude that nothing can repay."

Changes in Parlor-Car Service.—The schedule of parlor-car service on the lines of the Illinois Traction System was revised on Aug. 16, 1911.

Advertisements on Outside of Cars.—The Second Avenue Railroad, New York, N. Y., has placed commercial advertising signs on the risers of the steps and on the four corners of its cars.

Street Traffic Rules in Peoria, Ill.—The Peoria legal department is drafting rules for the regulation of street traffic which will be distributed to street railway motormen and vehicle drivers.

Ticket Books on Athol & Orange Street Railway.—The Athol & Orange Street Railway, Athol, Mass., places on sale on Sept. 1 workingmen's tickets in book form, and also books of ninety tickets good for bearer.

Dormitories for Trainmen in Savannah.—The Savannah (Ga.) Electric Company plans to build a dormitory at Ott Street and Gwinett Street for motormen and conductors whose duties require them to be up very early or very late. The building will contain lunch counters and transportation offices of the company.

Special Rates to Los Angeles Beaches.—The Pacific Electric Railway, Los Angeles, Cal., granted a special rate of 25 cents for the round trip from Los Angeles to the beaches on Aug. 22. The company proposes to give several of these special excursions as a basis for data from which the feasibility of a permanent reduction in the fare for this trip may be studied.

Car-Full Signs in Seattle.—Signs which read as follows are being displayed in the cars of the Seattle (Wash.) Electric Company at the suggestion of the supervisor of public utilities of the city: "This car seats forty-eight passengers. Standing room for thirty-one; total, seventy-nine. When this number of passengers is in the car 'full car' signs will be displayed."

Market Produce by Trolley to Kansas City.—The Missouri & Kansas Interurban Railway, Kansas City, Mo., has secured the right from the City Council in Kansas City to put tracks into the City Market House, with a view to delivering fruit and vegetables from the nearby agricultural sections which the road connects. The company expects to put on refrigerator cars.

Outing for Employees of the Milwaukee Electric Railway & Light Company.—The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., gave an outing to its employees and their friends on Aug. 24, 1911, at Waukesha Beach. Lunch was served by the company and prizes were given to winners of various athletic contests. Other features of the entertainment were a band concert and a boat ride.

Coney Island Single-Fare Zones to Be Extended.—The Brooklyn (N. Y.) Rapid Transit Company has announced that, effective Oct. 1, 1911, it will extend still further toward Coney Island the zone at which it will collect the second fare. On the Brighton Beach line the 5-cent zone will be extended from King's Highway to the Sheepshead Bay station, on the Culver line from Avenue P to Gravesend station (Neck Road), on the Sea Beach line from King's Highway to Avenue U, on the West End line from Ulmer Park station to Bay Fiftieth Street.

Complaint Against Auburn & Syracuse Railroad Closed.—The Public Service Commision of the Second District of New York has closed upon its record the complaint of the residents of East Genesee Street, Auburn, as to alleged unreasonable noise from the operation of cars on the Auburn & Syracuse Railroad on that street. The company has assured the commission that a new double track will be laid, work to commence after Labor Day and be finished by Nov. 1, 1911. It is expected that the laying of the new double track will reduce to a minimum the noise of operation on that street.

Rerouting in Buffalo.—The International Traction Company, Buffalo, N. Y., has rerouted its Elmwood and Hoyt cars over the Elmwood Avenue extension to relieve congestion on Main Street. In explanation, Thomas Penney, president of the company, has issued a statement in which he said: "We are endeavoring to adapt out service to the needs of the people and our traffic, and schedule men are investigating conditions now. Where more cars are needed they will be placed whenever possible. With the Elmwood and Hoyt cars off Main Street there will be fewer cars than before, as the need for them will be less. Only in that way could we relieve the congestion and give better service. The running time on the Main Street line will be cut fully ten minutes through the change and about the same on the Hoyt and Elmwood lines."

Wheel Guards in Philadelphia.—Charles O. Kruger, president of the Philadelphia (Pa.) Rapid Transit Company, has announced that 450 cars on various lines of the company are equipped with life guards. Mr. Kruger said: "We are equipping from ten to twelve cars daily and increasing the number as rapidly as possible. We shall endeavor to have the work pushed so that the remainder of the cars to be equipped with the new life guard will be completed in October or as early in November as possible." Instructions have been issued to the motormen that they must observe all signals displayed at danger points. At such points there are "slow up" and "stop" signs, and for guidance at night green and red lights. In approaching "slow up" signals cars must be run at a speed not exceeding 3 m.p.h. When approaching a "stop" signal the motorman must not be seated For the first violation of any of these rules a penalty of five days' suspension will be imposed.

Traffic Conditions in San Francisco.—Charles N. Black, vice-president and general manager of the United Railroads of San Francisco, Cal., was the guest of the Commonwealth Club of San Francisco at a luncheon given in the Palace Hotel, that city, recently. In addressing the members of the club Mr. Black reverted to the vicissitudes of the company with which he is connected. He said that, whereas before the companies now included in the United Railroads were consolidated it was the rule to pay 5 cents for every ride, under the present elaborate system of transfers the company averaged only 3.37 cents for each ride. The congestion of inbound travel or travel toward the ferry was between 7 a. m. and 8 a. m., and the greatest rush of outbound travel between 5 p. m. and 6 p. m., although between 4 p. m. and 5 p. m. travel was heavy. Mr. Black held that fewer cars on Market Street would better accommodate the crowds, as the cars blocked each other if too numerous. The rule of the road as observed in New York would facilitate street railway travel. He favored the longitudinal seats.

Owl Service on Elevated Successful in Philadelphia.—T. E. Mitten, acting chairman of the board of directors of the Philadelphia (Pa.) Rapid Transit Company, commented recently as follows on the owl service on the company's elevated lines, mention of which was made in the ELECTRIC RAILWAY JOURNAL of July 15, 1911, page 137: "As a result of the all-night service which was inaugurated on the Market Street Elevated line July 10 there has been an increase of from 10 per cent to 12 per cent in total passengers carried during the hours of midnight service (from 12 m. to 5 a. m.) upon the elevated and the surface lines affected thereby. Approximately 3800 passengers are carried by the elevated and the surface lines adjacent thereto during the hours of midnight service. Of this total approximately 2000 passengers per night now patronize the elevated, and the number showing preference for the elevated night service is constantly increasing, thus permitting the gradual with-

drawal of night-car service upon the surface lines on the streets where passengers are best served by taking elevated cars.

Through Routes in Chicago.—In an interview in regard to the operation of through routes in Chicago, Michael C. Buckley, city traction expert, is quoted by the Chicago *Journal* as saying: "I have made personal observation of conditions on most of the trunk lines and I am prepared to say that all through routes should be established at once. The local cars, which run a part of the distance along a street or series of streets, designated by ordinances as a through route, should be taken off. Recent withdrawal of cars on some of the lines is a mistake. The motormen cannot possibly make the running time required of them in the new schedules. The condition in Halsted Street is very bad. The transfer system is complicated and confusing. The Western and Kedzie Avenue through routes ought to be put into immediate operation. Neither line has enough cars on it now. Streets on which cars are too few and on which a motorman cannot keep to schedule are Madison Street, Milwaukee Avenue, Elston Avenue and Chicago Avenue. I am keeping the companies fully informed as to conditions, and am giving the same information to the board of supervising engineers and to the local transportation committee. Steps will be taken soon to require the operation of the through routes on which there are no obstacles."

Supposed Conflict Between Law and Commission Order.—Employees of the electric railways of Indiana are undecided whether to obey the law of Indiana or a recent rule of the Railroad Commission. The commission has required that all the doors of electric cars between the smoking compartment and the vestibule occupied by the motorman shall be locked. This rule, it is said, is in direct violation of the following statute: "Whoever, being an employee of any company engaged in transporting passengers, locks any car in which a passenger may be, or who orders the locking of such car when occupied by any passenger, whether the car is running or standing, shall be fined not less than $5 nor more than $500." The members of the commission say that its rule should be interpreted to mean that the door between the forward compartment and motorman's vestibule shall be kept closed, but not necessarily locked. The commission is in doubt whether the statute cited applies to interurban cars, and will submit the question to the Attorney General for an opinion. Another recently adopted rule of the commission to which the railways object requires both motorman and conductor to take the orders governing cars. This tends to increase the likelihood of accidents by dividing the responsibility for the reception of orders.

Car Capacity Cases in Minneapolis.—In deciding the cases of the twenty-two car crews arrested recently for violating the Minneapolis car capacity ordinance, Judge Montgomery held that the overcrowding section of the ordinance, as applied to motormen, was unreasonable, and dismissed the cases against the ten motormen arrested with conductors for violating this section of the ordinance. Two conductors were tried at the time the motormen were arraigned, but only one, a conductor on an interurban car, was found guilty. He was fined $5 for permitting his car to be overcrowded. The other conductor was acquitted, having shown that another car followed his car within 300 ft. The attorney for the company contended that the ordinance was a restricted ordinance for the operation of cars by the Minneapolis Street Railway. Judge Montgomery held that the title was sufficient to embrace the subject matter of the ordinance, and that the restricted sense applied to the running of cars by the Minneapolis Street Railway, a corporation, and included its officers and employees. Section 4 of the ordinance Judge Montgomery held to be unreasonable, as it applies to motormen. This section says that any conductor, motorman or other servant who shall willfully and knowingly allow passengers to board a car which has already reached its legal carrying capacity is liable to fine. The court holds that the motorman works under orders of the conductor, knows nothing about how many persons get on or off a car, and should not be arrested with the conductor. The cases of the eight other conductors were continued until Aug. 30, 1911.

Personal Mention

Mr. J. C. Bacon, who has been superintendent of schedules of the Metropolitan Street Railway, Kansas City, Mo., has accepted the position of general superintendent of the Augusta Railway & Electric Company, Augusta, Ga., effective Sept. 1, 1911.

Mr. Hugh M. Dougherty has succeeded Mr. E. C. Eckar as superintendent of the Kansas City & Westport Belt Railway, an interurban division of the Metropolitan Street Railway in Kansas City, Mo., running to Dodson, Mo. Mr. Dougherty has been chief timekeeper for the Metropolitan Street Railway for several years past.

Mr. J. H. Brinkerhoff, who resigned recently as general superintendent of the Grand Junction & Grand River Valley Railway, Grand Junction, Col., has been appointed to the staff of the vice-president of the Illinois Central Railroad. Mr. Brinkerhoff was formerly superintendent of the Rio Grande Junction Railway. He was also connected continuously with the Union Pacific Railway for a period of fifteen years.

Mr. D. C. Barnes, superintendent of the Pawtucket (R. I.) Electric Company, which is controlled by the Blackstone Valley Gas & Electric Company, managed by Stone & Webster, Boston, Mass., has been appointed manager of the Everett Railway, Light & Water Company and the Seattle-Everett Traction Company, Everett, Wash., to succeed Mr. W. I. Sturtevant, who will continue in the employ of Stone & Webster elsewhere.

Mr. Emil G. Schmidt has been elected president of the County Traction Company, Chicago, Ill., to succeed Mr. George B. Blanchard, resigned, who has been president of the company since December, 1910, when it was organized to take over the property of the Chicago Consolidated Traction Company outside of Chicago, the property within the city having been taken over by the Chicago Railways Company. Mr. Schmidt was formerly vice-president of the Rockford & Interurban Railway, Rockford, Ill.; vice-president and manager of the Peoria Gas & Electric Company, Peoria, Ill.; vice-president of the Evansville Gas & Electric Company, Evansville, Ind.; vice-president and general manager of the Springfield Gas Light Company, Springfield Consolidated Railway, and Springfield Light, Heat & Power Company, Springfield, Ill.

Mr. Patrick Broderick has been appointed by the Board of Public Works of San Francisco, Cal., superintendent of construction of the Geary Street, Park & Ocean Railroad, which is to be operated by the city. All of the other appointees on his work, including Mr. E. S. Hurley, the electrical superintendent, and Mr. A. M. Hunt, the consulting engineer, will be under Mr. Broderick's direction. Mr. Broderick will report to Public Works Commissioner Laumeister. Mr. Broderick has had considerable experience in electric-railway construction work. He supervised the construction of a number of lines which are now part of the system of the United Railroads of San Francisco, and was connected with the San Diego (Cal.) Southern Railway and the San Diego Electric Railway under Mr. John D. Spreckels, now president of both of these companies.

Mr. H. A. Johnson has been appointed master mechanic of the Albany & Southern Railroad, Hudson, N. Y. Mr. Johnson was graduated from Friends' University of Pennsylvania in 1891. He was appointed to a position with the engineering department of the Union Traction Company at Philadelphia on May 1, 1899, and continued with the company until March, 1900, when he resigned to become chief engineer and master mechanic of the Camden & Suburban Railway, Camden, N. J. He remained with the Camden & Suburban Railway after that company had been taken over by the Public Service Corporation of New Jersey, but resigned from the company on Aug. 1, 1906, to become superintendent of construction of the Tri-City Railway & Light Company, Davenport, Ia., for J. G. White & Co., Inc., New York, N. Y. On April 1, 1909, Mr. Johnson returned to New York to accept a position with the Brooklyn Rapid Transit Company. On June 1 1910, he was appointed chief engineer of the United States Express Company and United States Realty Company, with headquarters in New York.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

*Oakland (Cal.) Railways Company.—Incorporated in California to operate the railway properties controlled by the United Properties Company of California, including the Oakland Traction Company, San Francisco; Oakland & San Jose Consolidated Railway, and East Shore & Suburban Railway. Capital stock, $27,000,000. F. M. Smith is interested.

Berlin (Conn.) Street Railway.—Application for a charter has been made in Connecticut by this company to build an electric railway between Meriden and Berlin. Capital stock, $50,000. Officers: H. M. Kochersperger, vice-president of the Connecticut Company, New Haven, president; J. T. Kelly, secretary, and C. J. Danaher, Meriden, attorney. [E. R. J., Aug. 26, '11.]

Shelton & Bridgeport Traction Company, Bridgeport, Conn.—Incorporated in Connecticut to build an electric railway to connect Shelton, Huntington Centre, Trumbull and Bridgeport. Incorporators: O. G. Beard, Jr., L. E. Moulthrop and B. N. Beard. [E. R. J., Aug. 5, '11.]

***Chicago (Ill.) Suburban Traction Company.**—Incorporated in Illinois to build an interurban railway from Chicago. Capital stock, $25,000. Incorporators: Louis J. Behin, H. Morton Taylor and Frank R. Utely.

***Kewanee, Bradford & Henry Interurban Railway, Henry, Ill.**—Incorporated in Illinois to build an electric railway to connect Bradford, Henry and Kewanee. Capital stock, $5,000. Directors: John P. Code, of Bradford; John P. Brady, of Kewanee; Howard G. Stoner, of Henry; William H. Haines and Daniel J. Phenil, of Peoria.

Quincy & Western Illinois Electric Railway, Quincy, Ill.—Incorporated in Illinois to build a 75-mile electric railway from Niota to Quincy, via the counties of Hancock and Adams. Headquarters, Quincy. Capital stock, $5,000. Incorporators and first board of directors: W. T. Duker, H. F. Dayton, J. P. Wall, William S. Govert and S. B. Montgomery, all of Quincy. [E. R. J., July 22, '11.]

***Oklahoma Central Traction Company, Oklahoma City, Okla.**—Application for a charter has been made in Oklahoma by this company to build a 60-mile electric railway between Oklahoma City and Chicasha, with a branch to Blanchard or Washington. Capital stock, $2,000,000. Incorporators: M. E. Springer, A. R. Bettis, A. Cook, H. A. Kroeger and Carlos Combs.

Lebanon & Campbelltown Street Railway, Lebanon, Pa.—Chartered in Pennsylvania to build a 10-mile electric railway between Lebanon, Campbelltown and Lebanon via South Londonderry, South Annville and North Comwall. Capital stock, $60,000. M. S. Hershey, president. [E. R. J., Aug. 5, '11.]

FRANCHISES.

***Fayetteville, Ark.**—W. A. Fraser and others, of Dallas, Tex., have been granted a fifty-year franchise by the City Council on condition that they build a line connecting the university and East Mountain.

Chico, Cal.—The Fresno, Hanford & Summit Lake Interurban Railway, Fresno, has received a franchise from the Board of Trustees in Chico.

Los Angeles, Cal.—The Los Angeles Railway has asked the Board of Supervisors for a franchise to build an extension from the Boyle Heights line at Gage street, east of the city limits, north to a point east of Eastlake Park.

Riverside, Cal.—The Pacific Electric Railway has asked the City Council for a franchise to build a 2-mile extension of the Riverside & Arlington Electric Railway.

Sebastopol, Cal.—The Petaluma & Santa Rosa Railway has received a fifty-year franchise from the Board of Trustees in Sebastopol.

***Canon City, Col.**—The City Council and the Business Men's Association of Canon City are considering a proposition from F. D. Street and F. L. Kelsey, of New York City, to build an electric line from Canon City to the top of the Royal Gorge. They submitted an offer to construct and operate the proposed line a distance of about 9 miles provided they were guaranteed 6 per cent interest on the investment for five years with franchises and concessions at the top of the gorge for terminals and hotel sites.

Pueblo, Col.—The Pueblo & Suburban Traction & Lighting Company has received a franchise from the City Council to extend its tracks in Pueblo from Abriendo Avenue and Polk Street to the City Park. According to the terms of the franchise this extension must be completed by April 1, 1912.

Ansonia, Conn.—The Connecticut Company, New Haven, has received a franchise to extend its tracks from Ansonia to Beardsley Park via Huntington Centre.

Deep River, Conn.—The Shore Line Electric Railway, Saybrook, has asked the Selectmen for a franchise in Deep River.

Rome, Ga.—The Rome Railway & Light Company has asked the City Council for a franchise to double track its line from Second Avenue to Sixth Avenue on Broad Street in Rome.

East St. Louis, Ill.—The East St. Louis & Suburban Railway has asked the Council for a franchise in East St. Louis east of Thirty-eighth Street.

Marion, Ind.—The Indiana Union Traction Company, Anderson, will ask the City Council for a franchise to extend its tracks on East Fourth Street in Marion to connect with those of the Marion, Bluffton & Eastern Traction Company, Bluffton.

Halstead, Kan.—The Wichita Railroad & Light Company, Wichita, has received a franchise in Halstead. The company proposes to extend its line from Wichita to Hutchinson via Burrton and Halstead. Work will soon be begun.

Brockton, Mass.—The Bay State Street Railway has received a franchise from the City Council of Brockton.

Lynn, Mass.—The Boston & Eastern Railway, Boston, will ask the City Council on Sept. 29 for a franchise in Lynn. This line will connect Boston, Beverly, Danvers, Lynn, Chelsea, Revere, Salem and Swampscott. [E. R. J., Aug. 26, '11.]

Malden, Mass.—The Boston Elevated Railway has asked the City Council for a franchise through Medford and Quincy Streets to the Medford Boulevard, to connect with the Spot Pond line and pass into the Sullivan Square terminal.

Orange, Mass.—The Miller's River Street Railway, Miller's Falls, has received a franchise from the Selectmen in Orange. This is part of a plan to build a 14-mile electric railway to connect Miller's Falls, Montague, Irving, Wendall and Orange. D. P. Abercrombie, Jr., secretary and treasurer of the Connecticut Valley Street Railway, Greenfield, Mass., is interested. [E. R. J., Aug. 19, '11.]

Worcester, Mass.—The Worcester Consolidated Street Railway has asked the City Council for a franchise to extend its Providence Street line through Granite Street in Worcester.

Virginia, Minn.—The Mesaba Electric Railway, Duluth, has received a franchise from the City Council in Virginia. [E. R. J., Aug. 19, '11.]

***Rahway, N. J.**—Richard Hayes and associates have asked the City Council for a franchise to built an electric railway on Rahway Avenue from South Broad Street to the city limits of Rahway.

Waynesburg, Pa.—The Waynesburg & Blacksville Street Railway has received a franchise from the City Council in Waynesburg. This line will connect Waynesburg, Blackville and Spraggtown. W. M. Laws, Waynesburg, president. [E. R. J., Aug. 26, '11.]

Watertown, S. D.—The Watertown Electric Railway has received a franchise in Watertown. W. J. Ferris, La Crosse, Wis., president. [E. R. J., Aug. 26, '11.]

Brigham City, Utah.—The Ogden Portland Cement Company has asked the City Council for a franchise to build an electric line in Brigham and extending 6 miles northwest of the city to its factory.

TRACK AND ROADWAY

British Columbia Electric Railway, Vancouver, B. C.—This company will construct an extension from New Westminster to Millside.

Pacific Electric Railway, Los Angeles, Cal.—Contracts will be awarded by this company at once to build a 7-mile extension from San Bernardino to Riverside via Urbita Springs, Colton, Arrowhead, Highlands and Redlands.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—This company has begun construction at the portal at the west end of its tunnel from Alameda County into Contra Costa County at the head of Redwood Canyon. The tunnel will be 4000 ft. in length and its western entrance will be within 200 yards of the eastern city limits of Oakland.

United Properties Company, San Francisco, Cal.—Surveys have been completed by this company on its line between Oakland and Sacramento. [E. R. J., Jan. 14, '11.]

Illinois Central Electric Railway, Canton, Ill.—This company has awarded the contracts for the construction of its extension from Norris to Farmington to the Porter Construction Company, Mackinaw.

Woodstock & Sycamore Traction Company, Sycamore, Ill.—This company has begun the construction of its extension from Marengo to Union.

Evansville (Ind.) Railways.—This company has closed a lease for the abandoned tracks of the Illinois Central Railroad between Evansville and Henderson, Ky. Later on this company will extend the line from Henderson to Owensboro and will build a bridge across the Green River near Spottsville.

Indianapolis, New Castle & Toledo Railway, New Castle, Ind.—Arrangements are being made by this company for an immediate survey between New Castle and Richmond, via Millville, Hagerstown and Greensfork. It is expected to build this extension next year.

South Bend & Logansport Traction Company, South Bend, Ind.—Work will soon be resumed by this company on the line from South Bend to Logansport, at which point connection will be made with the Indiana Union Traction Company for Indianapolis. The grade is completed as far south as Plymouth.

Vincennes North & South Traction Company, Vincennes, Ind.—Contracts will be awarded for the construction of this company's line between Vincennes and Sullivan. B. M. Willoughby, Vincennes, president. [E. R. J., Jun. 17, '11.]

Vincennes & Southeastern Interurban Railway, Vincennes, Ind.—Plans are being made by this company to obtain a right-of-way for a proposed extension of the line from St. Meinrad, in Spencer County, to Troy, and from Troy through Tell City to Cannelton. The right-of-way from Vincennes to St. Meinrad has already been obtained, and work is in progress on the roadbed between the two points. It is said that if Troy gives the company the proper support the planned extension will be made. G. B. Hazleton, Vincennes, president. [E. R. J., May 27, '11.]

Iowa Traction Company, Oskaloosa, Ia.—C. E. Coon, Omaha, Neb., who was recently awarded the contract by this company for the construction of its 110-mile line between Oskaloosa and Waterloo, has just been awarded an additional contract for the 30-mile section of the line between Oskaloosa and Ottumwa.

Manhattan City & Interurban Railway, Manhattan, Kan.—This company advises that it will soon be in the market for rails, ties, poles, machinery, overhead materials, etc., for the construction of its 15-mile line from Manhattan to Ft. Riley via the Ogden and Eureka Lake stations. Jos. T. West, general manager, 217 Yuma Street, Manhattan.

***Frankfort, Ky.**—The State Board of Control of Charitable Institutions of Kentucky has under consideration plans for the construction of an electric railway from Hopkinsville to the Western Kentucky Asylum for the Insane, 2 miles east of Hopkinsville.

***Kentucky Southwestern Railway, Light & Power Company, Hickman, Ky.**—This company has recently been formed and is securing financial backing for the construction of an electric railway to connect Paducah and Hickman. An office has been established in Hickman. E. F. Wheaton, Nashville, Tenn., general manager of the Henderson Interurban Railway, is promoting this organization.

Henderson (Ky.) Interurban Railway.—This company has secured most of the right-of-way between Owensboro, Providence and Uniontown. The Tennis Company, which owns a controlling interest in the Henderson Traction Company and the Owensboro City Railroad, is also planning to build to Owensboro, a distance of 32 miles. An unconfirmed report also has it that the American Traction Company, of Indianapolis, desires to enter the western Kentucky field, and will build from Paducah or Uniontown to the Mississippi River. Malcolm Yeaman, Henderson, president. [E. R. J., April 1, '11.]

Springfield (Mass.) Street Railway.—Birnie, Adams & Ruxton Construction Company, Springfield, Mass., has been awarded the contract for building an extension in Ludlow, Mass., for this company. The work includes some earth excavation and embankment.

Ware & Brookfield Street Railway, Ware, Mass.—This company will at once connect its line at Pond Hill, West Brookfield, with the Warren, Brookfield & Spencer Street Railway, Brookfield.

Duluth (Minn.) Street Railway.—Plans are being made by this company for an extension between Superior and Bayfield via Allouez and Itasco. Several bridges will be necessary.

***Kansas City, Mo.**—John Rowe, Shawnee; George Casebeer, A. L. Howard, Louisburg, and associates plan to construct an electric railway between Kansas City and Ft. Scott, via Stanley, Stillwell and Louisburg.

St. Louis, St. Charles & Northern Traction Company, St. Louis, Mo.—It is reported that this company will erect six bridges on the proposed 77-mile railway from St. Charles to Laddonia, Mo. R. E. Race, Mexico, general manager. [E. R. J., Aug. 19, '11.]

***Westfield, N. J.**—L. P. Naylor and associates are considering plans to build an electric railway between Westfield and Newark, via Irvington, Germantown and along Echo Lake.

International Traction Company, Buffalo, N. Y.—This company has placed in operation its new Elmwood Avenue extension in Buffalo.

Ocean Electric Railway, New York, N. Y.—Within the next few week this company's extension from Belle Harbor to Neponsit will be placed in operation.

Oneida (N. Y.) Railway.—Work will be begun at once by this company on the construction of its Madison Street extension in Oneida.

Poughkeepsie City & Wappingers Falls Electric Railway, Poughkeepsie, N. Y.—This company is improving its lines in Poughkeepsie and plans to improve the Wappingers Falls line.

Syracuse (N. Y.) Rapid Transit Company.—The Public Service Commission, Second District, has authorized this company to begin construction of an additional single track in Manlius Street and Hartwell Avenue, East Syracuse, and to exercise a franchise therefor granted by the village.

***Bellefontaine, Ohio.**—The Belle Center Commercial Club, Belle Center, and Eastern capitalists are preparing plans for the construction of a 60-mile electric railway to connect Findlay, Russells Point, Lewistown, Reservoir, Kenton, Belle Center, Huntsville and the reservoir resorts of Lakeridge and Orchard Island.

Cleveland, Barberton, Coshocton & Zanesville Railway, Cleveland, Ohio.—This company has negotiated a bond issue for $2,000,000 and will begin the construction within thirty days on its electric railway to connect Cleveland, and Zanesville via Elyria, Barberton, Oreville, Millersburg and Coshocton. The company will first build from Cleveland to Orrvill, a distance of 52 miles Surveys have been completed from Orrville to Janesville. J. J. Breitinger, president. [E. R. J., Oct. 29, '11.]

Cincinnati (Ohio) Traction Company.—Officials of this company are considering plans for the construction of a single-track line to give the residents of Bond Hill better service.

Ohio Electric Railway, Cincinnati, Ohio.—The time for

the completion of the extension of the Defiance & Lima branch of this company into Cincinnati has been extended to Jan. 1, 1912.

Portland, Eugene & Eastern Railway, Eugene, Ore.—Work has been begun by this company on its 22-mile extension from Eugene to Monroe to connect with the Corvallis & Alsea River Railway, which the Portland, Eugene & Eastern Railway has absorbed.

Mahoning & Shenango Railway & Light Company, New Castle, Pa.—This company plans to build a belt line at Warren, Ohio.

***Phoenixville, Pa.**—David J. Knauer and associates are said to be promoting an electric railway from St. Peter's to Phoenixville.

Chambersburg, Greencastle & Waynesboro Street Railway, Waynesboro, Pa.—Right-of-way is being secured by this company to build an extension from Chambersburg to Shippensburg.

Ogden (Utah) Rapid Transit Company.—Plans are being considered by this company to build an extension from Brigham City, Utah, to Grace, Idaho.

***Arlington Electric Company, Alexandria, Va.**—It is announced that within a short time work on this company's line to Alexandria county will be begun. It will extend from the end of the Alexandria County Electric Company's line, at Columbia 'pike, to Clarendon, a distance of 2½ miles. When it is completed it is proposed to extend the line to Falls Church. The current will be suplied by the Alexandria County Electric Light Company.

Chehalis & Cowlitz Railroad, Chehalis, Wash.—This company, which was organized to build a railway between Chehalis and a point on the Cowlitz River, has entered into an agreement with the Washington-Oregon Corporation, Chehalis, to build and operate its line in Chehalis and east and south for 1½ miles. The latter company will operate the line temporarily. H. C. Coffman, Chehalis, president. [E. R. J., May 27, '11.]

Tyler Traction Company, Clarksburg, W. Va.—Work has been begun by this company at Sistersville on its electric railway to connect Sistersville, Middlebourne and Shirley. H. W. McCoy, president. [E. R. J., Aug. 19, '11.]

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—Work has been begun by this company on the construction of its new freight and passenger station on Mission Street, east of Fair Oaks Avenue, in Pasadena. The cost is estimated to be $10,000.

Sacramento Electric, Gas & Railway Company, Sacramento, Cal.—This company has been granted a permit to construct a new carhouse in Sacramento on the block bounded by M and N Streets and Twenty-eighth and Twenty-ninth Streets. The structure will be one story and of brick construction.

Geary Street Municipal Railway, San Francisco, Cal.—A site for this company's new carhouse at Geary Street and Presidio Avenue, in San Francisco, has been contracted for at $56,000. Contracts will be let by the Board of Public Works of San Francisco for the construction of the building and the installation of machinery.

St. Louis Electric Terminal Railway, Granite City, Ill.—This company, it is reported, plans to build a new temporary passenger station in St. Louis, and will let contracts. The structure will be 60 ft. x 100 ft., of fireproof construction. The cost is estimated to be about $30,000.

Northern Indiana Railway, South Bend, Ind.—Work has been begun by this company on a 60 ft. x 100-ft. addition to its carhouse in South Bend.

Vincennes & Southeastern Interurban Railway, Vincennes, Ind.—This company plans to build depots in the following towns: At Vincennes, to cost $10,000; Monroe City, $1,500; Petersburg, $1,000; Algiers, $1,000; Otwell, $1.500; Leland, $1,000; Huntingburg $4,000; Ferdinand, $1,000, and St. Meinrad, $1,000. The company's machine shops will be located in Vincennes and in St. Meinrad. George Hazleton, Vincennes, president.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Maine.—This company will soon open a new waiting room and supply depot at Waterville.

Ohio Electric Railway, Cincinnati, Ohio.—This company has secured an option on a building at Second Street and Auglaize Avenue, Cincinnati, to be used as a station.

Scioto Valley Traction Company, Columbus, Ohio.—This company has settled all differences with the authorities of Chillicothe and will shortly begin the construction of a new passenger and freight station there, plans for which have been completed by Frank L. Packard, Columbus.

Portland Railway, Light & Power Company, Portland, Ore.—This company's new carhouse at the rear of its old carhouses fronting on Killingsworth Avenue, Portland, has been completed. The cost is estimated to be $30,000.

Port Arthur (Tex.) Traction Company.—A site at the corner of Sixth Street and Austin Street in Port Arthur has been purchased by this company on which it will build a four-story brick building 75 ft. x 140 ft. Contracts for construction will be awarded at once. The cost is estimated to be about $50,000.

Puget Sound Electric Railway, Tacoma, Wash.—This company has begun work on an interurban station in Puyallup. The structure will be 60 ft. x 70 ft.

Fairmont & Clarksburg Traction Company, Clarksburg, W. Va.—This company has awarded the contract for the steel work on the addition to its carhouse in Clarksburg to the Riverside Bridge Company. The tracks will be furnished by the Pennsylvania Steel Company, Steelton, Pa.

Sheboygan Railway & Electric Company, Sheboygan, Wis.—The contract for the construction of a new carhouse at Clara Avenue and South Eighth Street, Sheboygan, has been awarded to William Lange by this company. Work has been begun.

POWER HOUSES AND SUBSTATIONS

Geary Street Municipal Railway, San Francisco, Cal.—The site for this company's new power house at Jefferson Street and Jones Street in San Francisco has been purchased for $56,000. Contracts for construction will be awarded by the Board of Public Works of San Francisco.

Kentucky Traction & Terminal Company, Louisville, Ky.—The new power house of this company at North Limestone Street, Lexington, will be 120 ft. x 150 ft. and 50 ft. high. The General Electric Company will furnish the equipment, including two 2500-kw turbo-generators, two 750-kw auxiliary machines and two 75-kw exciters. There will be four boilers equipped with automatic stokers to be furnished by the Murphy Iron Works, Detroit, Mich. The Edge Moor Iron Works, Wilmington, Del., will provide the boilers and the superheaters. There will also be two substations, one on the line to Nicholasville and the other on the Georgetown line. The two substations on the Frankfort line and that on the Paris line will be rebuilt. The cost is estimated to be about $500,000.

Boston & Northern Street Railway, Boston, Mass.—It is reported that this company is considering plans to construct several new power houses and install new machinery.

Rochester Railway & Light Company, Rochester, N. Y.—This company will increase the capacity of power station No. 6 by 2000 hp.

Cincinnati (Ohio) Traction Company.—This company has placed an order with the Westinghouse Electric & Manufacturing Company for equipment for a generating station and three substations consisting of one 6000-kva, 1500-r.p.m., 25-cycle, 13,200/6600-volts, three-phase turbo-generator, with direct-connected exciter; five 1500-kw, 25-cycle, six-phase, 600-volt, direct-connected, 250-r.p.m. rotary converters, self-starting from alternating-current end; sixteen 500-kva, 25-cycle, 13,200/6600-volt, oil-insulated, self-cooled transformers; also four switchboards for control of the above apparatus.

Central Pennsylvania Traction Company, Harrisburg, Pa.—This company has purchased from the Hooven, Owens & Rentschler Company, Hamilton, Ohio, a Hamilton-Corliss, cross-compound condensing engine, to be connected to a GE 500-volt, 1600-kw, direct-current generator, and installed in the company's plant in Harrisburg.

Eastern Wisconsin Railway & Light Company, Fond du Lac, Wis.—Plans are being considered by this company for the construction of an addition to its power house on North Main Street and Rees Street in Fond du Lac. The cost is estimated to be about $12,000.

Manufactures & Supplies

ROLLING STOCK

Fifth Avenue Coach Company, New York, N. Y., has ordered one 16-ft. 9½-in. omnibus body from the J. G. Brill Company.

Athens Railway & Electric Company, Athens, Ga., has ordered one 25-ft. 4-in. semi-convertible car body from the American Car Company.

Indianapolis (Ind.) Traction & Terminal Company has ordered two direct-current motors from the Westinghouse Electric & Manufacturing Company.

Ontario & San Antonio Heights Railway, Ontario, Cal., has ordered three 38-ft. 8-in. California-type passenger cars, mounted on Brill 39-E trucks, from the G. C. Kuhlman Car Company.

New Jersey & Pennsylvania Traction Company, Trenton, N. J., has ordered one 25-ft. 4-in. closed motor-car body, mounted on Brill 27-G-1 trucks, from The J. G. Brill Company.

Groton & Stonington Street Railway, Mystic, Conn., has ordered three quadruple, direct-current motor equipments with K-6 control from the Westinghouse Electric & Manufacturing Company.

Savannah (Ga.) Electric Company has ordered three double-equipments of No. 307 interpole railway motors with 36-F control from the Westinghouse Electric & Manufacturing Company.

Chattanooga (Tenn.) Railway & Light Company has ordered one Halsey 16-ft. wheelbase radial truck and a 27-ft. car body and two G.E.-210 motors from the Philadelphia Holding Company.

Boston (Mass.) Elevated Railway has ordered forty-one double-equipment No. 300-D motors with type H-L control and twenty double-equipment No. 301 motors with A-L unit switch control from the Westinghouse Electric & Manufacturing Company.

Bakersfield & Kern Electric Railway, Bakersfield, Cal., has ordered six 42-ft. 8-in. California-type motor passenger cars, mounted on Brill 27-GE-1 trucks, from Pierson, Roeding & Company. The American Car Company will build these cars.

TRADE NOTES.

S. Severance, who has been president and manager of the S. Severance Manufacturing Company, Glassport, Pa., will sever his connection with that company on Sept. 1.

Perry Ventilator Corporation, New Bedford, Mass., reports the receipt of an order for ventilators for twenty-five cars now being built for the Boston Elevated Railway by the Osgood Bradley Car Company.

The J. G. Brill Company, Philadelphia, Pa., reports the receipt of an order for three 30-ft. first-class passenger cars complete, mounted on Brill 57-D trucks, from Angel Jaramillo & Co., New York, N. Y., for export, and twenty-two Brill 21-E trucks from Tramways Capodimonte, Naples, Italy.

American Locomotive Company, New York, N. Y., has transferred Henry W. Swoyer from the Richmond plant of the American Locomotive Company to its Brooks plant as general manager, to succeed W. A. Wheatley, who resigned to go with the Canadian Locomotive Company, Kingston, Ont.

Southern Car Company, High Point, N. C., has entirely remodeled its plant recently. It has spent about $20,000 on rebuilding the old structures, has installed approximately $20,000 worth of new machinery and is spending $15,000 on other improvements, such as fire protection, sewerage, lighting of plant and transfer table.

Crocker-Wheeler Company, Ampere, N. J., announces the appointment of R. T. Miller as acting manager of its Chicago office, 1330 Monadnock Building, to take effect Aug. 26, to succeed James A. Lister. The company also announces that offices will be opened in San Francisco, Room 400, First National Bank Building, Sept. 1, with John S. Baker in charge.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., reports the receipt of the following orders: Pacific Gas & Electric Company, San Francisco, Cal., ten 1000-kva, oil-insulated, water-cooled, 13,200-volt transformers; Great Shoshone & Twin Falls Water Power Company, Twin Falls, Idaho, five 75-kva, 24,000-volt, oil-insulated self-cooled transformers; Minneapolis (Minn.) General Electric Company, three 1000-kva, oil- insulated, water-cooled, 13,200-volt transformers.

Orenstein-Arthur Koppel Company, Pittsburgh, Pa., will put its new and enlarged plant, located at Koppel, Pa., on the Pennsylvania Railroad in operation about Sept. 1. This addition will give about double the former capacity of the Orenstein-Arthur Koppel Company, enabling it to fully take care of the demand for its industrial cars, portable track and other railway equipment. The new shop will also put the company in a better position to handle orders for steel cars of special design.

Alberger Condenser and Alberger Pump Companies, New York, N. Y., have opened a branch office at 97½ Peachtree Street, Atlanta, Ga., which will be in charge of R. S. McMichael. The Pacific branch office of these companies, located at 503 Market Street, San Francisco, is now in charge of C. F. Braun & Company, Inc., of which new corporation Carl F. Braun is president, George C. Singletary vice-president, and Emory S. Singletary secretary. The corporation succeeds that formerly known as Braun, Williams & Russell.

McKeen Motor Car Company, Omaha, Neb., reports that through the consular service of the United States McKeen motor cars in use on the various railroads of the United States were investigated by the Australian government railway officials and subsequently an inspector representing the Australian railways commissioners visited Omaha to make a more detailed examination. The report of this investigation was so uniformly favorable that the Victorian Railways of the province of Victoria have placed a formal order for two standard 70-ft. gasoline-motor cars, to be delivered in January, 1912. The cars, however, are to be designed to conform to the track gage of 5 ft. 3 in. used in that state. The government has been particular not to specify any changes in the fundamental principles of the engine and car design of the motor car as developed and perfected by the manufacturers. The cars will be equipped with the same style of buffers used on English roads and will have their standard hook and link-coupling device. The cars will be of steel and will be provided with first and second-class passenger and smoking compartments and a baggage compartment.

ADVERTISING LITERATURE

W. N. Matthews & Brother, St. Louis, Mo., have published an illustrated booklet describing the Matthews fuse switch.

Allis-Chalmers Company, Milwaukee, Wis., has published a folder describing a new air-brake expander ring which it has recently placed on the market.

Duplex Metals Company, Chester, Pa., has issued a leaflet showing graphically the advantages of its duplex-metal ground rods over plain iron and copper rods.

Duncan Electric Manufacturing Company, Lafayette, Ind., has issued Bulletin No. 20, which describes its direct-current watt-hour meters for two-wire and three-wire service.

The J. G. Brill Company, Philadelphia, Pa., has issued No. 8 of Vol. V of *Brill Magazine*. This issue contains an article on the conditions which govern the type of car for city service in St. Louis, Mo., and descriptions of several new types of cars built by the company.

Standard Steel Works Company, Philadelphia, Pa., has issued an illustrated catalog describing its steel rings, shells and ring dies and illustrating their application to various industrial needs. Among the pieces manufactured are blanks for built-up gears for heavy electric railway service, bucket wheel rings for steam turbines, rolled steel flywheel bands and steel tires for electric locomotive wheels. A table is also given in the catalog showing the dimensions of standard flanges and electric locomotive wheels.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVIII NEW YORK, SATURDAY, SEPTEMBER 9, 1911 No. 11

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.
HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President
CURTIS E. WHITTLESEY, Secretary and Treasurer.
TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

HENRY W. BLAKE, Editor.
L. E. GOULD, Western Editor.
Associate Editors:
RODNEY HITT, FREDERIC NICHOLAS, WALTER JACKSON.
News Editors:
G. J. MACMURRAY, FRANK J. ARMEIT.

CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1021 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Thursday, 9 A. M., of the week of issue.

Copyright, 1911, by MCGRAW PUBLISHING COMPANY.

Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, SEPTEMBER 9, 1911.

CONTENTS.

A Time Factor for Track Renewals..... 415
Double-Deck Cars in England..... 415
Solving the Set-Back Problem..... 416
Decreasing Fire Hazards in Old Car Shops..... 416
The Operation of Through Cars..... 417
New Carhouse of Bay State Street Railway at Brockton, Mass.... 418
Convenient Car Horse Used in Denver..... 422
Home-Made Snow Melter..... 422
Electric Railway Storeroom Accounting Methods..... 423
Reporting and Checking Car Defects in Boston..... 425
Census Report on Manufacture of Electrical Machinery..... 427
Improvements of Des Moines City Railway..... 427
Report on Transit Conditions in Syracuse, N. Y..... 428
Illinois Traction Merit System..... 430
Outing of New England Street Railway Club..... 431
Electric Express Service into Boston..... 431
Near Side Stops in Milwaukee..... 431
Hearing on Proposal of New Buffalo Corporation..... 431
Atlantic City Convention Program and Notes..... 432
Destroying Weeds on Albany, Southern Railroad..... 435
Replaceable Ear Trolley Frog..... 435
New Ball-Bearing Jack..... 435
Electric Railway Legal Decisions..... 436
News of Electric Railways..... 437
Financial and Corporate..... 440
Traffic and Transportation..... 442
Personal Mention..... 444
Construction News..... 447
Manufactures and Supplies..... 450

A Time Factor for Track Renewals

The growing practice of keeping track maintenance cost on what might be termed a unit section basis suggests the possibility of using this information to forecast the life and renewal period of newly placed material. This would be a far more difficult problem than that of determining when it no longer pays to tinker with an old installation. The first step would be to calculate the probable number, weight and speed of the cars to be moved over the given section of tangent or curved rail; the next would be to choose the track substructure and superstructure best adapted for the service, and last but not least it would be necessary to bear in mind the character of the district to be served. The way engineer's ideal is to apply the same upkeep standards throughout, but the manager often finds this impracticable. The denizens of slum and factory districts may show a calm indifference toward such track defects as low joints, corrugated rail and loose paving, while the inhabitants of wealthy districts usually consider themselves abused if a track greaser is not stationed at every curve. Any estimates of track life are therefore incomplete if no account is taken of the attitude of the community toward the upkeep of the system.

Double-Deck Cars in England

It is interesting to find that at the last meeting of the British Tramways & Light Railway Association considerable skepticism was expressed as to the value of the double-deck car. For many years this type of car has been the standard in the United Kingdom, although it has been tried and practically passed out of service on the Continent and it has been used and entirely abandoned in this country. It is proper to say, however, that British conditions are especially favorable to the use of the double-deck car. The climate there is such that an open upper deck may be used by passengers without hardship during the entire year, and for the greater part of the twelve months seats in this part of the car are preferred by the majority of passengers. Contrary to the general impression, the rainfall in the principal cities of Great Britain does not exceed in amount that in many cities in this country. The hours of rainfall may be greater, but the British cities do not have the torrential falls which would make an unprotected open deck in America uncomfortable at many times during the summer. On the other hand, the temperature in winter is much more mild than in this country. Despite these favorable conditions there has been a tendency during the last ten years to inclose the upper decks of many British cars, and at the Edinburgh convention a number of the leading delegates expressed the thought that after all a single-deck car

with trailer, such as is used on the Continent, was perhaps more desirable than the "juggernauts," as they were sarcastically called by their opponents. The principal arguments advanced in favor of the car-and-trailer plan were less destructive action on track, greater speed in receiving and discharging passengers and the ability on the part of the company to operate a lighter unit by omitting the trailer during slack hours. It is safe to say that it would take a long time to bring about a general change to single-deck cars in Great Britain, even if all the managements were in favor of such a step. The riding habits of the public there have been established by the use for many years of the upper decks of street cars and 'buses, and customs of this kind are not as easily subject to change dictated by engineering conditions as matters in which the passengers have less intimate relation, such as the type of motors or wheels, or even the kind of motive power. Again, the discussion at Edinburgh indicated that the average Englishman enjoys his pipe, and several of the managers were puzzled to know what to do with the smokers if the upper deck was abolished. Nevertheless, the fact that the subject has been raised in a serious way is an indication that there is a chance that this typical characteristic of British tramway practice may disappear, at least on some roads.

Solving the Set-Back Problem

The so-called setting back of cars—that is, of starting in a fresh crew and car when the regular outward car is so belated that the next trip would otherwise be late in starting—is one of the necessary evils of street railroading. If this method was not employed either the schedule would be completely demoralized or else a vast amount of time would have to be paid for longer regular layovers to cover possible exigencies. On the other hand, the hustle and bustle in the carhouse which surrounds the assignment of set-back crews and the high rate of pay attached to this work, even for a fraction of an hour, result in the loss of a considerable sum of money in the course of a year. Starters are not as careful about such assignments as they should be and are prone to overlook facts which have come to be daily occurrences. But if the set-back trips cannot be eradicated they may at least be controlled and the critical point should be determined at which it is cheaper to extend the layover time rather than pay the high cost of set-backs. The first requisite in a study of this kind on any particular road is to have available full information as to the extent to which the practice is being followed. This cannot always be obtained to very good advantage from the data supplied on the ordinary trip register sheets. Many conductors when they make out reports of set-back trips trust too much to their ability to remember the important facts after they return to the carhouse. Others, especially new conductors, are apt to become confused in filling in the data required by this class of service. To overcome this trouble one large company has recently adopted a special time card for set-back trips. It calls for the time of detail and relief, the schedule time of trip, the actual time of starting and return, the place where cars were exchanged, etc. As the set-back card is virtually a time card every minute of the expense is accounted for. When a man is assigned to set-back work the starter gives him one of these cards and notes the time of issue. This means that the conductor has no excuse for not supplying complete information, for he has a card properly headed upon which to enter all data at the moment and of convenient size to fit in his day-card book. The claim department has also been greatly benefited by this innovation. It is now in possession for all these trips of regular time cards which are signed and are correct so far as they can be made. The transportation department is also in a good position to study this phase of the service. With a tabulating sheet the superintendent of transportation can easily determine all the trips which are regularly set back and the average number of minutes which they are late. He may then conduct an inquiry into the causes and if the schedule is at fault it may be changed as required.

DECREASING FIRE HAZARDS IN OLD CAR SHOPS

The reduction of fire risks in old carhouses and shops deserves the continued attention of those in charge of such properties. Few large systems are without one or two such structures, and as long as progress in building construction continues it will be possible to improve the fire protection of earlier plants. One of the first impressions made upon the visitor to an old wooden carhouse or repair shop is its liability of destruction by fire. Doubtless there are many buildings of this kind in service which ought to be abandoned, but as a practical question the problem which the operating company faces is to make the most of existing facilities while working toward their ultimate replacement.

It is surprising how much can be done to improve these old shops and car-storage buildings without an undue expenditure of money. The cost of installing sprinklers may or may not be warranted in particular cases, although a surprising amount of additional protection can be gained by their discriminating installation in the more exposed section of the plant. Examination of fire hazards discloses, as a rule, many relatively inaccessible and neglected corners which are prolific breeders of trouble through the accumulation of dirt and oily refuse. There is nothing new in the gospel of cleanliness, and few things are harder to keep in practice in an old wooden shop or carhouse, but here is found the first requisite of fire prevention. It is surprising to find the amount of debris and scrap which may often be removed from a carhouse if a determined effort is made to take it away. A great deal of this material, of course, is non-inflammable and is objectionable only because it serves as a hiding place for paper, bits of wood and even for oily waste and rags. But the only safe way is to remove it so that every part and corner of the carhouse will be free of everything except the necessary equipment. Beyond this the first essential is that of confining a small blaze to a very limited area once it gets a start.

Without repeating the regulations of the insurance companies it may be noted that fire hazards can be greatly decreased by substituting wired glass for transparent skylights, by going over the wiring of pits and installing conduits throughout, and if possible by providing for the first-class drainage of pit floors. If the company cannot afford to put down concrete in place of wood on all the

wearing surfaces of the house, it may improve the conditions a good deal by substituting concrete for the old wooden or earth pit bottoms. Fuses and switches for pit lighting service should be placed on slate or marble panels installed in such a way that a short-circuit cannot flash over into an inflammable structure. Another improvement is to substitute grouped sets of incandescent lamps installed under reflectors close to the ceiling for overhead drop lights serving the walkways between pits. In some cases the readjustment of the insulating trough supporting the trolley wire in the house is an important step in the direction of avoiding trouble through irregular alignment, with possible grounds and unexpected fire results. The desirability of the installation of fire hose and extinguishers is too obvious to require comment. The main line of inexpensive improvement, apart from the installation of sprinklers, is the removal of the minor conditions liable to cause trouble from apparently trivial sources. It is not a matter of great cost to substitute screened doors for ordinary wooden doors with a few perforated air outlets in lockers, but such a change may easily save a thousand times its cost in the prevention of fire. Generally speaking, prevention is far more important in old carhouses and shops than the taking of elaborate measures to extinguish a fire after it is under way, for the reason that once a blaze gains headway the possibilities of stopping it inside the building are small.

It is questionable if money can better be expended anywhere on a railway property than in providing for improved fire-preventive measures in old buildings, which frequently contain many thousands of dollars' worth of costly rolling stock.

THE OPERATION OF THROUGH CARS

The trip of the Illinois Traction System office car from St. Louis to Cleveland and return to Peoria, Ill., which was described in this paper last week, was a striking example of the possibilities of through travel on electric railways in the Central States. While it is doubtful whether regular operation of through passenger cars over such long interurban routes will ever be very profitable in competition with the service rendered by the steam roads, the experience of these companies which are now operating comparatively long-distance, joint through service is encouraging. Among the longest services over connecting lines may be mentioned those between Cleveland and Detroit, Dayton and Toledo, Cleveland and Columbus, Indianapolis and Toledo and Indianapolis and Detroit. All of these have been regularly conducted this year for every-day or Sunday excursions with through cars run over the tracks of three or more independent systems.

In the East the connecting suburban and interurban electric railways have done comparatively little to encourage through travel by arranging for the operation of through cars. Along that part of the Atlantic seacoast, for instance, which is crowded during the summer months with visitors and excursionists, there is an almost continuous line, physically speaking, of electric railways, all of them doing a good local business. But starting from any one of the large cities the excursion traffic seldom moves beyond a very limited radius, a much smaller radius than the available transportation facilities would seem to invite. Cars of the class operated on such lines make fairly high speed and are comfortable for long rides. There is no reason why excursions should not easily be run for distances of 50 or 60 miles from the starting point and back the same day, providing suitable traffic arrangements were made to enable through cars to be operated. As it is now, if one wants to travel this distance, say along the seashore, the chances are that he will have to devote a day of abominably hard work to the excursion, going 10 or 15 miles on one road and then, after a long wait and a scramble for a seat, going about the same distance on the next section and so on to the end of the route, where the stay is necessarily shortened on account of the prospect of more waits and more scrambles on the way home. If, on the other hand, one could buy a through ticket for an excursion on a car running on a definite schedule and could proceed without change or without waits other than those necessary on single-track sidings, he could make the distance in three or four hours very comfortably and have ample time for a pleasant outing in the vicinity of his destination.

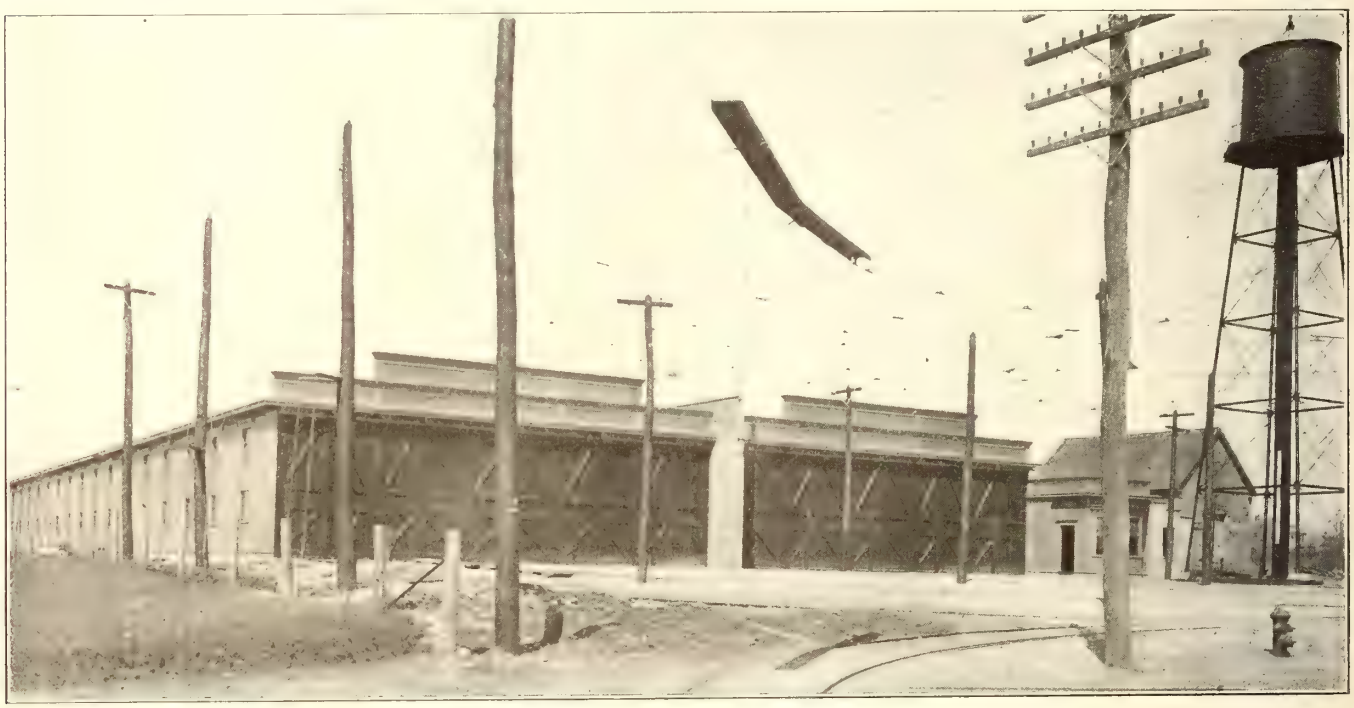
It is true that the opportunities for through travel in the East are probably not so great as those in the Central West. The competing steam service in the East is more frequent and the possible speed on the electric lines is less. It is also true that in some Eastern cities physical limitations in the special work and track and in clearances on curves might prevent the operation of through cars. Nevertheless, it would seem as if more could be done in this direction than is now being done. As it is now the public does not utilize the total facilities which are at its service, merely because these facilities are disconnected and unorganized. The condition of these short connecting electric roads doing a purely local business is little better than that of the early railroads of the country, when it was almost a point of honor for competing lines to dodge connections and to make through travel as uncomfortable as possible, each road working zealously in its own interest without a thought of the advantages of co-operation.

If there is any through business to be had on electric lines it must be developed in the way that long railway experience has shown to be profitable. If every train that ran from New York to Philadelphia or coastwise to Boston was a local train operating on a single-track road, stopping every few furlongs to take on passengers and waiting every few furlongs for more local trains to pass it, the number of through passengers would be much less than it is now. It has been found necessary in steam railway practice to establish a *modus vivendi* with other roads whereby comfortable through cars can be sent through over interconnecting lines without waits and delays and through tickets provided for the passengers. Of course in electric railway practice there is always the difficulty of moving through cars and frequent local cars on the same tracks. If the former have only a limited number of stopping places they can be kept clear of local traffic by following, or immediately preceding, one of the regular local cars and can make at least as good speed as the locals. With proper planning they can make much better speed by suitably arranging the passing points on single-track lines.

New Carhouse of the Bay State Street Railway at Brockton, Mass.

One of Four Carhouses Completed Recently by the Department of Motive Power and Machinery of the Company, All of Which Are of a Typical Design with Respect to Fire Protection and Operating Arrangements.

The management of the Bay State Street Railway, which is a consolidation of the Boston & Northern and Old Colony Street Railways, has for many years been keenly interested in the protection against fire of rolling stock stored in carhouses, and special efforts have been made in the construction of all new carhouses and in extending existing buildings to reduce the fire risk to a minimum. The two companies operates about 1000 miles of track, serving the territory surrounding Boston on the north and south and extending from Rhode Island into southern New Hampshire. The department of motive power and machinery of the combined systems has recently completed four new carhouses of a typical design with respect to fire protection and operating arrangement, located respectively at Brockton, Woburn, Revere and Reading, Mass. The largest of these carhouses is located at the intersection of West and Torrey Streets, in the western part of Brockton, nearly opposite the site of the Brockton Fair Grounds.

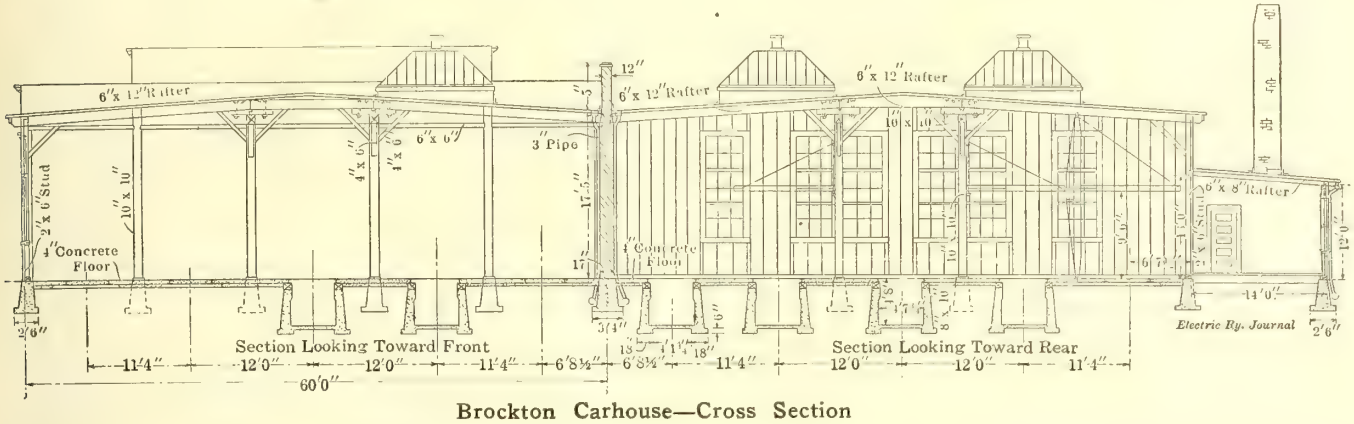


Brockton Carhouse—Exterior View Showing Tank and Tower for Sprinkler System

The new Brockton carhouse subdivides the carhouse service of the Old Colony Street Railway Division in that city, as the traffic requirements made it necessary to establish another depot instead of further expanding the existing carhouse and shop in the Campello district. The building is of mill construction, 281 ft. long by 134 ft. wide, and has a capacity of seventy double-truck semi-convertible cars, allowing 40 ft. of track per car. It consists of two sections separated by a fire wall extending beyond the building 5 ft. at each end and 5 ft. above the roof, which is of five-ply tar and gravel. A lean-to on one side extends the entire length of the building and contains an office for the operating foreman, a trainmen's lobby, lavatory, salt, sand, boiler and drier rooms, machine shop for light repairs and a stockroom. Five tracks are laid in each of the two sections of the house. All tracks are connected to a leading-in yard in front. Six of the tracks have concrete pits 4 ft. 6 in. deep, and facilities for washing cars are provided on three tracks. The floors between tracks are of cement throughout and the outer walls and doors are of wood. The roof is made of 3-in. plank, and the fire wall separating the two sections is of concrete, 17 in. thick. The foundations, piers and footings are concrete composed of one part cement, three parts sand and five parts crushed stone, maximum size to pass through a 2-in. ring. The concrete floors were mixed in the proportions of one part cement, three parts powdered stone and three parts small crushed stone. The top of the floor is lined off in 4-ft. squares. All main center posts, rafters, girders and front door posts are long-leaf yellow pine, the main rafters being 6 in. by 12 in. and spaced 7 ft. apart on centers. The sills and studding are of spruce. The floors of the machine shop, sand and salt rooms, lobby, office and lavatory are also of spruce. Two fire doors in the concrete division wall afford the only means of communication between the two sections of the house. They are located about 47 ft. from each of the end walls. The end doors are hinged to open outward. All the rooms in the lean-to section are 14 ft. wide, the lengths being as follows: Office, 14 ft.; lobby, 60 ft.; lavatories for trainmen and carhouse employees, 8 ft. each; saltroom, 14 ft.; sandroom, 25 ft.; sand drier and boiler room, 24 ft.; machine shop, 78 ft. 4 in.; stockroom, 63 ft. 4 in.

The carhouse is lighted by twenty-seven wired-glass skylights set in three rows, and by windows in the outer wall of the west section of the building, which is used almost entirely for car storage and washing. The skylights are spaced 28 ft. apart on centers, and are 7 ft. x 14 ft. Below the floor level a pipe conduit and subway extends across the building to a point about in the center of the storage division. The conduit is 1 ft. high and 2 ft. wide west of the

partition wall, and the subway is 4 ft. wide on the east side of the building. Heating and sprinkler pipe mains are carried in this conduit, and distributing pipes are taken off at the proper points. Inspection and light repairs are made in the east section of the house. Four of the pits are 254 ft. long and the other two pits 216 ft. long. One car-washing track is 92 ft. long and two others are 46 ft. long each.



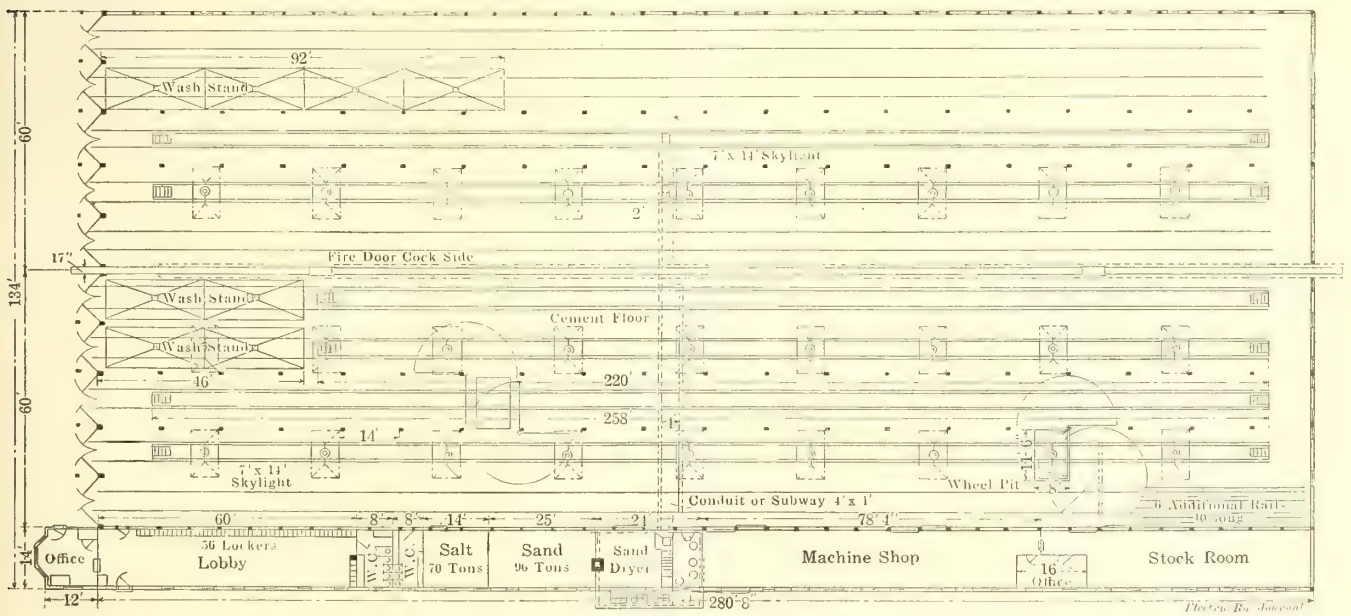
Brockton Carhouse—Cross Section

These tracks have sloping concrete floors draining into a sewer connection.

The carhouse is fully equipped with an automatic sprinkler system installed by the Rockwood Sprinkler Company, of Boston, Mass. The water supply for the system is drawn from the city service by an 8-in. main connected to a 40,000-gal. wooden storage tank mounted on a steel tower 75 ft. high; the tank is also connected with a three-way hydrant in front of the house. Just outside the building the feed line from the tank branches into two 6-in. lines, each of which is carried into the building to a separate set of dry valves from which the sprinkler mains are run. There are 562 heads installed on the ceiling and 460 in the aisles. In addition to these heads in the carhouse there are 113 heads installed in the lean-to section of the building, making a total of 1135 heads. The carhouse and other rooms in the building are also well equipped with hose, chemical fire extinguishers and sand pails.

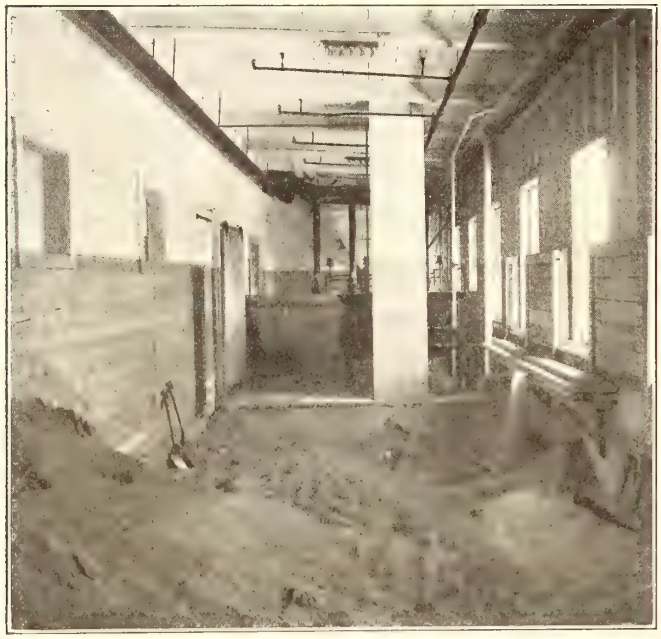
On account of the difficulty of repairing cars when sprinkler heads are installed in every aisle a compromise system was adopted. The aisle sprinklers are arranged to protect the cars only on one side, the sprinkler lines being installed along the wall with a double line along each row of posts. The sprinklers along the row of posts are installed with the heads 36 in. out from the rail and at a height of 8 ft. 6 in. above the floor. In general the heads are spaced 8 ft. apart on centers, but the double lines of sprinklers along the rows of posts are installed with the heads staggered, so that each car is protected by sprinkler heads 4 ft. apart, the second row being only 30 in. behind the first.

There are eleven lines of aisle sprinklers in the carhouse proper, the maximum distance between any two lines being 20 ft. The aisle sprinklers are supplied from the dry valve chambers by 5-in. mains which branch into smaller subdivisions as the distance from the dry valves increases, the minimum size of pipe being 1 in. The aisle sprinklers are subdivided into groups of fifty-four heads each, four dry valves supplying each half of the house. Cross-connecting lines between adjacent parallel rows of heads are 2 in. in diameter. Wherever the sprinkler lines cross the trolley wire in the house above the trolley trough the pipes are insulated with a wooden trough extending 18 in. on each side of the trolley wire. This arrangement prevents short-circuiting in case a trolley comes in contact with the sprinkler pipes, and avoids a frequent source of trouble where cars are equipped with two trolleys, one of which may be on the wire when the other is permitted accidentally to fly upward and come into contact with the grounded sprinkler piping. The ceiling sprinkler heads are installed in rows 5 ft. apart, the heads being spaced 10 ft. apart. They are served by 5-in. and 6-in. mains leading from the dry valves in each section of the house, and the smallest sprinkler line reached has a diameter of ¾ in. The

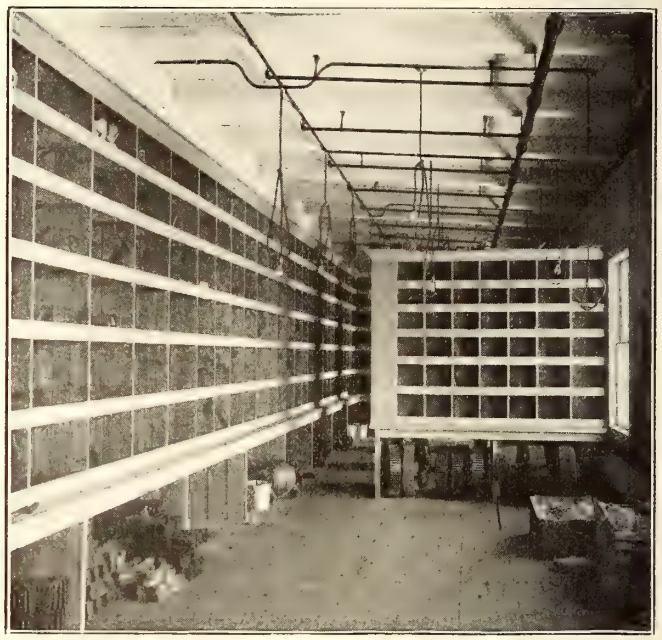


Brockton Carhouse—Plan Showing Wheel Pit Cranes

dry valves each control from 124 to 187 heads. The office and machine shop section of the building is protected by ceiling sprinkler heads covering about 40 sq. ft. each. The height of the ceiling sprinkler heads above the track level in the carhouse section varies from 17 ft. to 18 ft. 6 in. Heads are installed in each skylight at a height of 24 ft. above the rail, the head being in each case located at the hottest point in the skylight, which is in one of the upper corners.



Brockton Carhouse—Sand Bin and Drier



Brockton Carhouse—Storeroom

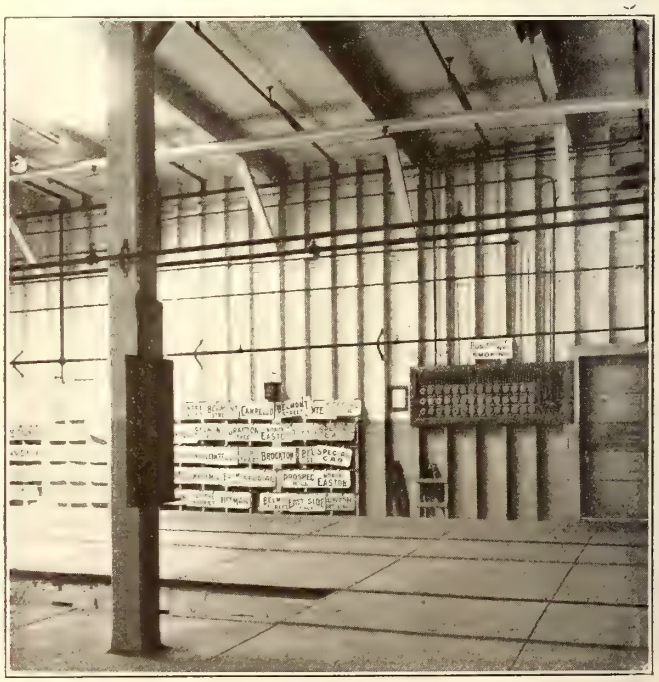
A blacksmith shop, oil house and lamp-cleaning room are provided in a separate concrete building, 72 ft. x 20 ft., located 20 ft. east of the lean-to, and near the front of the carhouse. The oilroom has a 4-in. concrete floor depressed 18 in. below the ground level, so that in case oil escapes from the barrels it cannot flow into the lean-to and carhouse. Oil barrels are stored in this room on two tracks built of worn-out rails spiked to timber bases. In the lamproom provision is made for testing arc headlights, a special circuit being brought into the room to terminals to which lamps may readily be attached. Sheet-iron troughs are installed in the lamproom to prevent the escape of oil drained from wick lanterns. The blacksmith shop is equipped with a power blower forge. The roof of the auxiliary building is of concrete, reinforced with old rails. Cast-iron columns 6 in. in diameter support the roof and the three rooms are separated by concrete division walls 6 in. thick.

The height of these rooms varies from 10 ft. to 10 ft. 7 in. The foundations of the building are of concrete, about 3 ft. in depth.

The Brockton, Woburn, Revere and Reading carhouses comply with the underwriters' requirements in substantially every particular. From the insurance point of view the use of sprinkler heads in every aisle would have been desirable, but the insurance engineers recognized that the operation of the carhouses would be hampered if every aisle were equipped. The construction of these four houses is such as



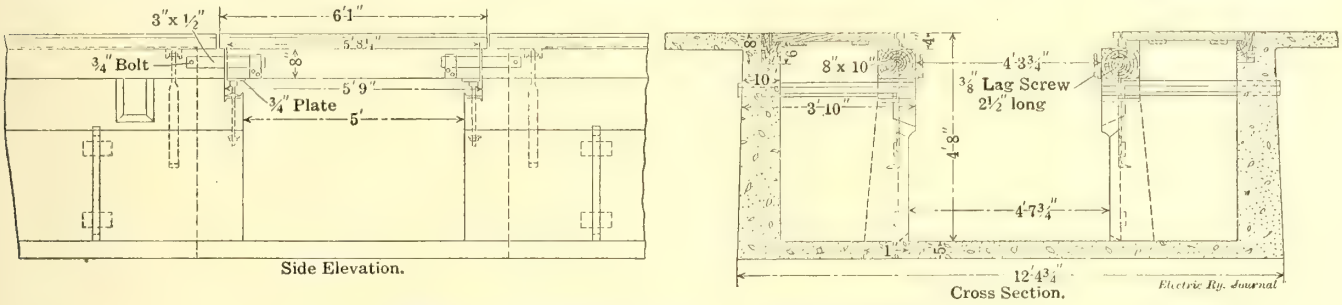
Brockton Carhouse—Machine Shop



Brockton Carhouse—Switchboard for Lighting Circuits

to give the railway companies the benefit of a substantial reduction in insurance premiums.

Two wheel pits, 8 ft. x 11 ft. 6 in., are provided at Brockton for the convenient removal of wheels. These are served by jib cranes of 12-ft. radius, air pit lifts and 15-ton hydraulic telescoping jacks. The jacks are portable and a car



Brockton Carhouse—Details of Wheel Changing Pits

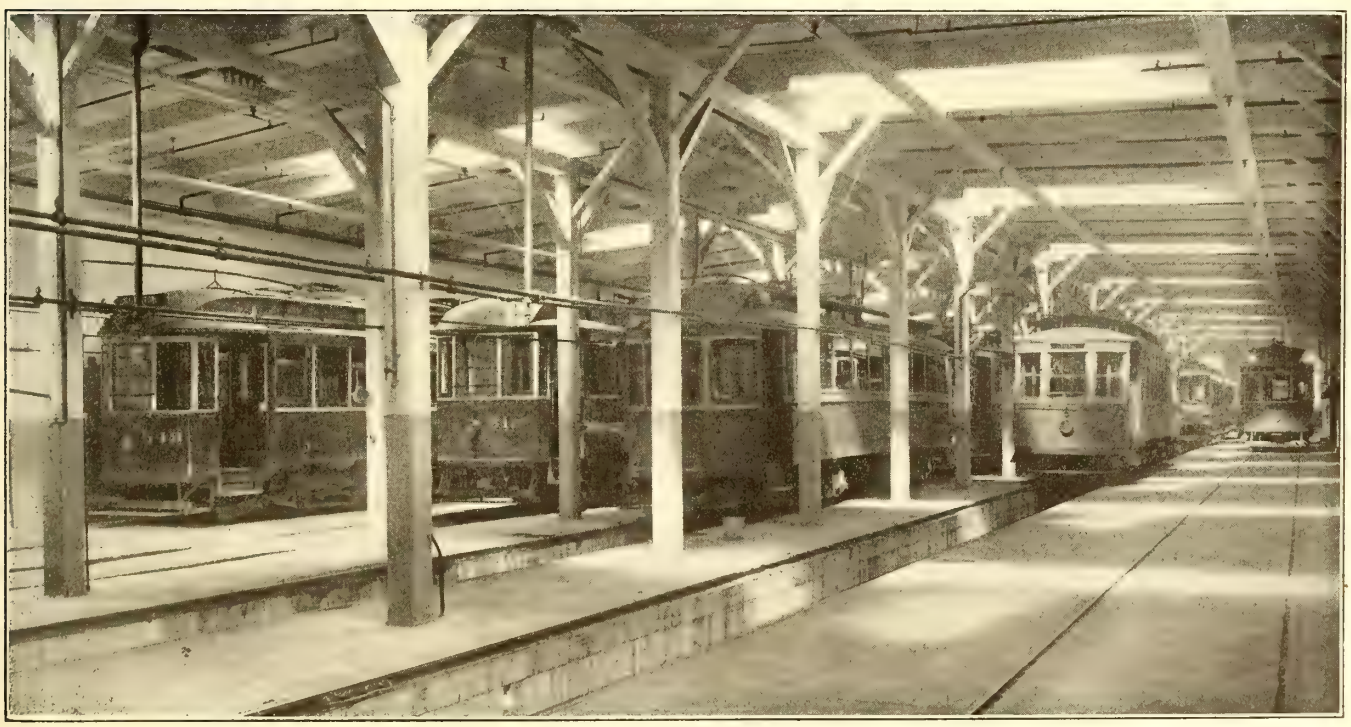
body can be lifted to the full length in any part of the house without the aid of blocking.

All the wiring in the building is installed in conduit with "Condulet" outlets. The lighting and power service is supplied from the trolley circuit and is controlled from a switchboard installed inside of the house near the front entrance. The switchboard consists of a slate panel bordered by a wooden frame of neat design, the panel carrying forty-two snap switches and inclosed fuses, a main single-pole knife switch and fuse and a motor switch and fuse. Each circuit switch is labeled. The electric lighting was designed to give a liberal degree of illumination without waste of current and lamps. The lights in each half of each pit are controlled on either side by a switch at the end of the pit. The switches and pit lights are installed in concrete pockets in the sides of the pits, the reflection of the white interiors helping materially in the illumination. The walls at the

life of the lamps in the machine-shop section was shortened by their proximity to an overhead belt carrying a considerable static charge which tended to bring the filaments into contact with the glass bulbs. The difficulty was overcome by the expedient of installing a miniature lightning rod or ground wire with a pointed end near the belt and connecting the other end of the bare wire to the piping of the sprinkler system, thereby providing a continuous path for the removal of the charge which previously accumulated on the belt.

The machine shop and stockroom are separated by an office for the repair foreman and for the recording of supply parts issued. As only light repairs are carried on in the four carhouses recently built, the tools are not elaborate or numerous. The Brockton shop is equipped with a 20-in. x 12-in. engine lathe, a 1½-in. emery grinder, one grindstone, a pinion puller, an air compressor of 50 cu. ft. per minute capacity, which supplies compressed air for the hoists, wheel-pit tables and cleaning, an auxiliary air compressor for the sprinkler system and a "WP" railway motor used for driving the machine tools. Two storage tanks each of 24 cu. ft. capacity are used in connection with the air compressor.

The stockroom is arranged with tiers of bins designed to



Brockton Carhouse—Interior View in Storage Bay

sides and ends of the carhouse are also illuminated with single lights installed about 10 ft. apart, with plugs and extension cords. The overhead lights are arranged in clusters of five lamps each, installed in a wooden trough, 12 in. x 8 in., lined with "transite" and painted white on the inside to increase the reflection of light. It was found that the

permit the storage of heavy parts on the floor and also the separation of new from second-hand repair parts. The bins now standardized embody a flexible feature which has been found useful in the Campello shops of the company. Each pair of bins is formed by a movable partition carried in a pair of closely fitting slotted wooden blocks, located one at

the top and the other at the bottom of the bin. Permanent partitions are installed at frequent intervals, but the use of the portable bin walls enables the size of each bin to be altered according to the size and quantity of material on hand and cuts down the amount of wasted space to the minimum. Waste boxes lined with sheet tin are provided; the boxes are arranged to be pulled out easily from beneath the workbenches, and the covers are arranged to open at the sides and be held in position by chains. Similar rag boxes are in use. The stockroom lights are provided with flexible drop cords and adjusters to facilitate working at different bin levels.

The heating system consists of open coils in the carhouse and pits, and radiators in the office, lobby and shops. A low-pressure boiler supplies the steam and its location beneath the sandroom and dry valves for the east half of the house has proved very satisfactory. A small coal pocket is located at the boiler room floor level, with provision for a gravity supply from wagons or cars above. In the trainmen's lobby fifty-six metal lockers are provided, one being allowed for each pair of men. The lockers are 18 in. x 12 in. in section by 72 in. high. Hot and cold water is provided in separate washrooms for the trainmen and carhouse employees. A ten-station watchman's clock system is installed throughout the building. The foreman's office contains a table of car-wiring data, first-aid equipment and a telephone connecting with the general offices. A safe for the reception of money collected on the cars is also placed in the office. It has a slotted opening in the top of sufficient size to receive money in bags.

The Woburn carhouse has a capacity of fifty cars, as has the Reading house, and the capacity of the Revere house is sixty cars. The Brooklyn house was built by day labor under the company's supervision. The sprinkler systems at Woburn and Revere were installed by the General Fire Extinguisher Company of Boston, Mass., that at Reading



Brockton Carhouse—Trainmen's Room

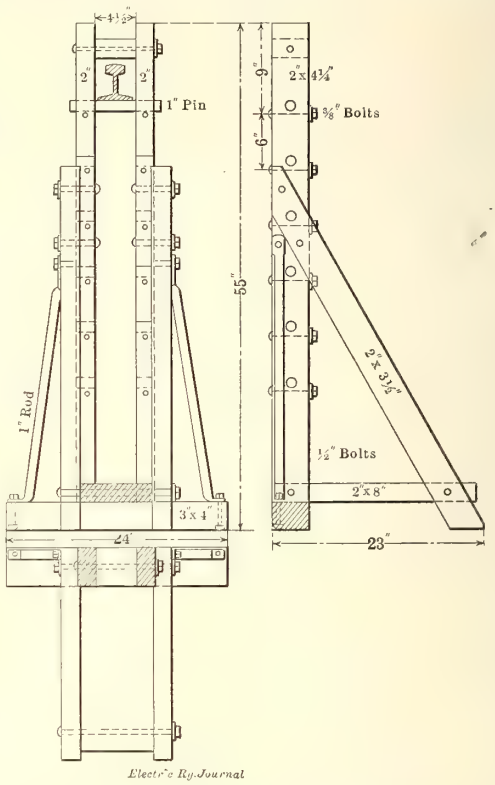
being furnished by the Rhode Island Supply & Engineering Company, Providence, R. I.

The designs of the four carhouses were made by the department of motive power and machinery—C. F. Bancroft, superintendent; E. W. Holst, superintendent of equipment, and G. F. Seibel, supervising architect.

Negotiations are under way to consolidate the tramway and electricity supply companies in Constantinople with a capitalization of $12,500,000.

CONVENIENT CAR HORSE USED IN DENVER

The accompanying illustration shows a home-made type of car horse used in the shops of the Denver City Tramway Company in place of the usual pair of barrels required to hold a car body in position in the absence of a truck. The horse is built of oak members, 2 in. x 4¼ in. in cross-section, the timbers being braced at the bottom of



Plan and Elevations of Car Horse

the framing by two 2-in. x 3½-in. pieces and tied together at intervals by ⅜-in. bolts. The horse is also braced at the bottom by 1-in. rods bent to an upset which is bolted respectively to the base and upright members. The small bolts tying the structure together are spaced 6 in. apart on centers. The horse is 55 in. high, and is provided with a 4½-in. spacing block at the top. The two principal members are bored at six levels 6 in. apart on centers for the insertion of a 1-in. steel pin to carry the cross-rail which supports the car body end sill. The bottom of the horse can be set in a space 23 in. wide by 24 in. long and about 20 ft. of lumber are required in its construction. The cost of the horse complete, including labor and material, was less than $3.

HOME-MADE SNOW MELTER

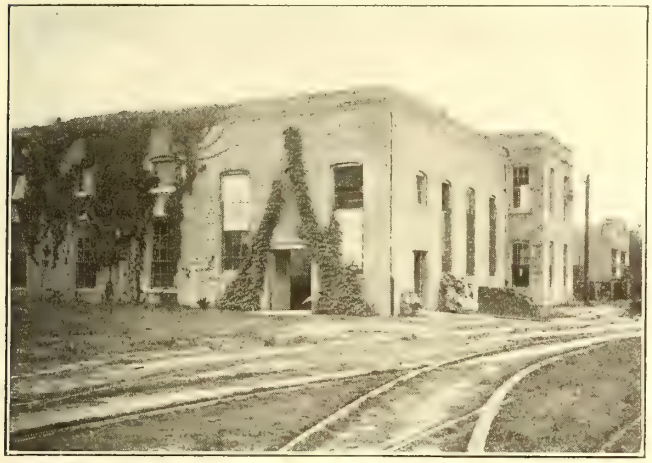
An oil burner of special design has been built for melting ice and snow from the running gear of the cars of the Chicago, South Bend & Northern Indiana Railway. This burner is a product of the new South Bend shops of that company, where it is used. It is designed to throw a flame 5 ft. or 6 ft. in length along the pit beneath a car and thus quickly melt away the snow and ice adhering to the trucks. The burner and tank are mounted on a truck so that they may be wheeled from one pit to another. The oil supply tank consists of a cylindrical reservoir 40 in. long by 15 in. in diameter. This tank is equipped with attachments for receiving one hose connected with the shop air pressure and another leading to the burner, which is attached to the end of a 5-ft. length of iron pipe. The use of the oil burner with its large flame is said to reduce greatly the time required for making slight repairs to cars.

Electric Railway Storeroom Accounting Methods

A Discussion of the General Principles of Storeroom Accounting and Stock Keeping and a Description of the New Storeroom and Record Forms of the Mobile Light & Railroad Company

BY M. W. GLOVER, SECRETARY AND AUDITOR MOBILE LIGHT & RAILROAD COMPANY

To be satisfactory an accounting system must be elastic. The purpose of a storeroom accounting system is to account properly for all material purchased and used; but the location of the storeroom, its relation to the departments served, and the ability and experience of the storekeeper, may necessitate certain changes in details to meet the local conditions. A theoretical system may be outlined which will



Mobile Storeroom—Exterior View

afford a perfect record, but, when put into practice, it may not prove satisfactory or it may be too expensive for the protection afforded. A practical test is always advisable before a decision is made upon a storeroom accounting system for any property.

All material should be bought by a purchasing agent, or someone familiar with the prices and quality of material, as it is not always the cheapest that is the most economical. To get bids on supplies and then close with the concern making the lowest bid, without going into the quality of the material to be furnished, is not good practice. Except on a very small property, a conscientious and capable purchasing agent will save his company many times the cost of his services.

When material is ordered, a copy of the order should be furnished the storekeeper to enable him to check the material properly when it is received. Whether or not the storekeeper should be furnished with the prices is a question to be determined by conditions. In my opinion there is no objection to having the storekeeper know the price of each article in the storeroom, as in many cases he can use this information to determine the relative value of the same material furnished by different supply houses. Of course, the storekeeper's price list should not be subject to inspection by any other employees, and it is taken for granted that the storeroom records will be kept private and will not be open to inspection except by proper authority.

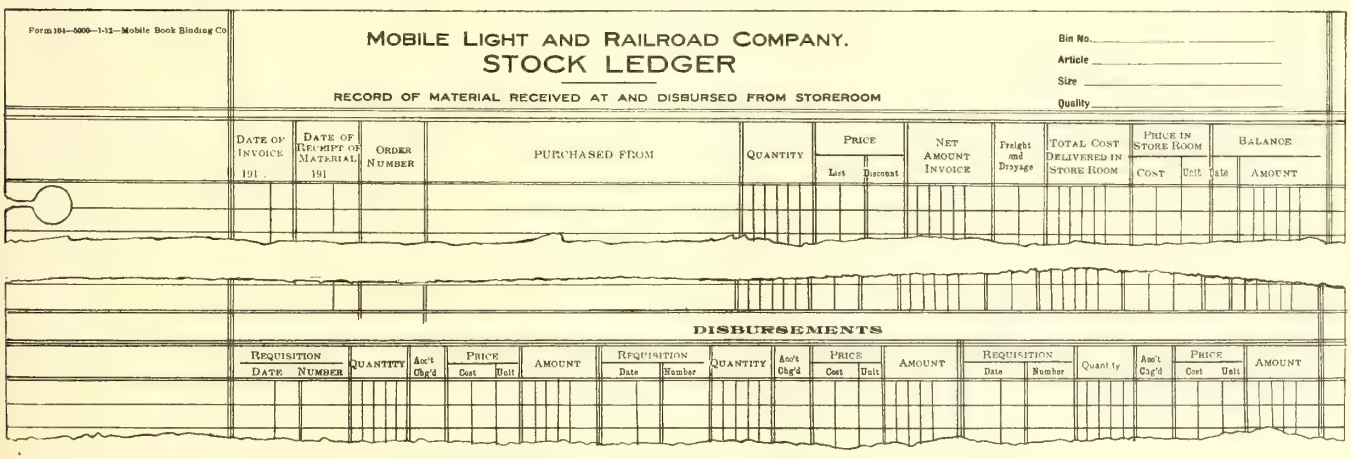
A storeroom without a storekeeper is a useless expense. The storekeeper should be under the jurisdiction of the purchasing department in all matters pertaining to the purchase and receipt of material, but should report to the accounting department in all matters relating to the issue of and the accounting for material.

No material should be issued except on a requisition properly approved, and all supplies issued and not used should be returned to the storeroom and the proper credit given. Before replenishing his supply of any material the storekeeper should consult the head of the department using this material to determine if any changes in the specifications will be made. Failure to do this sometimes causes the storeroom to become overstocked with obsolete material or material that has become useless on account of changes in standards adopted. The superintendent, roadmaster and master mechanic may fail to notify the storekeeper when a change is determined upon, but the storekeeper should consult them before ordering a new supply of material in order that this trouble may be avoided.

The losses through obsolete electrical material are enormous, as changes in standards are being made constantly in all departments, through the development of the science of electricity and through new inventions which are being placed on the market constantly.

A cheap storekeeper is not an economy to his company. A storekeeper should be familiar with the material and know its uses, but it is not necessary that he should be a skilled mechanic. On the other hand, he should not be simply a bookkeeper, or he might be unable to suggest uses for certain material, and as a result a lot of dead material will accumulate, much of which might be used for some purpose if brought to the attention of the proper parties. When obsolete material accumulates it should be sold, as very little material improves with age.

In my opinion an association of purchasing agents, or


Form 104—5000—1-12—Mobile Book Binding Co

MOBILE LIGHT AND RAILROAD COMPANY.
STOCK LEDGER
RECORD OF MATERIAL RECEIVED AT AND DISBURSED FROM STOREROOM

Bin No. _____
Article _____
Size _____
Quality _____

Date of Invoice 191	Date of Receipt of Material 191	Order Number	Purchased From	Quantity	Price List	Price Discount	Net Amount Invoice	Freight and Drayage	Total Cost Delivered in Store Room	Price in Store Room Cost	Price in Store Room Unit	Balance Date	Balance Amount

DISBURSEMENTS

Requisition Date	Requisition Number	Quantity	Acc't Chg'd	Price Cost	Price Unit	Amount	Requisition Date	Requisition Number	Quantity	Acc't Chg'd	Price Cost	Price Unit	Amount	Requisition Date	Requisition Number	Quantity	Acc't Chg'd	Price Cost	Price Unit	Amount

Mobile Storeroom—Page of Stock Ledger

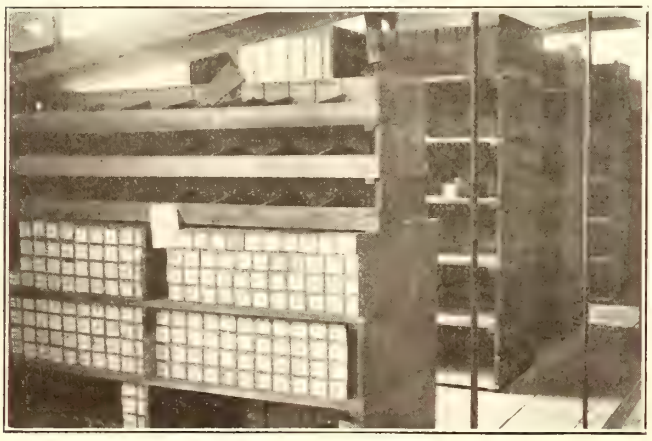
some means of interchanging information about material on hand, would be desirable. One company might use a certain type of car or line equipment and have on hand a large supply of extra parts. Should a new standard be adopted, these parts, while perfectly good, would become useless, and if it were possible to interchange information with another company using the parts in question many dollars which are now lost would be saved. Nearly every-



Mobile Storeroom—Portion of Interior

one familiar with storeroom accounting can recall thousands of dollars lost which might have been saved if proper means had been adopted.

The requisition on which material is issued should show the use to which it will be put and the name of the operating expense or other account chargeable. A stock ledger should be kept showing each article in the storeroom; this record should show the amount received, the date, from whom received (if desired), the price as invoiced, freight and drayage charges and the unit cost. On the credit side the ledger should show the date, requisition number, amount issued, accounts chargeable and value. An inventory should be taken at least once a year, or oftener if practicable, and the ledger balance adjusted to the inventory value. It has been found almost impossible to avoid some adjustment between the inventory and ledger balances, although theo-

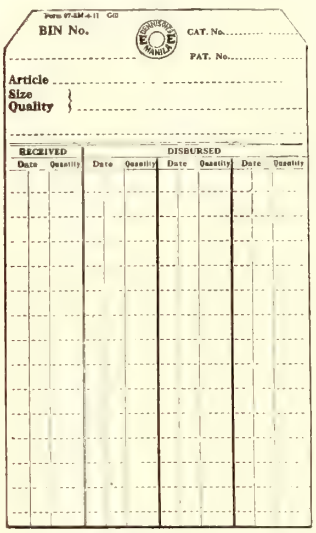


Mobile Storeroom—Storage Bins

retically there should be no difference. With some lines the stock ledger is kept in the accounting department, but usually it has been found more satisfactory to have this record kept by the storekeeper. A representative of the accounting and purchasing department should always be present when an inventory is taken.

The handling of second-hand material and scrap is very important, and unless a proper record is taken of all second-hand and scrap material, as soon as it begins to accumulate, considerable loss will result. All scrap should be collected and stored promptly, and an estimated value placed upon it, with credit to the proper expense accounts of such estimated value. As soon as scrap accumulates it should be sold, as it is very seldom that old material improves with age, and, while fluctuation in the price of metals may warrant the holding of some material for a short time, it is not desirable to keep it indefinitely in the hope that prices will go up. Any difference between the estimated value placed on the scrap and the actual price at which it is finally sold should be taken care of through the accounts, and the scrap account should be kept by the accounting department separate from the material and supplies account.

This company built a storeroom recently and it became necessary to provide a system of accounts for handling material and supplies that would afford proper protection and at the same time would not be too expensive. It is surprising how many different methods of storeroom accounting are in use by different companies, each line believing its system the best. Before building a storeroom and deciding upon a system of accounts the writer and S. M. Coffin, master mechanic, visited a number of cities and inspected the storerooms and methods of accounts used, with a view to the adoption of the system best suited to our needs. Many valuable suggestions were made, and the arrangement of bins and the system of accounts adopted are the result of an examination of the various plans used in the cities visited.



Mobile Storeroom—Stock Bin Ticket

The bins in which the material is stored are built on the sectional unit plan; all except a few are movable and so arranged that the sections may be interchanged as desired. In each sectional unit the partitions are movable, which gives greater elasticity. This plan was suggested by the purchasing agent and the master mechanic at Birmingham, Ala., and has worked out in a most satisfactory manner. The sections can be built up to any height desired, but it is not considered advisable to have them over 8 ft. or 10 ft. high unless the floor space is so limited as to make a greater height necessary.

The storeroom is of brick construction with three separate apartments, with fire doors and other conveniences for fire protection. Each room has a gallery 10 ft. from the floor, supported by hangers from the roof. These galleries are 8 ft. to 10 ft. wide and afford considerable additional room for storage. The floor of the storeroom is of concrete, and fireproof construction is used throughout.

FORMS USED FOR ACCOUNTING

The following forms are used in accounting for material, and an explanation of each will be given:

Requisition on purchasing agent for material, made by the storekeeper or head of department and approved by an executive officer.

Purchasing agent's order, in quadruplicate; original to the shipper, one copy to the auditor, one to the storekeeper and one for the purchasing agent's file. This form is published on page 425.

Storekeeper's stock ledger; kept by the storekeeper, showing all material received and issued. The headings of the ledger are published on page 423.

Requisition on storekeeper, in duplicate; original to the storekeeper, copy retained by the maker; price and value

to be inserted on the original by the storekeeper. Each requisition must bear the approval of a foreman or head of department.

Recapitulation of material issued; made by the storekeeper monthly and sent to the auditor, showing the value of all material issued and accounts chargeable. Credit for material returned to the storeroom should be shown in red ink.

Advice to auditor of material received and invoices passed; made by storekeeper monthly, showing all invoices passed during the month and used to balance the storeroom account.

In addition to the above forms a card may be attached to each bin showing the name of the article, the quality, the quantity, etc., which facilitates the checking of the inventory and is useful as a guide to the storekeeper. This

ORIGINAL

Form A M Rev.—1a—W.B.D.—12-08

MOBILE LIGHT & RAILROAD COMPANY
MOBILE, ALA.

Order No.
Req. No.
Date

To

Please deliver to this Company the following articles and note instructions:

Deliver no Goods for us without an order. Mail all Bills to the Company in Duplicate. Please enter each item separately. Do not combine. Bills rendered for less than $1.00 will not be paid. All deliveries must be accompanied by manifest, bearing Order No., which must agree with order. Bills rendered without Order No. will not be paid. Bills must be rendered in duplicate. All Boxes, Packages and Bundles must bear our order No. and name of Consignee. Invoices received up to last day of month will be paid on the 20th of month succeeding delivery. The above instructions are important and will be required by this Company.

Please Read

Deliver to
Care of Mr.
Ship via

MOBILE LIGHT & RAILROAD CO.
By
Purchasing Agent

Mobile Storeroom—Purchasing Agent's Order

card, which is published on page 424, is an additional record and is not absolutely necessary, but its use is approved by many storekeepers as a matter of information.

While this system is not perfect it answers all purposes and is as simple as possible, consistent with good accounting principles. Some may think that it requires too much work and provides too many records, but shortages in material are just as expensive as shortages in cash and there is no reason why one should not be safeguarded as much as the other. Elaborate systems of accounts are planned to protect the cash collected daily, which amounts to a few thousand dollars, and it is placed in a bank promptly, while many companies leave the storekeeper in charge of material which costs many times the amount of cash handled daily, without an adequate system of storeroom accounts to protect the company from loss. It is better to have a few extra records and protection than to omit these records and take chances of shortages.

The four street railways operating in Barcelona, Spain, have arrived at an understanding whereby the entire system will be managed by one of the companies, a Belgian enterprise called Les Tramways de Barcelone. The capital and length of the lines of the various companies follow: Tramways de Barcelone, $1,980,000 capital, 19.50 miles; General de Tranvias, $1,069,380 capital, 1832 miles; San Andres and extensions, $1,080,000 capital, 19.38 miles; Sarria Barcelona, $360,000 capital, 4.72 miles; total, $4,489,380 capital, 6192 miles. Of the four companies mentioned the first is wide-gage and the remaining three narrow-gage. The capital of the company Les Tramways de Barcelone, which consisted of 110,000 shares of 100 francs ($19.30) each, has been increased to 134,000 shares at the same value, making a total capital $2,586,000.

REPORTING AND CHECKING CAR DEFECTS IN BOSTON

BY EDWARD DANA, ASSISTANT TO THE SUPERINTENDENT OF TRANSPORTATION BOSTON ELEVATED RAILWAY

Early in the year 1910 it was found that the superintendent of rolling stock and shops of the Boston Elevated Railway was not securing the necessary knowledge of every car defect which occurred. His information was obtained from the log sheets of the several pit foremen and since these men had a natural desire to make a favorable showing as compared with other carhouses they would enter only such defects as necessitated the removal of a car from service or such troubles as had caused an appreciable delay to traffic. The discretion thus vested in those who were selfishly interested in keeping the reports of defects at a minimum was the weak point in the existing system. There was at the time no thorough and effective check between the transportation department and the mechanical department, with a result that many minor defects, such as blown fuses, broken register cords, poorly adjusted brakes, etc., which in their sum total characterize the efficiency of the carhouse force, constantly occurred and yet were not brought to attention in their true importance. It therefore became necessary to make certain changes in order to insure the desired

Defects Noted in Car .....

Date ..... Time ..... M

By Conductor ..... No. .....

By Motorman ..... No. .....

BODY	MIN. DEL.		MIN. DEL.		MIN. DEL.
Bell		Trolley Cord		Contactors	
Bell Cord		Trolley Base		Controller	
Cards, Adv. & Pub		Trolley Wheel		Fuse Box	
Curtain		Tail Lights		Fuses	
Cushion		Ventilators		Head Light	
Dasher		**MECHANICAL**		Heater or Switch	
Door Car		Air Brake Fuse		M Motor Switch	
Door, Pneumatic		Air Brake		Master Controller	
Door Vestibule		Air Gauge		Motor	
Draw Bar		Air Compressor		Moto Flash	
Draw Bar Rest		Air Pipe Leaks		Motor Susp	
Fender		Air Valves		Lamps	
Fender Castings		Axle		Lead Wires	
Floor		Brake Dog		Light Sw. or Fuse	
Glass		Brake Handle		Pump Governor	
Gong		Brake Rod		Relays	
Grab Handle		Brake Shoe		Resistance	
Hand Strap or Rail		Brake Staff		Reverser	
Lifeguard		Brakes		Rheostat	
Register Clocks		Gear and Casing		Sign Lights	
Register Cord		Hot Box		Gauge Lights	
" Cord Hanger		Shaking		**MISCELLANEOUS**	
Roof Leaks		Snow Scraper		Clothing Caught	
Running Board		Springs, Journal		In Collision	
Sand Box or spout		Squealing		Derailed	
Seats		Wheel		Paint Sticky	
Seat Arm		Bolster		Dirty	
Side Bar		**ELECTRICAL**		Slow	
Signs		Bucking			
Step or Hanger		Cable			
Trolley Catcher		Charged			
Trolley Pole		Circuit Breaker			

REMARKS

A Conductor or Motorman observing any defect while running a car must fill out this form and at once turn it in to the Starter or Station Master in charge of station.
Mark minutes delay in space opposite defect noted.

Fig. 1—Car Defect Records—Trainmen's Report

Daily Record of Defects Reported in Cars by Car Crews:

Carhouse .....

Station Master
Starter .....

5 A. M. ..... to 5 A. M. following Day

Time Occurring A. M.	Time Occurring P. M.	Car Number	Delay	DEFECT REPORTED

Enter Defect as printed in Defect Slip

Fig. 2—Car Defect Records—Carhouse Record of Defects Reported

effective check on defects so that those concerned should have prompt and accurate knowledge of the condition of the equipment and of its efficient repair. The system at present in operation is as follows:

Motormen and conductors are enjoined to report every defect, injury or accident to a car which affects its proper

condition for service, causes delay on the street or requires it to be taken out of service. This report is made out on Fig. 1 (Form 6092). It is handed to the station master or starter in charge as the car is brought in.

The information on the defect slip is then entered on Fig. 2 (Form 6009), which is in duplicate, green and white, and the slip itself is delivered to the pit foreman together with the defective car. The pit foreman enters the defect on his log, Fig. 3 (Form 6128), in duplicate and later completes the history by adding what trouble was actually found, who made the repairs, how much time they required, etc.

All defective cars which are reported during the day to the division headquarters by starters, inspectors, etc., are entered on Fig. 4 (Form 3422A), a green card 6 in. x 12 in. If the delay was three minutes or more it is telephoned to the superintendent of the day, who is located at the general offices of the company, and he in turn enters it on Fig. 5 (Form 3400), a green card 6 in. x 12 in. in size.

The foregoing statement gives the daily routine of reporting prior to any checking. It will be seen that there is a running account at each division office and at the general office right through the day, and upon the occasion of a serious defect the superintendent of the day can immediately notify the superintendent of rolling stock and shops so that the latter may investigate at the earliest moment.

The original defect slip, Fig. 1, both the original and the duplicate of the starter's summary, Fig. 2, and the duplicate of the foreman's log, Fig. 3, are sent each day to the division office. Here they are carefully checked, together with the telephone report card, Fig. 5. All errors or omissions in any one of them are corrected and the attention of the party responsible is called to the same.

Thereupon the duplicate of the foreman's log, Fig. 3, is forwarded direct to the superintendent of rolling stock and shops. From these logs are tabulated the monthly statements of car troubles which are taken up at the monthly meetings of the carhouse foremen.

At the same time the original of the starter's summary (Fig. 2) is forwarded to the superintendent of the day, who is located in the office of the superintendent of transportation. As there are twenty-five carhouses, he receives as many sheets. After checking these reports with the telephone report card (Fig. 5), which he completes where necessary, the superintendent of the day abstracts by marking onto total defect cards, of which there is one a month for each carhouse. On the reverse side of these cards he enters the duration of the delay in minutes against each defect. The superintendent of transportation's monthly statement of car troubles, showing every individual defect by carhouses, is tabulated from these cards. The starter's summary, Fig. 2, is then forwarded to the superintendent of rolling stock and shops for reference purposes.

It is an interesting fact that after passing through so many hands the difference between the two sets of monthly summaries for April, 1911, was just 1 per cent, which is inappreciable. It will be observed that the above system accomplishes the desired end, accurate and truthful reports. It supplies the following day complete information to the division office, the superintendent of transportation and the superintendent of rolling stock and shops of the performance of the equipment the day before.

During the month of April, 1911, there were 3227 defects, ranging from a disordered window curtain causing no delay to a dropped gear case which caused cars to be diverted for a considerable period. The list follows:

	Number of Defects.	Percentage of Total Defects.
Car body	1,440	44.6
Motors	670	17.6
Control	390	12.0
Trucks	156	4.8
Brakes	231	4.1
Trouble reported; nothing found	340	10.5
Total	3,227	

Mileage operated, 3,695,262.

Reported ratio of defects per 1000 miles, 0.87, or one defect for every 1145 miles operated. Actual ratio of defects per 1000 miles (trouble reported, but nothing found on shop inspection), 0.78, or one defect for every 1279 miles operated.

This compares most favorably with the reports of results obtained on other large properties. It indicates what reliable street car service is offered in Boston, where the conditions of street railway operation are most arduous. There is probably no city of equal size which has so many different grades, short-radius curves and narrow streets as Boston, and the strain on the equipment is correspondingly severe.

These figures are also a compliment to the thorough, highly efficient maintenance organization of the company, which in the past few years has made a remarkable reduction in the number of street car defects.

Weather A. M. Car House DAILY REPORT for 24 hours from 7 A. M. 191 Weather P. M.

CAR NO	TIME IN	TROUBLE REPORTED	TROUBLE FOUND	REPAIRED BY	Time Repairs Completed	CARS FOR INSPECTION	REMARKS

This sheet must be signed by each Foreman during his period of duty—original filed in the Car House and Carbon Copy forwarded to Office Supt. Rolling Stock and Shops

Signed. Night Foreman. Signed, Foreman

Fig. 3—Car Defect Records—Carhouse Foreman's Log

Div.

DEFECTIVE CARS AND DERAILMENTS

5 A. M. 191 to 5 A. M. Following Day

Time Occurring	LOCATION	Car	Carhouse	Conductor Motorman	Delay	CAUSE	DETAILS	Action Taken

Fig. 4—Car Defect Records—Division Record of Car Delays

Surface Cars Reported Defective, Causing Delay or Accident and Derailments

S. of Day

5 a. m. ..... to 5 a. m. following day. S. of Day

Time of Delay	Time Reported	Car No.	Car House	Location of Delay or Accident	Min Del	Reported Cause	REMARKS: Lines Affected or Diverted

Fig. 5.—Car Defect Records—Log of Superintendent of the Day

CENSUS REPORT ON MANUFACTURE OF ELECTRICAL MACHINERY

A preliminary statement showing the general results of the Thirteenth Census of establishments engaged in 1909 in the manufacture of electrical machinery and apparatus was issued Sept. 5 by Census Director E. Dana Durand. The report was prepared under the direction of William M. Steuart, chief statistician for manufactures. The reports were taken for the calendar year ended Dec. 31, 1909, whenever the system of bookkeeping permitted figures for that period to be secured, but in some instances they relate to the business year falling most largely within 1909.

The value of the machinery and apparatus manufactured for use in the generation and utilization of electricity increased from $105,832,000 in 1899 to $159,551,000 in 1904 and $243,967,000 in 1909, or 130 per cent during the decade.

GENERATORS, TRANSFORMERS, ETC.

Dynamos, motor-generators and similar machines constitute the most important generic group of electrical machinery. The number of dynamos manufactured annually increased from 10,527 in 1899 to 15,080 in 1904 and 16,791 in 1909, an increase of 59 per cent for the decade. The value of the dynamos for each year was $10,473,000, $11,084,000 and $13,081,000, respectively. The average capacity per machine increased from 55 kw in 1899 to 66 kw in 1904 and 84 kw in 1909. The value of the dynamotors, motor-generators, boosters, rotary converters and double-current generators manufactured increased from $380,000 in 1899 to $3,155,000 in 1909, or 730 per cent.

The value of transformers manufactured increased from $2,963,000 in 1899 to $4,469,000 in 1904, or 51 per cent, and to $8,801,000 in 1909, or 197 per cent. The value of the switchboards, panelboards and cut-out cabinets for light and power increased from $1,847,000 in 1899 to $3,766,000 in 1904, or 104 per cent, and to $5,972,000 in 1909, or 223 per cent.

MOTORS

The total value of motors of all kinds, including supplies and parts, manufactured increased from $19,505,000 in 1899 to $22,371,000 in 1904 and $32,087,000 in 1909, or 64 per cent for the decade.

The number of power motors manufactured annually increased from 35,604, valued at $7,551,000, in 1899 to 79,877, valued at $13,121,000, in 1904, and to 244,123, valued at $18,306,000, in 1909, there being an increase of 586 per cent in number and 142 per cent in value for the decade. Many powerful motors were manufactured, but the number of small motors has increased so rapidly that the average capacity per machine has declined, the average horsepower per motor for the three census years being 14.5, 8.5 and 6.7 respectively.

In 1899 there was great activity in the manufacture of motors for automobiles, but the increase in this branch of industry has not kept pace with that for other classes of electrical equipment. The number manufactured decreased from 3017 in 1899 to 1819 in 1904, with an increase to 2,796 in 1909. On the other hand, the capacity of motors reported increased 4251 hp, or 52 per cent, during the decade. The number of fan motors increased from 97,577 in 1899 to 102,535 in 1904, and 199,113 in 1909. The value of these motors increased from $1,055,000 in 1899 to $2,451,000 in 1909, or 132 per cent.

Unfortunately the statistics of motors for electric railroad cars are not separated. The report says that this cannot be done without disclosing the products of individual establishments, but there was a good increase in the manufacture of such motors as compared with the production of 1904, which was 12,298, of 713,181 hp, valued at $4,950,000. Considering the group of motors for cars, elevators and similar purposes, the combined number decreased from 23,582 in 1899 to 22,112 in 1904, and increased to 38,698 in 1909. The value of these motors was $10,707,000 in 1899, $7,929,000 in 1904, and $11,036,000 in 1909, there being an increase of 149 per cent in number and 3 per cent in value during the decade. The decrease shown for the group in 1904 was entirely due to the decrease in the manufacture of railway motors at the time of taking that census.

BATTERIES

The value of the storage and primary batteries manufactured increased from $3,679,000 in 1899 to $4,244,000 in 1904 and $10,612,000 in 1909, or 188 per cent during the decade.

ARC AND INCANDESCENT LAMPS

The number of arc lamps manufactured increased from 158,187 in 1899 to 195,157 in 1904, and decreased to 123,543 in 1909. The decrease is accounted for by the fact that other varieties of lamps are now used for street light and for other purposes for which arc lamps were formerly used almost exclusively. The total value of the incandescent lamps manufactured increased from $3,515,000 in 1899 to $6,953,000 in 1904 and $15,715,000 in 1909. The value of the carbon-filament lamps increased rapidly from 1899 to 1904, but there was a slight decrease in 1909, the value for the respective years being $3,442,000, $6,308,000 and $6,157,000. The manufacture of gem, tantalum, tungsten and other metal-filament lamps was reported separately for the first time in the census of 1909, when they were valued at $7,682,000.

IMPROVEMENTS OF DES MOINES CITY RAILWAY

The Des Moines (Ia.) City Railway is spending about $150,000 on renewal of tracks, including labor, to give the company more turnouts and more double track. All of the material has been purchased and most of it is on the ground, but some of the labor remains to be done to complete the work. The company is also building an extension to its power station to accommodate a new turbine purchased recently and is building another addition to its power station to accommodate new transformers purchased recently. A second story is being built to the company's Twenty-fourth Street carhouse, where a room is being provided for the motormen and conductors. The size of this addition is 30 ft. x 28 ft. Contracts have been let for all of this work. The company has purchased one 300-kw Westinghouse rotary, one 500-kw General Electric rotary and three 750-kw General Electric transformers. The necessary switchboards are to be ordered. Bids have been asked for coal-handling apparatus and a traveling crane for the company's power station, and for a new intake with a well with concrete walls. Twenty 40-ft. cars purchased from the American Car Company, St. Louis, Mo., have been placed in operation. They are of the double-end pay-as-you-enter type with cross-seats in the middle of the car and longitudinal seats at the end, and are equipped with maximum traction trucks and two GE-98 motors, Peter Smith hot-air heaters, Root scrapers, Crouse-Hinds headlights, Consolidated fenders, National Brake & Electric Company air equipment, Peacock brakes and International double registers. The company has also purchased from the Peter Smith Heater Company fifty-four additional hot-air heaters to be installed in all the old types of cars which are in use.

F. E. Drake, formerly manager of the French and Italian Westinghouse Companies and now engaged as consulting and contracting engineer, is building a new system of tramways in Palermo, Italy, for a Belgian syndicate of capitalists. This syndicate is also contemplating the construction of a tramway system in Catania and the reconstruction of the tramways in Messina.

Report on Transit Conditions in Syracuse, N. Y.

An Abstract of a Comprehensive Report on the Street Railway Traffic Conditions in Syracuse Which Was Made to the Public Service Commission of New York, Second District, and Was Used as the Basis of a Formal Order by the Commission to Make Certain Changes and Improvements on the Property.

A report of C. R. Barnes, electric railroad inspector of the New York Public Service Commission, Second District, on transit conditions in Syracuse was made the basis of certain recommendations by the commission concerning service and equipment.

Mr. Barnes showed that gross income of the Syracuse Rapid Transit Railway from all sources had increased from $621,299 in 1901 to $1,477,121 in 1910. Operating expenses in the same period rose from $340,830 to $1,069,793. The capital stock was $3,920,031 in 1901 and $3,918,072 in 1910. The funded debt was $3,823,000 in 1901 and $3,910,000 in 1910. Other indebtedness amounted to $75,963 in 1901 and to $1,925,040 in 1910. The population of the district served, excepting two small villages, increased from 117,380 in 1901 to 147,051 in 1910. The number of passengers carried, including transfers, was 15,433,650 in 1901 and 35,243,398 in 1910. Total miles of track increased from 62.04 in 1901 to 82.23 in 1910. Passenger car miles rose from 3,409,411 in 1901 to 5,549,710 in 1910. Where there were seventy single-truck cars and seven double-truck cars for winter operation in 1901, there were in 1910 fifty-seven single-truck and 102 double-truck cars. On Jan. 25, 1911, there were in the shop 10.8 per cent of the double-truck cars and 3.5 per cent of the single-truck cars. On March 1, 1911, 513 conductors and motormen were employed, of whom 100 were on the extra list. Mr. Barnes says that the methods of examination of applicants for the positions of motormen and conductors and their instructions are very complete and should result in an efficient and reliable class of men being employed. In addition to the instructions given applicants, the superintendent calls a portion of the men together at different times and discusses various matters; this tends to increase the discipline and results in more efficient service.

The operating force actually engaged in car movement consists of a general manager and one superintendent, a general foreman, one chief inspector, six inspectors, two traveling instructors. Each inspector has charge of a division, and during the rush hours is located at points of maximum travel. March 1, 1911, 513 motormen and conductors were employed, about 100 of whom were on the extra list.

One man is employed continuously in watching the traffic and making counts of passengers to determine sufficiency of service.

The usual means of protecting grade crossings of steam and electric tracks are described and Mr. Barnes states that all the crossings in Syracuse except steam switch track crossings are protected by one of these methods. At some of the crossings the protection employed is not considered sufficient and negotiations are pending to increase safety of operation at these points. An examination of cars was made and the results were tabulated with reference to general conditions of the car, the cleanliness of the floor, the general appearance of the outside of the car, including condition of paint and varnish; the condition of interior woodwork, including cleanliness, paint and varnish; the cleanliness of windows; the condition of the seats as regards repair and cleanliness. A detailed inspection of the new pay-as-you-enter cars belonging to the company was considered unnecessary.

In August, 1909, an inspection of the track and roadbed was made and for the purpose of the present report the data obtained then were supplemented by a statement of subsequent improvements.

When rails are worn at the joints the company has adopted experimentally the plan of cutting off the worn portions and laying a short section; 437 joints have been treated in this manner. It is expected that this will prolong the life of the rail from three to four years. From July 1, 1900, to June 30, 1910, the company expended for extensions of track, purchase of private right-of-way and pavement, exclusive of the cost of ordinary track maintenance, a total of $1,024,979. For extensions and construction of overhead system in the same period the company expended $153,642. Mr. Barnes states that the company has made liberal additions to its car equipment during the ten years, involving a total expenditure of $446,826. Notwithstanding that there is at present a shortage of power, the company has spent for equipment in the ten years $101,794 and for improvements to the power house $29,451, a total of $131,245.

Counts of the passengers in each car run on the different lines during different hours at the points of the usual maximum load were made by the company at the request of Mr. Barnes and were practically confirmed by subsequent counts which Mr. Barnes had his assistant make.

The percentages of increase in the principal items mentioned in the foregoing summary for the ten years ended June 30, 1910, are as follows:

	Per Cent.
Population	27.1
Passengers carried	128.4
Car miles operated	62.8
Miles of track	40.4
Cars owned	127
Seating capacity	172
Gross income	137.7
Operating expenses	210
Additional deductions from income	69.4

CONCLUSIONS

The conclusions drawn by Mr. Barnes are, in brief, as follows:

"An examination of the traffic sheets shows that on several of the lines during the rush hours the number of passengers in some of the cars was sufficient to cause serious inconvenience. In some such cases in the next car following on regular schedule all the seats were not occupied, and if the traffic during a certain period had been equally divided between all the cars run very little inconvenience caused by overloading would result, except during the peak of the rush hours.

Mr. Barnes then recommends certain track construction. Taking up the subject of power, he says:

"Shortage of power during the evening rush hours to operate and light properly the present number of cars run, especially on the outlying lines, is so apparent that no detailed investigation was necessary to establish that fact, and power conditions are such that no material additions to the service can be made until additional power is available.

"The company, realizing the above fact, has caused an investigation of its power conditions to be made by electrical engineers who have made a very thorough and exhaustive report on this subject. In this report the inadequacy of present transformer station capacity and lack of proper feeder system is set forth and plans are presented to relieve the above defects and to provide for a sufficient and reliable power supply which will also effect economies in use

of power. These plans include the erection and equipment of two additional transformer stations centrally located, and a rearrangement of and additions to the present feeder system. The report also includes estimates of costs for the proposed improvements in power system."

CARS

In regard to class of cars operated the report says:

"As shown in previous statements in this report, the company has been liberal in the number of cars added to its equipment during the past ten years. In 1900 the company was not operating a double-truck car; at present it has 102 such cars in service, including twenty-three modern pay-as-you-enter cars which have recently been added. In 1900 there were seventy single-truck cars in operation; at present the company has fifty-seven such cars, having retired from service thirteen of this class. From these statements it will be seen that the company has adopted as a standard the large double-truck car, and during the past ten years has added no other class of car to its equipment. This policy of the company is a proper one and in keeping with the street car requirements of a prosperous and growing city such as Syracuse.

"While a greater portion of the cars operated on this system are in proper condition for the comfortable and convenient transportation of passengers, a large number of them, especially the single-truck cars, have been allowed to deteriorate to such an extent that they detract from the general appearance of the residential and business streets through which they run and are not at present a proper car for the convenient and comfortable transportation of passengers. This is especially true of the side-aisle, cross-seat cars, of which the company at present has twenty-five. The general appearance of the cars is largely due to the fact that prior to Jan. 1, 1910, this company had no repair shop facilities. It now has available a modern repair shop the equipment of which is unequaled by any in the country, and includes all of the facilities necessary for the proper upkeep of the equipment.

"The schedule of shop work to be done, adopted by the company, does not include the building of any new cars.

"The company anticipates utilizing the additional facilities afforded by the new repair shop, and has arranged a schedule of car repairs under which a sufficient number of cars will be put through the different shops each month to result in the equipment being in proper condition as soon as it is possible so to do with the present limited number of cars owned. The schedule of car repairs includes the rebuilding of the side aisle, cross-seat, single-truck cars, six of which have been rebuilt, and nine more will be completed by December of this year, the others to be rebuilt during 1912 and 1913.

"The company has in a reasonable measure in the past kept pace in the transportation facilities furnished with the increase in travel, and there is no reason to doubt its intentions to continue that policy in the future.

"Notwithstanding the liberal expenditures made by the company in recent years for new cars of modern type, it has at present in operation too large a proportion of small, single-truck cars to accommodate properly the traffic on the different lines on which they are run.

"The policy of this and other companies operating in cities of the size of Syracuse has been to withdraw, as fast as financial resources would permit, this class of car from regular service on important lines, replacing them with double-truck cars of greater seating capacity.

"The fifty-seven single-truck cars at present owned by this company represent a considerable investment, and the company should not be requested entirely to discontinue their use.

"To provide properly for present schedule requirements the company should have six additional double-truck cars.

"The company has proper facilities and employs sufficient force to keep its cars in a clean and sanitary condition. The statement of the inspection of cars shows that while a large number of them were in first-class condition none is classed as in very poor condition. The general condition of cars in this respect is such that no definite recommendations for improvements in this direction are warranted."

OPERATION

Regarding methods of operation Mr. Barnes says:

"The operating department is in charge of competent and efficient officials. The general manager and superintendent employ methods which result in a thorough knowledge on their part of the smallest detail of operation, to an unusual extent. The discipline of employees maintained on this road is first class. During the investigation it was noted that conductors were courteous and obliging to passengers. Their uniform action in this respect, compared with conductors on some of the other roads in this State, is a subject of favorable comment. The efficiency of the motormen employed is reflected in the comparatively small number of collisions occurring on this system, showing that these men are competent and are interested in their work. Both of the above conditions are in a large degree attributable to the frequent conferences held and discussions of operating conditions by the superintendent and the men.

"The company has made in the past, and is making at present, reasonable expenditures for track maintenance. The method described of treating rails worn at the joints, which otherwise must have been replaced, has reduced the track maintenance cost in this particular; but if the expectations of the engineers of the company are realized these rails must be replaced at the end of the period of the anticipated life of the reconstructed joint, at which time maintenance cost will be greatly increased and for which provision should be made.

"The overhead structures, including poles, feeders and trolley wire, are generally in fair condition. The company has a sufficient number of emergency wagons and employs a sufficient force to maintain properly the overhead structure.

GRADE CROSSINGS

There are more grade crossings of steam tracks, in proportion to the size of cities, in the city of Syracuse than in any other in this Public Service district. This results in serious inconvenience to the people of Syracuse and vicinity and financial loss to the company. It is unfortunate that this condition cannot at present be entirely overcome. It can, however, be materially relieved by the enforcement of proper ordinances prohibiting trains from standing in a manner to block crossings longer than a limited time, and to prohibit ordinary switching being done during rush hours on tracks across streets through which the important lines of street cars are run.

"One of the most vexatious causes of delays is the operation of swing or lift bridges over canals. Since the gas engine has been applied to the propulsion of pleasure boats the use of this class of boats on the canals has been greatly increased. Aggravating delays to street car travel occur frequently in Rochester and Syracuse, caused by a small pleasure boat occupied possibly by one or two boys, for which a canal bridge is operated, stopping a line of street cars and delaying in some cases a thousand people from three to eight minutes.

"The above conditions during rush hours are unreasonable, and relief from them should be furnished. With this object in view a conference of the operating officials, the superintendent of public works and the Public Service Commission, Second District, has been suggested to devise, if possible, some means of relief."

It is recommended that a wrecking wagon be located near the business center.

Estimated expenditures which are recommended aggregate $158,090 for power system, $204,000 for thirty-four new double-truck cars at $6,000 each, $546,735 for exten-

sions and double track, and $29,984 for construction of new double track to effect a change of route, making a total of $938,809. Provision should be made for the completion of the improvements within five years.

In a letter written in acknowledgment of the letter, C. Loomis Allen, vice-president and general manager of the company, indicated his general acceptance of the recommendations and purpose of compliance, except that as to certain future expenditures assurance was given that in the preparation of the annual budget each year full consideration would be given to the matter. Mr. Allen gave the details of the expenditures authorized for 1911, including those recommended for this year, involving a total of $390,298.

The recommendations of Mr. Barnes were embodied in a formal order passed by the commission.

ILLINOIS TRACTION MERIT SYSTEM

On May 15, 1911, the operating department of the Illinois Traction System put into effect on the interurban lines a system of discipline based on a new schedule of merits and demerits. The system was instituted by C. F. Handshy, general superintendent of interurban lines. The following paragraphs from the bulletin issued to the trainmen describe the new merit system.

"Under this system the practice of suspending trainmen for violation of rules, etc., will be discontinued, and in place a certain number of marks (see list of merits and demerits) will be entered against their record, the object being to avoid a loss of wages by persons employed and the possible result, suffering of those dependent upon their earnings.

"When demerits are given for unsatisfactory service it is logical that merits should be given for good service, and to stimulate and encourage employees in the faithful and intelligent performance of their duty merit marks will be credited on their records whenever possible, and in this way let merits cancel demerits. All applications for merits must be filed within five days after the occurrence.

"The board will meet bi-monthly to investigate, produce evidence and pass judgment on all violations of the rules and on meritorious acts performed. The minutes of the board will be kept as part of the records of the merit system.

"Whenever merit and demerit marks are given a notice will be posted stating how many marks have been given and on what charge, but omitting name, train and car number.

"When an employee's demerits have reached the number of ninety he shall be called in by the superintendent, duly cautioned and advised that when his demerits amount to 100 he will be dismissed from the service.

"Employees will be permitted to examine their records at any time upon application, but no employee shall be permitted to see the record of any other employee. Records will be kept in the office of the superintendent."

The schedule of merits and demerits follows:

MOTORMEN AND CONDUCTORS—IMMEDIATE DISCHARGE

1. Disloyalty to the company, intoxication, dishonesty and false statements.
2. Incompetency, insubordination or unsatisfactory service.
3. Gross carelessness resulting in accident.
4. Disobedience of orders resulting in accident.
5. Entering saloons when on duty without good excuse, or drinking on or before going on duty.
6. Motorman wilfully running a railroad crossing, also for conductor failing to report such motorman.
7. Conductor failing to properly flag a railroad crossing.
8. Motorman who operates over a crossing improperly flagged or who fails to report such improper flagging.
9. Overrunning a train order or running ahead of schedule.
10. Passing fixed or automatic signal at danger, without proper authority.

DEMERITS

		Marks
11.	Failing to observe rules in taking and transferring orders	25
12.	Getting on the time of another train without proper authority or protection	50
13.	Failure to report accidents	15-25
14.	Accidents when avoidable ..... minor	10
	..... major	50
15.	Pernicious gambling	50
16.	Smoking on duty, on passenger trains	25
17.	Ungentlemanly conduct ..... minor	10
	..... major	50
18.	The making of derogatory remarks in public as to the management of the road, or any official or any department of the road or as to the protective board of the B. I. T. ..... minor	25
	..... major	50
19.	Disobedience of orders or rules ..... minor	10
	..... major	50
20.	Talking about accidents or other affairs of the company to others than the proper officials	50
21.	Incomplete and poor accident reports	10-25
22.	Failure to show up or report for duty at proper time: First time in one month	10
	Second time in one month	20
	Third time in one month	40
23.	Reading on duty, motorman or conductor	25
24.	Carelessness with switches and main line derails	25-50
25.	Carelessness with siding derails	10
26.	Unnecessary visiting of motorman and conductor	5
27.	Improper handling of freight or baggage..minor	10
	..... major	25
28.	Slovenly dressed or dirty appearance on passenger trains	10
28½.	Failure to have watch inspected or sign comparison sheet	10

CONDUCTOR'S DEMERITS

29.	Failure to ring fares	25
30.	Failure to turn in articles found on car	15
31.	Mistakes in reports to auditor and car accountant ..... minor	5
	..... major	15
32.	Failure to promptly report damage to freight or baggage	10
33.	Failure to cancel tickets	10-25
34.	Error in taking register impression or readings	10
35.	Carelessness in using hat checks or cash fare receipts	15
36.	Failure to give proper signals ..... minor	10
	..... major	25
37.	Inattention to passengers ..... minor	15
	..... major	25

MOTORMAN'S DEMERITS

38.	Signals improperly displayed ..... minor	25
	..... major	50
39.	Carelessness or indifferent operation of car	25
40.	Backing train without proper signal and protection	50
41.	Failure to whistle or ring gong in proper place or in proper manner	10-25
42.	Inattention to duty or visiting with passenger or conductor or permitting unauthorized persons to ride in cab	10
43.	Failure to report trouble or any defects with car, roadway or overhead	5-25
44.	Starting car without proper signal except to avoid accident	20

45. Exceeding speed limit through towns and cities or yard limits, or over special work.....minor 10
.....major 25
46. Failure to observe stop, slow or caution signs..10-25
47. Leaving car without taking reverse lever, throwing overhead or pulling line switch..... 10

MERITS

48. For the first six months without demerits..... 25
For the second six months without demerits..... 75
49. For any meritorious act which in the opinion of the discipline board deserves recognition..... 5-50
50. Conductors and motormen reporting dangerous defects in track or overhead work or making temporary repairs to same.....10-25
51. Assistance rendered in case of accident such as to bring commendation from passengers..... 10
52. Motormen for exceptional good work in bringing in disabled car or repairing damaged car on road 10-25
53. Conductors turning in void transportation or that which is used by other than to whom it is issued 10

OUTING OF THE NEW ENGLAND STREET RAILWAY CLUB

The New England Street Railway Club held its regular August outing at New Bedford and Fairhaven, Mass., on Aug. 31, 1911. The party went by special train and at New Bedford were taken charge of by Elton S. Wilde, general superintendent of the Union Street Railway, New Bedford. The party was photographed in the new Union Street Railway's station. On account of rain the plan for the excursion to Woods Hole was abandoned, and the members of the club and guests, who numbered 175, attended a vaudeville performance.

After inspecting the Union Street Railway's building the party boarded special cars of the company and went to Fort Phœnix, Fairhaven. The baseball game had to be given up, but the clambake scheduled for the noon hour at Whitfield's pavilion was enjoyed. The return was made to Boston by special train at 4 o'clock.

ELECTRIC EXPRESS SERVICE INTO BOSTON

The Bay State Street Railway, Boston, Mass., on Sept. 1, 1911, connected Boston with its electric express service and new delivers merchandise at Neponset in the Dorchester district of Boston, thence to be distributed in the city by teams. The present charters of the West End Street Railway and the Boston Elevated Railway preclude the carrying of freight, though an effort was made this year to secure a franchise for the Boston Elevated Railway to carry merchandise.

The Bay State Street Railway has been securing local franchises, one after another, for some time. At the beginning the territory south of Boston will be served. Regular electric express cars will be run through Neponset, Quincy, Randolph, Avon, Braintree, Holbrook and Brockville to Brockton. From Brockton freight routes are in operation as far as Fall River and Newport, R. I., and there is a service to Providence, R. I. It is intended to make this an interstate service. Tariffs have been filed with the Interstate Commerce Commission and business will begin between points in Rhode Island, Connecticut and Massachusetts on Oct. 1 or thereabouts.

The company's carhouse at Neponset has been enlarged and an extension built for a freight house. A new freight house has been built at Quincy and others will be erected at various points as the system develops. The necessary capital for the electric express development has been authorized by the Massachusetts Railroad Commission.

North of Boston a similar system is being formed. Already numerous franchises have been secured in the towns and cities traversed by the company's lines, but there are some towns which have resisted the movement and refused suitable franchises. Where opposition is met the company will probably appeal to the Railroad Commission.

The principal towns and cities reached by the Bay State Street Railway are: Abington, Attleboro, North Attleboro, Avon, Bourne, Braintree, Bridgewater, Brockton, Dighton, Fall River, Fairhaven, Franklin, Hanson, Kingston, Lakeville, Marion, Mattapoisett, Middleboro, New Bedford, Onset, Plainville, Plymouth, Quincy, Randolph, Raynham, Rehoboth, Rockland, Scotland, Seekonk, Somerset, South Easton, Swansea, Taunton, Wareham, Westport, Whitman and Wrentham.

NEAR-SIDE STOPS IN MILWAUKEE

The Milwaukee Electric Railway & Light Company on Sept. 1 began stopping its cars only on the near side of street intersections within the business district, bounded on the north by Chestnut Street and Juneau Avenue, on the west by Seventh Street, on the south by Sycamore and Michigan Streets and on the east by Lake Michigan. The change to the new plan of near-side stopping was announced by quarter-page advertisements in the Milwaukee daily papers, accompanied by news items. The advertisements carried a map of the near-side stopping district. This map was 10 in. by 5 in. in size, showed the routes and indicated each stopping position, according to the new plan. The news item accompanying the illustration stated that one reason for changing to the near-side stop was to increase the convenience of passengers at transfer points. "Under the method now used passengers have much farther to walk and must cross the tracks in leaving one car to board another."

It is expected that the near-side plan will also improve traffic conditions at the busy downtown street intersections, where traffic is now handled under the police signal system.

HEARING ON PROPOSAL OF NEW BUFFALO CORPORATION

The Public Service Commission, Second District, New York, has announced that on Sept. 14 it will conduct a hearing on the petition of the International Traction Railways, a new company, for permission to construct an electric railway on Abbott Road in Buffalo and for authority to issue stock and bonds and to acquire stock and bonds and other obligations of the International Railway Company and allied companies.

On June 28, 1911, the committee representing the holders of the fifty-year 4 per cent collateral trust gold bonds of the International Traction Company stated that more than 97½ per cent of the bonds had accepted the bondholders' plan dated June 1, 1910, and modified bondholders' plan dated Jan. 20, 1911, and it is understood that the organization of the International Traction Railways is a step in the plan looking toward the reorganization of the International Railway Company and the International Traction Company, of Buffalo.

Considerable progress is being made with the conversion to electric traction of the Mont Cenis line from Modane to Bardonèche, which will increase the carrying capacity through the Mont Cenis tunnel. Energy will be obtained from the muncipal generating station at Chiomonte, where 3500 kw capacity will be available at 50,000 volts, 50 cycles. At Bardonèche a substation will convert the supply to 3500 volts, 15 cycles for the overhead lines.

Atlantic City Convention Program and Notes

The Complete Programs of the Meetings of All of the Associations and Information Regarding Transportation Arrangements, Including the Special Trains to Be Run from St. Louis and Chicago.

The following general program has been arranged for the annual convention of the American Electric Railway Association and its affiliated associations during the week of Oct. 9 to 13 at Atlantic City, N. J.:

CONVENTION CALENDAR

Monday, October 9

9:00 A. M.—Opening of exhibits of Manufacturers' Association.
9:30 A. M.—Registration and issuance of badges at Convention Pier.
2:00 P. M.—Meeting of the Engineering Association.
2:00 P. M.—Social, informal gathering of Claim Agents' Association.
2:00 P. M.—Registration and issuance of badges to the Accountants' Association at Convention Pier.
2:30 P. M.—Meeting of the Transportation & Traffic Association.

Tuesday, October 10

9:00 A. M.—Meeting of the Claim Agents' Association.
9:30 A. M.—Meeting of the Accountants' Association.
9:30 A. M.—Session of the Engineering Association.
9:30 A. M.—Session of the Transportation & Traffic Association.
11:00 A. M.—Joint session of the Engineering and the Transportation & Traffic Associations.
2:00 P. M.—Meeting of American Association.
2:00 P. M.—Sessions of the Claim Agents' Association.
2:00 P. M.—Inspection of exhibits by the Engineering Association.

Wednesday, October 11

9:00 A.M.—Session of the Claim Agents' Association.
9:00 A.M.—Joint session of the Accountants' and Engineering Associations.
9:30 A. M.—Session of the Transportation & Traffic Association.
11:30 A. M.—Joint session of the Accountants' and Transportation & Traffic Associations.
2:00 P. M.—Session of American Association.
2:00 P. M.—Closing session of the Claim Agents' Association.
2:00 P. M.—Inspection of exhibits by the Engineering Association.
5:00 P. M.—Annual meeting of the Manufacturers' Association.

Thursday, October 12

9:30 A. M.—Closing session of the Accountants' Association.
9:30 A. M.—Session of the Engineering Association.
9:30 A. M.—Closing session of the Transportation & Traffic Association.
2:00 P. M.—Closing session of American Association.
2:00 P. M.—Inspection of exhibits by the Engineering Association.

Friday, October 13

9:30 A. M.—Closing session of the Engineering Association.

ASSOCIATION HEADQUARTERS

The headquarters hotels of the several associations at the Atlantic City convention will be as follows:

American Association.....Marlborough-Blenheim
Accountants' Association.....Chalfonte
Engineering Association.....Dennis
Claim Agents' Association.....Traymore
Transportation & Traffic Association.....Traymore
Manufacturers' Association.....Marlborough-Blenheim

PROGRAM OF AMERICAN ASSOCIATION

The American Association will announce no definite program for the convention. Its sessions, some of which will be executive, will be held Tuesday, Wednesday and Thursday.

PROGRAM OF ACCOUNTANTS' ASSOCIATION

All regular sessions at the Chalfonte Hotel. Joint session with Engineering Association at Marine Hall, Convention Pier. Joint session with Transportation & Traffic Association at Greek Temple, Convention Pier.

Monday, October 9

2:00 P. M. to 5:00 P. M.

Registration and badges, Convention Pier.

Tuesday, October 10

9:30 A. M. to 12:30 P. M.

Convention called to order.
Annual address of president.
Annual report of executive committee.
Annual report of secretary-treasurer.
Paper—"Accounting System for a Small Electric Railway," by E. D. Gault, auditor Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.
Report of the committee on interline accounting.
Report of the committee on car miles and car hours.
Appointment of convention committees.
Appointment of nominating committee.
New business.

1:00 P. M.

"Get-together luncheon," Marlborough-Blenheim.
Informal talk by M. R. Boylan, general auditor Public Service Railway Company, Newark, N. J., "Prepayment Fare Accounting."

Wednesday, October 11

9:30 A. M.

Report of the joint committee on engineering accounting. (Joint meeting with Engineering Association.)

11:30 A. M.

Report of the joint committee on express and freight accounting. (Joint meeting with Transportation and Traffic Association.)

Thursday, October 12

9:30 A. M. to 12:30 P. M.

Address—"Overhead Charges," by Dean M. E. Cooley, of the University of Michigan.
Paper—"Information Furnished Officers and Departmental Heads by the Auditing Department."
Report of the committee on life of railway physical property.
Report of the committee on a standard classification of accounts.
Reports of convention committees.
Report of nominating committee.
Election of officers.
Installation of officers.
Adjournment.

PROGRAM OF ENGINEERING ASSOCIATION

All Sessions at Marine Hall, Convention Pier

Monday, October 9

9:30 A. M. to 12:30 P. M.

Registration and badges, Convention Pier.

2:00 P. M. to 5:30 P. M.

Convention called to order.
Annual address of president.
Annual report of executive committee.
Annual report of secretary-treasurer.

Appointment of convention committees.
Report of the committee on education of engineering apprentices.
Report of the committee on power distribution.

Tuesday, October 10
9:30 A. M. to 11:00 A. M.

Report of the committee on heavy electric traction.

11:00 A. M. to 1:30 P. M.

Report of the joint committee on block signaling for electric railways. (Joint meeting with Transportation & Traffic Association.)

Wednesday, October 11
9:30 A. M. to 11:30 A. M.

Report of the joint committee on engineering accounting. (Joint meeting with Accountants' Association.)

11:30 A. M. to 1:30 P. M.

Appointment of nominating committee.
Report of the committee on power generation.
Photograph of the convention will be taken Wednesday, immediately after the closing of the session, in the ballroom on the Pier.

Thursday, October 12
9:30 A. M. to 1:30 P. M.

Report of the committee on buildings and structures.
Report of the committee on way matters.

Friday, October 13
9:30 A. M. to 1:30 P. M.

Report of the committee on equipment.
Report of the committee on rules of procedure of the committee on standards.
Report of the committee on standards.
Question box
General business.
Report of the nominating committee.
Election of officers.
Installation of officers.
Adjournment.

PROGRAM OF CLAIM AGENTS' ASSOCIATION

All sessions at the Traymore Hotel

Monday, October 9
9:30 A. M. to 12:30 P. M.

Registration and badges, Convention Pier.

2:00 P. M. to 5:00 P. M.

Social gathering, informal, to afford the members an opportunity of getting acquainted. Short, impromptu talks by president and other members.

Tuesday, October 10
9:00 A. M. to 12:30 P. M.

Convention called to order.
Annual address of president.
Annual report of executive committee.
Annual report of secretary-treasurer.
Reports of special committees.
Appointment of convention committees.
Paper—"Trainmen. Their Selection and Method of Instruction in Order to Obtain Complete and Intelligent Accident Reports," by E. P. Walsh, attorney United Railways Company of St. Louis, St. Louis, Mo., and A. E. Beck, claim agent British Columbia Electric Railway Company, Ltd., Vancouver, B. C.
General discussion.

2:00 P. M. to 5:00 P. M.

Paper—"The Prevention of Accidents." (a) "What Can Be Done to Increase the Interest of Employees of All Departments in This Work." (b) "The Best Means of Promoting Greater Caution on the Part of Platform Men." By Ellis C. Carpenter, claim adjuster Indiana Union Traction Company, Anderson, Ind., and F. J. Whitehead, secretary and claim agent Washington Railway & Electric Company, Washington, D. C.
General discussion.
Paper—"The Practical Value of Our Index Bureau with Some Statistics and Illustrations," by H. R. Goshorn, general claim agent Philadelphia Rapid Transit Company, Philadelphia, Pa., and Cecil G. Rice, superintendent of claim department Pittsburgh Railways Company, Pittsburgh, Pa.
General discussion.
Appointment of nominating committee.

Wednesday, October 11
9:00 A. M. to 12:30 P. M.

Paper—"How Can the Public Be Educated in the Prevention of Accidents," by B. F. Boynton, claim agent Portland Railway, Light & Power Company, Portland, Ore., and Seth W. Baldwin, claim attorney The Connecticut Company, New Haven, Conn.
General discussion.

2:00 P. M. to 5:00 P. M.

General business.
Reports of convention committees.
Report of nominating committee.
Election of officers.
Installation of officers.
Adjournment.

PROGRAM OF TRANSPORTATION & TRAFFIC ASSOCIATION

All regular sessions and joint session with Accountants' Association at Greek Temple, Convention Pier. Joint session with Engineering Association at Marine Hall, Convention Pier.

Monday, October 9
9:30 A. M. to 12:30 P. M.

Registration and badges, Convention Pier.

2:30 P. M. to 5:00 P. M.

Convention called to order.
Annual address of the president.
Annual report of the executive committee.
Annual report of the secretary-treasurer.
Appointment of convention committees.
Reports of special committees.
Report of committee on subjects.
Report of committee on training of transportation employees
Report of committee on passenger traffic.

Tuesday, October 10
9:30 A. M. to 12:30 P. M.

Report of committee on interurban rules.
Report of committee on block signaling for electric railways. (Joint meeting with Engineering Association.)

Wednesday, October 11
9:30 A. M. to 12:30 P. M.

Appointment of committee on nominations.
Report of committee on city rules.
Report of committee on express and freight traffic.
Report of joint committee on express and freight accounting. (Joint meeting with Accountants' Association.)

Thursday, October 12
9:30 A. M. to 12:30 P. M.

Repot of committee on fares and transfers.
Paper—"Operation of Multiple Car Trains on City Lines," by C. J. Franklin, general superintendent of railway department Portland Railway, Light & Power Company, Portland, Ore.
Report of committee on construction of schedules and timetables.
General business.
Report of nominating committee.
Election of officers.
Installation of officers.
Adjournment.

ENTERTAINMENT FEATURES

General direction of the entertainment features during convention week will be in the hands of W. L. Conwell, vice-president of the Manufacturers' Association, and C. R. Ellicott, chairman of the entertainment committee. The

usual pleasing variety of entertainment will be provided. Monday evening, Oct. 9, in ballroom, Convention Pier, reception in honor of the officers and ladies of the associations; Tuesday afternoon, cards for ladies, and manufacturers' amateur vaudeville in the evening, followed by dancing, Convention Pier; Wednesday, ladies' afternoon at the Country Club, and athletic carnival, followed by dancing at pier in the evening; Thursday afternoon, aviation exhibition, ocean end of Pier, and promenade concert and ball on Convention Pier in evening; Friday morning, aviation exhibition, and at the Marlborough-Blenheim Hotel informal dancing in the evening.

Arrangements have been made for the free use of rolling chairs by members and guests.

Plans for a golf tournament have been made. Those interested should bring clubs, although a limited number of clubs will be available.

TRANSPORTATION ARRANGEMENTS

President A. W. Brady, of the American Association, has appointed the following local committees:

New York City: J. H. Pardee, New York.

New York State: C. Loomis Allen, Utica.

Philadelphia and vicinity: E. C. Spring, Philadelphia.

New England States: H. C. Page, Worcester, Mass.

Middle Atlantic States, including Delaware, Maryland, Virginia and District of Columbia: C. B. Buchanan, Richmond, Va.

Southeastern States, including North Carolina, South Carolina, Georgia and Florida: P. S. Arkwright, Atlanta, Ga.

Central Electric Railway Association territory, including Indiana, Ohio, Michigan and Western Pennsylvania: C. D. Emmons, South Bend, Ind., and E. B. Peck, Indianapolis, Ind.

Chicago, including Northern Illinois and Wisconsin: J. M. Roach, Chicago, Ill.; E. C. Faber, Wheaton, Ill.; E. E. Downs, Belvidere, Ill.

Central Northwestern States, including Minnesota, North Dakota, South Dakota and Iowa: L. D. Mathes, Dubuque, Ia.

St. Louis and Kansas City, including Missouri and Southern Illinois, Capt. Robert McCulloch, St. Louis, Mo.; H. E. Chubbuck, Peoria, Ill.; C. F. Holmes, Kansas City, Mo.

Southwestern States, including Oklahoma, Arkansas and Louisiana: D. A. Hegarty, New Orleans, La.

Texas: E. T. Moore, Dallas, Tex.

West, including Colorado, Utah, Nebraska and Kansas: C. B. Wells, Denver, Col.

California: C. N. Black, San Francisco, Cal.

Northwestern States, including Washington, Oregon, Montana and British Columbia: H. T. Edgar, Seattle, Wash.

Canada: James Anderson, Windsor, Ont.

The Manufacturers' Association has appointed the following local committees which will serve jointly with the committees appointed by the American Association:

New York City, New York State, Philadelphia and vicinity, Middle Atlantic States, including Delaware, Maryland, Virginia and District of Columbia; Southeastern States, including North Carolina, South Carolina, Georgia and Florida, and Canada, E. H. Baker, Galena Signal Oil Company, New York City.

New England States: Charles C. Peirce, General Electric Company, Boston.

Central Electric Railway Association territory, and including Indiana, Ohio, Michigan and Western Pennsylvania: H. C. Ebert, Cincinnati Car Company, Cincinnati, Ohio.

Chicago, including Northern Illinois and Wisconsin; Central Northwestern States, including Minnesota, North Dakota, South Dakota and Iowa; the West, including Colorado, Utah, Nebraska and Kansas; California and Northwestern States, including Washington, Oregon, Montana and British Columbia: A. H. Sisson, Forsyth Brothers Company, Chicago, Ill.

St. Louis and Kansas City, including Missouri and Southern Illinois; Southwestern States, including Oklahoma, Arkansas, Louisiana and Texas: Scott H. Blewett, American Car & Foundry Company, St. Louis, Mo.

RAILROAD RATES

The Trunk Line Association and the New England Passenger Association (except Bangor & Aroostook Railroad and Eastern Steamship and Maine Steamship Companies) have granted a rate of one and one-half first-class limited fare, with minimum of $2, for round-trip, going and returning, via same route only. Tickets good going Oct. 6 to 10 inclusive, and returning, to reach original starting point not later than Oct. 16. The Central Passenger Association has granted one and one-half fare for round-trip, good going Oct. 5 to 9 inclusive, and returning to reach starting point not later than Oct. 17. The Southwestern Passenger Association has offered special rates, good going Oct. 4 to 7 inclusive, returning to starting point not later than Oct. 18. The Eastern Canadian Passenger Association will charge the lowest one-way first-class fare and one-half from Kingston, Sharbot Lake, Renfrew and west, good going Oct. 5 to 9 inclusive; east of these points, good going Oct. 6 to 10 inclusive, return to starting point not later than Oct. 16. The Western Passenger Association, from its territory, has granted double the one-way fares to Chicago, Peoria or St. Louis, added to one and one-half fare tendered therefrom, from points in Illinois south of, but not including, a line from Chicago through Aurora, Mendota and Galesburg to Burlington; also from St. Louis, Mo., and other Mississippi River points south of, but not including, Burlington. Tickets sold going Oct. 5 to 9 inclusive; returning to starting point not later than Oct. 17. From other points in this territory tickets will be sold, going Oct. 4 and 8, returning not later than Oct. 18. The Trans-Continetal and Southwestern Passenger Associations will not make special rates, but on the former delegates should avail themselves of the tourist nine months' excursion rates to Eastern termini. On the latter tickets should be purchased to Eastern gateways and special rates obtained therefrom.

SPECIAL TRAIN FROM ST. LOUIS

The train will be run over the Pennsylvania lines and will be in charge of the following committee: Capt. Robt. McCulloch, chairman; L. C. Haynes, C. F. Holmes, D. A. Hegarty, H. T. Edgar, W. J. Jones and Arthur S. Partridge.

It will be composed of a composite car with bathroom, barber, buffet and library, a library smoking car, baggage car, standard Pullman sleeping cars, compartment, observation, sleeping car and dining cars. A maid will be in attendance on the train. All cars will be lighted with electricity, with lights in each berth and electric fans in each car. The members of the party will have access to baggage in the baggage car if desired. Dining cars will serve meals à la carte except a special table d'hôte dinner the first night.

The train will run on the following schedule: Leave St. Louis, Saturday, Oct. 7, 12:25 p. m.; leave Terre Haute, 4:35 p. m.; leave Indianapolis, 6:35 p. m., leave Columbus, Saturday, Oct. 7, 11:55 p. m.; leave Pittsburgh, 6:30 a. m.; leave Philadelphia, 2:45 p. m.; arrive Atlantic City, Sunday, Oct. 8, early in afternoon.

The railroad fare, St. Louis to Atlantic City and return, will be $33.40. Tickets will be sold at this low rate, from Oct. 5 to 9, good returning up to Oct. 18. Sleeping car rates from St. Louis to Atlantic City will be: Berth, $6; compartment, $17; drawing room, $21. The return trip will be made on regular trains. Sleeping car reservations for return trip can be made after arrival at Atlantic City through J. S. Murphy, passenger agent Pennsylvania Railroad at Atlantic City. Applications for sleeping car accommodations on the special train from St. Louis should be sent in at an early date to Arthur S. Partridge, New Bank of Commerce Building, St. Louis, Mo.

SPECIAL TRAIN FROM CHICAGO

The committee in charge of the special train from Chicago, consisting of E. C. Faber, Aurora, Elgin & Chicago Railroad; J. M. Roach, Chicago Railways; E. E. Downs, Elgin & Belvidere Electric Railway, and A. H. Sisson, Forsyth Brothers Company, has arranged for a train to be run over the Pennsylvania Railroad. The train will leave Chicago about noon on Sunday, Oct. 8, and will arrive at Atlantic City about 10 a. m. Monday, Oct. 9. The round-trip fare from Chicago will be $29.25 and the one-way fare to Atlantic City will be $19.50. The Pullman fare will be $5. Reservations can be made through the district passenger agent of the Pennsylvania Railroad, 248 South Clark Street, Chicago. The committee is planning an especially elaborate program of entertainment for the journey. The train will consist of all-steel standard and compartment sleeping cars, two dining cars and an observation car.

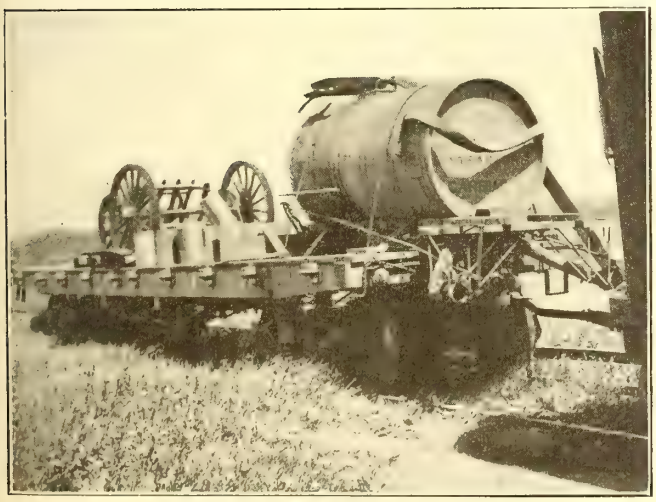
BULLETIN ON SHIPPING OF EXHIBITS

The exhibit committee of the Manufacturers' Association has sent to all exhibitors a bulletin containing suggestions with regard to packing and shipping exhibits to Atlantic City. All shipments should be made in plenty of time to allow for railroad and transfer delays and possible bad weather which may interfere with placing the exhibits on the Pier. It is suggested that screws be used instead of nails in fastening packing cases to facilitate the removal and replacement of the covers to boxes. It is also suggested that the return address be marked on the inside of the covers of boxes so that the cover can be reversed when packing up and thus save time and possible mistakes in labeling the boxes. All boxes containing shipments which are not to be returned should be plainly marked: "Not to Be Returned."

The exhibit committee urges all exhibitors to have their spaces in readiness on Saturday morning, Oct. 7. The address of the exhibit committee after Sept. 28 will be Million Dollar Pier, Atlantic City.

DESTROYING WEEDS ON THE ALBANY SOUTHERN RAILROAD

The Albany Southern Railroad has devised a simple and inexpensive method of spraying a chemical solution on its right-of-way to destroy weeds. An ordinary street-sprinkling wagon was rented from a sprinkling contractor and the running gear was removed. The tank was placed on one

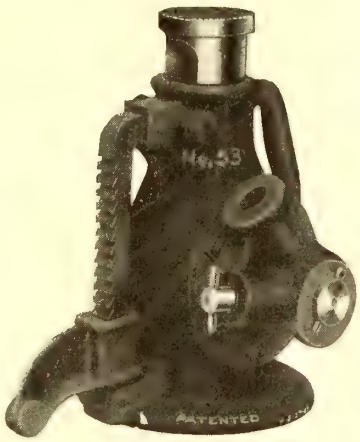


Street Sprinkler Used for Destroying Weeds

end of a flat car with the nozzles dropped down below the end sill. Two pieces of cable were used to fasten the tank down on the car floor. The tank is filled from hydrants or pumps in the towns and the chemicals are put in, after which the car is pulled over the road at slow speed with the sprinkling nozzles open. The accompanying engraving from a photograph shows the tank mounted on the car together with several cans of weed-destroying chemicals and the running gear.

NEW BALL-BEARING JACK

An interesting recent development in lifting jacks is an improved type with ball-bearing journals recently placed upon the market by the Duff Manufacturing Company, of Pittsburgh, Pa. These jacks are made in two regular sizes, each with a capacity of 15 tons. One size is 9¾ in. high and has a "raise" of 4 in., the other is 11 in. high and has a "raise" of 5 in. Both jacks contain ball bearings on which the load is raised, making them easy to operate. All the gears are forged, with machine-cut teeth. The jacks are arranged to raise their load on the downward movement of the lever handle.



Ball-Bearing Jack

Another feature in these jacks is the adjustable wheel-holding device, designed to hold the car wheel down when the jack is being operated. This device is very essential under many conditions, but it may be easily detached when it is not required.

REPLACEABLE EAR TROLLEY FROG

The Gilbert replaceable ear trolley frog, which has had a thorough trial on some of the large Western lines for several years, is now being offered to electric railways generally by the manufacturers, A. Gilbert & Sons Brass Foundry Company, St. Louis, Mo. The first of these frogs was made twelve years ago and showed many economies over the one-piece type frog, but the makers were not willing to place them on the market until they had perfected the design and arranged a bronze composition that would exactly meet the peculiar requirements. As the frog is now offered it consists of a long pan terminating in 10-in. leads having at the end strong plates to which are attached heavy ears of the clinch type. The frog and ears are cast in bronze of a special composition of the greatest rigidity and toughness. The long pan, with an inclined plane at each end, insures an easy transition of trolley wheel between the tongue and pan which adds greatly to the speed and safety of the trolley operating on these frogs. Each frog is provided with six guy rings, two on opposite sides of the center of the pan, and the other four at the plates on the end of the lead. When these frogs are in place on the wire practically all of the wear comes on the ears, which may be replaced quickly at small cost and without interfering in the slightest degree with traffic.

A number of the English municipal corporations have made special contributions to defray the cost of researches into the corrugation of tramway rails now being carried out by a sub-committee of the Municipal Tramways Association. Each corporation will defray a part of the expenses of the investigation proportionate to the amount of its gross receipts.

ELECTRIC RAILWAY LEGAL DECISIONS

LIABILITY FOR NEGLIGENCE

Indiana.—Frightening Animals.

In order to show a duty on the part of a street railway motorman to slow down or stop his car when he sees that a team is being frightened by it, it must appear that a person of reasonable prudence would have been led to believe that the persons driving were in danger, that the further approach of the car would probably increase the danger, and that by ordinary care the motorman could have taken precautions which would have avoided causing the injury. (Evansville Electric Ry. Co. v. Folz, 93 N. E. Rep., 866.)

Iowa.—Injuries to Animals—Statutory Provision—"Railway."

Code, Sec. 2072, requiring a bell and a steam whistle to be placed on each locomotive engine operated on any railway, and the whistle to be sounded 60 rods before a highway crossing is reached and the bell to be rung from that time continuously till the crossing is passed, is made applicable to electric interurban railways by Acts 29th Gen. Assem., Chapter 81, Sec. 2 (Code Supp., Sec. 2033b), providing that the word "railway," as used in the Code, shall apply to and include all interurban railways, so that an interurban railway failing to give the signals required by Sec. 2072 is guilty of negligence per se.

Where a motorman on an interurban electric car sees, or in the exercise of reasonable care should see, a horse on a crossing ahead of the car, it is his duty to give warning signals by blowing the air whistle or ringing the gong, since such signals would be calculated, even in the case of a dumb animal, to cause it to get off the track and avoid injury. (Swisher v. Interurban Ry. Co., 130 N. W. Rep., 404.)

Kentucky.—Killing Stock—Ordinary Care.

Where the uncontradicted and unimpeached testimony of the company's servants, operating a train or an electric car, shows that the killing of live stock could not have been avoided by the exercise of ordinary care, it is not proper for the jury to find otherwise. (Byrd v. Central Kentucky Traction Co., 125 S. W. Rep., 174.)

Michigan.—Obligation of Carriers to Boarding Passengers.

A street car must stop a sufficient length of time to enable a passenger to board it and reach a place of safety in the car, and this duty is a continuing one from the initial attempt of the passenger to board the car until final accomplishment. (Formiller v. Detroit United Ry., 130 N. W. Rep., 347.)

Minnesota.—Carriage of Passengers—Care Required.

The degree of care to be exercised by a common carrier with reference to its passengers is the highest degree of care and foresight consistent with the conduct of its business, or consistent with the practical operation of its road. Fewings v. Mendenhall, 88 Minn. 336, 93 N. W. 127, 60 L. R. A. 601, 97 Am. St. Rep. 519; Campbell v. Duluth & Northeastern R. Co., 107 Minn. 358, 120 N. W. 375, 22 L. R. A. (N. S.) 190. A common carrier is required to take every reasonable precaution for the safety of its passengers. Smith v. St. P. City Ry. Co., 32 Minn. 1, 18 N. W. 827, 50 Am Rep. 550. That degree of care which would be exercised by the ordinary prudent person under the same circumstances is not the test applicable to a motorman of a street car, and it was error so to charge. (Hill v. Minneapolis St. Ry. Co., 128 N. W. Rep., 832.)

Missouri.—Moving Cars—Stepping on Running Board—Question for Jury—Excessive Damages.

It is not negligence per se to step on the running board of a street car while the car is running slowly preparatory to stopping.

Where a hale and vigorous passenger of sixty-seven was injured while alighting from a car by a sudden jerk, throwing him to the pavement, by which his hip was broken, and other injuries ensued, and he had to be put in a plaster cast which practically covered half his body, and during the whole time he suffered greatly, and was in bed over eight months, and at the time of trial, three years after the accident, was barely able to go the distance of one or two city squares with the aid of crutches, and required attendance when he went a greater distance, and his injury was permanent, a verdict of $7,750 was not excessive. (Setzler v. Metropolitan St. Ry. Co., 127 S. W. Rep., 1.)

Missouri.—Injuries to Passengers—Assault by Carrier's Servant.

The rule that the master is not liable for the torts of the servant, unless the act itself pertains to the service for which the servant is employed, does not apply to an assault on a passenger by a carrier's servant, in which case the carrier's liability arises, not out of the relation of master and servant, but out of that of carrier and passenger, the carrier being bound to protect the passenger against assaults not only of its servants but of third persons. (Shelby v. Metropolitan St. Ry. Co., 125 S. W. Rep., 1189.)

Missouri.—Assault on Passenger—Scope of Employment—Exemplary Damages.

A carrier is liable for the acts of its conductor in assaulting a passenger while engaged in the performance of his duty as such, precisely as the conductor himself would be.

If the relation of passenger and carrier has ceased to exist the liability of the carrier for the act of the servant in assaulting a passenger no longer exists.

Where the jury were justified in finding that a street car conductor followed a passenger to the steps of a car and struck him with a switch iron while he was in the act of alighting, a proper case for exemplary damages is made out, as such action evinces malice.

Where a passenger, assaulted by a conductor with a switch iron, received a scalp wound about 3 in. long that laid bare his skull, and his skull was fractured, resulting in a blood tumor in the eye, in the loss of his memory, and a change of his disposition, and his injuries were permanent, and the assault was vicious and unprovoked, a verdict of $5,000 compensatory damages and $2,000 exemplary damages, is not excessive. (Neuer v. Metropolitan St. Ry. Co., 127 S. W. Rep., 669.)

New York.—Injuries—Persons Liable.

Though at that time of a street railway accident title to the property of the company was in a receiver, he cannot be held liable where the road was then being operated by another company and he did not assume charge until thereafter, since it is not a question of who had title to the property, but of who controlled the motorman whose negligence caused the accident. (Lauber v. Linch, 119 N. Y. Sup., 614.)

New York.—Receivers—Insolvency—Leases—Personal Injury Claimants.

Where a street railway company leased its property, which was subject to mortgages securing bonds, to an operating company, personal injury claimants were only creditors of the lessee and were not entitled to payment as against the holders of the bonds secured by the mortgages. (Guaranty Trust Co. of New York v. Metropolitan St. Ry. Co. et al., Farmers' Loan & Trust Co. v. Same, 180 Fed. Rep., 637.)

New York.—Pasenger Alighting at Emergency Stop.

A street car made a momentary stop about a quarter of a block from its regular stopping place at a transfer point because another car ran in ahead of it. A passenger, without any notice to the conductor or motorman, and without knowledge that the car had not reached its regular stopping place, attempted to alight, and while doing so the car started and she was injured. There was no evidence of any signal by the conductor to the motorman either to stop or to start the car. Held, as a matter of law, not to show negligence in the operation of the car. (Foden v. Brooklyn Heights R. Co., 121 N. Y. Sup., 420.)

Pennsylvania.—Carriage of Passengers—Care Required.

A carrier of passengers for hire is required to use a high degree of care to prevent injury to his passengers but is not required to protect them from every injury, and in an action by a passenger for personal injuries it was error to charge that the carrier owed the passenger the duty to use "such a degree of care as would be necessary under all the circumstances of the case and would prevent injury to the passengers." Such charge would make the carrier an insurer. (Carothers v. Pittsburg Rys. Co., 79 At. Rep., 134.)

News of Electric Railways

Operation in Kansas City Under the Receivers

R. J. Dunham, one of the receivers of the Metropolitan Street Railway, Kansas City, Mo., conferred on Aug. 29, 1911, with officials of the city in regard to the affairs of the company. Mr. Dunham is quoted as follows:

"When Frank Hagerman, counsel for the company, applied for a receiver one of the objects set forth was the preservation of the system. We are bound to the federal court by this petition and we are legally pledged to preserve the system if possible. We will try by all means to meet our obligations. Should we delay the payment of interest or fail to meet the obligations of the company the creditors might demand the dismemberment of the system and the return of their individual holdings.

"The rate of increase in street car traffic in Kansas City is lessening, showing that the city's growth is not so great as in former years. For the year ended June 1, 1911, the increase over the previous year was 5.54 per cent. The road has been in the hands of receivers nearly three months and the increase over last year is now a little more than 1 per cent. At the outset of the receivership an estimate of revenues and necessary expenditures was made. On those figures we could have operated the property, met our indebtedness and had a small amount more with which to make improvements. But the receipts since have decreased. We are not giving as good service as we would like to, but the service is better than it was a year ago. We are operating more cars in proportion to the number of passengers than we did a year ago."

Kansas City, Mo., and Kansas City, Kan., are acting in conjunction in connection with the subject of rates charged by the Kansas City Viaduct & Terminal Railway for the passage of street cars across the intercity viaduct. As a preliminary measure, the Utilities Commission of Kansas City, Mo., has determined to investigate the viaduct company's affairs, those of the Metropolitan Street Railway and allied corporations, and the Kansas City & Western Railway. It is proposed to inquire into the actual value of the intercity viaduct, the cost of its operation, the saving to the Metropolitan Street Railway and the Kansas City & Western Railway in time and money, if any, in operating cars over the viaduct and the value to the public of service over the viaduct. The investigation was provided for in a resolution by the Utilities Commission, in which the Commission expressed the belief that, under the franchises of the Kansas City Viaduct & Terminal Railway, it is compelled to allow the use of its structure for street cars and other carriers at reasonable rates; that Kansas City, Mo., has, under the franchise it granted to the company, the right to determine and fix such rates, and that all that now remains to be done in order to secure a resumption of car service over the viaduct is to find out what just and reasonable rates are.

According to Mr. Dunham, the receivers are willing at any time to resume service over the intercity viaduct, but he insists it must be at a reasonable rate. Mr. Dunham is reported to have said:

"We cannot afford to pay the 1-cent rate. Eighty per cent of the business moving across the viaduct was transfer business. That means that nearly half of the passengers also used another line, making operating expenses almost double. Our books show that for each passenger hauled across the viaduct we virtually received 3.15 cents. Of this amount 2.6 cents went for operation, maintenance, fixed charges and taxes, leaving only .55 of a cent with which to pay the 1-cent charges against us."

It is estimated that it takes only three minutes longer to go from the center of Kansas City, Mo., to the center of Kansas City, Kan., now than when the viaduct was used, and that fewer transfers are made than formerly, resulting in a saving to the passenger of the time spent in waiting at transfer points.

A conference between city officials and Mr. Dunham and Ford H. Harvey, receivers, and Frank Hagerman, counsel for the company, has been arranged to be held on Sept. 12, 1911.

Discussion of Proposed Franchise Ordinance in Los Angeles

At a hearing on Aug. 24, 1911, on the proposed ordinance to prescribe general terms for the granting of franchises in Los Angeles, Cal., Paul Shoup, first vice-president of the Pacific Electric Railway, opposed the ordinance. Mr. Shoup said in part:

"The city under the proposed ordinance is to receive for electric railroad franchises not less than 30 per cent of the net annual receipts, and in computing such receipts nothing is to be allowed for interest on bonds or any other investment whatsoever in the plant. The street car lines yet to be built are extensions or connecting links; not main stems. How would this provision affect an investment in an extension?

"A double track street railway line of one mile built with grooved rails 114-lb. section, paving as per city specifications, costs more than $100,000 per mile. Consider a 1-mile line well located and at the end of ten years contributing, say, $18,000 to the company. The operating expenses, taxes, depreciation and renewals may be figured conservatively at 75 per cent, which would leave a net operating profit of $4,500. Of this, $1,350—or 30 per cent—would go to the city, leaving $3,150 to meet an interest charge of, say, $6,000 on the $100,000 investment. The gross annual earnings contributed by this new mile of double track line must reach the extraordinary figure of nearly $35,000 before it is possible to pay 6 per cent on the money invested—and with no allowance for a sinking fund. These figures illustrate that the proposed ordinance would take 30 per cent of net revenue above operating expenses for such line, regardless of whether or not the amount left is sufficient to allow interest on the amount invested. The investor faces the possibility of operating at a loss for years and at a time when the line becomes profitable of having the city take it over.

"Another provision decrees that if the board of public utilities judges any expenditures to have been wasteful, extravagant or useless they shall not be considered in computing net annual receipts, and that salaries of all employees are left to be subject to the city's approval; in case of disagreement between the city and the company arbitration is to follow. This provision follows the line of the Chinese settlement. No condition corresponding in any respect exists here.

"Section 9 would give the city the right to purchase the line three years after the granting of the franchise, either to operate itself or to sell to somebody else. The owner is to have at least six months' notice to vacate. The price is to be the value of the property as an operating road with no value for good-will, future profits or obsolete equipment, and no regard for the stocks and bonds or other capitalization of such plant. Mortgages securing bonds must be drawn accordingly.

"Section 13 states that any other companies engaged in like business desiring to avail themselves of the benefits, privileges and rights conferred by a franchise shall have a common right to have their cars switched and transferred at equal and reasonable pro rata rates. This section means that any one coming to Los Angeles, buying a franchise for a few blocks and building a line would have the right to use at reasonable pro rata rates all the other lines built under franchises granted through this ordinance which he could intersect or connect with.

"Sections 19 and 20 reserve to the city the right to change the motive power, prescribe the style and type of cars and all the detail of the equipment, and as well to pass upon power contracts and other contracts of great importance. No obligation to make expensive changes in or abandon such equipment upon request should become a provision of some relatively unimportant franchise. And obviously it is out of the question to have separate power contracts or separate equipment of a special design for a mile or a few miles of road. This section should be modified to the point simply of giving the city power to see that clean and comfortable cars properly equipped and well maintained are operated."

Toledo Railways & Light Company Rejects Rental Proposal

The directors of the Toledo Railways & Light Company, Toledo, Ohio, by unanimous vote on Aug. 31, 1911, adopted the following resolutions, refusing to agree to a rental of $250 per day for the use of the streets upon which its franchises are said to have expired:

"Whereas, the Council of Toledo purported to pass, on July 26, 1911, and the Mayor purported to approve, an alleged ordinance, purporting to grant the consent, permission and authority of Toledo to the Toledo Railways & Light Company, to continue from day to day to operate its cars upon the streets and portions of streets in said purported ordinance set forth:

"Be it resolved, by the board of directors of the Toledo Railways & Light Company, that said purported ordinance and offer therein contained be, and the same hereby are, refused, and that no cars of this company be operated at any time under or in pursuance of said purported ordinance, or of any grant, permission, authority or condition therein set forth."

On Aug. 28 the city, through Cornell Schreiber, city solicitor, filed suit in Common Pleas Court asking for an injunction to prevent the company from operating cars upon the eighteen sections of streets enumerated, unless it pays the rental of $250 per day since Nov. 10, 1910, amounting to $70,000 at the time of the passage of the ordinance. The petition specifically describes the sections of the streets upon which it is claimed that the ordinances have expired and asserts that the company has been operating its cars over them since Nov. 10, 1910, as a trespasser.

The statement of earnings of the company for July and for the first seven months of the year follows:

	July.	Seven Months.
Gross receipts	$244,057	$1,783,528
Operating expenses	152,092	1,118,648
Net earnings	$91,965	$664,880
Miscellaneous income	481	5,112
Gross income	$92,446	$669,992
Deductions	79,052	554,381
Surplus	$13,394	$115,611

United Properties Developments in California

A portion of the Smith-Tevis holdings in Alameda County, Cal., was incorporated on Aug. 19, 1911, with a capitalization of $27,000,000, under the name of the Oakland Railway. It is announced by officials of the United Properties Company, the incorporation of which was noted in the Electric Railway Journal of Jan. 14, 1911, that the Oakland Railway was incorporated to simplify the expenditure of a large amount of money which is to be used in improvements and extensions of the railroad properties in Alameda County controlled by the United Properties Company. The roads on which this money will be expended are the San Francisco, Oakland and San José Railway (Key Route), the Oakland Traction Company, the East Shore Railway and the Oakland Terminal Company. The first work to be undertaken will be filling in the pier of the Key Route to a width of 1000 ft. and with masonry walls extending the full length of the structure from the shore to the present ferry terminal. Following this, it is announced, will come the double tracking of some of the single-track lines of the Oakland Traction Company, the improvement of the East Shore Railroad, and the purchase of additional rolling stock for each of the lines operated by the United Properties Company.

It is explained that the incorporation of the Oakland Railways was necessary to simplify the division of the funds in accounting for the expenditures to be made for the different lines in common and in the improvement of portions of the property of each of the separate concerns. The stock consists of 270,000 shares, at $100 each, 100,000 being preferred and 170,000 common. The names of the incorporating stockholders follow: John S. Fleming, S. Canham, Lloyd S. Jackson, C. Corner, G. A. Fay, W. Schmulowitz and Oliver B. Weyman.

It is expected that by the time the new Key Route docks are completed the United Properties Company will have a line of steamers of its own in operation on the Pacific Ocean to the Orient and along the coasts of North and South America.

Transit Affairs in New York

The New York, Westchester & Boston Railway, a subsidiary of the New York, New Haven & Hartford Railroad, has proposed to the Public Service Commission, First District, that it be permitted to build the proposed Pelham Bay extension of the subway in the Bronx, taking such a franchise in exchange for the one it holds for building an extension to Throg's Neck from its present line. It offers to build and equip the line with private capital and permit the city to take it over at any time on payment of cost of construction, plus 15 per cent. If the city does not desire to take over the line, the company is ready to operate it in connection with its main line, and make connections with the Lexington Avenue subway when the latter is completed. This would give the New York, Westchester & Boston Railway and the New York, New Haven & Hartford Railroad an entrance into Manhattan independent of the New York Central & Hudson River Railroad.

Mayor Gaynor has been notified that a group of capitalists who can furnish as much as $500,000,000 are ready to form a syndicate for the construction and equipment of new subways for the city, if such a course can be followed under the law. Former Corporation Counsel William B. Ellison, who has acted as spokesman for this group of men, says: "Those making the proposition would have a first lien on the subway so constructed and equipped. With such a lien protecting them, they seemingly have no hesitation in financing the plan. Two things are precedent, namely, an ability to agree upon the rate of commission of percentage which will go to the builders, and the power of the city to enter into such a contract. Subways so constructed would belong to the city, and their subsequent operation would be in the hands of the city. Municipal construction is thereby assured, and afterward it is for the city to determine whether these subways shall be operated by the municipality or their operation leased to others."

Counsel for the Public Service Commission, First District, has issued a reply to that part of Mayor Gaynor's recent letter to the cities committee of the Legislature which referred to transit franchises. Counsel for the commission says in part:

"The Mayor refers to Sections 74 and 242 of the present charter, but fails to refer to Section 72, which is part of the context, and especially to the last sentence of such section. This section provides that every grant of a franchise of any character to any person or corporation must, unless otherwise provided in this act, be by ordinance of the Board of Aldermen or by resolution of the Board of Estimate and Apportionment or a contract executed by or under the authority of the said Board of Estimate and Apportionment, provided that every such ordinance, resolution or contract shall be subject to the provisions of this act with respect to approval by the Mayor. But this section shall not apply to any franchise, right or contract authorized by the Board of Rapid Transit Commissioners of the City of New York.

"An attempt is being made to pass the proposed charter in its present form, upon the ground of an alleged obscurity in the Rapid Transit Act and the charter in respect of the power of the Mayor. There is no obscurity. Whatever confusion there is arises from a refusal to see the plain distinction between a constitutional consent (similar in scope to those given by thousands of property owners along the lines of rapid-transit railroads) to routes and general plans and a right of approval over contracts and franchises. When the commission adopts a route and general plan, it has to be consented to by the Board of Estimate and Apportionment, by the Mayor, and by one-half in value of abutting property owners, or in lieu of the last consent the determination of commissioners appointed by the Appellate Division of the Supreme Court, confirmed by the court.

"When the commission adopts a contract or franchise for a rapid-transit railroad, it must be approved by the Board of Estimate and Apportionment alone. These are two entirely separate and distinct steps; for example, the

route and general plan of the Lexington Avenue subway was first approved by the Board of Estimate and the Mayor in 1905, and modifications of it in 1907 and 1908. The contracts for its construction, however, were not entered into until last month."

San Francisco's Municipal Railway

Commissioner of Public Works Laumeister of San Francisco, who has special charge of the reconstruction of the Geary Street, Park & Ocean Railway as a municipal railway, has issued the following statement regarding the progress being made as follows: "The poles and trolley wires are up from Kearny Street to Thirteenth Avenue on Geary Street and on Tenth Avenue from Geary Street to the Park. The poles for that part of the line from Thirteenth Avenue to Thirty-third Avenue have not arrived from Pennsylvania, but are expected any day. It will take about two weeks to set them up after their arrival, and two days to string the trolley wires. It is expected that five or six weeks will see the construction of the roadbed completed from Fifth Avenue, where the present tracks turn off to the Park, to Thirty-third Avenue. The tearing up of the present tracks from Fifth Avenue to Kearny Street and the laying down of the new rails will take, it is estimated, about four months. The site for the new power house, at Jefferson Street and Jones Street, has been purchased for $55,000, and the site for the carhouse, at Geary Street and Presidio Avenue, has been contracted for at $56,000. The preparation of plans for the buildings has begun, but it will probably be about two months before contracts can be let. The plans for the cars are ready for the consideration of the supervisors. It is expected that five months will be sufficient for the building of the cars, although the contract to be let will allow a maximum time limit of 240 days. Plans for the machinery of the carhouse and the ornamental work for the poles are yet to be prepared.

Texas Attorney General on Public Service Operations in That State

J. P. Lightfoot, Attorney General of Texas, has submitted to the Legislature of Texas a report on his investigation of the operation of the public service companies in Texas. Referring to electric light and railway properties, the report states in part: "The railway and light companies in Texas which are operated by Stone & Webster, Boston, Mass., are as follows: Dallas Electric Light & Power Company, Dallas Consolidated Electric Street Railway, Rapid Transit Railway and the Metropolitan Street Railway, which are all owned by the Dallas Corporation. In El Paso the El Paso Electric Railway and the Juarez Traction Company are owned by the El Paso Electric Company. The Galveston-Houston Electric Company owns the controlling interest in the Galveston Electric Company, the Houston Electric Company, the Galveston-Houston Electric Railway, and also owns stock in the Suburban Realty Company and the Hotel Galvez at Galveston. The Northern Texas Electric Company owns a controlling interest in the Northern Texas Traction Company, the Dallas & Oak Cliff Electric Railway and the Ft. Worth Southern Traction Company. The several street railway systems of Dallas, Ft. Worth, Galveston, Houston and El Paso are all owned by a holding corporation, which in turn is owned, controlled or managed by the Stone & Webster Management Association, which is a corporation organized by the partnership firm of Stone & Webster.

"The four electric railway companies of Dallas are owned by one corporation, the two lines of El Paso by another, the street railway systems of Galveston and Houston by a third corporation; the Northern Texas Traction Company and the Ft. Worth Southern Traction Company are owned by a fourth corporation. Each of the four corporations is owned and managed by the Stone & Webster Management Association, another corporation. Some of the stock and bonds of all these Texas companies are owned by electric securities companies, which, in turn, are partly owned or controlled by the General Electric Company. It will, therefore, be seen that the electric street railways find control and domination finally lodged in Stone & Webster and the General Electric Company through subsidiaries."

Mr. Lightfoot concludes his report as follows: "The resolution under the authority of which I have acted made it necessary to examine into the relations of the corporations not only from a legal standpoint, but also in the light of the effect of such concentration upon the industrial and economic welfare of the State and nation. Many of the facts which have been set forth are valuable only for the light which they may throw on the great economic questions involved. It would be difficult for street railways and electric light plants in widely separated cities to enter into competition. Moreover, a great many of these concerns have no permit to do business in Texas, and if the facts set forth show any violation of the law by them it would be rather a violation of the laws of other States or of the federal government. The State courts have no jurisdiction to punish offenses which alone affect interstate or international commerce.

"The operation in Texas by the Stone & Webster syndicate presents several interesting questions for determination. Their movements have always been predicated upon the most eminent legal advice to be had. So far as I have been able to determine the fact, it appears that the city charters of the various cities in which they operate the local street railway systems confer upon the several city governments a wide control over the matter of franchises, the fares to be charged, the character of the equipment, the service to be rendered the public, the hours of labor for the employees and other pertinent and salient matters which might bring such cases within the reasoning of the decision by the Supreme Court of this State in the case of State against Shippers' Compress Company, 95 Texas, 613, in which the court held that under the facts in that case there was no unreasonable restriction of competition between several of the compress companies which were owned by the same corporation."

Key Route Basin Improvements at Oakland

Immediate development of the Key Route basin improvements at Oakland, which form a part of the large United Properties Company of California, is assured by a recent loan issue of $2,500,000 raised through E. H. Rollins & Son. The recently incorporated Oakland Railways takes in the San Francisco, Oakland & San José Railway, the East Shore & Suburban Railway, the Oakland Traction Company and the Oakland Terminal Company. The Oakland Railways was formed primarily to carry on the Key Route basin work and other extensive development plans of the United Properties. The Oakland Railways is capitalized at $27,000,000.

The plans for the Key Route basin have been made public heretofore. They consist in building a solid mole 1000 ft. wide to replace the present Key Route pier, with trackage to accommodate an increased service. Besides this the basin will be provided with extensive wharfing and terminal facilities for steamships.

A part of the plans is the early completion of the extension of the San Francisco, Oakland & San José Railway into North Berkeley by way of Sacramento Street, connecting at Fifty-third Street and Adeline Street with the present lines to the pier. This work is now under way. Under the franchise terms it must be completed in November. That line will parallel a part of the Southern Pacific Company's new electric system in Berkeley, which is also nearing completion.

Bridge Dynamited.—The bridge of the New York, Westchester & Boston Railway, at Mount Vernon, N. Y., which is controlled by the New York, New Haven & Hartford Railroad, was partially wrecked by an explosion on Sept. 3, 1911. No evidence has been found by which arrests could be made.

Inquiry in Regard to Gasoline Cars.—The manager of a railway operating in a Central American country informs an American consular officer that the company is considering the purchase of two gasoline cars, capable of seating twenty persons each, for use on its lines, and would like to receive catalogues and proposals from American manufacturers. The gage of the railway is 3 ft.; the maximum grade is 3 per cent, compensated for curvature, and the

roadbed is said to be very good. In applying to the Bureau of Manufacturers, Department of Commerce and Labor, Washington, D. C., for further information in regard to this inquiry the file number, 7284, should be given.

Bonds to be Sold for Municipal Railroad at Seattle.—The City Council of Seattle, Wash., has been directed to sell to the highest bidder $800,000 of bonds, authorized by the voters at the general election held on March 8, 1911, to be issued to acquire the Seattle, Renton & Southern Railway, between Fyar Street, the southern city limits, and Stewart and Blanchard Streets on the north. R. H. Thompson, city engineer, has valued the property of the Seattle, Renton & Southern Railway, and W. R. Crawford, president of the company, has been offered $386,063 for the property by the Board of Public Works.

Detroit United Railway's Arbitration Plans.—The Detroit (Mich.) United Railway has refused to accept Governor Chase Osborn of Michigan as the third arbitrator to settle differences over wages and time between the company and its employees, as it had been agreed in the beginning that no one holding political office or active in party politics would be named by either side. George F. Monaghan, arbitrator for the company, has suggested to Judge Phelan, arbitrator for the employees, the following names: Henry H. Swan, former federal judge; E. H. Doyle, owner the Majestic Building; John Wynn, Jr., real estate; M. J. Murphy, president the Security Trust Company; Charles Murphy, secretary of the S. J. Murphy Company, and Waldo Avery, capitalist.

Report on Operation of London County Council Tramways.—In a report of the highways committee on the tramway accounts it appears that the total income from the London County Council Tramways during the year 1910-11 was £2,232,317. The operating expenses amounted to £1,337,769, leaving a surplus of more than £895,000, a figure which would have been £20,000 more had it not been for the deficiency incurred on running the horse trams. Debt, income tax and other charges have had to be set against the surplus, amounting to £662,321, leaving a net surplus of £232,726. Provision for renewals absorbed £129,229, leaving £103,498 to be transferred to the general reserve fund. The renewals fund on March 31, 1911, amounted to £527,263 and the general reserve fund to £176,844. The total number of passengers carried during the year was 504,715,326; and the number of car miles run 48,101,570.

New York, New Haven & Hartford Railroad Retrenching.—C. S. Mellen, president of the New York, New Haven & Hartford Railroad, has issued a statement in which he says: "Business is of such a character at the present time and the outlook for the future is such as to require the strictest economy in the handling of the railway. Every one will be laid off that can be. Nothing will be started, and only such work will be continued as will cost more to leave uncompleted than to finish." The road has laid off about thirty enginemen since Aug. 15, 1911. The following improvements will not be delayed: The proposed railway across Hell Gate to connect with the Long Island Railroad and the Pennsylvania Railroad and the New York, Westchester & Boston Railway, money for which has already been provided. The following will be considerably delayed: The Westchester Northern Railroad, from White Plains to Danbury; further electrification east of Stamford; construction of a passenger station at New Haven; electrification in and near Boston.

Meeting of Illinois Electric Railways Association

A meeting of the Illinois Electric Railways Association has been called by C. E. Flenner, secretary, to be held at 10 a. m. on Sept. 15, 1911, at the La Salle Hotel, Chicago. The following program has been arranged:

Paper, "Electric Railway Advertising," by Fred G. Buffe, manager publicity department of the Illinois Traction System, Peoria.

Paper, "Traffic Promotion," by Richard Breckinridge, general freight and passenger agent of the Aurora, Elgin & Chicago Railroad, Chicago.

Address, "Publicity," by J. J. Rockwell, manager special service department Electric Railway Journal.

The members have been invited to make a trip over the single-phase line of the Chicago, Lake Shore & South Bend Railway as the guests of C. N. Wilcoxen, general manager.

Financial and Corporate

New York Stock and Money Markets

September 6.

Opening prices on Tuesday were low and the declines were attributed to weakness on foreign exchanges as a result of the Moroccan agitation. Recovery was made in the early part of the day and at the close slight gains were registered. Further advances were made on Wednesday, although a slight reaction took place later in the day. Favorable news of the Moroccan situation and the increased dividend of the Interborough Rapid Transit Company assisted the upward trend of prices. Movement of funds for financing crop requirements is becoming more pronounced and rates on the money market are becoming firmer. Quotations to-day were: Call, 2⅛@2⅜ per cent; ninety days, 3¼@3½ per cent.

Other Markets

Prices advanced to-day in the Philadelphia market, and the entire list was strong throughout the trading. The tone of the market is much better since the holidays.

The same conditions have prevailed on the Chicago Exchange. Chicago Railways 2s made marked advances on to-day's transactions.

Business has shown improvement in Boston. There were only a few prices changes of importance to-day, but the volume of transactions was fair.

The Baltimore market is extremely dull and there is nothing of importance to record.

Quotations of traction and manufacturing securities as compared with last week follow:

	Aug. 30.	Sept. 6.
American Light & Traction Company (common)	a296	a300
American Light & Traction Company (preferred)	a106½	a106½
American Railways Company	a45	44¼
Aurora, Elgin & Chicago Railroad (common)	44¾	a43
Aurora, Elgin & Chicago Railroad (preferred)	87	a87
Boston Elevated Railway	a127½	a127½
Boston Suburban Electric Companies (common)	a14	a18
Boston Suburban Electric Companies (preferred)	a75	a80
Boston & Worcester Electric Companies (common)	a13	a13
Boston & Worcester Electric Companies (preferred)	a56	a56
Brooklyn Rapid Transit Company	75½	76¾
Brooklyn Rapid Traisit Company, 1st ref. conv. 4s	*86¼	8[illegible]
Capital Traction Company, Washington	a130½	a131
Chicago City Railway	a190	a190
Chicago & Oak Park Elevated Railroad (common)	a3	a3
Chicago & Oak Park Elevated Railroad (preferred)	a5	a5
Chicago Railways, ptcptg., ctf. 1	90	a97
Chicago Railways, ptcptg., ctf. 2	a27¼	30¼
Chicago Railways, ptcptg., ctf. 3	a10	a11
Chicago Railways, ptcptg., ctf. 4	*7	a7
Cincinnati Street Railway	*130	*130
Cleveland Railway	*100¼	a100¼
Columbus Railway (common)	*82	*82
Columbus Railway (preferred)	*95	*95
Consolidated Traction of New Jersey	a76	a76
Consolidated Traction of N. J., 5 per cent bonds	a105	a[illegible]
Dayton Street Railway (common)	a25	a25
Dayton Street Railway (preferred)	a101	a101
Detroit United Railway	a70	a70
General Electric Company	a153	a153
Georgia Railway & Electric Company (common)	a165	a161
Georgia Railway & Electric Company (preferred)	92	92
Interborough Metropolitan Company (common)	a14½	16
Interborough Metropolitan Company (preferred)	a43¼	45⅛
Interborough Metropolitan Company (4½s)	79	80½
Kansas City Railway & Light Company (common)	a19	a19
Kansas City Railway & Light Company (preferred)	*41	a44
Manhattan Railway	a138	a136½
Massachusetts Electric Companies (common)	a17¾	a19
Massachusetts Electric Companies (preferred)	a88¼	a86½
Metropolitan West Side, Chicago (common)	27	*27
Metropolitan West Side, Chicago (preferred)	*75	*75
Metropolitan Street Railway, New York	*15	15
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	a70	70
Northern Ohio Light & Traction Company	*50½	*50½
Northwestern Elevated Railway (common)	*30	*30
Northwestern Elevated Railroad (preferred)	*70	*70
Philadelphia Company, Pittsburgh (common)	51	51
Philadelphia Company, Pittsburgh (preferred)	42½	42½
Philadelphia Rapid Transit Company	a22⅝	23
Philadelphia Traction Company	a85	85½
Public Service Corporation, 5% col. notes (1913)	a94	a94
Public Service Corporation, ctfs.	a106½	a106½
Seattle Electric Company (common)	111	a110
Seattle Electric Company (preferred)	103	103
South Side Elevated Railroad (Chicago)	95⅛	95¼
Third Avenue Railroad, New York	a8	8¾
Toledo Railways & Light Company	a7	a6½
Twin City Rapid Transit, Minneapolis (common)	a106	a108½
Union Traction Company, Philadelphia	50⅛	51
United Rys. & Electric Company (Baltimore)	a18	a18
United Rys. Inv. Co. (common)	*65	a62
United Rys. Inv. Co. (preferred)	a35	a35
Washington Ry. & Electric Company (common)	a44½	a45
Washington Ry. & Electric Company (preferred)	a89	a90
West End Street Railway, Boston (common)	a88	88
West End Street Railway, Boston (preferred)	100	100
Westinghouse Elec. & Mfg. Co.	a64½	66½
Westinghouse Elec. & Mfg. Co. (1st pref.)	*114	a120

a Asked. * List sale.

Boston (Mass.) Elevated Railway.—Stockholders of the West End Street Railway at a special meeting held in Boston on Sept. 6, 1911, voted to sell their property, privileges and franchises to the Boston Elevated Railway. The sale takes effect at the expiration of the present lease of the West End Street Railway to the Boston Elevated Railway on June 10, 1922. The terms of sale guarantee a 7 per cent return to holders of common stock of the West End and 8 per cent on preferred stock. A new issue of stock of the Boston Elevated Railway will be exchanged share for share for stock of the West End Street Railway the Boston Elevated Railway had, on June 30, 1911, 4701 stockholders, an increase of 162 over 1910. Of these 4191, or 89 per cent, were residents of Massachusetss, and they owned $17,829,900 stock, or 89 per cent, of the $19,950,000 share capitalization. In 1898, a year after organization, Massachusetts shareholders numbered 1541, or 80 per cent of the total, and they owned about 77 per cent of the outstanding capital of $5,000,000. From Sept. 20, 1909, to June 30, 1910, the stockholders increased by 567, reflecting the distribution of the newly issued shares.

Columbus, Delaware & Marion Railway, Columbus, Ohio.—In a suit brought by Eli M. West, receiver of the Columbus, Delaware & Marion Railway, against John G. Webb, president of the company, Mr. Webb testified before W. M. Rockel, special master, at Springfield, Ohio, on Aug. 28, 1911, that he has subscribed for 24,933 shares of stock of the company and that to the best of his knowledge this stock, which had been used as collateral, still remained in his name. The stockholders had never elected a board of directors. The directors had been chosen by voting trustees and had full charge of the financial management and control of the road. Mr. Webb said that a portion of the expenditure of $600,000 which was authorized by the directors was used to pay off debts of the company, while the remainder was used to purchase the Delaware Street Railway, and to increase the equipment of the Columbus, Delaware & Marion Railway.

Columbus Railway & Light Company, Columbus, Ohio.—The meeting of the Columbus Railway, originally set for June 26, 1911, to act upon the proposed increase of the capital stock from $7,000,000 to $10,000,000 was again adjourned on Aug. 28, 1911, to permit the completion of the report of the special committee of stockholders which is inquiring into the financial relations of the Columbus Railway and the Columbus Railway & Light Company. The committee appointed by the chairman of the meeting held June 26, 1911, to investigate the affairs and condition of the Columbus Railway submitted the following partial report: "After appointment the committee organized by electing D. M. Massie chairman and John A. Poland secretary, and proceeded to consider the question of expert assistance. After due investigation the committee recommended the employment of Ernst & Ernst, certified public accountants of Cleveland, and the employment of Julian Griggs, Columbus, as engineer, with the understanding that he should secure the assistance of Prof. E. A. Hitchcock. The directors of the Columbus Railway arranged to employ the experts above named to assist in the investigations. Ernst & Ernst began work July 17, and from that date have had constantly three or more men employed in auditing the accounts of the Columbus Railway, and have recently notified us that it will require until Sept. 11, 1911 for them to complete their labors. Messrs. Griggs and Hitchcock began work on July 18, and we have this day received their complete report, but have not yet had time to give it any consideration. In view of these facts, we ask that we be given further time to complete our work and formulate our report, and suggest that a resolution be adopted adjourning this meeting until Sept. 25, 1911, at which time we trust we shall be able to submit a full report."

Interborough Rapid Transit Company, New York, N. Y.—The directors of the Interborough Rapid Transit Company on Sept. 6, 1911, voted to increase the dividend on the company's stock from 9 per cent to 10 per cent per annum by declaring an extra dividend of 1 per cent. Of the $35,000,000 of stock on which the increased dividend will be paid $33,912,800 is in the treasury of the Interborough-Metropolitan Company, having been exchanged by the holders for the 4½ per cent bonds on the basis of $200 in bonds for each $100 of stock. Theodore P. Shonts, president of both companies, made the following explanatory statement: "On June 2, 1910, a resolution was passed by the directors of the Interborough-Metropolitan Company appropriating $300,000 annually out of any surplus income in the hands of the company after the payment of interest and taxes upon its obligations to the acquisition of its 4½ per cent collateral trust bonds. These bonds are to be acquired in the open market at not exceeding par and interest and to be turned in to the trustee of the mortgage, so as to operate as a sinking fund. The time now having come when the Interborough Rapid Transit Company has felt justified in increasing its dividend beyond 9 per cent per annum heretofore paid, the Interborough-Metropolitan Company will be in a position to put in effect the declared policy of the company with respect to its 4½ per cent bonds. Inasmuch as these bonds, when turned in to the trustee as additional security for the mortgage, cannot, under the terms of the resolution of June 2, 1910, be released, and will continue to draw interest, which must also be devoted to sinking fund purposes, a sum of over $40,000,000, or a larger amount if the bonds can be secured at less than par, will have been accumulated before their expiration for the purpose of paying off the $67,825,000 4½ per cent bonds outstanding. Contemporaneously, by reason of the paying off of the 5 per cent bonds of the Interborough Rapid Transit Company by the sinking fund provided for by that mortgage, the equipment of that company, now valued at $38,000,000, will have been released from that mortgage and the assets of the Interborough-Metropolitan Company will have been enhanced by a corresponding increase in the value of its stock in the Interborough Rapid Transit Company. There will remain the lease of the Manhattan Railway, which has been earning at a rate approximately $1,400,000 surplus, to the Interborough Company."

International Transit Company, Sault Ste. Marie, Ont.—A. E. Ames & Company, Toronto, Ont., are offering for sale a block of 5 per cent first mortgage serial gold bonds of the International Transit Company. The total issue is $300,000 and the bonds are dated July 1, 1910, $20,000 due annually on July 1 of each year until 1925. The principal is guaranteed by the Lake Superior Power Company. The National Trust Company, Ltd., Toronto, Ont., is trustee of the issue.

Metropolitan Street Railway, New York, N. Y.—Judge Lacombe, in an opinion filed in the United States Circuit Court on Aug. 30, 1911, affirmed the report of William L. Turner, special master, holding that the lease of the various city surface lines, dated Feb. 1, 1902, between the Metropolitan Street Railway and the New York City Railway, was no longer in effect after Sept. 24, 1907, with the amendment, however, that the date of the expiration of the lease should be changed to Oct. 1, 1907. In all other respects the findings are approved. They concern the accounting between the Metropolitan Street Railway and the New York City Railway. Judge Lacombe says that the dual receivership did not exist on Sept. 24, 1907. He adds: "It began when the application of the Metropolitan Street Railway was granted, Oct. 1, 1907. It is thought, therefore, that the special master erred in finding that the lease should be deemed to have been no longer in effect after Sept. 24, 1907; the date should have been Oct. 1, 1907, and the special master's report should be corrected accordingly."

New Hampshire Traction Company, Haverhill, Mass.—Subsidiary companies under the New Hampshire Traction Company have petitioned for additional issues of securities to retire part of their floating indebtedness, as follows: Haverhill & Southern New Hampshire Street Railway, $5,000 stock at par and $5,000 bonds; Haverhill & Amesbury Street Railway, $400,000 bonds and 3600 shares stock at par; Lawrence & Methuen Street Railway, $35,000 bonds and 1650 shares at par.

Public Service Corporation of New Jersey, Newark, N. J.—The $4,000,000 of 5 per cent three-year collateral gold notes of the Public Service Corporation of New Jersey, dated Oct. 1, 1910, have been called for payment at par and interest at the office of the Fidelity Trust Company, Philadelphia, Pa., on Oct. 2, 1911. The notes were provided for by the sale of general mortgage 5 per cent bonds in March, 1911.

Sherbrooke Railway & Power Company, Sherbrooke, Que.—The stockholders of the Sherbrooke Railway & Power Company have authorized an issue of $300,000 of additional consolidated first mortgage 5 per cent bonds in connection with the recent purchase of the Eastern Townships Electric Company, the Lennoxville Light & Power Company and the Hanstead Electric Company and to extend the distribution systems of these companies. McCuaig Brothers & Company have been authorized to offer $150,000 of the bonds at 95 and interest, carrying a bonus of 40 per cent in common stock.

MONTHLY ELECTRIC RAILWAY EARNINGS

BANGOR RAILWAY & ELECTRIC COMPANY.

Period.	Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1 m., July, '11.....	$55,677	*$26,809	$28,868	$13,056	$15,812
1 " " '10.....	54,007	*24,775	29,232	11,921	17,311

CHATTANOOGA RAILWAY & LIGHT COMPANY.

1 m., July, '11.....	$84,175	*$50,362	$33,813	$19,870	$13,943
1 " " '10.....	88,412	*46,501	41,911	18,601	23,310
7 " " '11.....	530,130	*307,385	222,745	137,466	85,279
7 " " '10.....	496,840	*292,871	203,969	127,433	76,536

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY.

1 m., July, '11.....	$437,192	*$261,404	$175,788	$106,104	$69,684
1 " " '10.....	421,157	*239,973	181,174	100,655	80,529
7 " " '11.....3,066,276		*1,765,592	1,300,684	725,732	574,952
7 " " '10.....2,843,801		*1,607,969	1,235,832	718,589	517,243

DETROIT UNITED RAILWAY.

1 m., July, '11.....	$974,078	$616,283	$357,794	$277,377	$180,418
1 " " '10.....	950,679	986,726	364,553	180,797	283,757
7 " " '11.....3,827,578		3,642,573	2,185,004	2,234,634	950,350
7 " " '10.....5,369,414		3,357,511	2,011,904	1,153,854	856,050

EAST ST. LOUIS & SUBURBAN COMPANY.

1 m., July, '11.....	$195,688	*$109,404	$86,284	$45,453	$40,831
1 " " '10.....	210,844	*111,279	99,565	45,382	54,183
7 " " '11.....1,287,407		*736,239	551,168	317,604	233,564
7 " " '10.....1,330,197		*746,919	583,278	316,324	266,954

GRAND RAPIDS RAILWAY COMPANY.

1 m., July, '11.....	$107,072	*$58,523	$48,549	$15,008	$33,541
1 " " '10.....	113,005	*54,186	58,819	15,291	43,528
7 " " '11.....	660,432	*378,988	281,444	105,346	176,098
7 " " '10.....	643,828	*346,804	297,024	106,265	190,759

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY.

1 m., July, '11.....	$60,340	*$30,205	$30,135	$14,390	$15,745
1 " " '10.....	60,443	*30,906	29,537	13,134	16,403

PORTLAND RAILWAY, LIGHT & POWER COMPANY.

1 m., July, '11.....	$543,704	*$258,938	$284,766	$130,660	$154,106
1 " " '10.....	490,724	*237,378	253,346	116,507	136,839
7 " " '11.....3,658,516		*1,763,074	1,895,442	873,484	1,021,958
7 " " '10.....3,136,336		*1,484,700	1,651,636	795,724	855,912

ST. JOSEPH RAILWAY, LIGHT, HEAT & POWER COMPANY.

1 m., July, '11.....	$92,375	*$60,202	$32,173	$19,239	$12,934
1 " " '10.....	90,928	*51,289	39,639	18,274	21,365
7 " " '11.....	622,697	*382,202	240,495	134,713	105,782
7 " " '10.....	584,942	*350,290	234,652	127,717	106,935

TOLEDO RAILWAYS & LIGHT COMPANY.

1m., July, '11	$244,539	$152,092	$92,447	$79,052	$13,395
7 " " '11	1,789,641	1,118,649	669,992	554,381	115,611

UNION RAILWAY, GAS & ELECTRIC COMPANY.

1 m., July, '11.....	$244,931	*$141,736	$103,195	$62,924	$40,271
1 " " '10.....	232,318	*134,084	98,234	59,480	38,754
7 " " '11.....1,763,387		*1,039,702	723,685	426,073	297,612
7 " " '10.....1,663,338		*996,283	667,055	407,500	259,555

*Includes taxes.

Dividends Declared

Binghamton (N. Y.) Railway, 3 per cent.

Brockton & Plymouth Street Railway, Brockton, Mass., $3, preferred.

Connecticut Valley Street Railway, Greenfield, Conn., 3 per cent, preferred.

Metropolitan West Side Elevated Railway, Chicago, Ill., quarterly, ¾ of 1 per cent., preferred.

Sao Paulo Tramway, Light & Power Company, Sao Paulo, Brazil, 2½ per cent, quarterly.

Second & Third Streets Passenger Railway, Philadelphia, Pa., $3.

West Penn. Traction Company, Connellsville, Pa. quarterly, 1 per cent, common.

Hearings on minor matters of street railway interest were held on Sept. 5, 1911, before the Massachusetts Railroad Commission. No testimony was taken, but only the presentation of their case by the several petitioners. The Bay State Street Railway asked to relocate tracks in Wakefield and in Rockport, and the West End Street Railway petitioned for relocations in Boston that involved merely the widening of the space between tracks in certain places. Plans for track changes at the Dudley Street station of the Boston Elevated Railway were submitted for approval.

Traffic and Transportation

Accident Statistics of Philadelphia Rapid Transit Company

A comparison of accident statistics on the lines of the Philadelphia (Pa.) Rapid Transit Company for four years, from 1907 to 1910, made by the Philadelphia *News Bureau*, shows that while the proportion of accidents is still high, substantial results have been obtained. In 1907 the company spent nearly 10 per cent of its transportation revenue from surface lines in settling accident claims arising on those lines. By 1910 this proportion had been reduced to 6.95 per cent. In all the comparisons herewith given accidents attributable to strike conditions are omitted. Accidents due to alighting were reduced from 5033 in 1907 to 4596 in 1910, while accidents occurring in boarding were reduced from 3998 to 2787. Both of these classes of accidents were specially reduced by the use of pay-within cars. The number of persons killed from all causes, including passengers, employees and others, was reduced from 113 to 70, or 40 per cent.

The following table compares the number of fatal and non-fatal accidents to persons (excluding cases of property damage alone) for the four years, together with the amounts paid in damages in each year:

	1907.	1908.	1909.	1910.
Persons killed.....	113	98	55	70
Persons injured.....	19,343	11,598	6,694	7,240
*Damages paid.....	$1,780,839	$1,078,407	$1,063,643	$1,149,261
Ratio to trans. revenue.....	9.88	6.00	6.19	6.95

*Including property damage from accidents.

The payments in 1910 doubtless included considerable amounts representing injuries happening a number of years earlier. As the tendency of accidents is shown to be downward, the real cost to the company of the accidents actually happening in 1910 will probably be appreciably less than the amount actually paid out in that year. How Philadelphia compares with other cities in accidents on its surface lines is shown by the tables given below. The first shows the actual number of fatal and non-fatal accidents and the amounts paid in damages in each city in 1910. The New York figures are said to include Manhattan and Bronx, but the names of the companies considered are not mentioned. The article does not say whether one or more companies are included in the Brooklyn statistics.

	New York.	Brooklyn.	Boston.	Philadelphia.
Persons killed.....	86	60	37	70
Persons injured.....	14,643	8,653	3,112	7,240
Damage payments.....	$1,682,990	$884,878	$840,277	$1,149,261

The relative frequency of accidents is most accurately shown by a comparison of the number of passengers carried per accident. The following table shows that of the four cities the record of Philadelphia in regard to fatal accidents is the most unfavorable.

Passengers carried.	New York.	Brooklyn.	Boston.	Philadelphia.
Per persons killed.....	6,874,623	7,461,856	10,705,100	5,700,370
Per persons injured.....	40,375	51,741	127,278	55,084

In the matter of both fatal and non-fatal accidents per car mile, Philadelphia stands second. The comparison, however, is said not to be so accurate as the foregoing, since the use of smaller cars in Philadelphia increases the car mileage in proportion to the traffic above that of other cities.

Car miles.	New York.	Brooklyn.	Boston.	Philadelphia.
Per persons killed.....	801,869	924,258	1,381,830	952,646
Per persons injured.....	4,709	6,409	16,429	9,210

Uniforms for Division Superintendents, Inspectors and Road Officers.—After Oct. 1, 1911, all division superintendents, inspectors and road officers of the United Railways, St. Louis, Mo., will be required to wear uniforms while on regular duty.

Electric Railway Information Bureau in San Francisco.—The San Francisco, Oakland & San José Railway (the Key Route) and the Oakland Traction Company have opened in the Monadnock Building, San Francisco, Cal., a bureau of information for the benefit of tourists and sightseers.

Fare Inquiry in Los Angeles.—The Board of Public Utilities of Los Angeles, Cal., has adopted a recommendation asking the Council to pass an ordinance authorizing the board to inquire into the reasonableness of the rates of fare charged by the street railways which operate in Los Angeles.

Accident in Indiana.—A car on the Logansport branch of the Indiana Union Traction Company which is said to have been overdue struck a traction engine of the American Construction Company at Thirty-eighth Street, Indianapolis, Ind., on Aug. 29, 1911. Six passengers and the motorman of the car were injured.

School Children to be Instructed How to Avoid Railway Accidents.—E. C. Carpenter, claim agent of the Indiana Union Traction Company, Anderson, Ind., has prepared a pamphlet on the subject of how to avoid accidents which has been placed in the hands of the teachers, with instructions to read the same to the children.

Woman Charged with Attempting to Wreck Lake Shore Cars.—Mary Ermer, nineteen years old, of Dover Bay, Ohio, is under arrest on the charge of having made several attempts to wreck cars on the Lake Shore Electric Railway. On Aug. 13 four ties were found across one of the tracks by a motorman of a car going in the opposite direction.

Collision on Long Island Railroad.—More than thirty persons were injured in a rear-end collision on the Long Island Railroad on Sept. 4, 1911, in which a train drawn by a steam locomotive crashed into an electric train from the rear at Hammel's Station, Rockaway Beach, while the passengers on the electric train were being discharged.

Annual Report of the Montreal Street Railway Mutual Benefit Association.—At the annual meeting of the members of the Montreal Street Railway Mutual Benefit Association the eighth annual report was submitted and showed the following financial standing: Contributions from the company, $17,102; fees and dues from members, $15,391; proceeds from picnic and interest on investments and bank deposits, $12,363; total revenue, $44,856; expenses, $28,927; surplus, $15,929.

Belt Line Suggested in Pittsburgh.—J. D. Callery, president of the Pittsburgh (Pa.) Railways, has promised to take up with the engineers of the company the suggestion that a belt line of cars be established to connect and encircle the downtown districts of Pittsburgh and the North Side. The plan includes a system of transfers that will place either of the two large downtown business sections within reach of persons from all parts of the city for a 5-cent fare.

Finding on Maine Accident.—The Railroad Commission of Maine has rendered its finding in the case of the collision between the regular car and a special car on the Rockland, Thomaston & Camden Street Railway at Warren on Aug. 8, 1911, in which two persons were killed. The commission says: "The accident resulted from the confusing and improper manner in which the meeting order was given, but the accident, nevertheless, might have been avoided by the exercise of reasonable care and prudence on the part of those operating and controlling the movements of the special car. We believe that the safety of the traveling public requires that such instructions and orders shall be given in every case to both the conductor and motorman."

Transfer Interchange Question in Washington, D. C.—On Sept. 1, 1911, the Capital Traction Company was given ten days by the Supreme Court for the District of Columbia in which to appear in court on a writ of subpoena issued in the suit instituted by the Baltimore & Washington Transit Company, the petition charging that the defendant corporation refused to honor transfers of the complaining traction line, in violation of the law. The Capital Traction Company, in correspondence with the receiver, A. L. Shreve of the Baltimore & Washington Transit Company, denied that any obligation in law rested upon the company to exchange transfers. The petition prays that the Capital Traction Company be required immediately to make reciprocal transfer arrangements with the Baltimore & Washington Transit Company at Fourteenth Street and Kennedy Street, and for such other and further relief as may be necessary, or to the court may seem proper.

Advertising in Chattanooga.—Reference has been made previously in the ELECTRIC RAILWAY JOURNAL to the vigorous advertising campaign being conducted by the Chattanooga Railway & Light Company, Chattanooga, Tenn., to create new business. The company is using large space in the Sunday papers in Chattanooga. One of the most striking of the company's recent advertisements follows: "Where the sun shines, the birds sing and the trees beckon you and the kiddies, take your family—the wife and the tots—for a day and an evening in the open, away from the dust, the grime and the noise of the city and the monotony of the streets. Pack your family lunch in a basket and go to East Lake or the Mountain. They will enjoy the novelty—they will come home with a sparkle in the eye and a glow on the cheek—they will sleep better and you will feel better because of their enjoyment." Lookout Mountain, one of the famous spots in the South, is close to Chattanooga and is connected with the city by the lines of the company.

Passenger and Freight Tariff Changes of the British Columbia Electric Railway, Ltd.—The traffic department of the British Columbia Electric Railway, Vancouver, B. C., announces a general reduction of its passenger rates over the interurban lines connecting Vancouver and New Westminster, effective on Sept. 1, 1911. The revised rates do not apply to the Burnaby interurban line, however, as this line is operated under a Dominion railway charter, but the revised rate will go into effect as soon as the formal permission of the Railway Commission can be obtained. The new rate from Vancouver to New Westminster is 25 cents single fare and 50 cents round trip. Proportionate reductions are made covering all points on the lines where interurban rates prevail. The company has also recently put in force a reduced freight tariff on its South Fraser Valley extension which covers the 76-mile stretch between Vancouver and Chilliwack and connects the rich agricultural district lying on the south side of the Fraser River with the British Columbia coast cities.

Question of Abandonment in Fishkill.—The Public Service Commission of the Second District of New York has denied the application of the Fishkill Electric Railway, Fishkill-on-Hudson, N. Y., for the approval of an abandonment of a portion of its road in Fishkill. The petition is denied upon the condition that Fishkill enter into an agreement which will save and indemnify the company from all expense in connection with the laying of a brick pavement between its rails and 2 ft. on each side of its tracks from the post office to the easterly terminus of the line, and that the village shall pay all the expense occasioned in the laying of such pavement, except that the railway company shall pay for any rails and ties. If the village does not make the agreement provided for the commission will approve of the abandonment of the line from the post office to the easterly terminus of Fishkill. In the building of a new State road through Fishkill it became necessary to pave the streets along a large portion of the electric railway. The company contended that to pay the usual cost in connection with paving along street railways would practically bankrupt the company and asked to have a portion of its line abandoned. After several hearings the commission secured an agreement from the village to pave the entire street from the post office to the easterly terminus of the railroad without expense to the street railway.

Hearing on Commutation Rates in New Jersey.—The New Jersey Board of Utilities Commissioners heard testimony and argument in Chancery Chambers, Jersey City, recently in the cases of commuters who object because railroad companies refuse to sell commutation tickets to Jersey City and Hoboken, which are connected with New York by ferry. A Jersey City lawyer testified that the ticket agent at Ramsey, N. J., refused on Aug. 2 to sell him a commutation ticket to Jersey City, saying he had been directed not to sell tickets of any kind to that place. Testimony that other roads had refused to sell commutation tickets to Jersey City was also given. Counsel for the various railroads made the point that the rates to New York are justified by the great volume of traffic and that Jersey City and other municipalities in Hudson County profit by the rates because they are so near New York. D. M. Cooke, general traffic manager of the Erie Railroad, said that the circumstances and conditions which surround the passenger traffic between Jersey City and points elsewhere in New Jersey are different from those which surround New York commutation traffic and do not justify the maintenance of such a low basis of rates as applies to New York commutation traffic. Passengers to and from Jersey City can purchase and use New York tickets. The commission was to continue the hearing on Sept. 7, 1911.

Personnel of Chicago Elevated Railways

The complete personnel of the Chicago elevated railways has been announced. In the Electric Railway Journal of Aug. 12, 1911, the election was noted of F. A. Delano to the board of governors of the company, of Britton I. Budd as president of the company and E. C. Noe as general superintendent of the company. A biography and portrait of Mr. Budd were published at that time. The announcement now made covers the other officers of the company, of whom brief biographies are presented herewith. The Chicago Elevated Railways controls about 150 miles of road and operates more than 1200 cars. The operating headquarters of the company are on the tenth floor of the Royal Insurance Building, Chicago, where the headquarters of the Metropolitan West Side Elevated Railway were located. The offices of the treasury and accounting departments of the company are at 4430 Evanston Avenue, where the headquarters of the Northwestern Elevated Railroad were located. It was expected that all the officers would be located in the new quarters by Sept. 9.

Elzer C. Noe, general manager and purchasing agent of the Northwestern Elevated Railroad and general manager and purchasing agent of the Chicago & Oak Park Elevated Railroad for several years, has also been appointed general manager of the South Side Elevated Railroad and the Metropolitan West Side Elevated Railway. He was born at Western Star, Summit County, Ohio, on March 25, 1862, and began work as an engineer in a flour mill in Cleveland, Ohio. Shortly after the Brush arc lighting exhibition in 1879, Mr. Noe became identified with electrical work. In 1882 he became connected with the Western Edison Light Company, Chicago, and served with that company and the General Electric Company until 1903, when he was appointed general superintendent of the Northewestern Elevated Railroad and the Chicago & Oak Park Elevated Railroad.



E. C. Noe

Garrett T. Seeley, formerly vice-president and general manager of the South Side Elevated Railroad, was appointed assistant general manager of the South Side Elevated Railroad, Metropolitan West Side Elevated Railway and Northwestern Elevated Railroad, effective Sept. 4. Mr. Seeley was graduated from the University of Illinois in 1899 and then spent one year in Oklahoma as a topographer for the Santa Fé Railroad. During 1900 and 1901 he was in the engineering department of the Chicago & Western Indiana Railroad engaged in track elevation work. In 1901 he was apointed engineer of maintenance of way of the South Side Elevated Railroad and in March, 1909, was appointed assistant to the general manager, with the heads of the operating organization reporting to him as representative of the genral manager. In January, 1910, Mr. Seeley was elected second vice-president and general manager of the South Side Elevated Railroad.

Mr. P. D. Sexton, formerly secretary and treasurer of the Metropolitan West Side Elevated Railway, Chicago, Ill., has been appointed secretary of the Metropolitan West Side Elevated Railway, South Side Elevated Railroad and Northwestern Elevated Railroad.

W. V. Griffin, formerly secretary and treasurer of the Northwestern Elevated Railroad and the Chicago & Oak Park Elevated Railroad, has also been appointed treasurer of the South Side Elevated Railroad and Metropolitan West Side Elevated Railway.

E. D. Adams, formerly secretary and treasurer of the South Side Elevated Railroad, has been appointed assistant secretary and assistant treasurer of the Metropolitan West Side Elevated Railway, South Side Elevated Railroad, and Northwestern Elevated Railroad. Mr. Adams has been secretary and treasurer of the South Side Elevated Railroad since Dec. 1, 1910, and for fifteen years previous to his railway experience he was assistant manager of the Auditorium Theatre, Chicago.

Thaddeus D. MacRae, formerly auditor Metropolitan West Side Elevated Railway, was also appointed auditor of the Northwestern Elevated Railroad and the South Side Elevated Railroad, effective Sept. 4. Mr. MacRae was born at Jackson, La., on Feb. 7, 1865, and was educated at the United States Military Academy. He entered railway service as a clerk in the local office of the Chicago & Northwestern Railway at Cedar Rapids, Ia., and served from Oct. 1, 1888, to Nov. 1, 1890, as clerk in the freight auditor's office of the Burlington, Cedar Rapids & Northern Railway; from Oct. 1, 1890, to Dec. 31, 1894, as traveling auditor, and from Jan. 1, 1895, to July 19, 1902, as chief accountant in the general auditor's office of that road. From July 19, 1902, to Oct. 1, 1902, he was a clerk in the comptroller's office of the Chicago, Rock Island & Pacific Railway at Chicago, closing the books and acounts of the Burlington, Cedar Rapids & Northern Railway. From Oct. 1, 1902, to Feb. 25, 1905, he was clerk in the office of the auditor of disbursements of the same road. On March 15, 1905, Mr. MacRae was appointed auditor of the Metropolitan West Side Elevated Railway.

M. I. Feron, formerly superintendent of transportation of the Metropolitan West Side Elevated Railway, has been appointed general superintendent of transportation of the Metropolitan West Side Elevated Railway, Northwestern Elevated Railroad and South Side Elevated Railroad. Mr. Feron has been connected with the Metropolitan West Side Elevated Railway about seventeen years. He was previously for several years with the Chicago & Northwestern Railroad as yardmaster. Mr. Feron entered the employ of the Metropolitan West Side Elevated Railway as switchman and since has served as dispatcher, trainmaster and superintendent.

E. F. Schaaf, roadmaster of the Northwestern Elevated Railroad, Chicago, Ill., has been appointed superintendent of transportation of that property. Mr. Schaaf began railway service with the Chicago & Oak Park Elevated Railway when the motive power of the road was changed from steam to electricity, and had charge of the electrical equipment of the cars of that road for five years. In 1900 he became connected with the Northwestern Elevated Railroad as shop foreman in charge of electrically equipping the Northwestern cars. In 1903 he was appointed superintendent of motive power and in 1904 was given the title of roadmaster and put in charge of the track, roadway and electrical departments. During the last five or six years Mr. Schaaf has assisted in the transportation department and now assumes charge of that department for the Northwestern Elevated Railroad, which hereafter is to be operated as a part of the Chicago Elevated Railways.

John Feldhake has been reappointed superintendent of transportation of the South Side Elevated Railroad, Chicago, Ill. Mr. Feldhake began railway service as a telegraph operator on the Cincinnati & Northern Railroad and later served with the Lake Erie & Western Railroad. From 1889 to 1892 he was connected with the transportation department of the Kings County division of the Brooklyn Elevated Railroad and then for a short time was with the Long Island Railroad. In 1893 he began service as a ticket agent with the South Side Elevated Railroad and occupied successively the positions of train dispatcher, trainmaster and superintendent.

C. E. Patten, since 1908 general agent of the Metropolitan West Side Elevated Railway, has also been appointed general agent of the South Side Elevated Railroad and Northwestern Elevated Railroad. In 1888 he began his railroad service as a telegraph operator with the Illinois Central Railroad. He next became connected with the Chicago, Burlington & Quincy Railroad, serving in the general office, then as dispatcher for the Chicago terminals and later as chief clerk to the general superintendent. In 1905 he entered the service of the Metropolitan West Side Elevated Railway as secretary to the president, and in 1908 he was appointed general agent in charge of all the ticket agents, station facilities, promotion of traffic, advertising, real estate and the handling of leases and contracts. During Mr. Patten's connection with the Metropolitan West Side Elevated

Railway that company was successful in locating a number of very large industrial plants at the ends of its branches, thus assisting materially in building up traffic for the rush hours to move in the opposite direction from that traffic which is handled to and from the central business district at morning and night.

C. M. Mock, formerly chief engineer and assistant general manager of the Northwestern Elevated Railroad and chief engineer of the Chicago & Oak Park Elevated Railroad, has been appointed chief engineer of the Metropolitan West Side Elevated Railway, South Side Elevated Railroad and Northwestern Elevated Railroad, and retains the title of chief engineer of the Chicago & Oak Park Elevated Railroad. Mr. Mock was graduated from Purdue University in 1888 as a mechanical and civil engineer. For some time thereafter he was engaged in railroad and public works engineering in the West and with the Columbian Exposition in Chicago. He entered the service of the Northwestern Elevated Railroad as assistant engineer in 1897 and later was made assistant chief engineer and then chief engineer of the Northwestern Elevated Railroad and Union Elevated Loop and the Chicago & Oak Park Elevated Railway, succeeding Mr. C. V. Weston, who became president of the South Side Elevated Railroad. In 1907 Mr. Mock was appointed assistant general manager of the Northwestern Elevated Railroad, retaining his position as chief engineer of that company and the Chicago & Oak Park Elevated Railway, which three positions he held at the time of the consolidation.

E. J. Blair, electrical engineer of the Metropolitan West Side Elevated Railway, has also been appointed electrical engineer of the Northwestern Elevated Railroad and the South Side Elevated Railroad. Mr. Blair was graduated from Cornell University in 1905 and began work in the shops of the Metropolitan West Side Elevated Railway. In 1906 he was transferred to the construction division of the engineering department, in 1907 to the maintenance-of-way department and in 1908 to the power department, in which he was given charge of the lines, cables, substations and storage batteries. Mr. Blair was appointed electrical engineer of the Metropolitan West Side Elevated Railway in 1910.

B. J. Fallon, formerly assistant general manager Metropolitan West Side Elevated Railway, has been appointed engineer of maintenance of way of the Metropolitan West Side Elevated Railway, Northwestern Elevated Railroad and the South Side Elevated Railroad. Mr. Fallon graduated from De La Salle Institute, Chicago, in 1890 and began work with the Chicago, Burlington & Quincy Railroad, in whose service he spent eight and one-half years, during which time he served as rodman, assistant maintenance engineer, locating and constructing engineer, division engineer Chicago division, assistant engineer and superintendent of track elevation at Chicago. In 1907 Mr. Fallon was appointed engineer of maintenance of way of the Metropolitan West Side Elevated Railway and in March, 1910, he was made assistant general manager of that property.

H. A. Johnson, formerly master mechanic of the Metropolitan West Side Elevated Railway, has also been appointed master mechanic of the Northwestern Elevated Railroad and South Side Elevated Railroad. Mr. Johnson was graduated from Purdue University with the degree of mechanical engineer and immediately thereafter entered the service of the Chicago, Burlington & Quincy Railroad, specializing in locomotive work. He has been connected with the Metropolitan West Side Elevated Railway since 1908, serving in the inspection and electrical departments, the armature shop, power house and in the drafting department. More recently he was appointed superintendent of motive power and equipment and during the construction of the Douglas Park extension of the Metropolitan West Side Elevated Railway he served as engineer in charge.

E. E. Kretschmer has been appointed purchasing agent of the Metropolitan West Side Elevated Railway, South Side Elevated Railroad and Northwestern Elevated Railroad. Mr. Kretschmer has been chief clerk to Mr. E. C. Noe, general manager of the Northwestern Elevated Railroad, since 1893, and previous to that time was connected with the General Electric Company of Chicago.

P. F. McCall has been appointed general storekeeper of the South Side Elevated Railroad, Metropolitan West Side Elevated Railway and Northwestern Elevated Railroad. Mr. McCall was formerly stock clerk and storekeeper for one of the large Chicago packing houses. About three



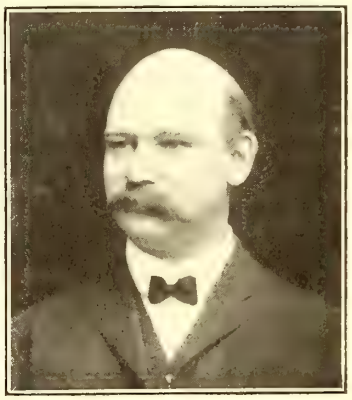
G. T. Seeley



T. B. MacRae



M. I. Feron



C. E. Patten



C. M. Mock



E. J. Blair



B. J. Fallon



H. A. Johnson

years ago he entered the service of the Metropolitan West Side Elevated Railway as stock clerk and shortly thereafter was appointed storekeeper.

Dan Sheehan, roadmaster of the Metropolitan West Side Elevated Railway, Chicago, Ill., has also been appointed roadmaster of the Northwestern Elevated Railroad and South Side Elevated Railroad. Previous to his connection with the Metropolitan West Side Elevated Railway, which began in April, 1911, Mr. Sheehan served for a long period with the North American Railway Construction Company as construction superintendent of several of the elevated railways in Chicago. He had charge of the erection of the steel structure for the four-track main line of the Northwestern Elevated Railroad, the third-track reconstruction of the South Side Elevated Railroad and the construction of the Logan Square branch of the Metropolitan West Side Elevated Railway.

Personal Mention

Mr. A. J. Davis, formerly treasurer of the Alton, Jacksonville & Peoria Railway, Alton, Ill., has been elected assistant secretary of the company.

Mr. L. W. Carlisle, formerly chief clerk of the Tampa (Fla.) Electric Company, has been appointed assistant treasurer of the Pensacola (Fla.) Electric Company.

Mr. J. C. McGrath, formerly secretary of the Alton, Jacksonville & Peoria Railway, Alton, Ill., has been elected vice-president of the company to succeed Mr. C. A. Caldwell.

Mr. Royal H. Weller, formerly of the legal department of the Metropolitan Street Railway, New York, N. Y., has been appointed a deputy assistant district attorney of New York.

Mr. C. H. Rowland, heretofore general manager of the Center & Clearfield Street Railway, Philipsburg, Pa., has been elected president of the company to succeed Mr. James Passmore.

Mr. Cary N. Weisiger, Jr., of St. Louis, Mo., has been elected president of the Alton, Jacksonville & Peoria Railway, Alton, Ill., to succeed Mr. Edgar M. Davis, who has been elected secretary and treasurer of the company.

Mr. Fleming Ramsaur has resigned as division engineer of the Piedmont Traction Company, Piedmont, N. C., to become engineer in charge of the Coquitlam dam construction for the Vancouver Power Company, Ltd., Coquitlam, B. C.

Mr. W. M. Cutlip, who was recently elected secretary and treasurer of the Muskogee (Okla.) Electric Traction Company, has also been appointed auditor of the company to succeed Mr. A. A. Coupland, whose retirement from the company to enter into business for himself is noted elsewhere in this column.

Mr. A. A. Coupland, who recently assumed the duties of auditor of the Muskogee (Okla.) Electric Traction Company, as previously noted in the Electric Railway Journal, resigned from the company, effective Aug. 15, 1911, to enter business for himself as a member of the Dewel-Coupland Company, with offices in Flynn-Ames Building, Muskogee, Okla.

Mr. W. F. Cox, whose appointment as chief engineer of the Vicksburg (Miss) Traction Company was announced in the Electric Railway Journal of Aug. 26, 1911, succeeds Mr. J. H. Pallister with that company and not Mr. Thomas Hunt, as previously stated. Mr. Cox was formerly chief engineer of the Southern Railway & Lighting Company, Natchez, Miss., in which capacity he served six years.

Mr. F. W. Wilson has been appointed manager of Sacandaga Park by the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., to succeed Mr. C. B. Nellis. For four years prior Mr. Wilson was connected with the auditing department of the company under Mr. G. A. Harris, general auditor. Before becoming connected with the Fonda, Johnstown & Gloversville Railroad he was employed on the staff of the Gloversville *Morning Herald.*

Mr. C. A. Henderson, whose appointment as assistant general manager of the Los Angeles (Cal.) Railway Corporation was noted in the Electric Railway Journal of Aug. 5, 1911, was appointed auditor of the Los Angeles Railway in May, 1895, and on Nov. 1, 1911, he was elected secretary and treasurer of the Los Angeles Railway Corporation, which took over the Los Angeles Railway. Mr. Henderson also served as secretary and assistant to the treasurer of the Los Angeles Railway.

Mr. Frank Parks, superintendent of the Central Park, North & East River Railroad, New York, N. Y., began his railroad career on Jan. 2, 1880, as a driver on the Broadway Railroad, New York. In July 1889, he was made a driver on the Avenue C line and subsequently served as starter, inspector and general inspector for the Metropolitan Street Railway, New York. On Nov. 9, 1908, Mr. Parks resigned from the Metropolitan Street Railway to accept a position under Mr. George W. Linch, receiver of the Second Avenue Railroad, as chief inspector.

Mr. Robert R. Hertzog, who recently resigned as general superintendent of the Chicago (Ill.) Railways Company, has been made general manager of the Whitmore Product Sales Company, the Western branch of the Whitmore Manufacturing Company, of Cleveland, manufacturer of lubricating compositions. Mr. Hertzog was connected for twenty years with the Chicago Railways Company and the companies that preceded that corporation. He entered street railway work as a boy in a minor capacity and at one time or another has held nearly every position in the operating department.

Mr. J. Beckett Russell, auditor and local secretary and treasurer of the Manila Electric Railroad & Light Company, Manila, P. I., is on a visit to New York to consult with J. G. White & Company, Ltd., who constructed the Manila property and now operate it. Mr. Russell on his journey to New York visited Hongkong, Singapore, Colombo, Cairo, Algiers, Nice, Genoa, Madrid, Paris, London and Glasgow and studied the transit systems in these cities. He is optimistic as to the future of the Philippines and says that before long Manila will have a population of 500,000. Mr. Russell will return to Manila in a few weeks via Japan.

Mr. J. C. Espy has recently been appointed superintendent of transportation of the Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio. Mr. Espy entered the employ of the Cleveland, Painesville & Eastern Railroad in July, 1898, as a motorman. Later he was transferred to the position of conductor and was appointed night train dispatcher in October, 1901. In the fall of 1906 he was appointed chief dispatcher and continued in this capacity until recently. Prior to becoming connected with the Cleveland, Painesville & Eastern Railroad Mr. Espy was in the employ of the Lake Shore & Michigan Southern Railroad for more than eight years. He began his service with the Lake Shore & Michigan Southern Railroad as a locomotive fireman. After about three years in that capacity he was promoted to be a locomotive engineer, but not being satisfied with the work he resigned to take up electric railroading.

OBITUARY

W. H. Latshaw, formerly vice-president of the National Tube Company, Pittsburgh, Pa., died at his home in Pittsburgh, Pa., on Aug. 29, 1911.

James Christie, formerly chief engineer of the American Bridge Company, New York, N. Y., died of apoplexy at his summer home in Atlantic City, N. J., on Aug. 24.

The Public Service Commission of the First District of New York has been officially notified by T. P. Shonts, president of the Interborough Rapid Transit Company, New York, that the company refused to accept the terms of the certificates for the completion of the third track upon the elevated system of the Manhattan Elevated Railway and to the Interborough Rapid Transit Company for elevated extensions through White Plains Road and Jerome Avenue in the Bronx, and over the Queensboro Bridge. The directors of the company decided that the terms of the certificates were "too onerous for acceptance by the Interborough Rapid Transit Company." In his letter to the Public Service Commission President Shonts also says that the directors of the Manhattan Elevated Railway are not willing to apply to the commission for a certificate for the third-tracking of the elevated lines under conditions which would make the third track improvements subject to recapture by the city at the end of ten years.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS.

***Stuttgart & Southern Railway, Little Rock, Ark.**—Incorporated in Arkansas to build a railway from Stuttgart 25 miles through Arkansas County to a point on Bayou Meto. Capital stock, $300,000. Among the incorporators: J. I. Porter, John L. Ingram, Phillip Reinsch, Elliott Tallman, J. W. Underwood, L. E. Morphew and George C. Lewis.

***West Side Railroad, San Francisco, Cal.**—Application for a charter has been made by this company to build an electric railway between Sacramento and Rio Vista. Capital stock, $1,000,000. Headquarters, 310 Sansome Street, San Francisco. Officers: William Herlitz, secretary and treasurer; B. P. Lilienthal and H. W. Furlong, directors.

Waycross Street & Suburban Railway, Waycross, Ga.—Chartered in Georgia to build a 30-mile electric railway between Hebardville, Deenwood, Winona Park, Blackshear, Waresboro and Waycross. Capital stock, $150,000. Common stock issued, $100,000. Preferred stock issued, $50,000. Incorporators: L. J. Cooper, George W. Dean, A. M. Knight and J. M. Cox, all of Waycross. [E. R. J., July 15, '11.]

Southwestern Kentucky Electric Railway, Light & Power Company, Hickman, Ky.—Incorporated in Delaware to build an electric railway from Paducah to Hickman, Ky., via Mayfield, Fulton and Union City, Tenn., or from Paducah through the north of Ballard County, following the Mississippi River to Hickman. Officers: H. C. Rhodes, Paducah, president; R. H. Scott, treasurer and John D. Smith, secretary. [E. R. J., Sept., 2, '11.]

***Cadiz (Ohio) Traction Company.**—Chartered in Ohio to build an electric railway in Cadiz. Capital stock, $10,000. Incorporators: Robert P. Scott, B. W. Rowland, C. S. Scott, R. C. Pittus and Thomas Scott.

***Hood River Terminal Company, Portland, Ore.**—Application for a charter has been made in Oregon by this company to build a gasoline, electric or steam railway from a point on the Oregon-Washington Railway & Navigation Company's line in Hood River to the steamboat landing ½ mile east of Hood River. Capital stock, $5,000. Incorporators: W. A. Delashmutt, A. B. Ireland and W. Chapman.

***Snow Shoe Electric & Street Railway, Snow Shoe, Pa.**—Application for a charter has been made in Pennsylvania by this company to build a 2-mile electric railway to connect Snow Shoe and Bellefontaine. Capital stock, $15,000. Incorporators: David Chambers, John G. Uzzle, James Uzzle, George B. Uzzle and W. E. Brown.

***Twentieth Century Transportation Company, Pierre, S. D.**—Incorporated in South Dakota to build an electric railway from Chicago, Ill., to Rapid City, S. D., via Minneapolis and St. Paul, Minn., and Watertown and Pierre, S. D. Capital stock, $1,000,000. Incorporators: Robert Bailie, C. B. Keene, Lancaster, Wis.; Ernest Norwood, Winona, Minn., and John A. Holmes, Pierre, S. D.

Highland Park & Lake Burien Railway, Seattle, Wash.—Incorporated in Washington to build an 8-mile electric railway from Seattle to Highland Park and Lake Burien. Reitz, Storey & Duffy, Northern Bank Building, Seattle, are the engineers for this company and it is reported that contracts will be awarded at once for 21,000 ties and 2000 ft. of trestle work. Incorporators: W. H. Coughlin, 302 American Bank Building, Seattle; William H. Murphy, James R. Stirrett and J. R. McLaughlin. [E. R. J., Aug. 12, '11.]

FRANCHISES

***Hollywood, Cal.**—The Board of Trade has been asked to grant franchises for crosstown lines in Hollywood for Griffith Park and for sections of Hollywood not well provided for.

***Los Angeles, Cal.**—The Supervisors of Los Angeles County have been asked for a forty-year franchise for a bridge across El Monte Road and a double-track electric railway, and will receive bids until Sept. 25, 1911.

Watts, Cal.—The Pacific Electric Railway, Los Angeles, has received a franchise from the Town Trustees over certain streets in Watts connecting the four-track lines of the company with the lines of the Los Angeles & Redondo Railway at Homewood station.

Deep River, Conn.—The Shore Line Electric Railway, New Haven, has received a franchise from the Selectmen to lay tracks on Main Street in Deep River.

Hartford, Conn.—The Connecticut Company has asked the Railroad Commission to approve plans to double track its lines in East Hartford and in Manchester.

Marengo, Ill.—The franchise referred to in the ELECTRIC RAILWAY JOURNAL of Aug. 26, 1911, as having been granted the Woodstock & Sycamore Traction Company in Marengo refers to the rights under which this company is constructing an extension of its line through Marengo to Woodstock, 12 miles northeast of Marengo. The Woodstock & Sycamore Traction Company has been operating regular service through Marengo as far as the tracks of the Elgin & Belvidere Electric Company since Aug. 26 and is now operating between Marengo, Genoa and Sycamore on a three-hour schedule.

Salem, Mass.—The Boston & Eastern Railroad, Boston, has asked the Selectmen for a franchise in Salem. [E. R. J., Aug. 26, '11.]

Kansas City, Mo.—The Metropolitan Street Railway, Kansas City, has received a franchise from the City Council for the construction of the West Twelfth Street trafficway, toward which this company is to contribute $200,000 as a rental for the operation of its Twelfth Street cars over the viaduct portion of the trafficway until June 1, 1925, when all of its franchises expire.

Binghamton, N. Y.—The Binghamton Railway has asked the Common Council for a franchise to extend its tracks in the South Side, Binghamton.

Cleveland, Ohio.—The Cleveland Railway has asked the City Council for a franchise for a new cross-town line for the East Side of Cleveland, extending from Broadway to Gordon Park, via East Seventy-ninth Street.

Middletown, Ohio.—The Ohio Electric Railway has asked the Council for a renewal of its franchise through Middletown and to double track Main Street.

***Marshfield, Ore.**—The Terminal Railway has received a franchise from the City Council to build an electric railway in Marshfield and a steam line down the waterfront. P. A. Sandberg, Marshfield, chief engineer. This is part of a plan to build an electric railway between Marshfield, North Bend and Sunset Bay.

Lebanon, Pa.—The Mayor has approved the franchise giving the Ephrata & Lebanon Railway perpetual rights over certain streets in Lebanon.

Montreal, Que.—The Board of Control of Montreal has approved and recommended to the Council the acceptance of the Montreal Street Railway's plan for a new belt line within the city. New tracks will be laid on Prince Arthur Street, from St. Lawrence Boulevard to Cadieux Street. The new route will be known as the St. Antoine belt line.

South Denison, Tex.—The Texas Traction Company, Dallas, will ask the Council for a franchise to extend its tracks to South Denison.

Wenatchee, Wash.—The Wenatchee Traction Company and the Wenatchee Valley Railway & Power Company have applied to the commissioners of Chelan County for the right to use the county roads. The City Council has prepared a franchise and will tender it for acceptance.

Moundsville, W. Va.—The Wheeling Traction Company has asked the Council for a franchise to relocate the tracks on some of its lines in Moundsville.

New Cumberland, W. Va.—The Steubenville, Wellsburg & Weirton Railway, Charleston, has received a franchise from the County Court to build its tracks over certain county roads in the Butler district. Albert Lee is interested. [E. R. J., Aug. 5, '11.]

TRACK AND ROADWAY

Fresno, Coalinga & Monterey Railway, Fresno, Cal.—Surveys have been completed by this company from Fresno to Coalinga, from which point the line passes

through the Los Gatos Pass to Hollister and San Juan and thence to Salinas and Monterey. Construction will be begun as soon as the company secures financial backing. T. C. White, Fresno, president. [E. R. J., June 17, '11.]

Glendale & Eagle Rock Railway, Los Angeles, Cal.—Plans are being considered by this company to extend its line north from Glendale. The ultimate terminus will be Sunland, 13 miles northwest of Glendale around the Verdugo hills. Other improvements also will be made.

Pacific Electric Railway, Los Angeles, Cal.—The extension of this company from Hollywood to Van Nuys has been begun. On Sept. 15 the company expects to place in operation its extension between Glendale and Burbank.

Monterey & Pacific Grove Railway, Monterey, Cal.—Plans are being made by this company to build an extension from Nineteenth Street in Pacific Grove via Lighthouse Avenue, Willow Street and Spruce Avenue to the Presidio of Monterey.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—After the completion of this company's line into Oakland it will be continued into the San Joaquin and Sacramento Valleys to Sacramento and Stockton.

Sacramento & Woodland Railway, Sacramento, Cal.—Work has been begun on Main Street in Woodland by this company on its line between Sacramento and Woodland to connect at Woodland with the Vallejo & Northern Railway. T. T. C. Gregory, president. [E. R. J., July 20, '11.]

San Diego & El Cajon Valley Interurban Railway, San Diego, Cal.—The Schnidt Grading Company is grading this company's line at City Heights on the last strip of the section between La Mesa and San Diego. Immediately after this section is graded the rails will be laid to La Mesa, 12 miles.

Central California Traction Company, San Francisco, Cal.—It is reported that this company will build a line from Lodi, San Joaquin County, up Dry Creek, with extensions to Jackson and Sutter Creek.

Tidewater & Southern Railroad, Stockton, Cal.—This company will extend its line from Merced to Fresno. Surveys have been begun south from Merced. [E. R. J., Aug. 19, '11.]

Georgia Railway & Electric Company, Atlanta, Ga.—Work has been begun by this company on its extension from Buckhead to Brookhaven along the Peachtree Road.

Macon Railway & Light Company, Macon, Ga.—Work has been begun by this company on its new track in Vineville.

Chicago (Ill.) City Railway.—This company has placed in operation two new routes in Chicago connecting the West and South Sides through the downtown district. No. 7 begins at State and Thirty-ninth Streets and extends to Madison Street and Sixtieth Avenue and No. 10, known as the Western Avenue line, extends from Belmont Avenue to Seventy-first Street.

Kewanee, Bradford & Henry Interurban Railway, Henry, Ill.—Work has been begun by this company on its railway to connect Kewanee, Osceola, Bradford, Broadmoor, Whitefield and Henry. It is planned to operate gasoline cars. John P. Brady, Kewanee, is interested. [E. R. J., Sep. 2, '11.]

***Pekin (Ill.) City Railway.**—This company has placed in operation its line in Pekin from the Court House to the sugar works. The company expects to build the Court Street line from the Capital Street terminus east to the East Bluff. J. E. Melick, Springfield, president of the Mississippi Valley Interurban Railway, promoter.

Ft. Wayne & Springfield Traction Company, Decatur, Ind.—This company will soon let contracts to build an extension from Springfield to Portland.

Indiana & Northwestern Traction Company, Monticello, Ind.—Work has been resumed by this company, grading and clearing the right-of-way through Newton County. Over $50,000 in subsidies have been voted in aid of the construction of this proposed electric railway to connect Cedar Lake, Reynolds, Hammond, Crown Point, Rensselaer, Lafayette and Chicago. Eugene Purtell, 222 La Salle Street, Chicago, president. [E. R. J., Jan. 28, '11.]

Vincennes & Southeastern Interurban Railway, Vincennes, Ind.—This company has awarded the contract to the Western Construction Company for the construction of its line from Vincennes to St. Meinrad, Jasper, Tell City, Troy and West Baden. Work has been begun. G. B. Hazleton, Vincennes, president. [E. R. J., Sep. 2, '11.]

Ft. Dodge, Des Moines & Southern Railway, Ft. Dodge, Ia.—This company has acquired a new right-of-way by which it will enter Des Moines by means of a new track from Brooks Street northward to the city limits. This route will involve the construction of new track and the building of a bridge over the Des Moines River.

Wichita Railroad & Light Company, Wichita, Kan.—Grading has been begun by this company on its extension into Halstead. The line from Wichita extends north to a point about 5 miles east of Halstead. From this junction one branch will go east to Newton and the other is to come west through Halstead and Burrton to Hutchinson.

Henderson (Ky.) Interurban Railway.—Right-of-way has been secured by this company for its electric railway between Henderson and Owensboro, via Dixon, Uniontown, Sebree, Morganfield and Providence. Malcolm Yeaman, Henderson, president. [E. R. J., Apr. 1, '11.]

***Algiers, La.**—Joseph E. Renecky and associates plan to build an electric railway on Morgan Street and Patterson Street in Algiers.

Springfield (Mass.) Street Railway.—Work has been begun by this company on its 1-mile extension from Springfield to Ludlow. The company will not build its Mill River line this year.

Detroit (Mich.) United Railway.—This company is said to be considering plans to build a new crosstown line to extend from the southwestern section of Detroit to the northwestern district and then east to the automobile industry section in the northeastern end of the city.

***Grand Rapids, Mich.**—It is reported that Chris De Jonge, Zeeland, and others are promoting an electric railway between Grand Rapids and Grand Haven via Georgetown, Blendon and Robinson.

Interurban Construction Company, Hastings, Minn.—This company advises that it has begun the construction of the electric railway to connect St. Paul, Inver Grove, Hastings, Cannon Falls, Zumbrota, Pine Island, Orinoco and Rochester. The company's repair shops will be located at Hastings. Officers: A. T. Stebbins, Rochester, president; Edward Feldhouser, Capital National Bank Building, St. Paul, vice-president; John Heinen, Hastings, secretary and treasurer; W. L. Sonntag, Hastings, general manager and purchasing agent, and W. F. Brettschneider, Hastings, chief engineer. [E. R. J., Aug. 26, '11.]

***Carson City, Nev.**—D. W. Williams, Carson City, and associates are considering plans to build an electric railway between Carson City, Glenbrook, Lake Tahoe and Reno. He has been promised $100,000 by the residents of Carson City.

Frontier Electric Railway, Niagara Falls, N. Y.—Right-of-way has been secured by this company from Main Street across country, through the Tonawandas, down the Niagara River and through Niagara Falls. James S. Simmons, Niagara Falls, general manager. [E. R. J., July 1, '11.]

Ohio Electric Railway, Cincinnati, Ohio.—This company contemplates extending the northern terminus of its Defiance & Lima branch into Defiance. The present terminus is in the suburbs and the plan is to extend the line as far as the Auglaize River Bridge.

People's Electric Railway, Muskogee, Okla.—This company has completed the grading of its line between Muskogee and Fort Gibson. George W. Risser, Oklahoma City, president. [E. R. J., Aug. 19, '11.]

Toronto (Ont.) Railway.—This company has placed in operation its newly completed Harbord Street line in Toronto.

***Terminal Railway, Marshfield, Ore.**—Preliminary engineering work is being done by this company, which proposes to build an electric railway in Marshfield from a point several miles above the C. A. Smith mill, on Isthmus Inlet, into Marshfield and down the waterfront of both Marsh-

field and North Bend, and from North Bend down the coast to Sunset Bay. The company building the road is composed of the C. A. Smith Lumber Company, the Simpson Lumber Company and W. S. Chandler and Flanagan & Bennett, bankers. It is to be incorporated with a capital stock of $200,000, with $100,000 to be paid up at once. P. A. Sandberg, who was formerly the city engineer of Marshfield, has been engaged as engineer for the road and has started on the work.

Oregon Electric Railway, Portland, Ore.—This company has secured right-of-way through the Schindler ranch, south of Salem.

Bloomsburg & Millville Street Railway, Bloomsburg, Pa.—At a meeting of the stockholders of this company held at Bloomsburg a reorganization of this company was effected and plans made to complete the new railway. The company will be named the Bloomsburg, Millville & Northern Railway.

Johnstown (Pa.) Traction Company—This company will soon begin the construction of its extension from Johnstown to Southmont via the Eighth Ward.

Lebanon & Campbelltown Street Railway, Lebanon, Pa.—C. J. Barr and William S. Davis, Lebanon, and M. E. Brightbill, Annville, have been awarded the contract to construct this line, a distance of about 9 miles. Work will be begun at once. M. S. Hershey, president. [E. R. J., Sept. 2, '11.]

Stroudsburg & Water Gap Street Railway, Stroudsburg, Pa.—This company has placed in operation its extension from Portland to Delaware Water Gap.

Titusville (Pa.) Electric Traction Company.—Surveys have been begun by this company on its extension from Townville northeast along Muddy Creek toward Little Cooley Road. This line will be extended to Cambridge Springs.

Nashville Railway & Light Company, Nashville, Tenn.—This company will soon place in operation its extension of the Belmont line near Belmont College.

Texas Traction Company, Dallas, Tex.—Plans are being considered by this company to extend its lines in Southeast Denison.

Denton (Tex.) Traction Company.—The extension of this company's lines from Denton to the College of Industrial Arts has been placed in operation.

San Antonio (Tex.) Traction Company.—This company will start work this fall on an extension of the Beacon Hill line for a distance of about a mile in the Los Angeles Heights addition.

Southwestern Traction Company, Temple, Tex.—Grading has been begun by this company on its extension from Temple to South Temple.

Utah Light & Railway Company, Salt Lake City, Utah.—This company has begun the construction of its Sugar House extension towards Halliday. It has also begun to build its extension from Fifth South Street in Salt Lake City.

***Richmond, Va.**—J. C. Robertson and associates plan to construct an electric railway between Richmond and Urbanna.

Washington-Oregon Corporation, Vancouver, Wash.—This company advises that it will soon build about 2 miles of track from the center of Vancouver across the United States Military Reservation to East Vancouver.

Clarksburg & Weston Electric Railway, Clarksburg, W. Va.—This company's extension from Clarksburg to Byron has been completed and will be placed in operation as soon as the bridge at the Old Fair Grounds is finished. The connecting line between the Goff Addition and Broad Oaks lines was recently completed.

SHOPS AND BUILDINGS

British Columbia Electric Railway, Vancouver, B. C.—This company has called for bids for a carhouse at Queen's Avenue and Twelfth Street, nearly opposite the company's repair shops in New Westminster. The plans call for alternate bids on reinforced concrete or wood frame with galvanized iron covering. The carhouse is to be 240 ft. x 104 ft. and will consist of two units, each having four tracks. Provision is made for pit tracks, workshops, etc., in connection with project. The work will be rushed to completion as soon as the contract is awarded.

Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind.—This company advises that it is in the market for one 48-in. steel-tired carwheel lathe, for wheels up to 42 in., to be motor driven; one 48-in., 40-ton hydraulic wheel press for 42-in. wheels, to be motor driven, and one 42-in. car-wheel bore, to be motor driven.

Des Moines (Ia.) City Railway.—This company has purchased a site at Second Street and Locust Street, Des Moines, on which it expects to build a new interurban depot and freight house. A second story is being built to this company's Twenty-fourth Street carhouse, where a room is being provided for the motormen and conductors. The size of this addition is 30 ft. x 28 ft. Contracts have been let for this work.

Beaver Valley Traction Company, New Brighton, Pa.—This company will build an addition to its repair shop in Rochester and will install new equipment.

Regina (Sask.) Municipal Railway.—This company has awarded a contract for the construction of its new carhouse in Regina to A. E. Downs. The cost is estimated to be about $22,975.

Greenville, Spartanburg & Anderson Railway, Anderson, S. C.—Plans are being considered by this company for the erection of a passenger station in Anderson.

Ft. Worth, Cleburne & Dallas Railway, Cleburne, Tex.—A new depot for the use of this company and the Pacific & Texas Railway has been built in Dalworth. It is now in use by the Ft. Worth, Cleburne & Dallas Railway.

POWER HOUSES AND SUBSTATIONS

British Columbia Electric Railway, Ltd., Vancouver, B. C.—This company has awarded C. C. Moore & Company, Seattle, Wash., the contract for the extension of its auxiliary steam power plant, operated in connection with the Vancouver substation of the company at Main and Branard Streets. This firm installed the original steam power plant for the company at the point. The approximate expenditure represented by the contract is about $250,000 and the terms call for the completion of the work by Dec. 18, 1911. The equipment covered includes four Babcock & Wilcox boilers, each of 500 hp, a 200-kw Allis-Chalmers turbo-generator, condensers, piping, etc. The additional equipment will increase the available power from the steam auxiliary plant to 12,000 hp.

Wilmington & Philadelphia Traction Company, Wilmington, Del.—A. S. Reed & Brothers Company, Wilmington, have been awarded the contract to construct the new power plant on Buena Vista Street in Wilmington. Exclusive of the cost of the foundations, which have been completed, this new plant will cost about $60,000.

Des Moines (Ia.) City Railway.—This company is building an extension to its power station in Des Moines to accommodate transformers purchased recently. The company has purchased one 300-kw Westinghouse rotary, one 500-kw General Electric rotary and three 750-kw General Electric transformers. The necessary switchboards are to be ordered. Bids have been asked for coal-handling apparatus and a traveling crane for the company's power station and for a new in-take with a well with concrete walls.

Boston (Mass.) Elevated Railway.—This company has begun the construction of six new transformer substations in Brookline, Walden, Arlington, East Boston and Roslindale.

San Antonio (Tex.) Traction Company.—This company is remodeling and improving its power house in San Antonio.

Ashland Light, Power & Street Railway Company, Ashland, Wis.—A. E. Appleyard, Ashland, general manager of this company, has begun the construction of a power plant in Mellen to supply the power to the plants at White River, Ironwood, Ashland, Bessemer and Hurley.

Wisconsin Traction, Light, Heat & Power Company, Appleton, Wis.—Plans are being made by this company to build a new power plant at Gardner dam, near Antigo, for the generation of electricity to be transmitted to Appleton.

Manufactures & Supplies

ROLLING STOCK

Oregon Short Line Railroad, Chicago, Ill., has ordered one 70-ft. gasoline motor car from the McKeen Motor Car Company.

New York & Queens County Railway, Long Island City, N. Y., has ordered ten double-truck city cars from the Jewett Car Company.

Philadelphia & Westchester Traction Company, Philadelphia, Pa., has ordered one 50-ft. express car body from the Jewett Car Company.

Dayton & Troy Railway, Dayton, Ohio, has ordered two 26-ft. 6-in., combination passenger, baggage and smoking car bodies from the Jewett Car Company.

Hutchinson (Kan.) Interurban Railway has ordered one double equipment No. 92-A motors with type K-10 control from the Westinghouse Electric & Manufacturing Company.

Richmond & Henrico Railway, Richmond, Va., has ordered one No. 101-B-2 motor equipment with type K-10-A controllers from the Westinghouse Electric & Manufacturing Company.

Trenton, Bristol & Philadelphia Street Railway, Trenton, N. J., has ordered two No. 305 motor equipments with type K-36-F controllers from the Westinghouse Electric & Manufacturing Company.

Pensacola Electric Company, Pensacola, Fla., has ordered four double-motor equipments using No. 92-A motors and type K-10-A control from the Westinghouse Electric & Manufacturing Company.

Lehigh Valley Traction Company, Allentown, Pa., has ordered twenty double equipments of No. 304 motors and type H-L control from the Westinghouse Electric & Manufacturing Company.

Reading Traction Company, Reading, Pa., has ordered six double-motor equipments of No. 305 motors and type K-35-F control from the Westinghouse Electric & Manufacturing Company.

Springfield (Mo.) Traction Company has ordered six double equipments of No. 323 motors with type K-10-A controllers from the Westinghouse Electric & Manufacturing Company.

Lehigh Valley Transit Company, Allentown, Pa., has ordered four quadruple No. 101-B motors with type K-28 controllers from the Westinghouse Electric & Manufacturing Company.

Connecticut Valley Street Railway, Greenfield, Mass., has ordered five quadruple, direct-current motor equipments with K-28-B control from the Westinghouse Electric & Manufacturing Company.

Grey & Lewiston Railway, Lewiston, Me., has ordered one 8-4-E, 35-ton locomotive equipped with quadruple No. 303-A motors and H-L control from the Westinghouse Electric & Manufacturing Company.

Indianapolis, Crawfordsville & Western Traction Company, Crawfordsville, Ind., has prepared plans for a freight locomotive which probably will be built in its own shops, utilizing material available from the recent re-equipment of its passenger cars.

City and County Contract Company, Westchester, N. Y., has ordered from the Westinghouse Electric & Manufacturing Company one 80-ton switching locomotive with quadruple equipment of No. 410 motors and H-L control.

Morris County Traction Company, Morristown, N. J., has ordered five double equipments of No. 101-B motors with type H-L control and ten quadruple equipments of No. 101-B motors with type K-28-B control from the Westinghouse Electric & Manufacturing Company.

New York, New Haven & Hartford Railroad, New York, N. Y., has ordered one 80-ton central control switching locomotive with four No. 410 motors and unit switch control and fourteen 80-ton switching locomotives equipped with four No. 410 motors and type H-L control from the Westinghouse Electric & Manufacturing Company.

TRADE NOTES

Boss Nut Company, Chicago, Ill., has opened a New York office in the Grand Central Terminal Building, in charge of Alonzo C. Shults as Eastern sales agent.

Louis Wehner, who has been connected with the Bucyrus Company, South Milwaukee, Wis., has resigned to become chief engineer of the Vulcan Steam Shovel Company, Toledo, Ohio.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has received an order from Walter Brothers, Rio de Janeiro, Brazil, for two double-motor equipments of 101-B Westinghouse motors with K-16-A control.

Arthur S. Huey, first vice-president of H. M. Byllesby & Company, Chicago, spoke on the subject of public utility regulation before the convention of the American League of Municipalities held at Atlanta, Ga., October 4, 5 and 6.

Ashley P. Peck, who has been sales engineer for the New York office of Allis-Chalmers Company, is now connected with the Messrs. A. L. Ide & Sons and the Terry Steam Turbine Company, and has opened a sales office at Room 814, People's Gas Building Chicago, Ill.

Westinghouse Air Brake Company, Pittsburgh, Pa., has purchased a site at Emeryville, Cal., on which will be erected a manufacturing plant. This new plant on the Pacific coast will supply the company's Oriental trade in a more efficient manner than was possible heretofore.

Locke Insulator Manufacturing Company, Victor, N. Y., advises that it has taken over the exclusive handling of the Nicholson arcing rings. These rings are already in service on the lines of the Niagara, Lockport & Ontario Power Company, Chicago Sanitary District, Syracuse Rapid Transit Company and several other smaller installations.

American Ship Windlass Company, Providence, R. I., has received repeat orders for Taylor stokers from the General Electric Company, Pittsfield, Mass.; from the New York, New Haven & Hartford Railroad Company, for their new plant at Waterbury, Conn., and from the Northern Ohio Traction & Lighting Company, Akron, Ohio, and the Solvay Process Company, Syracuse, N. Y.

Gilbert & Sons Brass Foundry Company, St. Louis, Mo., has concluded arrangements with the Lester-Hiland Company Railway Exchange, Chicago, Ill., to handle the Gilbert line of electric railway specialties in the northern Mississippi Valley. R. L. Thayer, manager of the electric railway department of the Lester-Hiland Company, will have immediate charge of the sales of the Gilbert products for his company. He is well known in the electric railway field.

ADVERTISING LITERATURE

Sellers Manufacturing Company, Chicago, Ill., has issued an illustrated catalog describing the uses and advantages of Sellers tie plates for general railway construction.

Mesta Machine Company, West Homestead, Pa., has issued a booklet containing the program and several illustrations of the various machine products which the American Society of Mechanical Engineers inspected at the Pittsburgh meeting June 2. This booklet has been re-published and a two-page half-tone of the visitors from a photograph taken at the Mesta plant has been inserted.

Blake Signal & Manufacturing Company, Boston, Mass., has issued an illustrated folder describing the uses and giving prices and discounts of its insulated staples and compressed cleats for low-voltage wiring; also a folder illustrating the use and giving prices and discounts of its tube soldering flux. This flux is a non-conductor and is non-corrosive and the tube is of convenient form for job work.

National Carbon Company, Cleveland, Ohio, has issued a new booklet entitled "Analogies between Battery Current and Water Flow." It gives an explanation of the electrical expressions commonly applied to dry cells in terms of water current and flow. The comparisons between water flow, pressure, current, resistance and quantity and the same thing in electricity cannot be misunderstood. The book is illustrated so as to make a visual explanation of the points brought out, in addition to the word description.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVIII NEW YORK, SATURDAY, SEPTEMBER 16, 1911 No. 12

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.
HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.
CURTIS E. WHITTLESEY, Secretary and Treasurer.
TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

HENRY W. BLAKE, Editor.
L. E. GOULD, Western Editor.
Associate Editors:
RODNEY HITT, FREDERIC NICHOLAS, WALTER JACKSON.
News Editors:
G. J. MACMURRAY, FRANK J. ARMEIT.

CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1021 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Thursday, 9 a. m., of the week of issue.

Copyright, 1911, by MCGRAW PUBLISHING COMPANY.

Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, SEPTEMBER 16, 1911.

CONTENTS.

Prompt Settlement of Claims..... 451
The Atlantic City Program..... 451
The Meeting of the Governors..... 452
The Manufacturer and the Railway Man..... 452
Minor Conveniences in the Shop..... 453
Power Station and Transmission Line of the Hoosac Tunnel..... 454
Switching Locomotive Built by Terre Haute, Indianapolis & Eastern. 463
Meeting of the Committee on Standards..... 464
Conferences of Governors of States..... 465
Hearing on Transfers in New York..... 468
Reinforcing Poles on Indiana Union Traction Lines..... 468
Reduction of Noise by Novel Track Construction..... 469
New Crude-Oil Engine..... 469
News of Electric Railways..... 471
Financial and Corporate..... 473
Traffic and Transportation..... 476
Personal Mention..... 478
Construction News..... 479
Manufactures and Supplies..... 482

Prompt Settlement of Claims

One page of the annual report of the Interborough Rapid Transit Company of New York for the last fiscal year, an abstract of which is published elsewhere in this issue, is devoted to a statement in reference to the results of the policy which has been adopted in the settlement of claims for accidents and damages. The total disbursements for the year in settlement of all claims, suits and judgments were equal to 0.62 per cent of the gross operating revenue. The expense of the legal and claim departments amounted to an additional 0.38 per cent, making a total of 1 per cent for the year. This percentage appears very low in comparison with the showing of the average street railway company. No comparison of this nature, however, is exactly fair because of the advantage held by the subway and elevated lines, which operate on other than street levels. However, the speed at which the trains are operated and the unparalleled congestion of the territory served contribute a hazard to operation which is not experienced in the same degree by any other company in the country. Notwithstanding these manifest differences in conditions, attention should be called to the attitude with which the company now meets all claims of this nature. Mr. Shonts, the president, attributes the favorable results of the cases tried in court to the policy of the company of settling claims outside of court unless the company considers them to be either fraudulent or exorbitant. Prompt settlement of just claims and avoidance of prolonged litigation wherever possible tend to prevent the dangerous accumulation of liabilities on account of claims of this character, and are policies which may be adopted by smaller companies with satisfactory results.

The Atlantic City Program

A study of the programs arranged for the Atlantic City conventions of the different electric railway associations shows some changes from those of last year. With the exception of Monday, the opening day, the sessions of the Accountants, Engineering and Transportation & Traffic Associations will be held during the mornings of convention week, while those of the American Association will be held on the afternoons of Tuesday, Wednesday and Thursday. This arrangement was adopted primarily to permit any delegates who wished to attend all of the meetings of the American Association to do so and yet be present at the sessions of any one of the affiliated associations which they desired to attend. Incidentally the new plan gives, we believe, a better distribution of the time available for the sessions of the Engineering Association than last year, when there were three afternoon meetings. Under the old

plan Thursday was the only day which was set aside by the engineers for the inspection of exhibits, whereas now every afternoon is available for that purpose. The Engineering Association hopes by confining its meetings to one long session each day to accomplish really more work than by the former arrangement of two sessions. Another feature of the program this year with each of the affiliated associations, except the Claim Agents, is the marked preponderance on the programs of committee reports over individual papers. Thus the Accountants have scheduled for convention week two formal papers, two addresses or informal talks and the reports of six committees, outside of the nominating committee and other committees appointed at the convention. Last year the program of the association contained six papers, one address and three committee reports. The convention of the Engineering Association will be made up this year, as last, entirely of committee reports, of which there are eleven this year as compared with nine last year. The Transportation & Traffic Association proposes to consider this year one formal paper and the reports of nine working committees, while last year the program of the association listed four papers and the reports of seven working committees. The Claim Agents have always held to the plan of papers rather than of committee reports, but expect this year to have eight instead of seven papers presented for their consideration.

The Meeting of the Governors

The first general meeting of the State executives, since the early history of the country at least, was called by President Roosevelt to consider the subject of the conservation of our national resources. But the governors seem to have become infected with the desire to form an association which is now so general among the different trades and industries, and the meeting at Spring Lake this week was the second since that called in Washington. If an association of State governors will tend to make more uniform many of the diverse State laws on subjects of national importance, it will be of benefit to the country at large. A good beginning might be made, for instance, in the inheritance tax laws, under which at present every State which can base the shadow of a claim to any portion of the property of a testator exacts its full percentage. In effecting any reforms of this kind it might be said that the duty of enacting legislation in most States is placed by their constitutions upon the legislatures, but the tendency of the times seems to be for the chief executives to assist very largely in this work. The important part taken by the States at present in shaping the destinies of public utility corporations is shown by the reservation of an entire day to a discussion of this subject. Ten years ago such a topic would naturally have been considered only in a conference of mayors. But municipal control in these matters in most cases has gradually been absorbed by the State, and comparatively little authority outside of that connected with the police power is now left to the city rulers in matters relating to the public utility companies of their own community. The date at which this issue went to press precluded an account of the meeting on Friday, at which the State control of public utilities was considered, but a report is published of the meeting on employers' liability.

THE MANUFACTURER AND THE RAILWAY MAN

Several reasons have been advanced to explain the fact that the electric railway convention exhibit is larger and more elaborate than that conducted at the convention of any of the other national technical associations. The cause is certainly not the extent of the industry, because in capitalization the electric railways of the country are greatly exceeded by the steam railroads and in number of companies by both the steam railroads and the electric lighting companies. Nor is it because of a greater purchasing power, because the expenditures of the steam railroads in their car and motive power departments alone must be greater than those of the electric railways for mechanical equipment. Still a third reason, the theory that the electric railway industry or the art is growing more rapidly than any other, is hardly tenable.

The explanation in our opinion is the close relation which has always existed in the electric railway industry between the users and the manufacturers. Ever since the beginning of electric traction all of the motors, transformers, generators and prime movers and most of the cars and trucks required by the electric railways have been built in outside manufacturing establishments. Few, if any, electric railway companies have followed the example of many steam railroads and built the greater part of their equipment in their own shops. Even in the smaller parts of the equipment, such as registers, heaters, overhead appliances, etc., the electric railway companies have looked to others to supply their needs. Thus the electric railway industry—perhaps more than any other—has been the means of developing a large corps of outside experts, connected for the most part with manufacturing companies, who have been devoting themselves under the stress of business competition to improving some phase or phases of the electric railway transportation problem.

We do not consider this situation to be in any way discreditable to the engineers connected with the railway companies themselves. In fact, we are sure that as individuals and as a body they would be the last to attempt to ignore the benefits which they have received and are constantly receiving from the engineering and inventive talent possessed by the manufacturers. Undoubtedly many improvements in apparatus have been originated by railway engineers. But as a rule their services have been most valuable, so far as the design and manufacture of electric railway apparatus is concerned, in determining the requirements of the apparatus needed. The details of the design and manufacture of apparatus required have then been left to be worked out by the builders. This, to our mind, has been a most favorable condition, and one which tends far more to economy of production and efficiency of product than if each company attempted to manufacture its own supplies, to the same extent, for instance, as do the steam railroads.

One practical effect of this situation is that the relations between the manufacturers and the electric railways are quite different from those which usually exist between a buyer and a seller. The latter does not merely produce a staple article which he tries to make as cheaply as possible and then to sell as dearly as possible. He is an expert in departments of his customers' business, which he often un-

derstands as well as the latter and sometimes better, because he gives his entire attention to that one subject. Hence not only his products but also his advice is often sought by the railway company, and properly so, even in the establishment of standards of apparatus for the entire industry.

This condition explains one fact which has often caused surprise among those manufacturers who are unacquainted with the electric railway field. They cannot understand why some exhibitors who have gone to great expense in making a display at a convention should be satisfied with their efforts when the close of the convention has resulted in few if any contracts. They do not realize that an electric railway exhibit is not like the Stock Exchange, where men gather simply to buy and sell. Instead, it is more a meeting place of the user and the designer. The essential difference between these two relations is illustrated by the fact that prices, although often quoted, do not form the main topic of conversation between exhibitor and delegate and actual orders are still rarer. The purpose which most manufacturers have in attending a convention is to learn the point of view of the railway men and to show and explain to them such new apparatus as the manufacturers have made during the year.

The conclusions to be drawn from this condition of affairs are numerous. One is that whomever else manufacturers send to a convention they should include among their representatives their engineers and chief designers. Such a policy would be helpful to these men because it would enable them to learn from the users just what they want. It would also be of great assistance to the railway delegates to talk their problems over directly with these men.

A second conclusion is that railway men should make more use of the expert knowledge of the manufacturers on special subjects, both at the convention and at other times. If, for instance, the engineers of the manufacturers should generally attend the conventions as already suggested we believe that their participation in the discussions upon mechanical subjects could properly be sought to a greater extent than it is. We assume, of course, that their remarks would be free from commercialism, but the privileges of the association have not been abused by manufacturers to any extent in this way and there is no reason to fear that they will be in the future.

A third suggestion is that in such advertising literature as the manufacturers prepare for the convention—in fact, for all purposes—they lay stress upon the engineering merits of their appliances. They need not be afraid that any good technical points which they may make will be overlooked. A catalog—or an advertisement—which presents merely bald claims is about as interesting to a railway engineer or manager as a convention exhibit would be which was made up of boxed apparatus. Preferably such advertising literature should be prepared by the best engineer or sales-engineer of the company, one who really knows the troubles of the railway man and the way in which the device or apparatus for sale will overcome them. Sales arguments prepared in this way will accomplish a thousand times more good than glittering generalities, even when expressed in the choicest language.

MINOR CONVENIENCES IN THE SHOP

There is always room for the utilization of special labor-saving devices in the maintenance of car equipment. As the amount of work handled in a given shop approaches the maximum the importance of the minor conveniences is magnified. Improved shop lighting, for example, has a direct effect upon the volume of work which can be turned out in a day, and any means of securing better illumination should receive close attention. It is safe to say that good light saves more labor than any tool or appliance, with the possible exception of power-driven tools. Some day an enterprising efficiency engineer will make a stop-watch test of the proportion of time spent on a given job in hunting for supplies, tools and fittings when working on the under side of a car, and the results will be interesting and significant. In this connection it is worth noting that in one shop the working conditions on the under side of the cars were improved several hundred per cent by the simple expedient of placing an arc headlight in a position where the particular piece of apparatus under repair was exposed to the penetrating rays of the lamp. The speed with which troublesome boltheads, holes and fittings could be located by the maintenance force was a revelation.

It is usually a simple matter to install a track in a storeroom by which material needed in the shop or on the outside can be economically handled on small trucks in place of the usual method of wheeling barrows through the shop to the nearest open track. Perhaps nowhere do small motor-driven hoists offer a better opportunity for saving time than in handling heavy material in bulk from the floor of the storeroom to the mezzanine floor or second story. Systematic carding of all storage bins according to an index number, title or even the maker's number of the parts contained in the bins saves time and money in the long run. Another shop convenience that deserves consideration is the location of a sub-storage division containing fuses, trolley ropes, lamps and other small supplies near the section of the shop or carhouse devoted to inspection and adjustments of equipment.

Lack of adequate facilities for the storage of tools which constantly are being used results in the loss of a large amount of time during a year's operation of a shop. There is little doubt that the storage of tools near the work on which they are used is a paying proposition in all busy shops. As cars enter the building the kind of repair work to be handled varies widely, and the number and variety of tools required tends to increase. There is seldom time available in which to return tools to a central point, and the practice of leaving them on the floor between pits is not to be commended. Some shops have met these conditions by providing racks and boxes along the walls nearest the working area in which are kept enough inexpensive wrenches, jacks and pinch bars to save practically all extra walking to obtain tools needed in ordinary car repairs. An inventory of shop equipment will disclose many tools which could be provided in duplicate at several points in the shop at a trifling expense when manufactured by the company blacksmith. The fact that they were near at hand would save a good many dollars a year in the time of the skilled mechanics and inspectors who would use them.

Power Station and Transmission Line of the Hoosac Tunnel

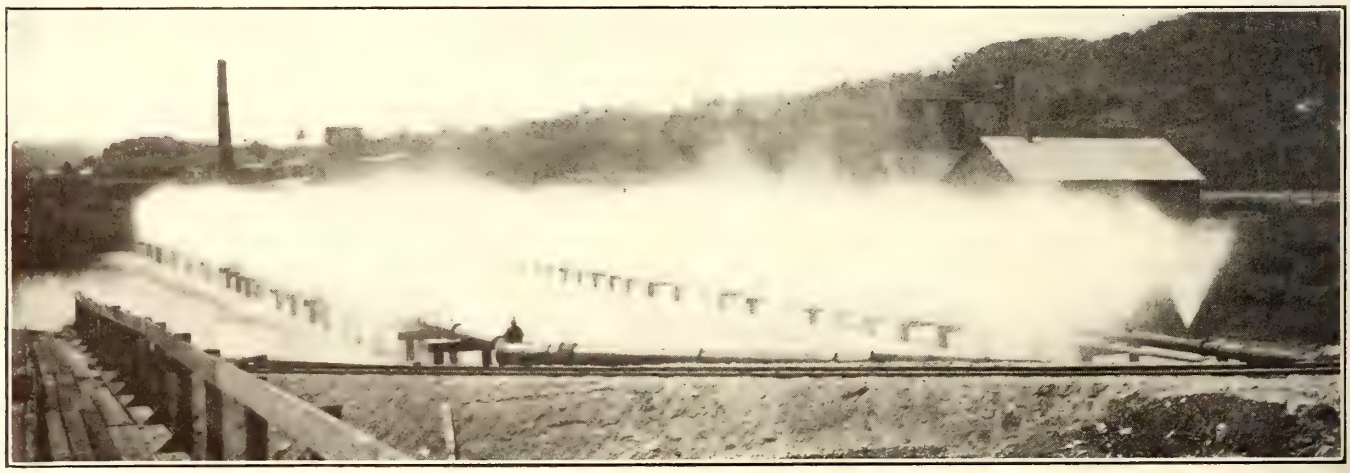
The Principal Features of Interest in This Station Are the Use of Forced and Induced Draft in the Boilers, the Coal Handling Machinery, Condensing Water Supply and the Electric Switching Apparatus.

The catenary construction, locomotive repair shops and operating features of the electrified Hoosac Tunnel of the Boston & Maine Railroad were described in the Electric Railway Journal of July 1, 1911. The power station at Zylonite, which supplies the electrical energy for the operation of trains, and the transmission line 2.4 miles long, which extends to the west portal of the tunnel, will be described in this article.



Hoosac Tunnel Power Station—Exterior View Showing Coal Conveyor and Outgoing Transmission Line

The decision to electrify the Hoosac Tunnel was made late in the summer of 1910 and on May 27, 1911, regular operation with electric locomotives was commenced. Every part of the construction work was rushed and the power station building itself was completed in less than sixty days. Steam was raised in the boilers in a little over three months from the time of breaking ground for the foundations, and the turbo-generators were in operation within four months. The construction and equipment of the power station were facilitated by the fact that the plans for a power station recently built by the Connecticut Company at Waterbury, Conn., were capable of being adapted with some changes to the conditions existing at Zylonite. The preliminary engineering study and designing, therefore, were materially lessened. The mechanical equipment of the Zylonite station in the more important details is a duplication of that in the Waterbury station, but the electrical equipment and switching gear were designed especially for service in this station.

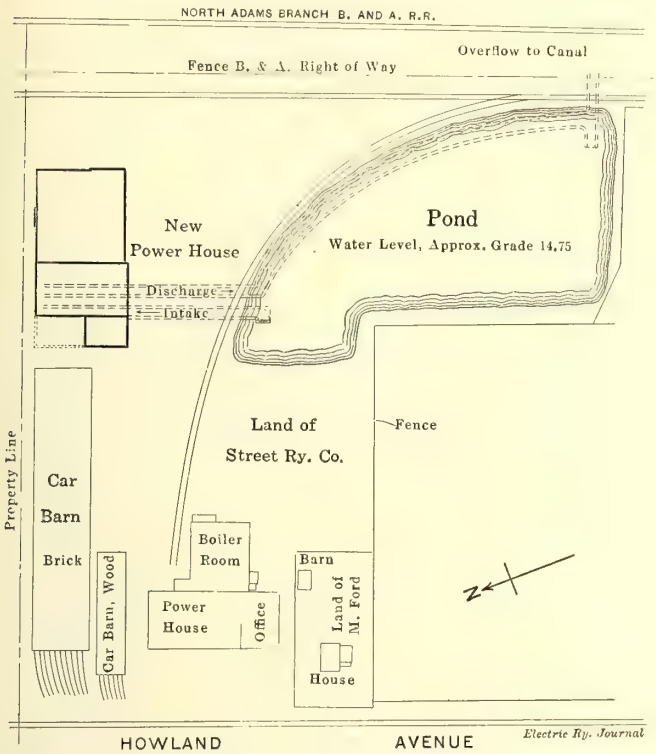


Hoosac Tunnel Power Station—Spray Cooling System in Operation

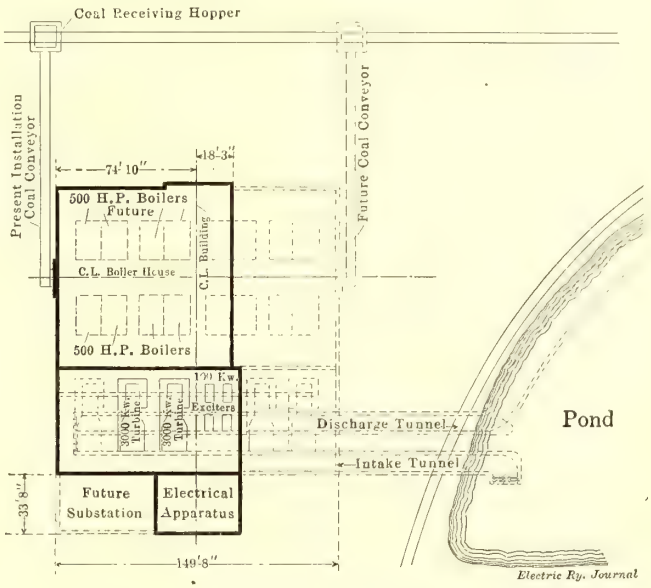
POWER STATION SITE

The site selected for the power station is in the town of Zylonite, 2 miles south of North Adams, Mass., on land owned by the Berkshire Street Railway, which is controlled by New Haven and Boston & Maine interests. The Berkshire Street Railway has built on this piece of land two carhouses and a power station with a total capacity of about 1500 kw. Part of the land is occupied by a small pond, from which the street railway power station is supplied with condensing water and feed water. The North Adams branch of the Boston & Albany Railroad runs along the east side of this tract of land and the new power station

for the Hoosac Tunnel was built in the northeast corner, adjoining the railroad right-of-way. A switching track for coal supply cars was built between the railroad and the power station building.



Hoosac Tunnel Power Station—Map of Property



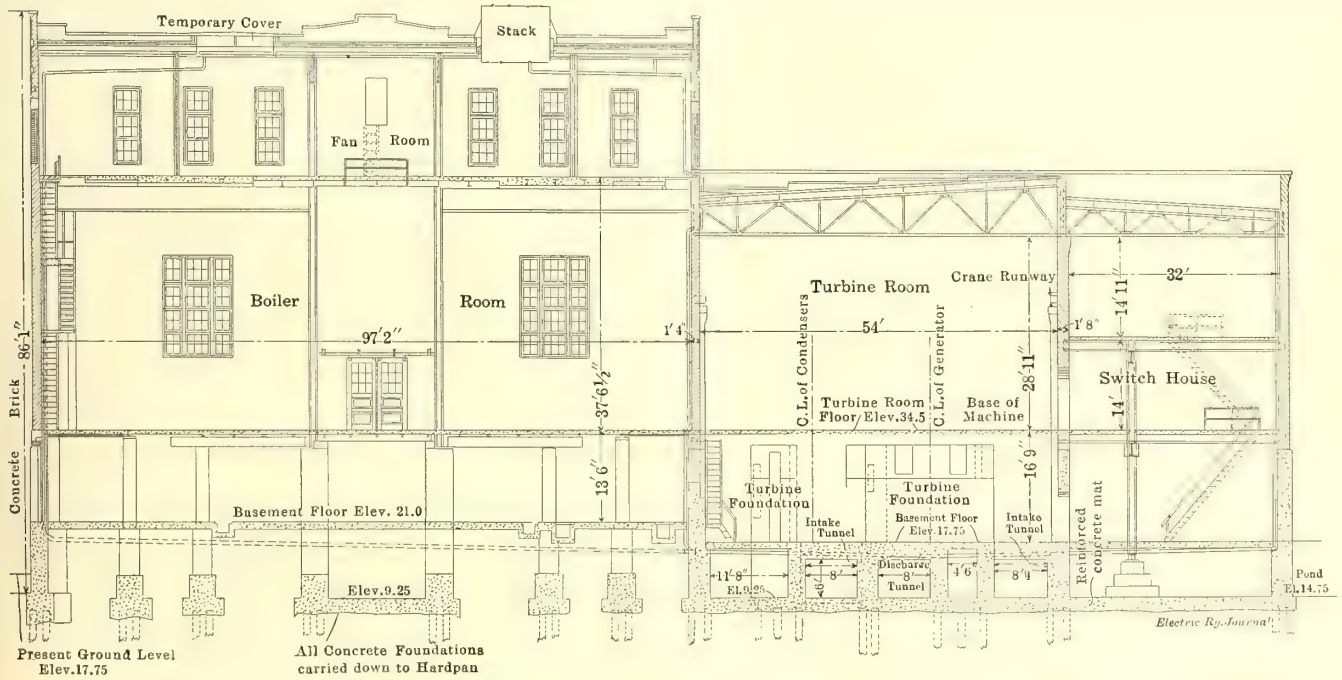
Hoosac Tunnel Power Station—Plan of Station

BUILDING

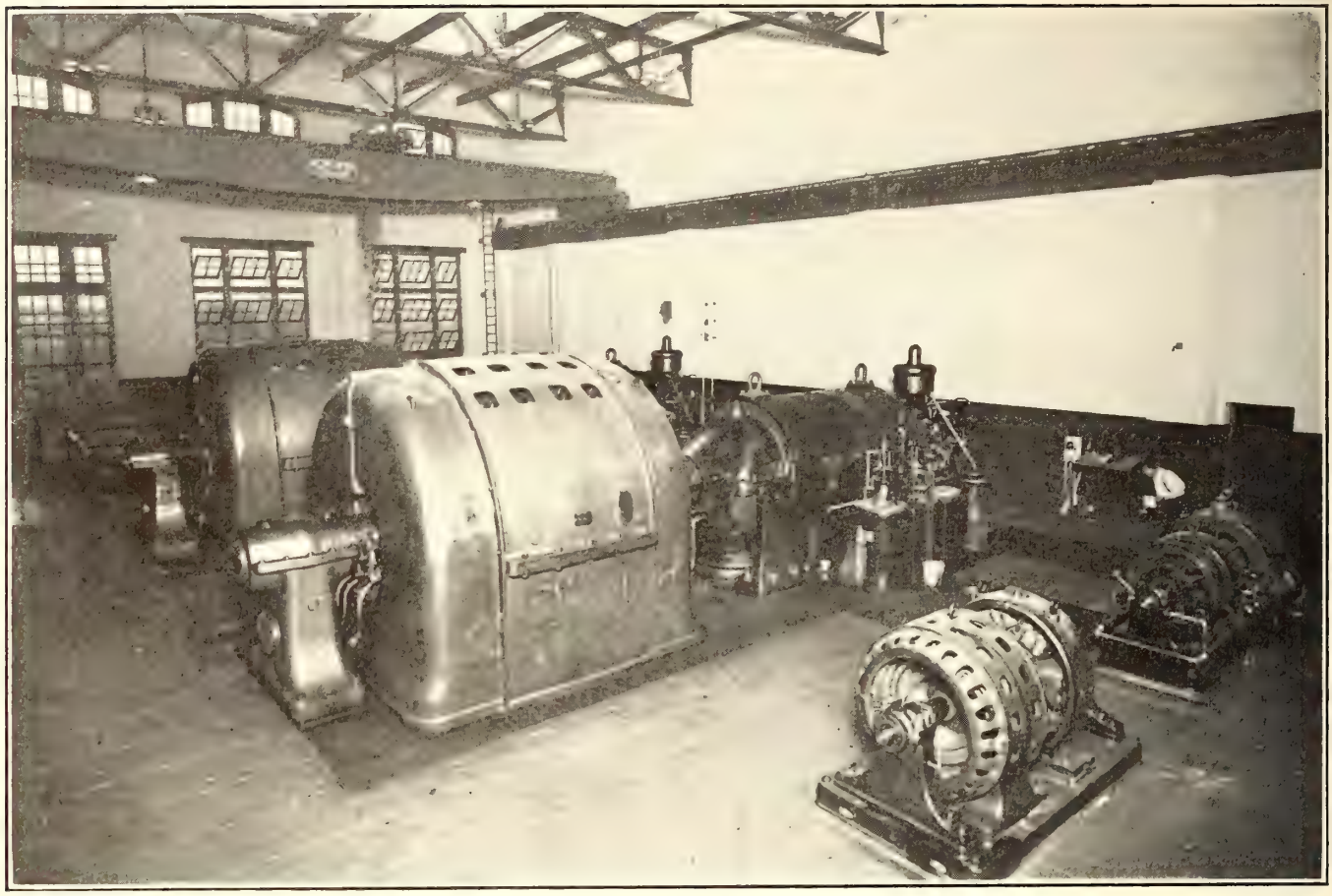
The power station was designed for an ultimate capacity of 15,000 kw in turbo-generators and 8000 hp of boilers, but only a part of the building was erected to house the initial equipment of two 3000-kw turbo-generators and four 500-hp boilers. The ultimate size of the building will be 149 ft. 8 in. x 152 ft. 6 in., with an addition 97 ft. 8 in. x 33 ft. 8 in. on the west end to be used as a switch house and possibly as a future substation for the Berkshire Street Railway lines. The size of the building now in use is 83 ft. 1 in. x 152 ft. 6 in., with an addition for the switch house 33 ft. 8 in. x 45 ft. 8 in. It is built with brick walls on concrete foundations, structural steel framework and roof trusses and reinforced concrete floors and roof. On account of the gravity system of supplying condensing water from the pond adjoining the power station, the building, including the basement floor, is entirely above the ground level. The turbine and boiler room floors are 21 ft. 9 in. above the ground. The total height of the boiler room section from the ground to the top of the roof parapets is 83 ft. 7 in. The turbine room has clear headroom under the roof trusses of 28 ft. 11 in. The present building will accommodate without further enlargement three 3000-kw turbo-generators, ten 500-hp boilers, and four exciter units with the necessary auxiliary apparatus.

BOILER ROOM

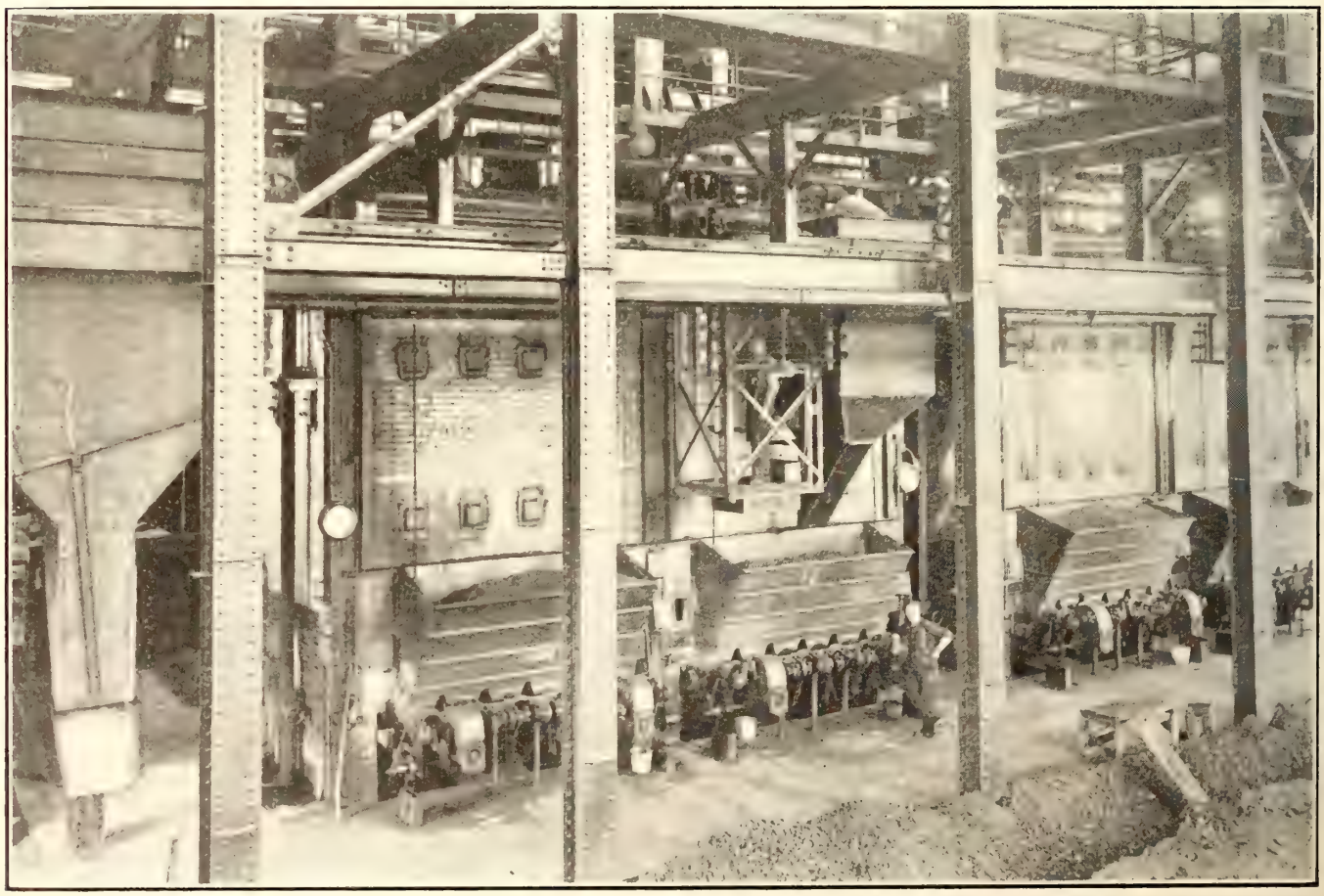
The boiler room is 97 ft. 2 in. wide and extends across the east end of the building. It is separated from the turbine room by a brick wall 16 in. thick, which is carried up above the roof of the turbine room to the same height as the other outside walls surrounding the boiler room. The headroom in the boiler room under the fan room floor above is 37 ft. 6½ in. Four Bigelow & Hornsby water



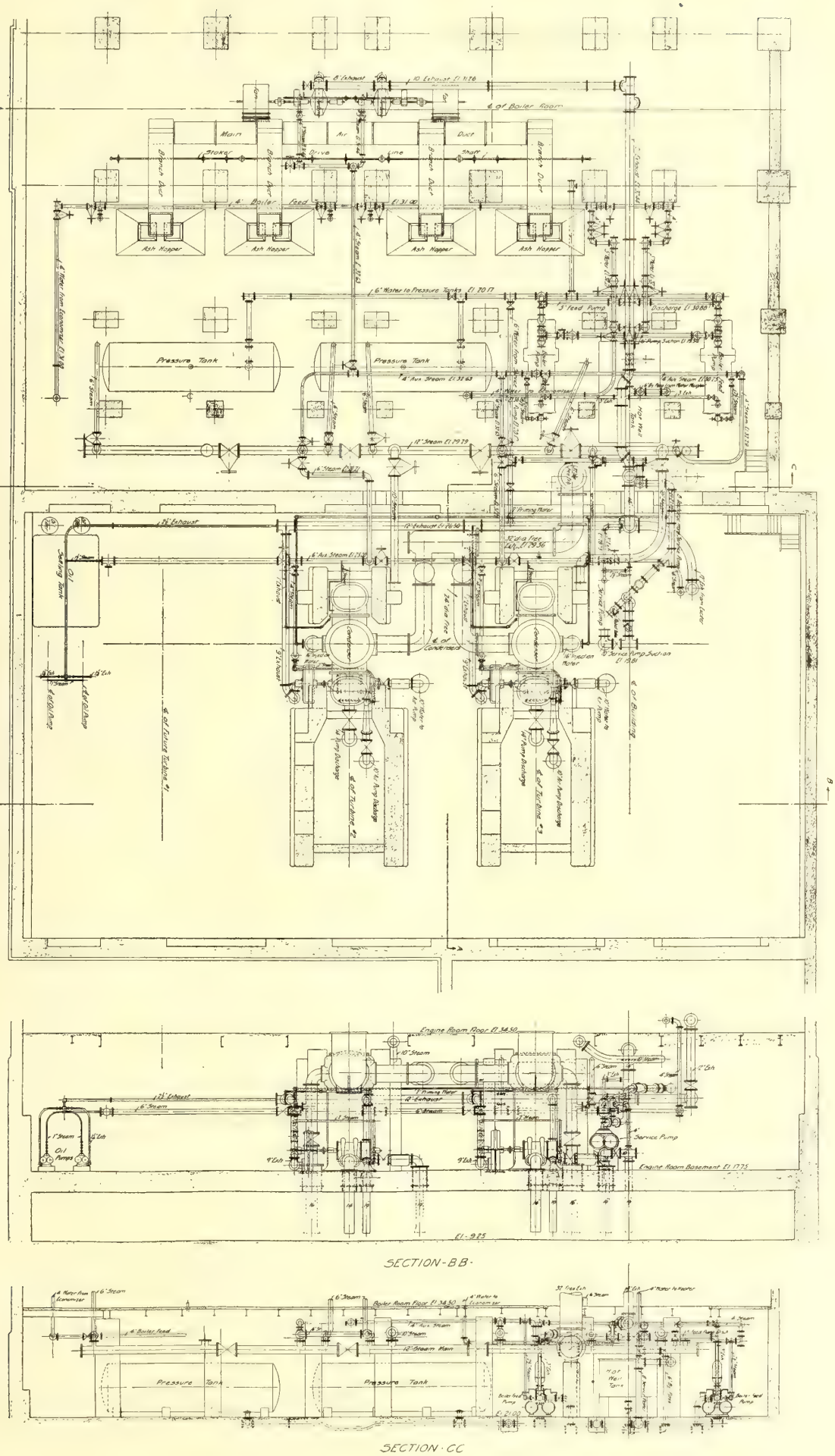
Hoosac Tunnel Power Station—Section Through Boiler Room, Turbine Room and Switch House



Hoosac Tunnel Power Station—Turbine Room

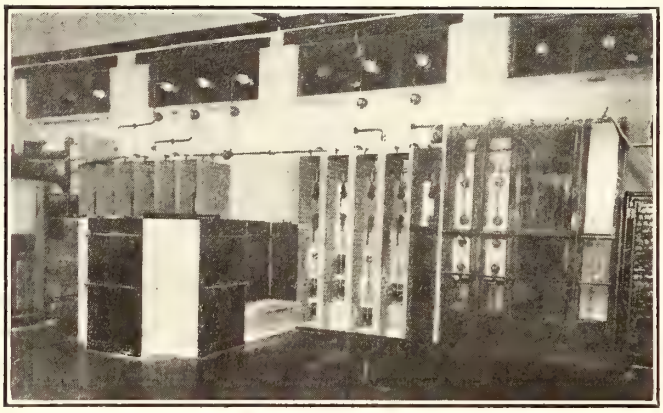


Hoosac Tunnel Power Station—Coal-Handling Traveler in Boiler Room



Hoosac Tunnel Power Station—Plan and Sectional Elevations of Piping

tube boilers are installed in two batteries adjoining the partition wall next to the turbine room. When additional boilers are required they will be placed on the opposite side of a central firing aisle 12 ft. wide. The boilers are equipped with Taylor automatic under-feed stokers and



Hoosac Tunnel Power Station—Lightning Arresters and Disconnecting Switches

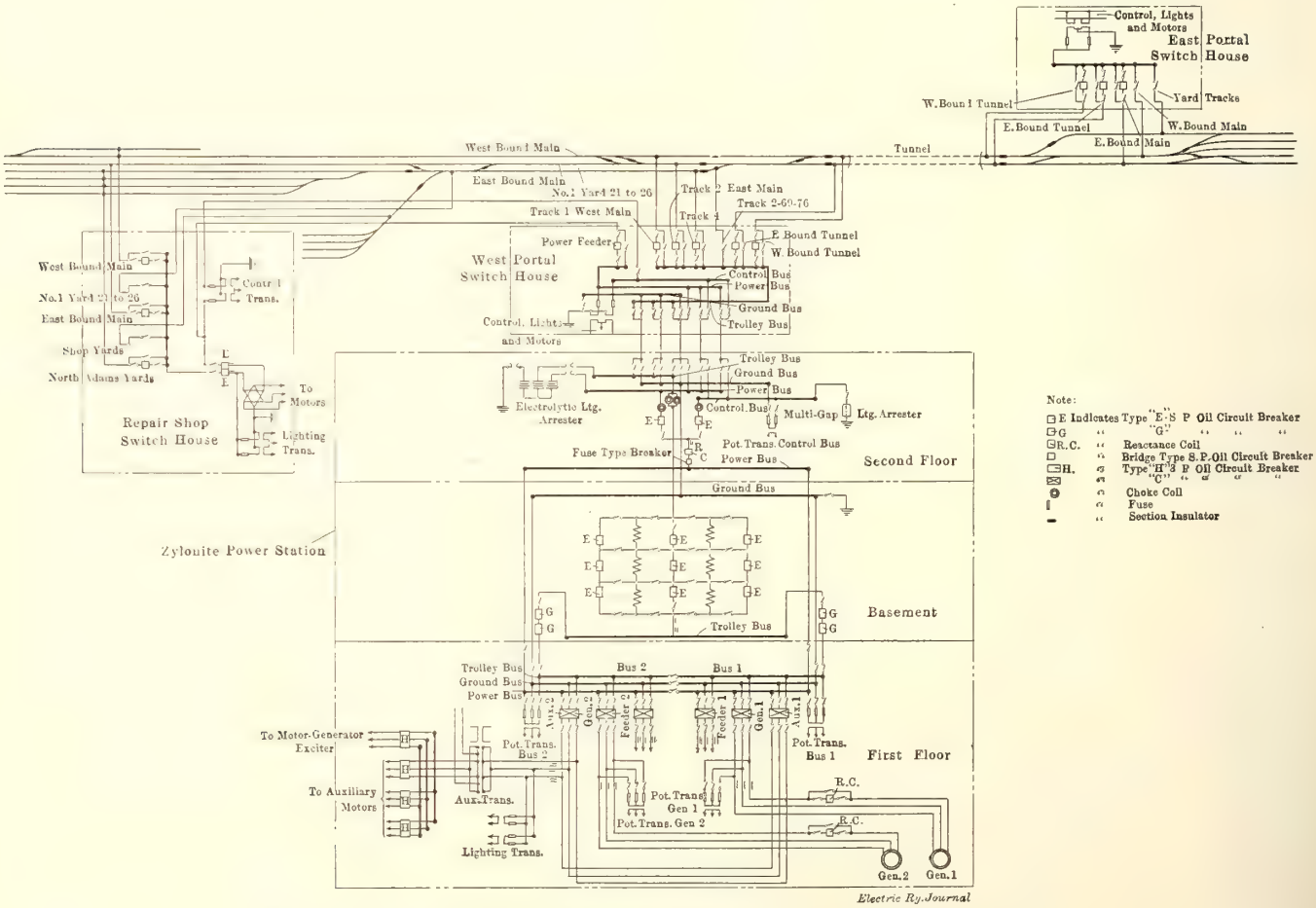
Foster superheaters. Green economizers have been installed in the smoke flues to heat the feed water.

A combined forced draft and induced draft system is used in the boilers and the smoke is exhausted through a steel stack 10 ft. in diameter. A single stack is used for the four boilers at present installed, and an opening has been left in the roof for another stack of the same size to be connected to future boilers to be installed on the east side of the firing aisle. The forced draft apparatus is located in the basement under the firing aisle. Two 100-hp Kerr turbines, driving Sturtevant blowers, force air into the ash pits under the boiler grates. The induced draft fans are placed in a fan room on the floor above the boiler room. Two American Blower Company's steel fans, driven by Harrisburg reciprocating engines, are installed for the four boilers now in use. An engine and blower are held in reserve. A duplicate equipment of two engines and blowers will be put in when additional boilers are connected to the second stack.

COAL AND ASH HANDLING

Coal is delivered in hopper-bottomed cars, which are dumped over a receiving hopper in the side track adjoining the power station. From this hopper it is fed to a bucket conveyor which elevates it to the top of a storage bin built along the north wall of the boiler room. As the coal is delivered from this conveyor it passes through a crusher before dropping down to the storage bin. Suspended from the roof of the boiler room above the center of the firing aisle is an I-beam trolley track, which carries an electrically-driven traveling coal hopper, designed to weigh the coal as it is handled. This hopper is run under the storage bin and filled and then travels back and forth in front of the boilers delivering coal to the stokers through a spout. It is operated by an attendant who rides in a cage hung from the trolley carriage. The coal-handling apparatus was furnished by the Bergen Point Iron Works.

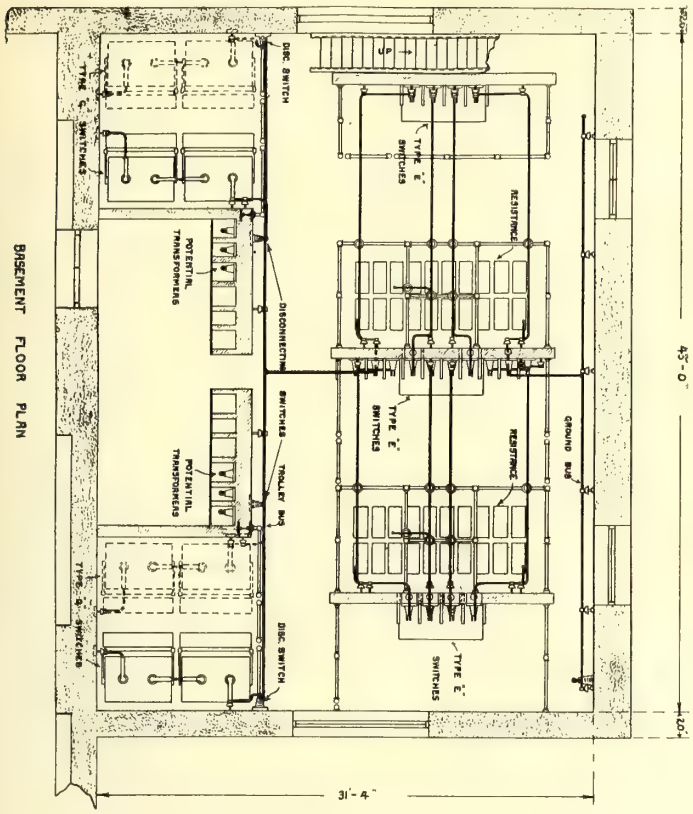
The boiler ash pits have hoppers which are emptied into a small dump car running on a narrow-gage track on the basement floor. This track leads out through the north wall to a dumping platform, where the contents of the ash cars may be dumped into railroad cars standing on a track below. The ash cars are moved by hand.

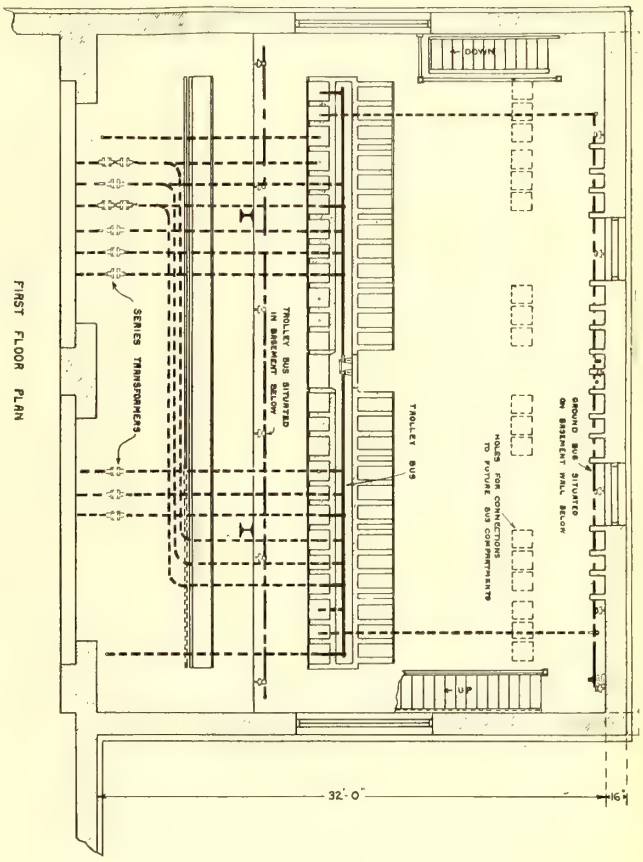


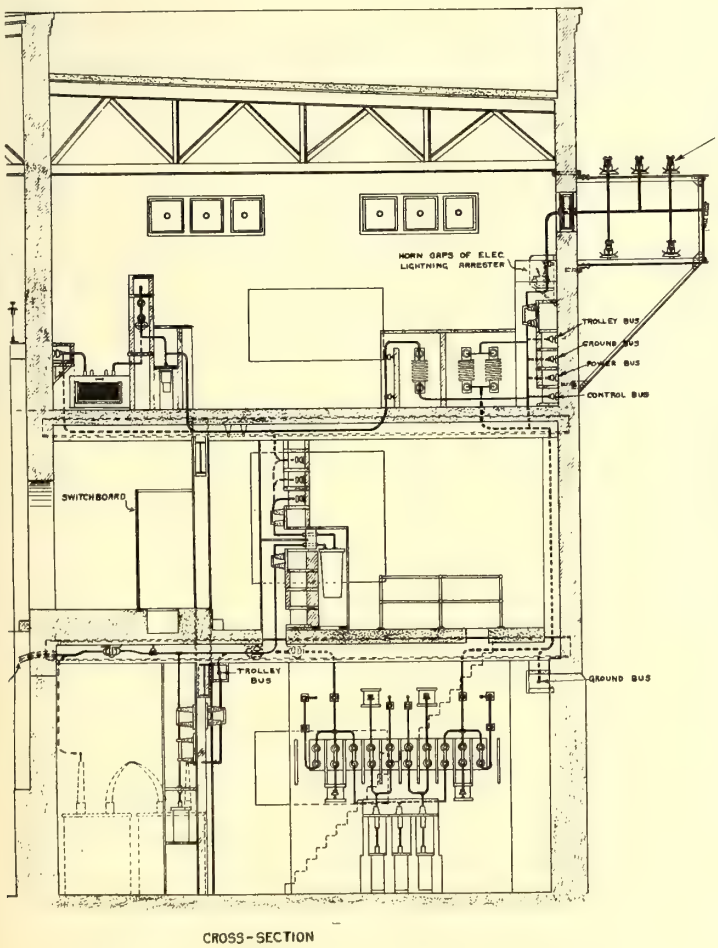
Hoosac Tunnel Power Station—Diagram of Electric Switching Apparatus

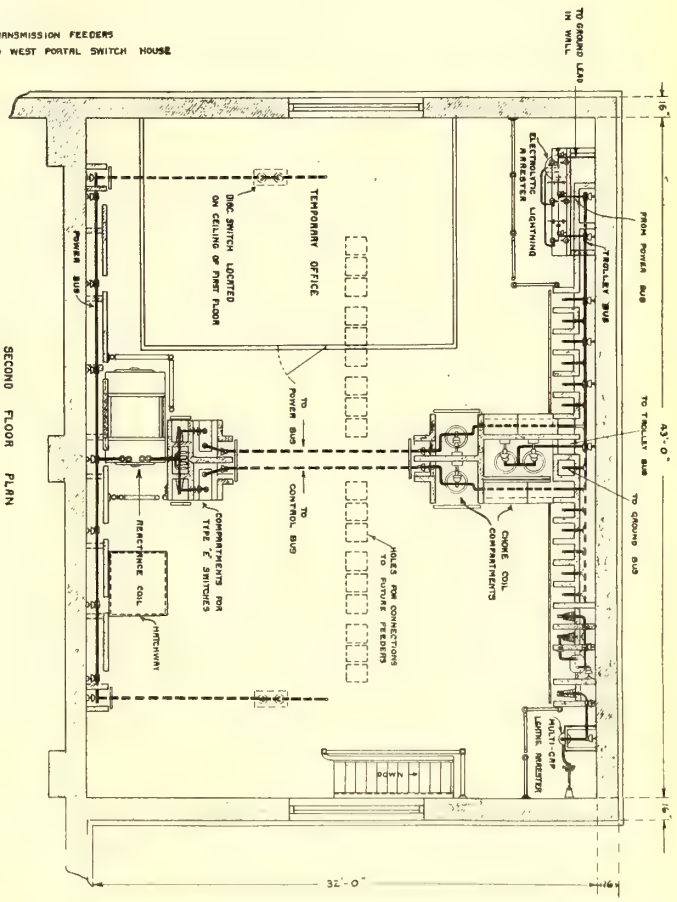
BOILER ROOM PIPING AND AUXILIARY APPARATUS

The water weigher and feed-water heater are placed on the boiler room floor. All other boiler room auxiliary apparatus is placed in the basement under the boiler room, and all of the main and auxiliary steam and exhaust piping









Hoosac Tunnel Power Station—Floor Plans and Cross-Section of Switch House

is also run under the floor. Two Worthington boiler feed pumps discharge into one end of a 4-in. boiler feed line and either pump may be by-passed to a 4-in. line connected to the economizers, which in turn are connected to the far end of the boiler feed line. The feed pump suction



Hoosac Tunnel Power Station—Main Circuit Breakers in Switch House

may be taken direct from a 6-in. supply connected to a service pump under the turbine room or from a hot-well tank located between the two pumps. All of the steam-driven auxiliaries exhaust into a Hoppes feed-water heater having a rated capacity of 4000 hp. Provision is also

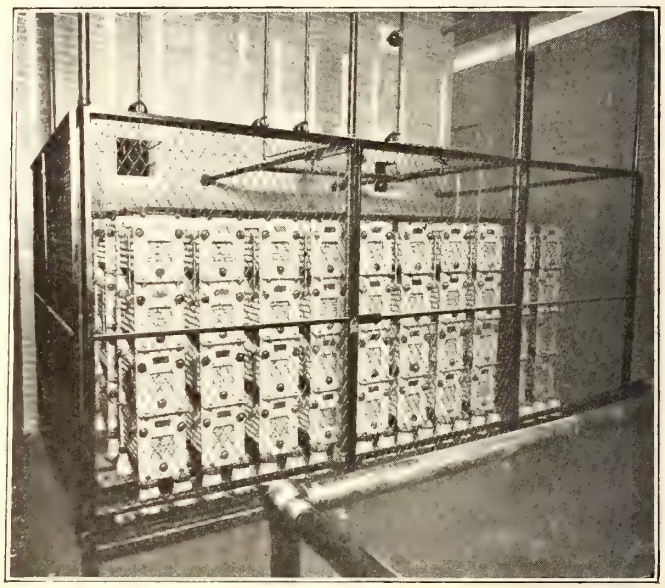


Hoosac Tunnel Power Station—Operating Switch Board

made for a supply of feed water from the city mains in case of emergency. All feed water is weighed by a Wilcox water weigher before passing through the feed pumps. The service pump which supplies water for all miscellaneous purposes was furnished by the Platt Iron Works. It has an 8-in. discharge and a 10-in. suction pipe which extends down into the condenser intake flume. The main steam pipe connections from the boilers are attached to a 12-in. loop which is carried down under the boiler room floor at each end of the room and is continued under the floor parallel to the partition wall between the turbine and boiler rooms. From this header all the main and auxiliary live-steam lines are taken off under the floor. The turbine connections are 10 in. in diameter. Each of the two turbines has a free exhaust connection 24 in. in diameter, and both of these connections discharge into an exhaust pipe 32 in. in diameter which leads up through the roof.

TURBINE ROOM

The turbine room contains two three-phase Westinghouse turbo-generators rated at 3000-kw single-phase. These



Hoosac Tunnel Power Station—Short-Circuit Resistance

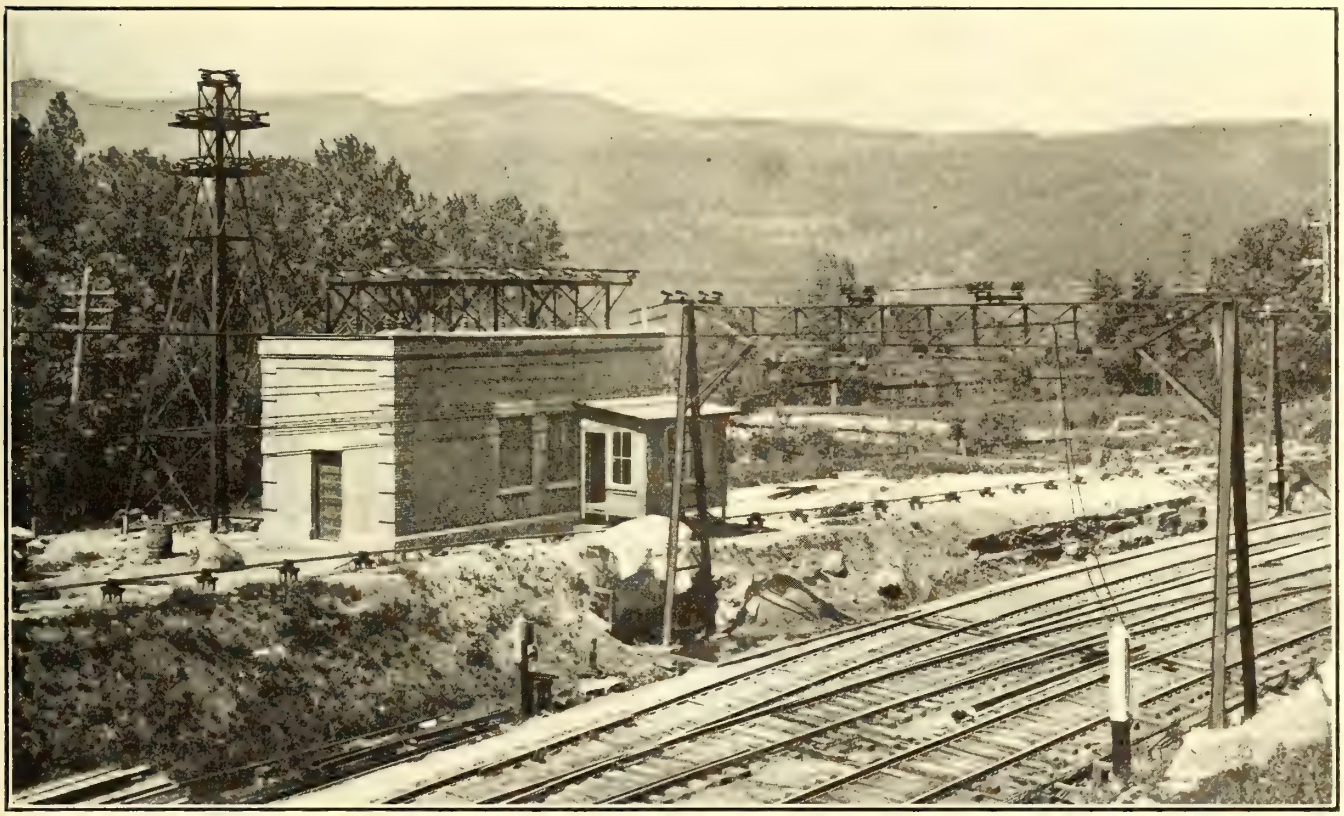
machines deliver three-phase, 11,000-volt, 25-cycle alternating current, but only single-phase is used for the trolley feeders. The other two phases provide for a supply of three-phase current for the operation of motors in the power station and in the repair shops, and also a single-phase control circuit for the operation of the switching apparatus in the three switch houses along the track. On the south side of the turbine room are two 100-kw exciter units, both of Westinghouse manufacture. One unit is driven by a turbine and the other by an induction motor. The turbine room is spanned by a 30-ton hand-operated traveling crane made by the Northern Engineering Works.

CONDENSING WATER

The supply of condensing water is obtained from a pond holding about 2,250,000 gal. of water. The normal level of the pond is 19.75 ft. below the turbine room floor and 3 ft. below the basement floor. This permits of a gravity supply to the condensers through concrete intake and discharge flumes, 6 ft. x 8 ft. in cross-section, which are built under the basement floor. As will be seen from the accompanying map of the power station site, the pond is long and narrow, and the intake tunnel extends into the water at the end of the pond nearest the power station. It enters the building along the west wall, passes around the north wall and then back directly under the condensers. The discharge tunnel is built between and parallel to the two legs of the intake tunnel. After it leaves the building it is continued under the surface of the ground to the pond, and thence between sheet piling to the far end of the pond. Thus the discharge water must traverse the entire length of the pond before again entering the intake

tunnel. The space between the return branch of the intake tunnel and the boiler room partition wall is utilized as a water storage reservoir. It will hold between 35,000 and 40,000 gal. of water for an emergency supply.

The pond is fed by twelve artesian wells driven on the property. These wells have a total flow of about 1500 gal. per minute, at a temperature of about 50 deg. As the pond also supplies condensing water for about 1200 hp of engines in the station of the Berkshire Street Railway and contains only a comparatively small volume of water, it was thought desirable to supplement the cooling effect of the continuous supply of well water by installing a spray cooling system. A motor-driven turbine pump, with a capacity of 6000 gal. per minute, and a steam-driven reciprocating pump, with a capacity of 4000 gal. per minute, are provided for circulating the water through the spray piping. These pumps draw water from the discharge tunnel at a point between the building and the entrance of the discharge tunnel to the pond, and force the water through a system of pipes and spray nozzles which are suspended above the surface of the pond. Each of the turbines requires about 4000 gal. of condensing water per minute, so that either pump has a capacity sufficient to spray all of the condensing water from one turbine. The spray cooling system ordinarily is not required, but it has proved effective in lowering the temperature of the pond water in warm weather when the full load on both stations is being utilized.



Hoosac Tunnel Power Station—West Portal Switch House and Feeding-in Bridge

CONDENSERS

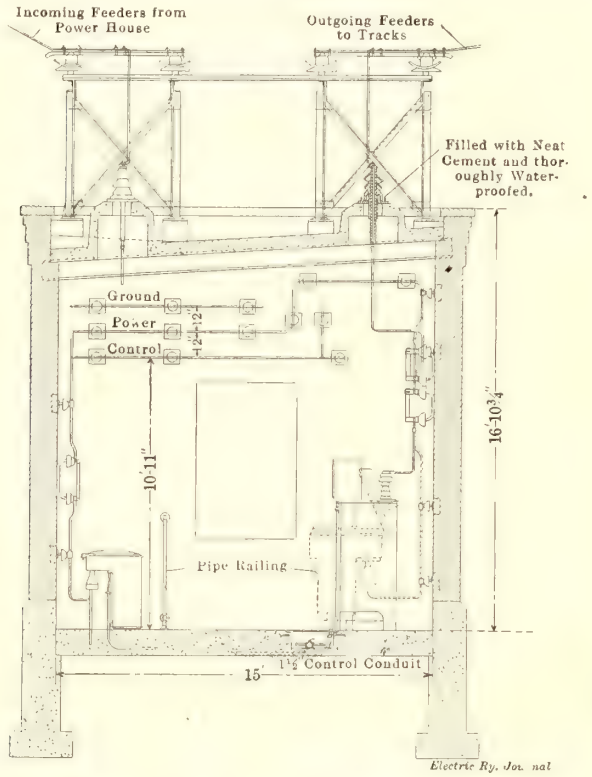
The turbines exhaust into Westinghouse-Le Blanc jet condensers, which are mounted on the basement floor immediately over the return leg of the intake tunnel. A 16-in. intake pipe extends down into the intake tunnel, and as the lift from the intake tunnel to the top of the condenser is only about 12 ft., the water is raised by the suction of the condensed steam and the action of the discharge pump. The discharge pump and air pump of each condenser are mounted on the same shaft and are driven by a steam turbine. In order to provide means for re-establishing the vacuum in case it is lost while the turbine is in operation without shutting down the machine, a supply of priming water is provided by a 2000-gal. electrically driven pump. This pump draws water from the intake tunnel and discharges it through a 6-in. pipe which enters the top of the condenser. The vacuum can be re-established by this means under full-load conditions. For starting up the condensers while the turbine is at rest the supply of priming water is furnished through a 2-in. pipe connected to the service pump. Under these conditions it is necessary to completely fill the condenser with steam before starting the circulating pump and then admit the water from the service pump connection.

SWITCHING ARRANGEMENT

The switch house which adjoins the turbine room on the west side has three floors. On the basement floor are located the main oil switches for the trolley phase of the generators and the resistances and oil switches used to cushion the effect of a short circuit. The first floor is open through to the turbine room and contains the control switchboard, main busbars, generator buses and disconnecting switches for the generators, auxiliary power circuits and blank panels for future transmission line circuits. The lightning arresters and disconnecting line switches are mounted on the second floor. The two generators are three-phase machines with one-phase grounded after passing through the switching gear but before leaving the building. They are connected to a trolley bus, ground bus and power bus on the first floor through suitable oil switches. A reactance coil is inserted in the trolley phase of the generators to reduce the effect of short circuits on the generators. Each of the generators is connected to separate sections of the three buses on the first floor, but these sections may be connected at the center by hand-operated switches. The auxiliary connections are made to

each section of the buses by a loop from which the auxiliary transformer connections are taken off. The lighting transformers supply current for station lighting at 110 volts and the power transformers supply current at 440 volts for the station motors.

The trolley bus on the first floor is connected at each end to a trolley bus in the basement, to which connections are made to the group of switches and resistances used for cushioning short-circuit surges. These switches and resistances are installed in duplicate, but only one set is used, the other set being held in reserve. The resistance is divided into three parts, and each part is successively connected in series with the trolley by the opening of an oil switch. Four current-limit relays are mounted on the control switchboard. These relays are operated by current supplied from a series transformer in the trolley circuit. When a short circuit occurs of sufficient magnitude to cause an excessive rise of current in the circuit, the first relay acts and opens one of the three oil switches, which in turn cuts into the trolley circuit the first section of



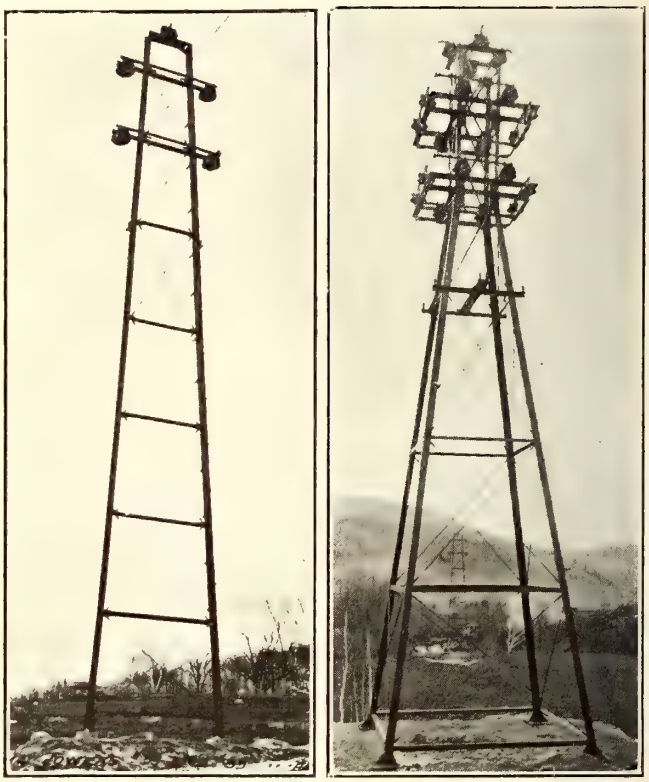
Hoosac Tunnel Power Station—Section Through West Portal Switch House

resistance. At the same time connections are made on the first relay whereby the operating current from the series transformer is passed through the second relay. When the second relay operates it cuts in the second section of resistance and also transfers the operating current to the third relay. The third relay cuts in the last section of resistance and transfers the operating current to the fourth relay, which controls the main circuit breaker. The effect of this arrangement is greatly to reduce the amount of current flowing at the instant that the main circuit breaker opens. An interval of about four seconds is required to cut in all the resistance and open the main circuit breaker. Entire dependence is not placed upon the operation of the relays and cutting in of the resistance, as the main circuit breakers have a time-limit device which is set for five seconds, and if the short circuit continues for that length of time they will open regardless of the operation of the relays and resistance switches. This plan is substantially the same method which has been developed as a result of experience and is now being successfully used for limiting the effects of short circuits at the Cos Cob power station of the New Haven Railroad.

On the second floor of the switch house are four buses from which the transmission line wires are taken off. The trolley bus and the ground bus are connected to the corresponding buses in the basement, while the power and control circuit buses are connected to the main power bus on the first floor. The power and trolley buses are connected to three sets of electrolytic lightning arresters arranged so that each circuit has two sets of arresters and horn gaps in series. The control bus is connected to a multigap lightning arrester. Hand-operated disconnecting switches are provided so that any one of the transmission wires can be connected to any desired busbar when an emergency arises.

TRANSMISSION LINES

The transmission line wires are carried out through the west wall of the switch house just under the roof. A terminal strain tower is built near the corner of the power station building, and from this point the transmission line



Hoosac Tunnel Power Station—Intermediate and Corner Towers of Transmission Line

extends to a switching house near the west portal of the tunnel, a distance of 2.42 miles. Four angles are turned by this line, which runs across country over the foothills of the Hoosac Mountains. The corner strain towers and terminal towers have four legs formed of heavy steel angles braced with diagonal rods and horizontal angle braces on all four sides. The legs of the towers are anchored to concrete foundations. The intermediate towers used for supporting the transmission line are of the A-frame flexible type. The average span between towers is 400 ft. The transmission line consists of five wires; two of these are No. 0000 cables for the trolley circuits, and a third, No. 0000 wire, is placed on top of the poles for the ground return circuit. The power and control circuits consist of two No. 2 wires. The insulators on the corner and terminal towers are supported on steel angle cross-arms by pins, but on the intermediate towers they are suspended from twin cross-arms. The insulators are of the same size and type as those used for supporting the catenary cables from the trolley bridges over the tracks. The transmission line towers were built by the Archbold-Brady Company, Syracuse, N. Y.

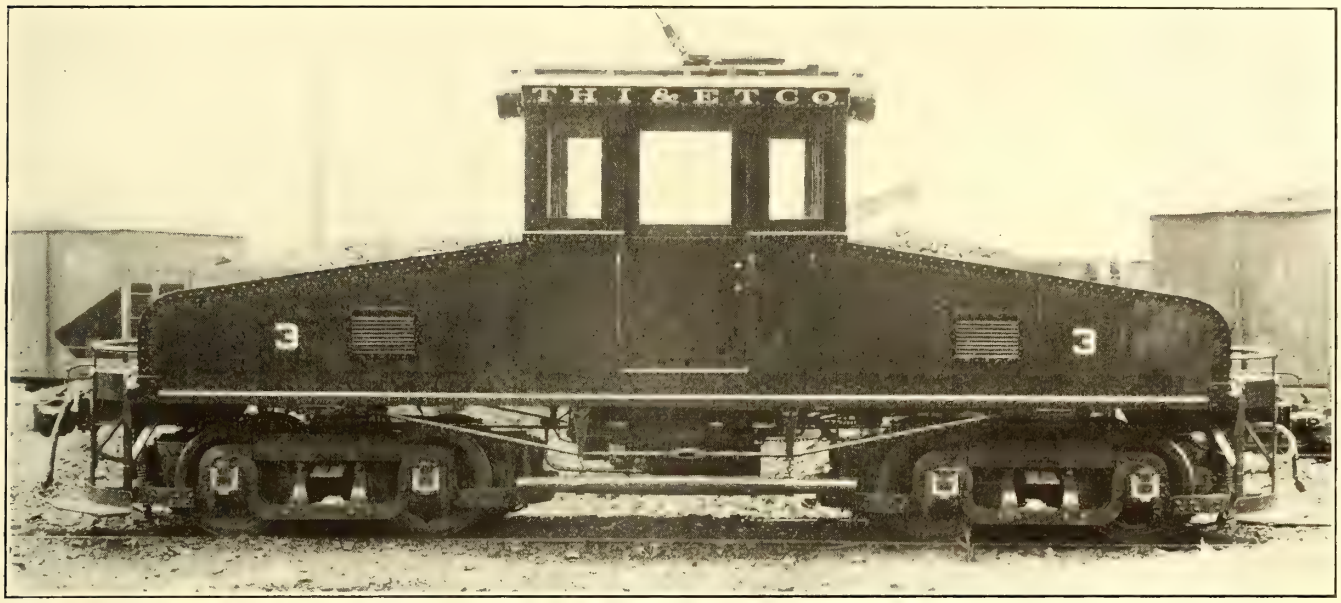
SWITCH HOUSES

The transmission line terminates at a switch house 17 ft. 8 in. x 23 ft. near the west portal of the tunnel. From this point the trolley sections are fed directly through six feeders taken off of the trolley bus. The power and control circuits are continued through this switch house and along the railroad right-of-way to the switch house adjoining the repair shop in North Adams. In the repair shop switch house a 60-kw transformer is connected to the trolley phase, the control circuit and the power circuit in such a way as to supply three-phase current at 440 volts for the shop motors. A third switch house has been built near the east portal of the tunnel for the purpose of installing suitable sectionalizing switches for controlling the track sections east of the tunnel. All of these switch houses are one-story brick buildings. The incoming transmission lines and feeder connections are supported on insulators carried on a framework of light steel angles, and the entrances of the wires are through the roof by means of insulated waterproof bushings.

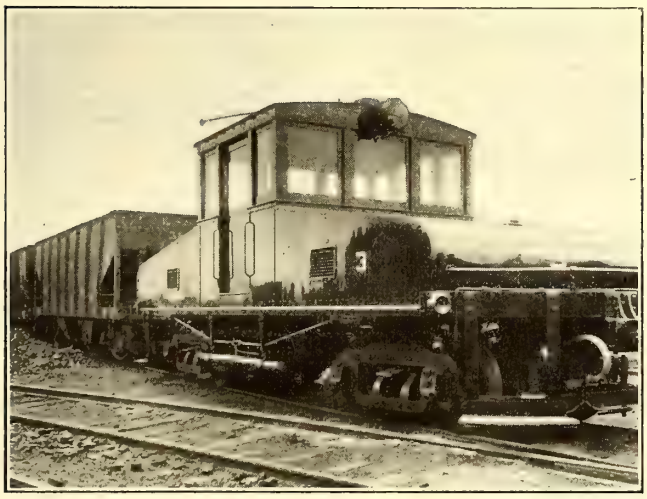
This power house was designed under the general direction of E. H. McHenry, vice-president in charge of engineering of the New York, New Haven & Hudson River Railroad. The general scheme of the electrical equipment was developed in the office of W. S. Murray, electrical engineer of the New Haven. L. B. Stilwell and H. S. Putnam, of New York, were the consulting and supervising engineers for the work. The general contractors for the installation of the transmission lines and the erection of the power house building and switch house buildings were F. T. Ley & Company, Inc., Springfield, Mass.

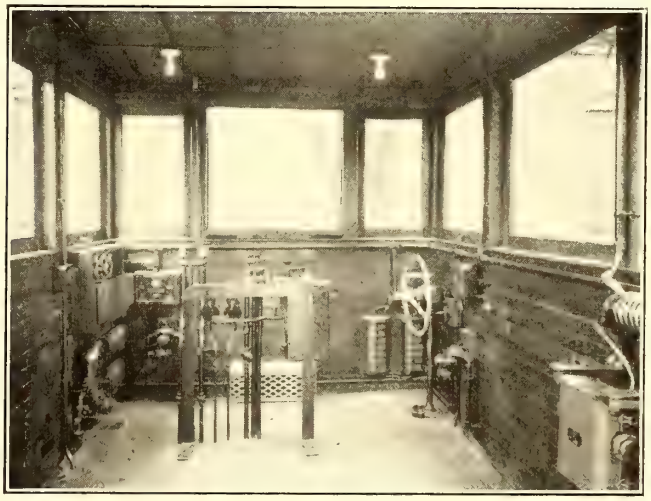
SWITCHING LOCOMOTIVE BUILT BY TERRE HAUTE, INDIANAPOLIS & EASTERN

A 30-ton, 240-hp electric switching locomotive has just been built by the Terre Haute, Indianapolis & Eastern Traction Company for handling coal and cinders to and from the large new turbine station which this company is now completing on West Tenth Street in Indianapolis. The coal-handling plant at this station includes a steel-and-concrete trestle, which is connected with nearby steam tracks so that coal may be discharged into a hopper at the side of the boiler house. Underneath the trestle is storage space for 10,000 tons of coal, which can be raised to the hopper economically by grab buckets. The new locomotive is designed to shift steam railroad coal cars to and from this trestle. It was designed and built under the supervision of L. M. Clark, master mechanic. Accompanying engravings show the interior and exterior appearance of this new locomotive.



Side View of Terre Haute, Indianapolis & Eastern Switching Locomotive





End and Interior Views of Terre Haute, Indianapolis and Eastern Switching Locomotive

The controlling dimensions of the locomotive are as follows:

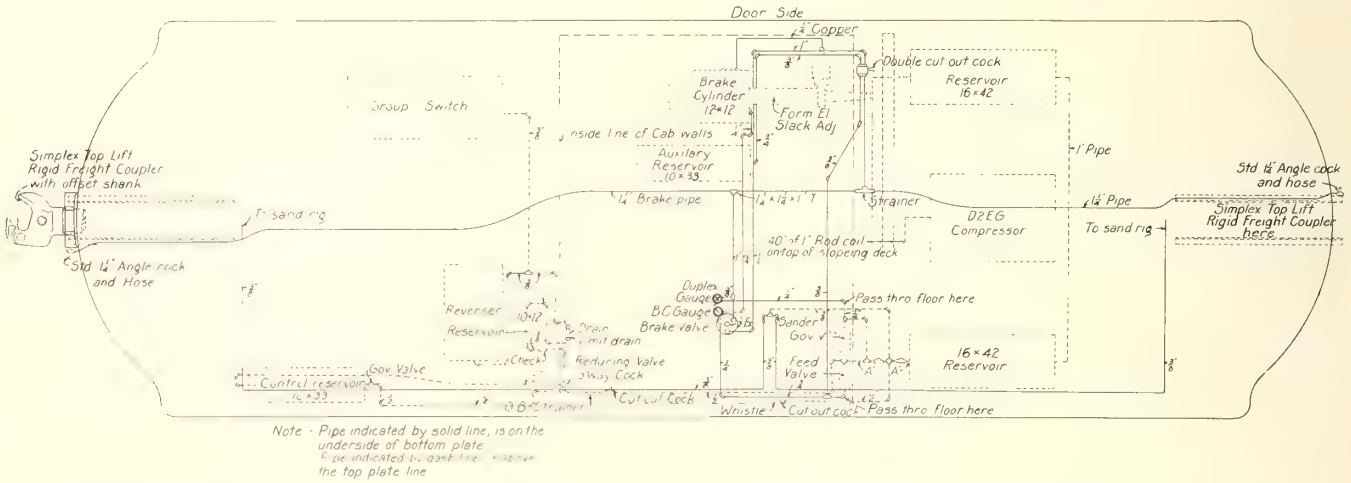
Length over buffers	30 ft.	0	in.
Length over cab	7 ft.	8	in.
Width over sheething	9 ft.	6	in.
Width over all (grab-handles)	10 ft.	0	in.
Height, trolley base to rail	12 ft.	3½	in.
Height, undersill to rail	3 ft.	7	in.
Bolster centers	17 ft.	6	in.
Total wheel base	22 ft.	4	in.
Rigid wheel base	4 ft.	10	in.

The locomotive body, which is of all-steel construction, is carried on eight through sills. The side sills are channel section and the intermediate sills are I-section. All eight sills are 7 in. high and weigh 20 lb. to the running foot. They are covered above and below by ¼-in. steel plate, thus forming a very rigid all-steel underframe structure with continuous members between bumpers. The superstructure is framed of 4-in. x 4-in. tees and angles, weighing 10.9 lb. to the foot. It is sheathed with ¼-in. plate.

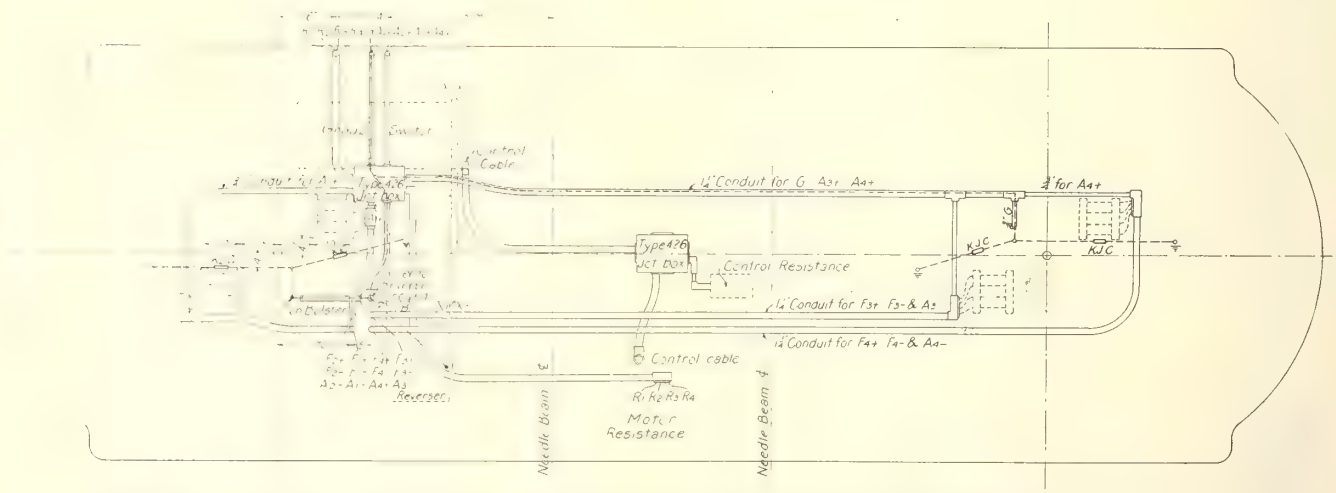
gear ratio of 16-71 and Westinghouse H. L. control; Westinghouse AMM air brakes with D 2-E G compressor and a 12-in. x 12-in. brake cylinder were installed. The couplers are of the rigid M. C.B. Simplex type, with offset shanks. Other special equipment includes General Electric luminous arc headlights, pneumatic sanders, Consolidated electric heaters, U. S. No. 10 trolley bases and Emery automatic brake-system lubricators. The locomotive complete weighs 60,880 lb. Accompanying line engravings show the arrangement of the brake and control air piping and the electrical conduit.

MEETING OF THE COMMITTEE ON STANDARDS

A meeting of the committee on standards of the American Electric Railway Association was held at the Association Headquarters, New York City, on Sept. 13. Those



Plan Showing Brake and Control Air Piping of Terre Haute, Indianapolis & Eastern Switching Locomotive



Plan Showing Conduit under Floor of Terre Haute, Indianapolis & Eastern Switching Locomotive

The body consists of a central cab over the middle of the underframe and two sloping decks which inclose the auxiliary equipment. Twelve-inch by eighteen-inch ventilators, two on each side, are provided to assure a circulation of air under the closed decks. The interior of the body is lined with wood up to the window rail. The steel roof has no lining.

The body is carried on two "Standard" 0-50 trucks with 34-in. solid steel wheels. The body bolsters are 10-in. M. C. B. type. The wheels are mounted on axles conforming to the American Electric Railway Association standards. The axles are 5 in. in diameter by 7 ft. ¼ in. in length, and have 4¼-in. x 8-in. journals. The motive-power equipment includes four Westinghouse 93 A-2 motors with

present were: Paul Winsor, chairman; Milan V. Ayres, Martin Schrieber, Charles Hewitt, L. P. Crecelius, F. G. Simmons, J. H. Hanna and H. H. Adams. The committee considered the various matters referred to it for action by last year's convention, which included the matter of rolled-steel wheels of light design for one wear, proposed standards for rolled-steel wheels, gage for mounting steel and chilled wheels, standard taper for pinions, specifications for wrought-iron bars and specifications for open-hearth steel rails. Recommendations were made in regard to these matters for submission to the coming convention. The proposed rules of procedure for the adoption of standards, which will be acted upon at the convention, were then explained by Chairman Winsor.

Conference of Governors of States

An Account Is Published of the Meeting on Wednesday, Sept. 13, When the Subject Discussed Was Employers' Liability and Workingmen's Compensation.

The third conference of governors of States was held at Spring Lake, Sept. 12 to 16, and two subjects were considered that have an interest to electric-railway companies. One of these dealt with workmen's compensation for injuries. The other subject was public-service regulation. An abstract of the discussion of the first-mentioned topic is given below, and a report will appear next week of the discussion on public-service regulation.

The conference convened on Tuesday, Sept. 12, at 11:30 a. m., Governor Francis E. McGovern (Wisconsin) being elected temporary chairman. Governor Wilson (New Jersey), in extending a welcome, expressed gratification that a meeting so important should take place in New Jersey. He stated that his conception of these conferences was that they were for the benefit of the States themselves and for those responsible for the State government, the purpose being to discuss those fundamental economic problems and social complexities which constitute the difficulties of American life and government. Governor Carey (Wyoming) responded to Governor Wilson's address of welcome. A committee of organization was then appointed, consisting of Governors Willson (Kentucky), Norris (Montana) and Bass (New Hampshire). There were nineteen governors present at the opening session.

The subjects discussed at the meeting on Tuesday, Sept. 12, were "Possibilities of the Governors' Conference" and "Strengthening the Power of the Executive." On the first subject there was an address by Governor Augustus E. Willson of Kentucky. The second subject was considered by Governor Edwin L. Norris of Montana and Governor Emmet O'Neal of Alabama.

The meeting on Wednesday, Sept. 13, was devoted entirely to a discussion of "Employers' Liability and Workingmen's Compensation." There were two addresses on this topic, one by Governor M. E. Hay of Washington and the other by Governor Eugene N. Foss of Massachusetts.

PAPER BY GOVERNOR HAY OF WASHINGTON

Governor M. E. Hay of Washington presented a paper giving details of a workmen's compensation act passed this year by the Legislature of his State. In introducing the paper Governor Hay denounced indemnity, casualty and liability companies as "fungoid social parasites." Out of the $600,000 collected from the employers of the State of Washington in 1909, only $100,000, he said, ever reached the injured workman or his family, $500,000 thus being withdrawn from the avenues of commerce and industry and transferred to the army of officers, agents, adjusters and stockholders of liability companies. He denounced the system of technical defense in indemnity suits which has grown up and been distorted by court precedent to the point where the recovery of damages becomes a mere question of skilled lawyers, sympathetic juries and luck. When Oregon abolished its technical defenses the indemnity companies raised the rates 400 per cent.

Governor Hay said that when the industrial conditions in Washington had become intolerable the Tacoma Chamber of Commerce called a meeting of the leading manufacturers and labor men of the State to discuss employers' liability and workmen's compensation for injury, and invited the Governor to preside during the conference. At this meeting, he said, it was apparent that employers and employees were united on the need of prompt, courageous remedial legislation as a means not only of providing for the widows, orphans and dependents of injured or deceased workmen, then largely a charge on society, but to bring together labor and capital, which, he said, the iniquitous methods of the casualty companies had driven further and further apart. As a result of this movement a commission of ten members was appointed to draft a workmen's compensation bill, which, with some amendment, was passed by the Legislature during the present year.

The new law applies only to extra-hazardous occupations, which are classified under forty-seven heads. One of these classes includes the construction of electric light and power plants, telegraph and telephone systems and electric railways. Three other classes cover respectively the operation of electric light and power plants, of street railways and of telegraph and telephone systems. The Governor in his address cited as a notable example of the spirit in which employers are accepting the act the cases of the Seattle, Tacoma, Bellingham and Everett street railway, lighting, power, telephone and telegraph companies, which are not only voluntarily segregating their pay rolls into hazardous and non-hazardous classes, but are taking advantage of the "elective-adoption" feature of the law, whereby the employer and employees may jointly agree to place themselves under the provisions of the act, even though their work is not hazardous in any degree.

The fund for the payment of compensation is obtained by assessing the employer a sum equal to a definite percentage of his total pay roll for a year. The percentages are different for each of the forty-seven classes, and each class of industry is assessed for the accidents occurring in that class and for no other. The rates are subject to readjustment depending upon the number of accidents and need for compensation of injured workmen. The first assessments are levied on the pay rolls of October, November and December of this year, and no further assessments will be made on any class, unless the accidents occurring in that class deplete its fund to a point when it is necessary to call for more money.

Injured workmen, their families or dependents are paid certain sums out of the fund, and cannot recover by law except where the injury is caused by intent of the employer, in which case the workman or his family may recover not only the sum due under the act, but may sue for any demand in excess of this sum. Where a workman is injured because an employer has neglected to observe the safeguards required by law or by the regulations of the department the employer must pay 50 per cent more than the fixed amounts. Where the workman injures himself intentionally he receives no benefit. No part of the premium can be deducted from the wages of the workman, the violation of this section by the employer being made a gross misdemeanor, punishable by one year in the county jail or a fine of $1,000, or both. The State provides for the administration of the law, and for this purpose sets aside $150,000, so that none of the money in the general fund is used for the expenses of the commission. The act enables the commission to raise the rate of a particular industry or firm which conducts its business in a notably careless or negligent manner, thus tending to compel a closer observance of factory laws and assist the work of the labor commissioner in the inspection of mills and manufacturing plants.

Governor Hay said that the wisdom of the classification of industries is already seen in a certain class pride, many industries making a concerted effort to hold their casualties down and thus lower the net cost of carrying insurance. The lumbermen, for example, are considering a system of private inspection to guard against negligence and accidents in their own class, thus preparing for a satisfactory annual adjustment, such as is provided for by law, and a possible

reduction of their rate by the next Legislature to be elected.

The schedule of payments for various injuries is as follows: First, in case of death, the expenses of burial, $75. Payment to widow or invalid widower of $20 per month while unmarried, or $240 in a lump sum on remarriage of widow. For each surviving child under sixteen, $5 per month, the whole monthly payment being limited to $35. If no widow or widower survives, $10 a month to each child under sixteen, the same rule applying to children who become orphans by death of the surviving parent, with a monthly limit of $35. Dependents get 50 per cent of the average monthly support formerly received from the deceased workman, limited to $20 per month. The parents of deceased unmarried workmen receive $20 per month up to the time the deceased would have been twenty-one years old. When totally disabled, which disability is specifically defined in the act, the payment is $20 a month if unmarried; if supporting a wife or invalid husband $25, or if the husband is not an invalid $15; for each child under sixteen an additional $5 a month up to a total of $35. In case of death of the totally disabled workman the widow or widower receives $20 a month until death or remarriage and $5 per month additional for each child under sixteen; orphaned children receive $10 a month. When partially disabled as defined in the act a workman receives a certain cash lump sum up to $500. The parents of an injured workman under twenty-one and unmarried also receive 10 per cent of the amount awarded the injured minor. If the injured workman resides or moves out of the state the commission may lump the monthly payments into one sum not to exceed $4,000, as based on the American mortality table.

PAPER BY GOVERNOR FOSS OF MASSACHUSETTS

Governor Foss said that workingmen's compensation is essentially a business subject, and as such it ought to be brought to a uniform level throughout the United States. In his inaugural message he urged on the Massachusetts Legislature immediate and equitable legislation on the subject, setting forth that the criterion of such a law must be definite, certain and speedy adjustment of all claims, so that they may be discounted alike by capital and by labor, and that the results of such a law should not be measured merely by financial considerations, but by the better relations which will be brought about between the employer and employees. Hs also urged that it was not sufficient to say in answer that Massachusetts had a just law, giving compensation to an injured workman at once and without the necessity of a lawsuit. Referring to the desirability of uniformity of state legislation on the subject, he said that at present the award of compensation for industrial injury might be acceptable to the highest court in Massachusetts and yet be declared unconstitutional in New York State. While, he said, we like to think of our States and our country as the home of popular rights, yet in this matter of simple justice to workmen it is painful to realize that almost all of the rest of the industrial world has abandoned the old principles of employers' liability in favor of the broader and more liberal spirit of workmen's compensation.

The federal government five years ago applied the principle of automatic compensation for injuries to workmen in its employ on the Philippine Islands, and three years ago this was followed by a similar law protecting all workmen working in government arsenals, navy yards, fortifications and other hazardous employment under federal jurisdiction. Later, protection was extended to federal employees working in the Panama Canal zone, and legislation is now pending which will include a still larger number of men and women employed by the federal government.

Governor Foss then took up the discussion of the recent Massachusetts law on the subject, which, he said, had been sanctioned by the Supreme Court as constitutional. The law will not go into full effect until July, 1912, thus giving employers an opportunity to study its provisions and to meet them. As originally drafted the bill eliminated the private insurance companies and substituted a state insurance association, the purpose being to do away with the great loss both to employers and employees through the large profits made by these companies. This could not, however, be achieved, the insurance companies being strong enough in the Legislature to defeat the provision. The law as it stands permits a corporation to insure itself against accident casualty in any of the established liability companies or in a specially created state association. The act establishes a mutual liability insurance company, which has fifteen directors appointed by the Governor. Any employer may become a subscriber, and each subscriber is entitled to one vote, with another vote for each additional 500 employees, up to twenty votes. It is not, however, of fundamental consequence in the act how the employer shall insure himself, provided always that he makes suitable provision for the payment in full of all compensation which may be due from him to his injured workmen.

The law does away with the defenses of negligence on the part of the injured employee or fellow employee and with the assumption that he assumed the risk of injury as a condition of employment. The schedule of compensation provided is as follows: For two weeks after an injury a workman is entitled only to receive medical and hospital services; in case of death the dependents, if any, are to receive a sum equal to one-half of his weekly wages, extending over 300 weeks, the maximum being $3,000, the compensation being less when there are only partial dependents; in case of total incapacity the payment is up to a maximum of $3,000, figured at one-half of the average wages for 500 weeks; in the case of partial incapacity a similar schedule holds, with a maximum of 300 weeks. For certain specified serious injuries, as, for example, the loss of both eyes or both hands, an additional compensation up to $1,000 is paid. There is no compensation if the injury results from the workman's seriously wilful misconduct; and if the injury results from the seriously wilful misconduct of the employer the nominal compensation is arbitrarily doubled. An employee has no right under the act to recover damages by common law unless he gives the employer notice in writing that he claims such a right, and even in this case the claim may be subsequently waived. A wife living with her husband, a husband living with a wife, a child or children under eighteen years of age or older, if physically or mentally incapacitated, are presumed to be totally dependent upon the injured party. If an injured employee refuses to submit to a physical examination by a physician or surgeon the right to compensation is suspended. No employee can waive his rights to compensation or enter into an agreement to that effect, and no payment made under the act is assignable, subject to attachment or liable in any way for debt.

For the administration of the act the Governor appoints an industrial accident board of three members, maintained by the commonwealth. Claims for compensation, if agreed upon by the employer and employees, are filed with this board, and if approved by it the agreement becomes enforceable as equivalent to a decree of the Superior Court. In cases where the employer and the injured employee fail to agree the board calls for a committee of arbitration of three members, one a member of the board and two named respectively by the injured workman and by the employer or the association which represents the latter. This committee investigates the case and its decision is enforceable as equivalent to a decree of the Superior Court. If, however, the findings of the committee are not satisfactory to both parties, then the board itself must pass upon the case. If a case brought before the board is found not to rest upon reasonable grounds the whole cost of the proceedings is assessed upon the party who brought or defended the action.

Governor Foss laid stress upon the fact that the Massachusetts law provides for payment of claims to relatives who are non-residents. In twenty-two States such relatives

are compelled to enter suit for the purpose of establishing their claim, with the result that many employees actually prefer to hire foreign workmen for the reason that if these men are killed the non-resident families cannot readily make an appeal for compensation. The attitude of the Massachusetts Supreme Court has been clear and fearless on this point.

Governor Foss referred to the past system of workmen's compensation as vicious for a number of reasons. An industrial accident, for example, instantly lines up the employer and employee as parties in a lawsuit, from which it is difficult to keep out a spirit of hostility. At present only one-half or less of the amount of money paid out by employers for compensation gets to the injured employee. For instance, 327 firms in New York State spent $192,538 in 1907 on account of accidents, legal expenses, etc., of which the injured workman received only $104,642. The casualty insurance companies during the years 1906 to 1908 took in premiums to the amount of $23,000,000 and disbursed in payment to injured men and their families only about $8,500,000. In the latter case there was thus a direct loss to the employer and to the employees and a tax on the industry of about $15,000,000 in three years through nine insurance companies.

The latter part of Governor Foss's paper was devoted to a discussion of the legality, ethics and economics of workmen's compensation laws. The conclusions were that such compensation was fully justified in the basic industrial law of costs; that it had excellent claims to recognition as a proper exercise of the general peace power of the State, which cuts through a good many personal rights in order to establish and maintain in general life, safety and order; that in its broad working such compensation would not increase but only distribute the total burden of payment for injuries and deaths, and that the only obstacle which impedes the establishment of workmen's compensation laws in all States uniformly is that an employer in any one industry can successfully oppose the imposition of any sort of tax which some neighboring industry does not share.

DISCUSSION.

Governor McGovern (Wisconsin) said that Wisconsin has now a law in operation similar to that of Massachusetts. It is, like that law, voluntary. The employers have shown a willingness to come within the operations of the law, as have the employees also. There is one important difference between the law in Wisconsin and that in Massachusetts. Wisconsin has by its industrial commission law conferred upon the Industrial Commission not only the administration of the compensation act, but the investigation of all conflicts between employers and employees. This whole matter of the legal relation, so far as the public is concerned, between the employer and employee has been turned over to the Industrial Commission. This commission has also within its jurisdiction free employment bureaus, factory inspection, truancy and the standardization of safety devices. He considered it as making for economy and efficient administration of the law to confer upon the same commission which determines industrial disputes the authority to inspect the factories, mines, etc., where these disputes arise, so that there may be uniformity in these matters throughout the State.

Governor Wilson (New Jersey) said that New Jersey has passed a law similar to the act already described by Governor Foss. The real difficulty, however, was that under the constitutional limits of the State of New Jersey the Legislature has no right to pass compulsory measures of this character. Hence the New Jersey law was not compulsory. What most interested him, therefore, was the discussion of this constitutional difficulty. The New Jersey act is divided mainly into two parts. The first part abolishes the common-law defenses. The second provides a scheme of compensation similar to that under the Massachusetts law. But, after all, he said, the trouble was with the indemnity companies. They had raised their rates in New Jersey in some cases 1000 per cent. He believed these companies to be singularly unwise and to be adopting an attitude which would ultimately compel the establishment of a system of State insurance. Without a system of State insurance it might happen that employers in a small way of business or small corporations would not be able to pay the indemnities, and the security afforded by the law would be extended only to those whose employers were solvent. New Jersey had therefore not protected all classes of workmen until it could be certain that claims of this sort should be paid whatever the circumstances. He could not say that all employers in the State had been inclined to meet the law halfway. Some had determined to test its validity.

Governor Hadley (Missouri) referred to the fact that the New York workmen's compensation act had been declared unconstitutional by the Court of Appeals of that State. He called the attention of the conference to the report of the law committee of the Civic Federation, which was in answer to the decision of the Court of Appeals. The argument was there made that the common law was not a "straitjacket"; that it was elastic and could be made to conform to meet particular classes of problems. He stated that of $95,000,000 contributed by the employers of the country to the indemnity companies only $40,000,000 had reached the pockets of the injured workmen. He also pointed out a fact which has been recognized for some time, that the lives lost and injuries sustained annually by workmen in the pursuit of their occupations exceed the number of killed and wounded in modern warfare between nations.

Governor Stubbs (Kansas) submitted an analysis of the Kansas law, quite different from the laws of Massachusetts or Washington. The act is voluntary in character and applies to hazardous industries, such as railways, mining, gas, explosive works, etc. Application of the act is made only to employers of more than fifteen persons. Employers might elect not to come within the provision of the act by written notice before the injury. Where the injury is caused by the individual negligence of the employer he has the right of choice between existing remedies and the compensation provided for in the act. The workman of a subcontractor may recover indemnity from the principal, who may in turn recover from the sub-contractor. The employers are not liable for compensation to the employee if the latter was drunk or if the injury was caused by a violation of the statutory regulation for injuries caused by the employee, or for any injury which did not disable him for at least two weeks from earning his wages. Governor Stubbs believed that the charge for workmen killed and injured in the interests of society should be borne by the respective classes of society. If a railroad has to pay for its plant, its machinery, it should, on the same principle, be made to pay for the life of the engineer killed in the railroad service.

Governor Harmon (Ohio) said that the feature in which the Ohio law differed from the other compensation laws was that the law made no classifications, but left the classification to the commission appointed to administer the law. It was thought that the commission could from the results of its investigations make a better classification than could the General Assembly. It seemed to be the general desire in Ohio to make the law a success, and there had been no threat of interfering with its operation except from the indemnity companies.

PROGRAM FOR LATER MEETINGS.

On Thursday, Sept. 14, the two subjects discussed were "The Inheritance Tax and State Comity" and "The Right of the State to Fix Intrastate Traffic Rates." On Friday, Sept. 15, the program arranged for a consideration of "State Control of Public Utilities." There were to be addresses by Governor McGovern, of Wisconsin, and Governor Carroll, of Iowa. On Sept. 16 the subject for consideration was "Problems of Prison Labor."

HEARING ON TRANSFERS IN NEW YORK

The hearing on transfers in the Borough of Manhattan, New York, was continued on Sept. 13, 1911, before Commissioners Eustis, McCarroll, Willcox and Maltbie, of the Public Service Commission of the First District, being confined to testimony in regard to the Third Avenue Railroad and the other companies of which F. W. Whitridge is receiver. John Flint, of West & Flint, testified as to the receipts from passengers and the number of transfers received by the Third Avenue Railroad and other companies before and after the receivership. He offered in evidence the following statement of revenue and transfer passengers carried by the Third Avenue Railroad, including the Kingsbridge line, for the ten years ended June 30, 1911:

THIRD AVENUE RAILROAD (INCLUDING KINGSBRIDGE), PASSENGERS CARRIED FOR TEN YEARS ENDED JUNE 30, 1911.

Year ended June 30	Number of Passengers Carried— Revenue.	Transfer.	Total.
1902	45,818,161	7,080,312	52,898,473
1903	45,512,271	6,573,424	52,085,695
1904	46,123,799	11,880,289	58,004,088
1905	46,867,961	15,019,314	61,887,275
1906	47,909,290	15,652,526	63,561,816
1907	44,175,860	16,911,787	61,087,647
1908	43,163,510	15,706,950	58,870,460
1909	45,115,175	5,772,237	50,887,412
1910	48,678,914	7,523,165	56,202,079
1911	50,728,964	8,804,784	59,533,748

W. D. Guthrie, of counsel for the Third Avenue Railroad, and counsel for the commission agreed for convenience to accept statements of franchises owned and other specified data from the case of the reorganization of the Third Avenue Railroad, which was heard some time ago before the commission.

Edward A. Maher, general manager of the Third Avenue Railroad, said that the companies of which Mr. Whitridge acted as receiver were operated separately. He described briefly the routes of the properties. They are principally north and south lines. Mr. Maher said that the Third Avenue Railroad operated underneath an elevated railroad and was paralleled on the west by the Lexington Avenue and the Madison Avenue lines of the Metropolitan Street Railway and on the east by the Second Avenue Railroad, the First Avenue Railroad and the Second Avenue elevated line of the Interborough Rapid Transit Company. The Third Avenue Railroad would also have to compete with the proposed subway on Lexington Avenue. The Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad was paralleled largely on the west side by the subway. Mr. Maher presented a statement showing points at which transfers are issued between the Third Avenue Railroad and lines of other companies. There were nine points at which transfers were being given by the company at the suggestion of the court because of the joint use of tracks.

The Third Avenue Railroad furnished the equipment for the Twenty-eighth and Twenty-ninth Streets Crosstown Railroad and operated that property under a verbal agreement with the receiver, Joseph Mayer, which provided for transfers between the two lines. This agreement could be terminated at any time. A plan of reorganization for the Twenty-eighth & Twenty-ninth Streets Crosstown Railroad was pending before the commission and the company had applied for leave to extend its lines to the Pennsylvania station at Thirty-third Street and Seventh Avenue. The future of the Twenty-eighth & Twenty-ninth Streets Crosstown Railroad depended largely on whether the company secured this franchise. The cross-town line now served as a feeder to the Third Avenue Railroad. On the Third Avenue Railroad a passenger could ride 15 miles for 5 cents; on the Forty-second Street, Manhattanville & St. Nicholas Avenue Railway a passenger could ride direct or by transfer 10½ miles; on the Dry Dock, East Broadway & Battery Railroad, which operates from the plaza in Brooklyn over the Williamsburg Bridge, a passenger could ride by transfer 15 miles.

Mr. Maher presented a statement prepared by him to show the schedule which would be required if transfers were restored at the points at which transfers were issued previous to 1908. This statement was based on the increase in population in New York, the probable increase in passengers and the probable increase in transfers judged by the record previous to abolition of transfers. He also testified in regard to the increase in the cost of living in New York, the increase in the wages of employees and the increase in the cost of material and supplies. Mr. Maher estimated the present purchasing power of the 5 cents paid by a passenger for a ride to be only 80 per cent as great as it was a decade ago.

On Sept. 14 Mr. Flint was called again and explained exhibits which counsel for the company had entered as part of the evidence.

Mr. Maher explained a reciprocal power arangement which the Third Avenue Railroad had with the Metropolitan Street Railway. He presented a table to show the expenditure made for betterments to cars since Mr. Whitridge had been receiver of the company. He described the system of transfers in use on the Union Railway in the Bronx, stating that the interests which control the Union Railway, the New York City Interborough Railway and several less important lines hoped eventually to consolidate the properties. The officers of the Third Avenue Railroad had gone over the transfer order of the commission with a view to complying with the directions contained therein calling for the restoration of transfers and had conferred with the officers of the Metropolitan Street Railway and the Second Avenue Railroad. The subject of the division of fares had been left open in the discussion, it being felt that this was a matter which could be determined only by the results shown in operation. It appeared that the length of haul was the proper basis for the division of fares. Mr. Maher suggested that if the ride began with a long haul, succeeded by a short and then a long haul, the first company should receive 4 cents, the second 2½ cents and the third 3½ cents, but if the long haul was in the middle, then the first company, which took the passenger for only a short distance, should receive 3 cents, the long-haul company 4½ cents and the third the remaining 2½ cents.

The hearing will be continued on Sept. 19, 1911.

REINFORCING POLES ON THE INDIANA UNION TRACTION LINES

The overhead department of the Indiana Union Traction Company, Anderson, Ind., this year is reinforcing about 1600 of its trolley poles. Last year about 700 poles were reinforced and during the late fall of 1909 similar work was done on 250 to 300 poles. The work is in charge of G. H. Kelsay, superintendent of power, who has supplied the following details with regard to the method used in carrying out the work.

An excavation to a depth of 24 in. to 28 in. is first made around the pole. The rot around its base is then shaved off, and a thorough application of creosote is given the pole from the bottom up to a height of 3 ft. or 4 ft. above the ground. For installing the concrete reinforcement thirty-six forms, 48 in. long and ranging in diameter from 18 in. to 24 in., are used. These are constructed of black sheet iron and are made in semi-circular halves. Semi-circular bands are riveted to the iron to hold the forms in shape, the edges of the forms being hinged together, thus permitting easy handling and assuring that halves of the same size are kept together. With thirty-six forms four men can be kept busy concreting.

A form of the size most nearly conforming to the size of the pole is laid around it, and inside this form is placed wire reinforcement consisting of 46-in. twelve-bar heavy wire fence, with No. 7 top and bottom wires, No. 9 intermediate horizontal wires and No. 9 vertical wires spaced

3 in. apart. This fencing is cut in lengths sufficient to encircle the pole and be embedded in the concrete just inside the forms. The form is then filled with concrete consisting of one part cement to five parts gravel and sand. The top is sloped off slightly to assist in shedding water from the top of the concrete and around the pole. The form is removed from the pole after about twenty-four to thirty-six hours. After the forms have been removed the dirt is tamped in around the concrete and the pole is coated with a heavy paint or pitch compound around the top of the concrete to eliminate as nearly as possible the entrance of moisture between the concrete form and the pole.

The reinforcement is being applied to 30-ft. and 40-ft. poles, although the latter size poles are thought to be good for a considerable length of time. The 30-ft. poles, however, are believed to be near the maximum limit of their life without some form of protection and therefore reinforcement, as described, has been applied.

REDUCTION OF NOISE BY NOVEL TRACK CONSTRUCTION

The elevated railways of Chicago operate a very large proportion of their trains around the Union Elevated Loop, which encircles the greater portion of the congested business district of Chicago. This loop has 2 miles of double track and during the hour of maximum train service handles about 150 trains, each of four or five cars. The trains of the Northwestern and Oak Park elevated roads use the outer track and operate in a clockwise direction: the trains of the Metropolitan and South Side elevated roads run counterclockwise on the inner loop track. Every train stops at eleven passenger stations and on account of the short headway and the interlockers at three corners of the loop a considerable number of additional stops are necessary. Thus the track structure has to withstand very severe operating conditions.

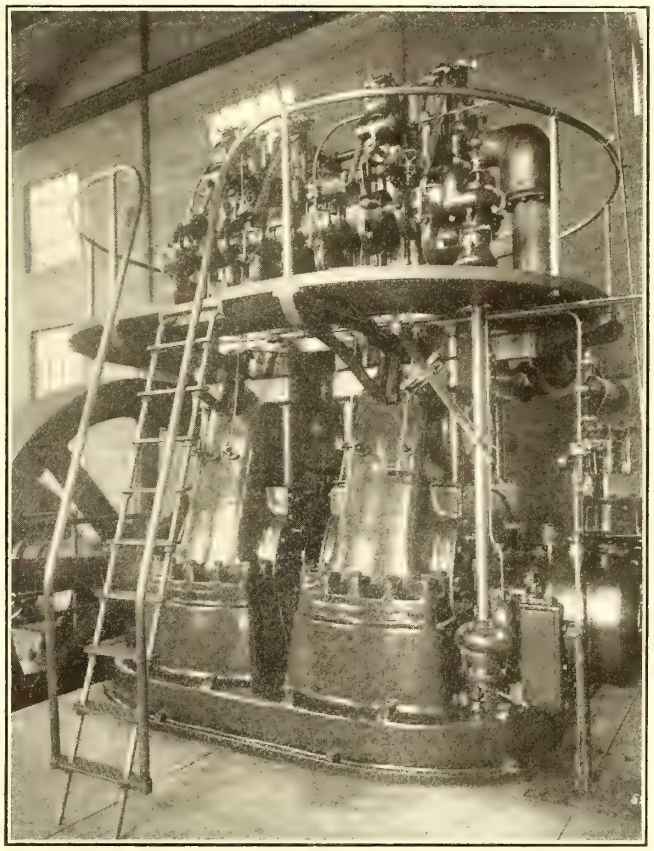
The rails on the Union Elevated Loop, except those at the curves, which are of manganese steel, are now being relaid and a special arrangement of ties and wedging is being installed with a view to reducing the noise. As now laid the rails are carried on tieplates and these rest on 6-in. x 8-in. x 8-ft. sawed ties, which are hook-bolted to the top flanges of the longitudinal girders of the elevated structure. The ties are held to the correct spacing by one 6-in. x 6-in. inside guard rail and one 6-in. x 9-in. outside guard rail for each running rail. The guard rails are bolted to the ties.

The present reconstruction plan includes renewal of the rails on the Wabash Avenue and Van Buren Street sides of the loop, thus covering 2 miles of track. The new rails are 90-lb. standard section in 60-ft. lengths joined by six-hole angle bars and electrically connected by bonds extending around the joints. At intervals of 200 ft. to 300 ft. the rails are being bonded to the steel elevated structure. Other changes in the method of laying the rails include the omission of tieplates, the spacing of ties 3 in. apart and the blocking of the opening between ties under the running and guard rails with wooden wedges. The omission of the tie plates and the use of 60-ft. rails in place of 30-ft. rails are expected to reduce the noise considerably. The spacing of ties only 3 in. apart and the insertion of wedges between the ties are designed to reduce tie-cutting and provide a solid wooden base underneath the rails, thus eliminating a portion of the noise. Screw spikes are being used. The wedges being used are 6 in. wide, 2 in. thick at one end and 1 in. at the other. They are placed on edge and their lower sides will rest on the tops of the longitudinal steel girders; the upper sides of the wedges will bear against the bottoms of the track rails and the inner and outer guard rails. Thus when a pair of wedges is driven home between two adjacent ties the wedges will not only rigidly block the ties in the desired position, but will give the rail a bearing surface over its full length. The placing of these wedges between ties and under the guard rails will serve with the ties and guard rails to form a trough surrounding the running rail on three sides. Later, if it is found desirable, this trough will be filled to the level of the head of the rail with some mastic compound designed to reduce the noise.

The major portion of this renewal work is being done between 9 p. m. and 5:30 a. m., as between these hours the minimum average headway between trains on each track is 90 seconds. The work is first being done on the outer track on Wabash Avenue. This particular section of track lies between two cross-overs and all trains are being run by the work on the inner track.

NEW CRUDE-OIL ENGINE

The Atlas Engine Works, Indianapolis, builders of steam engines and gasoline motors, have recently brought out a crude-oil engine of the Diesel type, which is built in vertical units with two, three or four cylinders and respectively of 300, 450 and 600 brake hp. The theoretical economy of



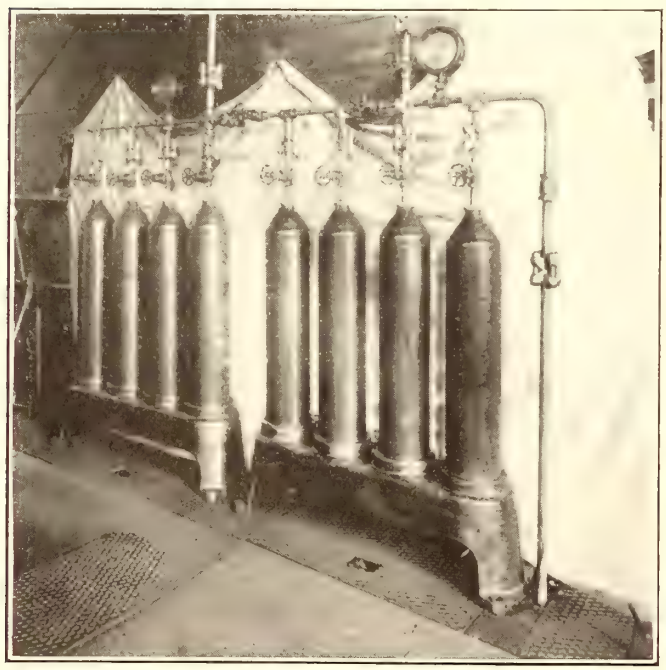
Crude-Oil Engine—Side View

the crude-oil engine is well known, but the Atlas works are prepared to guarantee that if the consumption of oil by one of their engines in directly connected electric service exceeds 12 gal. per 100 kw-hours at the switchboard, when the average load for the running period is not less than one-half full rated capacity at standard speed, they will pay a cash forfeit equal to five times the average cost of the excess fuel used during the year. They state that with oil at 2 cents per gallon the cost for fuel at full load should not exceed 2.1 mills per kw-hour. The thermal efficiency of the Atlas oil engine is estimated at 37½ per cent, its mechanical efficiency at 80 per cent and its total efficiency, based on brake horse-power developed at full load, at 30 per cent. Each brake horse-power, therefore,

requires 8483 b.t.u., and as each pound of fuel oil contains about 19,000 b.t.u., and as there are about 7.3 lb. of oil per gallon, there should be a consumption of about 61.65 gal. of oil per ten-hour day for 100 brake hp. For purposes of comparison it might be said that the thermodynamic efficiency of a simple non-condensing engine with boilers has been estimated at about 6 per cent, of the compound condensing engine at 9 per cent and of triple-expansion engines or steam turbine, units in large sizes with economical equipment, at from 17 per cent to 20 per cent.

The Atlas oil engine works on the four-stroke cycle. On the first downward stroke of the piston pure air only, not an explosive mixture, is drawn into the cylinder. On the first upward stroke this air is compressed into a small clearance space between the piston and the cylinder head. No combustible mixture exists in the cylinder during this stroke, and premature ignition or back firing is impossible. The compression of the air to 500 lb. pressure raises its temperature to about 1000 deg. Fahr., sufficient to ignite the small amount of a finely divided spray of oil, which is thoroughly mixed with a jet of air at about 900 lb. pressure, and is gradually introduced into the cylinder. About ½ cu. in. of oil is burned in each 21-in. x 30-in. cylinder during each working stroke, the exact quantity being regulated in proportion to the load by a single pump, the delivery of which is directly controlled by a governor. As will be seen, no ignition device is required. After the fuel valve closes the gases work expansively and the terminal pressure is but slightly in excess of that of the atmosphere. At the end of each working stroke the exhaust valve opens and the products of combustion are expelled on the second upward stroke, thus completing the cycle.

To start the engine compressed air at about 900 lb. pressure is used. This air is stored in a series of bottle reservoirs, shown in one of the engravings. The manipulation of a starting lever opens a valve which admits sufficient air from one section of the bottles to drive the piston of one cylinder during the first few revolutions. The heat

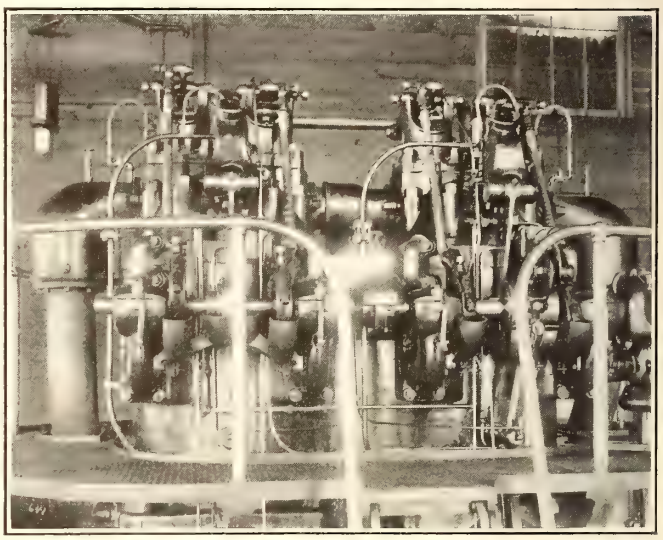


Crude-Oil Engine—Compressed-Air Storage Bottles

generated by the compression of air in the other cylinder or cylinders meanwhile ignites the oil that has been injected. Then the starting lever is thrown out of commission; this closes the air valve, and the cams operating the fuel-admission valves come into play simultaneously. The engine is ready for full load in less than a minute after the initial movement of the starting lever.

The governor is driven directly from the main shaft and is so graduated that less than ½ cu. in. of fuel oil is injected on any working stroke when full load is on and less amounts are used to suit momentary load conditions. The fuel injection pump is of the two-stage type. The speed can be controlled closely.

A regards maintenance, a two-cylinder 300-hp engine



Crude-Oil Engine—Showing Cylinder

was run continuously for one month and then run for a second month with a shut-down from Saturday midnight until Sunday midnight each week to determine whether the economy of the engine or its ability to start quickly would be affected if the parts were allowed to cool off and contract. No effect was noticed in these particulars and no adjustments were required other than those which any ordinary operator could effect. The piston, cylinder and valve mechanism were in as good a condition as at the beginning and there was no perceptible wear on any of the bearing surfaces, and no repairs were required.

During June of this year C. E. Sargent, consulting engineer, Chicago, made a series of tests of a two-cylinder Atlas engine directly connected to a 175-kw generator. The engine cylinders were 20-in. diameter by 30-in. stroke and the speed of the unit was 175 r.p.m. The compressed air for the injection and starting was furnished by a three-stage compresor, driven by a 25-hp motor. An analysis of the oil used showed that it had 19,149 b.t.u. per pound. Seven runs in all were made. The variation in speed between the lightest load and 25 per cent overload did not exceed 2 per cent. The results of four of the tests follow:

SUMMARY OF TESTS OF 300-HP. ATLAS ENGINE BY MR. C. F. SARGENT.

Date of run	6-21-11.	6-20-11.	6-21-11.	6-21-11.
Duration of test in hours	1.	3.	2.5	1.
Load in kw-hours by switchboard meter	67.	132.	200.4	249.
Kw to compressor by wattmeter	24.75	23.6	29.6	31.
Net e. h. p.	64.44	152.62	238.22	301.91
Transmission losses to compressor, 23.6 per cent	5.84	5.5	6.98	7.31
Net kw used by compressor	18.91	18.1	22.62	23.69
B.h.p. used by compressor	25.32	24.25	30.31	31.74
Net kw delivered to line	48.09	113.9	177.78	225.31
Net e.h.p.	64.44	152.62	238.22	301.91
Generator efficiency per cent, manufacturers' rating	87.	89.	91.	91.
Net b.h.p.	74.	171.4	261.7	331.7
Revolutions of engine per minute	174.7	173.13	172.9	171.
Fuel oil used, pounds per hour	50.	81.	120.4	167.
Pounds oil per kw-hour	1.04	.71	.68	.74
Gal. oil per 100 kw-hour	14.22	9.73	9.27	10.15
Pounds of oil per b.h.p.-hour	.67	.472	.46	.505
Gal. of oil per 100 b.h.p.-hours	9.18	6.47	6.3	6.9
B.t.u per b.h.p.-hour	12,829.	9038.	8808.	9632.
Thermal efficiency of engine, 2545 b.t.u. per b.h.p.	19.8	28.15	28.9	26.4
Fuel cost of 100 kw-hours in cents, oil at 2 cents per gal.	28.44	19.46	18.54	20.3

News of Electric Railways

Petition for Limited Ordinance Pending Final Settlement in Toledo

Fourteen prominent residents of Toledo, Ohio, have petitioned the City Council to pass an ordinance for a limited period to secure street railway service under a permanent status pending a final settlement of the differences between the company and the city. The petitioners propose a fare of seven tickets for 25 cents on routes on which franchises have expired. Charles S. Ashley, who was largely instrumental in preparing the petition, states that at the present time the company is carrying about 100,000 revenue passengers per day, and estimates that 65,000 of these passengers now pay 5 cents, while the remainder secure the lower fare by the purchase of tickets. He has presented the following statement:

65,000 passengers at 5 cents	$3,250
35,000 passengers at 4 1-6 cents	1,458
Total	$4,708
100,000 passengers at the rate of seven for 25 cents	3,571
Daily gain to Toledo	$1,137

The petition presented for the consideration of the Council follows:

"We, the undersigned citizens of Toledo, respectfully petition your honorable body to pass an ordinance requiring the Railways & Light Company to sell seven tickets for a quarter until the further action of the Council. We respectfully suggest that to save all legal question the ordinance be made to apply only to those streets where the franchises have expired, and that if accepted in writing by the company within three days of its taking legal effect, it shall be in lieu of the street rental provided by a former ordinance; the intention being that the rate provided shall continue for sufficient time for further negotiations looking to a more permanent settlement."

Trains from New York to the Atlantic City Convention

The Pennsylvania Railroad will run a special train, or special parlor cars if there is not a sufficient number of persons to justify a train, from New York to Atlantic City, on Saturday, Oct. 7, 1911, leaving New York from Pennsylvania Station, Seventh Avenue and Thirty-second Street, at 3:04 p. m.

The Central Railroad of New Jersey will arrange to provide special Pullman cars on all of its New York-Atlantic City trains, leaving New York on Oct. 7-10, inclusive, for the benefit of those attending the convention. If a sufficient number advise of their intention to use any one train, a special train composed exclusively of Pullman parlor cars will be operated for their accommodation.

The first-class one-way rate between New York and Atlantic City is $3.25, and the six months' excursion rate $5, but both companies will sell excursion tickets, good going Oct. 6-10, and returning to reach original starting point not later than Oct. 16, for $4.90. Tickets via Pennsylvania Railroad will be available for stop-off at Philadelphia within limit, at pleasure of the holder.

Questions of Paving and Operation in Kansas City

Ford Harvey, who is receiver of the Metropolitan Street Railway, Kansas City, Mo., with R. J. Dunham, returned to Kansas City recently after an absence of some time. Pressed for a statement in regard to the affairs of the company, more particularly the matter of paving and the question of the operation of cars of the company over the intercity viaduct, to which reference has been made previously in the ELECTRIC RAILWAY JOURNAL, Mr. Harvey said:

"Since my return I have talked at length with John M. Egan, president of the company, and with certain of the city officials, but I have had no opportunity to confer with Mr. Dunham. I understand the principal issues under discussion at present are the maintenance of paving and track, the car service and the inter-city viaduct.

"With respect to the paving, I feel that where the paving to be maintained or renewed by the company is not in perfect or good condition, and the city is paving that part of the street between the 18-in. line and the curbstone, the receivers of the company should arrange promptly to do their work. I am informed there are conditions on certain streets where the proposed new paving will require the raising or changing of the grades of the streets, in which tracks have previously been laid in accordance with the city's established grade, and that the change will necessitate very extensive expenditures by the receivers. Under the latter conditions the matter presents itself to me as a question of equity and responsibility, on which the court will probably have to determine. As to track conditions, I have just had submitted a complete report which covers the same in detail on every block in the city, with which I will familiarize myself fully as soon as possible. There have been some large expenditures in this direction within the past two years, and I can say these expenditures have not been curtailed up to the present time during the receivership.

"In regard to the car service, generally speaking, I have felt that car service in Kansas City compares favorably with that in other cities, but this is frankly stated as an impression rather than a conclusion. This is a question also that requires very careful study before attempting to interfere with the ideas of those who have had much greater experience in the handling of such affairs. The company's reports indicate they are handling on an average 350,000 a day; the business must be considered in its entirety.

"About the intercity viaduct, I was absent when this came up and it has been handled entirely by Mr. Dunham and Mr. Hagerman. As far as I can see, the company considered it was paying too much and the intercity viaduct not enough. The public is familiar with the situation."

Opinion on Jurisdiction of Ohio Commission

Timothy S. Hogan, Attorney General of Ohio, has rendered an opinion to the Public Service Commission of Ohio in which he holds that the jurisdiction of the commission in regard to extensions of street railway lines extends only to the operation or service on such lines, and that the commission is not empowered to compel street railways to extend their lines to reach new traffic or create new traffic. Mr. Hogan concludes his opinion in part as follows:

"It would appear at first glance that the act referred to, known as House Bill 325, would confer upon the Public Service Commission of Ohio power to order extensions to street railways. Your jurisdiction in my judgment is subject to limitations. I do not think that the act referred to requires the addition of a new line for the accommodation of what might be termed people outside the range of the original line. The Legislature unquestionably would have no power to order any street railway or railroad to extend its lines so as to reach out for new traffic, either freight or passenger. It has only the right to see that the street railway or railroad shall afford proper facilities between its terminal points.

"I have come to the conclusion that the jurisdiction of your commission goes only so far as relates to the operation or rendering of services by said public utility, and not to compelling said utility to extend its railroad to reach a new traffic or accommodating a new traffic. Section 30 provides that your commission has the right to compel utilities to make any additions thereto in order to promote the convenience or welfare of the public or of employees, or in order to secure adequate services or facilities. It seems clear that this means additions to the then existing system or utility, but not extensions. In other words, the jurisdiction of your commission is limited to repairs or improvements to the plant or equipment of any public utility, or additions in connecton thereto, all reasonably necessary to execute what could fairly be expected of public utility in the light of its charter and according to the principles of House Bill 325.

"In short, your jurisdiction is ample to compel any public utility to execute the purposes fairly declared by its own charter, but you are without jurisdiction to order any street railway to extend its line into new territory to accommodate an additional public. My holding, in conclusion, is that the Public Service Commission of Ohio is without jurisdiction to order the things petitioned for by the citizens referred to in your communication."

Bion J. Arnold to Report on San Francisco Traffic.—The Supervisors of San Francisco voted unanimously on Sept. 5, 1911, to retain Bion J. Arnold to study transit conditions in that city and report to them.

Experiment on St. Joseph Valley Railway.—The St. Joseph Valley Railway, La Grange, Ind., one of the first roads in the United States to place a gasoline-electric car in operation, has recently received another of these cars and has added it to the equipment already in service.

Los Angeles Assessments Reduced.—The State Board of Equalization of California has directed that assessments made by City Assessor Mallard of Los Angeles on the franchises of the Los Angeles Railway Corporation be reduced from $11,164,100 to $6,095,743; the Los Angeles Pacific Company, from $2,684,150 to $1,600,000; Los Angeles & Redondo Railway, from $1,509,825 to $1,000,000.

Bond Issue Authorized for San Francisco Municipal Railroad.—The clerk of the Board of Supervisors of San Francisco, Cal., has been directed to advertise the sale of $400,000 of municipal bonds in order to provide funds for erecting a power station and carhouse for the Geary Street, Park & Ocean Railroad, which the city is equipping for municipal operation. The Board of Public Works has been authorized to spend not more than $350,000 for cars.

Connecticut Public Utility Commission Organizes.—The Railroad Commission of Connecticut passed out of existence on Sept. 9, 1911, when the members composing it organized as the Public Utility Commission under the law recently passed by the General Assembly. After being sworn Richard T. Higgins, Winchester, was chosen as chairman. The other members are John H. Hale, Glastonbury, and Theodore B. Ford, New Haven. The Public Utility Commission is composed of two Democrats and one Republican.

Track Elevation in Chicago.—The Chicago & Oak Park Elevated Railroad, Chicago, Ill., has formally accepted the terms of the ordinance of the Oak Park Board regarding the elevation of tracks through the village. The ordinance providing for the elevation of the tracks of the road from Austin Avenue to Harlem Avenue, in Oak Park, was passed several months ago, and on Aug. 3, 1911, the company was given until Sept. 8, 1911, to accept. By the terms of the ordinance the company is given forty days in which to start the improvement.

Massachusetts Commssioner Investigates European Systems.—George W. Bishop, a member of the Massachusetts Railroad Commission, returned to Boston on Sept. 13, 1911, after an extended tour of Europe, during which he inspected various railway systems. The principal matters upon which he secured detailed information were electrification, wheelguards and fenders. The result of his investigations will be transmitted through the board to the next Legislature. Mr. Bishop's itinerary included Liverpool, London, Glasgow, Edinburgh, Newcastle and Paris. The Massachusetts Legislature has asked for information on the subject of fenders and wheelguards and the Railroad Commission proposes to give the matter further consideration before preparing its report.

Pittsburgh Subway Ordinance Drafted.—A new subway ordinance has been prepared by a special committee of City Council of Pittsburgh and will be submitted to the public service committee of that body. The measure is similar to the ordinance originally presented by the Pittsburgh Subway Company. The bill provides that any company may bid for the franchise, but before the franchise becomes effective the company obtaining the right must furnish Council with a plan of the subway, showing the location of stations and routes specified, together with a statement of the company's financial responsibility. If the plans and financial backing of the company do not meet with the approval of Council the franchise is to be null and void. Supervision of the construction of the subway is to be in the hands of a board of engineers, but it is proposed that the City Council shall retain authority over the board.

The Chicago Electrification Committee.—The Chicago Association of Commerce committee of investigation on smoke abatement and electrification of railway terminals is established at work. The committee is organized under the auspices of the Chicago Association of Commerce to investigate the practicability of electrification of the railroad terminals of Chicago, particularly with reference to smoke abatement. The committee is made up of business men, including a number of steam-railroad officials, and its chairman is Jesse Holdom, a lawyer and former judge. The railroads are defraying all the expenses of making the investigation, and the chief engineer retained by the committee is Horace G. Burt, former president of the Union Pacific Railroad and an engineer by profession. Assisting him are Louis H. Evans, terminal engineer; Hugh Pattison, electrical engineer, and Theodore H. Curtis, mechanical engineer. Mr. Evans was recently chief engineer of the Chicago Junction Railway; Mr. Pattison was connected with the electrification of the Pennsylvania Terminal, New York, and Mr. Curtis was superintendent of motive power and machinery for the Louisville & Nashville Railroad.

Personnel of Buffalo, Lockport & Rochester Railway.—Instead of naming a general manager to succeed J. M. Campbell with the Buffalo, Lockport & Rochester Railway, the management of the property has been turned over to the several departments that have charge of the various other roads in the Bebee system except that the Rochester men whose names appear in the following list are attached to the Buffalo, Lockport & Rochester Railway only: Transportation—J. H. Cain, Rochester, general superintendent. Maintenance of way and structures—T. H. Mather, Syracuse, chief engineer; W. A. Steckel, Syracuse, roadmaster; W. H. Snow, Rochester, superintendent of track. Maintenance of equipment—R. A. Dyer, Jr., Auburn, mechanical and electrical engineer; H. C. Prather, Rochester, superintendent of motive power. Traffic department—H. J. Clark, Syracuse, general traffic manager; L. J. Hoenig, Rochester, general passenger agent; A. J. Littlejohn, Syracuse, assistant to general traffic manager. Auditing department—W. W. Foster, Syracuse, assistant treasurer and general auditor; D. C. MacKenzie, Rochester, chief clerk. Legal department—William Nottingham, Syracuse, general counsel; H. C. Beatty, Skaneateles, secretary of the company; L. J. Hoenig, Rochester, claim agent. Tax department—H. D. Brewster, Syracuse, tax agent.

A Statement of Policy.—In the annual report of the Interborough Rapid Transit Company, New York, N. Y., an abstract of which is presented elsewhere in this issue, the company included a long explanatory statement of its negotiations for subway and elevated extensions with the city officials of New York, and gave its reasons for refusing both the subway and elevated extension propositions. In concluding its statement the company referred to its policy of betterments as follows: "Although all efforts upon the part of your company to procure the construction of new subways and elevated lines have been rejected by the public authorities, your company will still continue to carry out its policy of improving the service and of adding facilities to the present system to make it equal, as far as possible, to the ever-increasing traffic. The extent to which this policy has been carried on in the past will appear from the fact that during the last two years your company has paid out more than $8,000,000 for improvements, or $2,000,000 in excess of the amount paid out in dividends to stockholders during the same period. For the purpose of making travel in the subway as comfortable as possible under existing conditions, experimental fans were installed in fifty subway cars. Their use demonstrated that considerable relief could be afforded in this manner and that passengers could be made more comfortable. In consequence, authority was given to install fans in all of the express cars, a total of 3000 fans, this being the maximum number which could be installed during the summer, the cost of this installation amounting to approximately $104,000."

Financial and Corporate

New York Stock and Money Markets

September 13, 1911.

Trading this week has shown the same irregularity prevalent during the August decline. Prices have fluctuated widely, in many cases dropping to new low quotations for the year, followed by abrupt recovery. This was the condition in to-day's market, and stocks offered little resistance to bearish operations. The irregularity is due in a large measure to disturbing conditions abroad, and while it is expected that present negotiations will result in peaceful settlement of the Moroccan dispute, the influence of conditions on foreign exchanges is disturbing. There is still a large amount of funds available at present prices. Quotations to-day were: Call, 2¼ @ 2½ per cent; ninety days, 3½ per cent.

Other Markets

On Monday Chicago Railways, Series 1, sold three points under former quotations, and on Tuesday there were losses in nearly every active issue. Prices to-day were somewhat firmer, and a few slight gains were made.

Philadelphia Rapid Transit sold close to 22 on Monday, making a sudden recovery to 23 later in the day and closing at 22½. The market in Philadelphia is dull, and the list is showing a downward tendency.

Similar irregularity prevails on the Boston market, and in to-day's market there was a general falling off in prices.

There has been little activity on the Baltimore Exchange, and price changes have been unimportant.

	Sept. 6.	Sept. 13.
American Light & Traction Company (common)	a300	a300
American Light & Traction Company (preferred)	a106½	a107
American Railways Company	44¼	a44
Aurora, Elgin & Chicago Railroad (common)	a43	a43½
Aurora, Elgin & Chicago Railroad (preferred)	a87	a87
Boston Elevated Railway	a127½	a127½
Boston Suburban Electric Companies (common)	a18	a14
Boston Suburban Electric Companies (preferred)	a80	75
Boston & Worcester Electric Companies (common)	a13	a13
Boston & Worcester Electric Companies (preferred)	a56	a52
Brooklyn Rapid Transit Company	76¾	73
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	84	83¾
Capital Traction Company, Washington	a131	a130¾
Chicago City Railway	a190	a190
Chicago & Oak Park Elevated Railroad (common)	a3	a3
Chicago & Oak Park Elevated Railroad (preferred)	a5	a7
Chicago Railways, ptcptg., ctf. 1	a97	a97
Chicago Railways, ptcptg., ctf. 2	30¼	a30
Chicago Railways, ptcptg., ctf. 3	a11	a11¼
Chicago Railways, ptcptg., ctf. 4	a7	a7
Cincinnati Street Railway	*130	a132½
Columbus Railway (common)	*82	83
Cleveland Railway	a100¼	a101
Columbus Railway (preferred)	*95	95
Consolidated Traction of New Jersey	a76	a76
Consolidated Traction of N. J., 5 per cent bonds	a105	a104½
Dayton Street Railway (common)	a25	a25
Dayton Street Railway (preferred)	a101	a101
Detroit United Railway	a70	a70
General Electric Company	a153	149
Georgia Railway & Electric Company (common)	a161	a158
Georgia Railway & Electric Company (preferred)	92	a93
Interborough Metropolitan Company (common)	16	14⅛
Interborough Metropolitan Company (preferred)	45⅛	41⅜
Interborough Metropolitan Company (4½s)	80½	79
Kansas City Railway & Light Company (common)	a19	a19
Kansas City Railway & Light Company (preferred)	a44	a42
Manhattan Railway	a136½	134⅛
Massachusetts Electric Companies (common)	a19	18¼
Massachusetts Electric Companies (preferred)	a86½	a88
Metropolitan West Side, Chicago (common)	*27	*27
Metropolitan West Side, Chicago (preferred)	*75	*75
Metropolitan Street Railway, New York	15	15
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	70	65¾
Northern Ohio Light & Traction Company	*50½	58
Northwestern Elevated Railway (common)	*30	30
Northwestern Elevated Railroad (preferred)	*70	70
Philadelphia Company, Pittsburgh (common)	51	a51
Philadelphia Company, Pittsburgh (preferred)	42½	a42½
Philadelphia Rapid Transit Company	23	22¼
Philadelphia Traction Company	85½	a85⅜
Public Service Corporation, 5% col. notes (1913)	a94	*94
Public Service Corporation, ctfs.	a106½	a106
Seattle Electric Company (common)	a110	a109
Seattle Electric Company (preferred)	103	a105
South Side Elevated Railroad (Chicago)	95¼	*95¼
Third Avenue Railroad, New York	8¼	9
Toledo Railways & Light Company	a6½	a6½
Twin City Rapid Transit, Minneapolis (common)	a108½	a106
Union Traction Company, Philadelphia	51	a50
United Rys. & Electric Company (Baltimore)	a18	a17¾
United Rys. Inv. Co. (common)	a35	32
United Rys. Inv. Co. (preferred)	a65	57½
Washington Ry. & Electric Company (common)	a45	a43½
Washington Ry. & Electric Company (preferred)	a90	a89
West End Street Railway, Boston (common)	88	a86½
West End Street Railway, Boston (preferred)	100	a100½
Westinghouse Elec. & Mfg. Co.	66½	61½
Westinghouse Elec. & Mfg. Co. (1st pref.)	a120	a118

a Asked. *List sale.

ANNUAL REPORT

Annual Report Interborough Rapid Transit Company

Operations of the Interborough Rapid Transit Company of New York for the year ended June 30, 1911, showed the following results as compared with 1909 and 1910:

Year Ended June 30,	1909.	1910.	1911.
Gross operating revenue	$26,524,394	$28,987,648	$29,767,352
Operating expenses	10,747,443	11,013,143	12,368,982
Net operating revenue	$15,776,951	$17,974,505	$17,398,370
Taxes	1,799,807	1,750,422	1,925,090
Income from operation	$13,977,144	$16,224,083	$15,473,280
Non-operating income	1,001,775	411,024	339,915
Gross income	$14,978,919	$16,635,107	$15,813,195
Interest on bonds and three-year gold notes, rentals, sinking fund and amortization charges (including Manhattan guarantee)	10,389,096	10,552,960	10,673,158
Net corporate income	$4,589,823	$6,082,147	$5,140,037
Dividends	3,150,000	3,150,000	3,150,000
Surplus	$1,439,823	$2,932,147	$1,990,037
Per cent expenses to earnings	40.52	37.99	41.55
Passengers carried	514,680,342	562,788,395	578,154,088

The annual report contains a long statement by T. P. Shonts, the president, in which he says in part:

The results for the years 1910 and 1911 are stated in conformity with the rules of the uniform system of accounting adopted by the New York Public Service Commission, First District, and effective on July 1, 1909; those for 1909 are stated as nearly in accordance therewith as possible.

"Gross operating revenue for the year ended June 30, 1911, as compared with the previous year, increased $779,704 or 2.69 per cent, the result of a gain on the subway division of $420,700 or 3.02 per cent, and on the Manhattan Railway division of $359,003 or 2.38 per cent.

"Operating expenses increased $1,355,838 or 12.31 per cent, the result of an increase on the subway division of $1,173,203 or 24.66 per cent, and on the Manhattan Railway division of $182,635 or 2.92 per cent. This increase was largely due to the extraordinary expenditures resulting from changes in subway equipment, made necessary in connection with the operation of ten-car express and six-car local trains, amounting to approximately $770,000 during the year. The enlarged train service and the increase in wages of employees in the transportation departments of both divisions account for an additional $373,000.

"Net operating revenue decreased $576,134 or 3.20 per cent, the result of a loss in the subway division of $752,502 or 8.20 per cent, and a gain on the Manhattan Railway division of $176,368 or 2 per cent.

"The total amount of taxes increased $174,668 or 9.98 per cent, the result of an increase on the subway division of $43,157 or 19.16 per cent, and on the Manhattan Railway division of $131,510 or 8.62 per cent. This increase in subway division taxes is substantially the amount of the federal tax for the year; the increase in the taxes of the Manhattan Railway division is due to the federal tax and an increase in the real estate and special franchise assessments.

"Income from operation decreased $750,803 or 4.63 per cent, the result of a loss on the subway division of $795,660 or 8.89 per cent, and a gain on the Manhattan Railway division of $44,857 or 0.61 per cent.

"Non-operating income decreased $71,108 or 17.30 per cent, the result of a decrease on the subway division of $64,803 or 16.81 per cent, and on the Manhattan Railway division of $6,305 or 24.59 per cent. This decrease in non-operating income is principally due to the sale of the securities formerly constituting the Manhattan guarantee fund and the application of the proceeds thereof to the purchase of additional subway equipment.

"Gross income decreased $821,912 or 4.94 per cent, the result of a loss on the subway division of $860,464 or 9.21 per cent, and a gain on the Manhattan Railway division of $38,552 or 0.52 per cent.

"Total income deductions increased $120,198 or 1.14 per cent, the result of an increase on the subway division of $120,295 or 2.56 per cent, and a decrease on the Manhattan Railway division of $97.

"The net corporate income decreased $942,110 or 15.49 per cent, the result of a loss on the subway division of

$980,760 or 21.13 per cent, and a gain on the Manhattan Railway division of $38,649 or 2.68 per cent.

"The surplus over dividends of 9 per cent on the capital stock was $1,990,036 as compared with $2,932,147 in the preceding year, a decrease of $942,110 or 32.13 per cent.

"The percentage of operating expenses to gross operating revenue was 41.55 per cent as compared with 37.99 per cent last year, an increase of 3.56 per cent, the result of an increase on the subway division of 7.17 per cent, and on the Manhattan Railway division of 0.21 per cent.

"The total number of passengers carried was 578,154,088, as compared with 562,788,395 in the previous year, an increase of 15,365,693 or 2.73 per cent, the result of a gain on the subway division of 7,742,681 or 2.88 per cent, and on the Manhattan Railway division of 7,623,012 or 2.59 per cent.

"Every precaution and safeguard against fire has been rigorously enforced during the year. Your insurance rate has not been increased by the general advances in rates during the past year, owing to the fact that the insurance on all your properties was previously arranged under long-term contracts at a time when lower rates prevailed.

"The equipment of all subway express service cars with electrical synchronizing brake control added to the present type of pneumatic brakes and the substitution of new brake cylinders, as well as the installation of new drawbars and draft rigging so as to make them adaptable to the operation of ten-car express trains, have been completed. One hundred and nineteen of the local cars have also been equipped with these electrical brakes.

"The installation of the automatic coasting recorder, referred to in last year's report, on the cars of the Manhattan Elevated Railway division has not only resulted in the saving of power amounting to many times its cost, but has caused a more uniform handling of trains in and out of stations, effecting a saving in time and wear and tear on the machinery. It is now being istalled on the cars of the subway division, where it has already proved its efficiency.

"For the purpose of obtaining additional safety in the operation of trains in the subway, all danger signals located at curves and other danger points on the local tracks are being equipped with automatic stops. This installation will be made at an expense of approximately $50,000.

"The airbrake emergency valves in the elevated railway motor cars which were equipped with two separate pull ropes on the inside and one on the outside of each car and the trailer cars with one pull rope at each end, causing considerable loss of time in the operation of the valves when quick action was required, were equipped with emergency cord running the entire length of the car and out onto the platform, so that in cases of emergency the brakes could be applied from any point in the car. This change was made at a cost of $20,000.

"All of the Manhattan Railway division and subway cars were equipped with improved fire extinguishers.

"Collapsible shoes were installed on all center side doors in subway cars. This device consists of a mechanical cushion attached to the edge of the door and causes the door to rebound the instant it comes in contact with any obstruction, however slight. After the obstruction has been removed the door closes automatically.

"There was an increase in the general law expenses of your company for the year ended June 30, 1911, of $39,384, due principally to the amount paid associate counsel during 1911 for services rendered prior to that year in connection with Manhattan Railway Company franchise tax cases for the years 1906, 1907 and 1908; in the matter of allowances against the special franchise tax on account of the payment of 5 per cent tax on the Ninth Avenue elevated line net earnings and in connection with the proceedings to review the assessment for the tax on real estate of the Manhattan Railway Company. This increase was partially offset by a decrease in payments for accidents and damages, making the net increase in general expenses for the year $28,403.

"The claims of the Rapid Transit Subway Construction Company (all of the stock of which is owned by your company) against the city of New York, growing out of construction contract No. 1, aggregating over $6,000,000, and the counterclaims of the city of New York, aggregating over $3,000,000, were adjusted at an informal conference between counsel for the company and counsel for the city, held at Saratoga on Aug. 16-24, 1910, and the net sum due the company from the city was agreed to be fixed at $2,260,-354. This adjustment was approved by the directors of the company and by the Public Service Commission, and formally passed by the comptroller of the city. The matter is still held up in the comptroller's office, but it is hoped that favorable action will be taken in time to provide for the compromise payment in the next issue of municipal bonds.

"Aside from the improvements included in this report for the fiscal year ended June 30, 1911, your directors have, since that date, authorized the installation of center side doors in all of the subway cars comprising the local service at an expense of $530,500. This will complete the side-door equipment for the subway. We have also equipped 800 cars with 32-cp tungsten lamps in place of the 16-cp carbon lamps formerly in use. While these lamps give a much more brilliant light, they have only recently been perfected to better withstand vibration, and their installation is therefore more or less in the nature of an experiment.

"These and other improvements are in line with our policy of anticipating the necessities of the traveling public in so far as the limitations of the subway will permit. Undue congestion during the rush hours cannot, of course, be avoided, but constant efforts are being made to reduce the inconvenience and discomforts arising therefrom. The use of courtesy and consideration on the part of employees in their intercourse with passengers is a matter of great importance and to insure this a separate complaint bureau has been established, where criticisms and suggestions from the public are welcomed and receive prompt attention. Your management has also endeavored to add to the comfort of employees and to obtain a more pleasing effect by the substitution of white duck uniforms during the hot weather for the heavier blue uniforms previously used. These uniforms are furnished to the men without cost and the laundry expense is also assumed by your company.

"Claims, suits and judgments met in 1911 aggregated $184,070, a decrease of $30,508 or 14.3 per cent as compared with the previous year. Expenses in connection therewith amounted to $114,971, an increase of $8,029 or 7.5 per cent as compared with the fiscal year 1910. Mr. Shonts adds:

"During the year 111 personal injury actions were tried, resulting in verdicts aggregating $17,130. Of this amount $6,000 will be paid by the city of New York under the contract for lowering the Second Avenue elevated tracks for the Manhattan bridge approach. This leaves $11,130 against the company compared with $27,372 last year. The plaintiffs were unsuccessful in over two-thirds of the cases tried, and the average verdict recovered was $330 less than last year.

"The company was obliged to pay only $9,015 in judgments during the year and only $1,622 in judgments are pending on appeal, against $19,998 on appeal at the close of the last fiscal year.

"The company voluntarily settled 1620 claims without waiting for a suit to be brought, and compromised 180 suits before trial, and it is believed that this liberal policy, which has now been followed for several years, is one of the reasons for the favorable results of the cases tried. It is becoming pretty well understood in this community that this company will not permit a claim against it to go to trial unless it is either fraudulent or exorbitant.

"There has not been any increase in the volume of litigation out of proportion to the increase in the number of passengers carried. The passengers increased 15,365,693, but there were only thirteen more actions in the Supreme Court, although, as last year, there was an increase in the number of petty actions in the lower courts.

"The disbursements in payment of claims, suits and judgments amounted to 0.62 per cent and the expenses of the legal and claim departments were 0.38 per cent of the gross operating revenue, an aggregate of 1 per cent for the year and a decrease of $22,569.

"The appeal in the stockholders' action to enjoin the company and its directors from paying the federal excise tax on corporations imposed under the authority of the act of Congress passed in August, 1909, was, with the similar cases brought to test the constitutionality of that act, reargued before the United States Supreme Court in January of this year. The court apparently did not consider that the peculiar conditions under which this company operates the municipally owned subway were sufficient to distinguish

its case from others before the court, for the tax was upheld on the same broad general grounds as were assigned in the other test cases. The decision means an additional tax burden upon this company of approximately $61,000 a year.

"Last fall the New York Court of Appeals made its decision in the appeal involving the question as to the right of the comptroller of the State of New York to assess this company for the State franchise tax measured by a percentage upon subway earnings and upon dividends paid in excess of 4 per cent. The effect of the decision is somewhat different from that forecast by the decision of the Appellate Division of the Supreme Court, referred to in the last annual report, since the Court of Appeals held that the company had been wrongfully assessed with respect to its subway earnings under a section which related only to street surface or elevated railroad companies. The court did not decide finally that the company was not subject to any general franchise tax on its corporate existence with respect to its subway earnings, but left that matter for later determination. The practical effect of the decision means a cancellation and credit to the company of taxes already paid to the amount of $134,933 and a saving in future of between $50,000 and $60,000 a year.

"In another test case, involving the question as to the taxable status of power house, substation sites, buildings and machinery, the New York Court of Appeals has recently decided that the exemption from taxation given to the subway operator by the provisions of the rapid transit act is not broad enough to include the power house and substation sites and buildings, but that the machinery is not taxable. The decision with respect to the buildings was not contemplated and has necessitated the paying of taxes which have accrued since the opening of the subway, amounting to about $475,000. The decision means an increase in future taxes amounting to approximately $60,000 a year.

"After the city authorities rejected the subway overtures of this company they prepared and submitted to this company, without further conferences with this company, two certificates, one for building certain elevated extensions in the Bronx and one for completing the third track upon the elevated lines. An examination of these certificates, however, has shown that it is impossible for this company or the Manhattan Railway to accept them. Practically all the objectionable features to the third-tracking certificates have been retained, and other objectionable features have been added. The company under the terms of the certificates now tendered cannot treat the necessary expense of financing as a part of cost, and the cost of financing would thus fall as a total loss upon the company in the event that the city, under the recapture provision, should take back the new lines after ten years. The equipment likewise might be taken over at an obsolescent valuation, thus entailing a tremendous loss upon the company in that regard. The company is likewise asked to leave to the Public Service Commission the power to prescribe service and facilities and to reduce the 5-cent fare if, in its discretion, it deems that rate unreasonable. Such deferred maintenance charges as the commission might hold to exist may be required to be taken up. In these franchises the company is asked to pay in effect one-half of all increased future profits, not only from property covered by the new franchises but from the old elevated system as well, and at the end of twenty-five years, if the certificates be renewed, the company is required to pay as a minimum a sum equal to 130 per cent of all future profits in excess of the average profits for the last two years.

"Although all efforts upon the part of your company to procure the construction of new subways and elevated lines have been rejected by the public authorities, your company will still continue to carry out its policy of improving the service and of adding facilities to the present system to make it equal, as far as possible, to the ever-increasing traffic. The extent to which this policy has been carried on in the past will appear from the fact that during the last two years your company has paid out over $8,000,000 for improvements, or $2,000,000 in excess of the amount paid out in dividends to stockholders during the same period. The time has doubtless come when these stockholders are entitled to some increased distribution. Notwithstanding these large expenditures it is manifest that the present system of itself cannot through improvement of service and facilities alone provide for the constantly increasing stream of travel on the island of Manhattan. The only practical relief seems to be in carrying out the original policy of completing the subway H, making through trunk lines upon both the east and west side. Toward the construction and operation of these natural extensions this company should always stand ready to co-operate with the public authorities to the best of its ability and to the limit of its financial resources."

Reports of New York City Companies for Quarter

The accompanying statement showing the principal figures of operation of the large street railway companies in Brooklyn and Manhattan, for the quarter ended March 31, 1911, has been prepared from the summary of the reports made public by the Public Service Commission of the First District of New York. Included in the grand total are the returns of all companies reporting, including a number whose detail figures are not given in the table published herewith.

Company.	Total Revenue, Car Miles.	Number of Fare Passengers.	Revenue from Transportation.	Total St. Ry. Operating Revenue,	Total Operating Expenses.	Street Railway Taxes.	‡Total Gross Income.	Total Deductions.	Net Corporate Income.
Hudson and Manhattan..	1,845,355	14,245,912	$712,295.60	$758,327.16	$318,150.54	*$45,902.11	$611,835.20	$630,783.65	†$18,948.45
Interborough Rapid Transit—									
Subway Division.....	15,157,032	76,807,734	3,838,779.74	3,980,311.83	1,576,581.79	74,359.16	.....	.....	.....
Elevated Division.....	17,009,614	75,423,586	3,776,287.89	3,855,894.67	1,663,673.18	395,371.89	4,203,433.54	2,652,431.11	1,551,002.43
B'klyn Rapid Tran. Co.'s..	19,411,791	99,575,561	4,982,239.94	5,142,746.18	3,402,312.62	317,760.18	1,528,055.67	1,571,148.21	†43,092.54
Metropolitan St., Receivers.	9,268,572	61,993,702	3,068,523.51	3,194,142.66	2,104,918.40	329,508.53	812,159.84	651,249.16	160,910.68
Third Ave., Receiver.....	1,579,711	11,304,114	565,205.70	841,261.72	417,050.78	66,959.02	357,251.92	97,552.61	259,699.31
Union, Receiver.....	2,266,183	9,320,190	467,106.53	487,081.84	393,613.33	24,941.09	68,715.23	52,943.53	15,771.70
Coney Island and B'klyn..	1,266,826	6,010,787	291,864.74	294.164.99	203,511.19	22,207.36	76,933.66	81,564.77	†4,631.11
Total	75,205,369	388,297,792	$19,367,722.37	$20,292,730.53	$11,675,490.52	$1,369,510.82	$7,761,234.65	$6,053,893.48	$1,707,341.17

*On capital employed in operation. †Deficit. ‡Includes income from other sources.

Binghamton (N. Y.) Railway.—The directors of the Binghamton Railway have declared an annual dividend of 3 per cent on the $978,649 of stock, payable on Sept. 15, 1911. This dividend compares with 2½ per cent paid from 1906 to 1910.

Chicago & Oak Park Elevated Railway, Chicago, Ill.—W. A. Fox, treasurer of the Commonwealth-Edison Company, has been elected a director of the Chicago & Oak Park Elevated Railway to succeed Redmond D. Stephen, resigned.

Duluth-Superior Traction Company, Duluth, Minn.—F. H. Deacon, Toronto, has been elected a director of the Duluth-Superior Traction Company to succeed Rodolphe Forget, Montreal, resigned.

Evansville (Ind.) Railways.—The Illinois Central Railway has leased its line between Henderson, Ky., and Evansville, Ind., to the Evansville, Henderson & Owensboro Railway, which is controlled by the Evansville Railways. This line is to be electrified and connected at Evansville with the Evansville Railways and at Henderson with the lines of the Henderson Traction Company, which are now operated by the interests in control of the Evansville Railways.

Fargo & Moorhead Street Railway, Fargo, N. D.—H. M. Byllesby & Company, Chicago, Ill., are reported to have

purchased the property of the Fargo & Moorhead Street Railway.

Northwestern Elevated Railroad, Chicago, Ill.—The Northwestern Elevated Railroad has filed a new mortgage for $25,000,000 to the Illinois Trust & Savings Bank, Chicago, as trustee. The bonds will be used as collateral for the three-year 5 per cent notes of the Chicago Elevated Railways.

Pacific Electric Railway, Los Angeles, Cal.—The Pacific Electric Railway has been incorporated in California with an authorized capital stock of $100,000,000, divided into 1,000,000 shares of a par value of $100 each, to merge the interurban lines of the following subsidiaries of the Southern Pacific Company: Pacific Electric Railway, Los Angeles-Pacific Company, Los Angeles & Redondo Railway, Los Angeles Interurban Railway, Riverside & Arlington Railway, San Bernardino Valley Traction Company, Redlands Central Railway and San Bernardino Interurban Railway. The incorporators of the company are: William F. Herrin, R. C. Gillis, W. C. Martin, Epes Randolph and Paul Shoup.

San Francisco, Vallejo & Napa Valley Railway, Napa, Cal.—The property of the San Francisco, Vallejo & Napa Valley Railway will be sold under foreclosure on Oct. 30, 1911, at San Francisco as a result of an action brought against the company by the Mercantile Trust Company, San Francisco, Cal., on account of default by the railway in the payment of interest due in June, 1911, on its bonds.

Wilmington (Del.) City Railway.—The Wilmington City Railway, the property of which is leased to the Wilmington & Philadelphia Traction Company and the entire capital stock of which is owned by the Wilmington & Chester Traction Company, has sold to a syndicate headed by Scott & Company, Wilmington, Del., bankers, an issue of $600,000 of 5 per cent bonds, maturing in 1951, in order to refund the $600,000 of first mortgage 4 per cent bonds due on Sept. 1, 1911.

Dividends Declared

Cleveland (Ohio) Railway, quarterly, 1½ per cent.

Duluth-Superior Traction Company, Duluth, Minn., quarterly, 1 per cent, preferred; quarterly, 1¼ per cent, common.

El Paso (Tex.) Electric Company, 2½ per cent, common.

Frankford & Southwark Passenger Railway, Philadelphia, Pa., $4.50.

Galveston-Houston Electric Company, Galveston, Tex., 3 per cent, preferred; 1½ per cent, common.

Houghton County Traction Company, Houghton, Mich., 3 per cent, preferred; 2½ per cent, common.

Philadelphia (Pa.) Traction Company, $2.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., quarterly, 1¾ per cent, preferred.

Tri-City Railway & Light Company, Davenport, Ia., quarterly, 1½ per cent, preferred.

Twin City Rapid Transit Company, Minneapolis, Minn., quarterly, 1¾ per cent, preferred; quarterly, 1½ per cent, common.

United Traction & Electric Company, Providence, R. I., quarterly, 1¼ per cent.

MONTHLY ELECTRIC RAILWAY EARNINGS

AURORA, ELGIN & CHICAGO RAILROAD.

Period.		Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1 m., July,	'11.....	$186,271	$91,538	$94,733	$36,475	$58,258
1 " "	'10.....	182,387	87,612	94,775	32,569	62,206

LAKE SHORE ELECTRIC RAILWAY.

1 m., July,	'11.....	$135,300	$61,984	$73,316	$34,772	$38,545
1 " "	'10.....	132,032	60,084	71,948	34,751	37,197
1 " "	'11.....	693,386	375,113	318,773	242,775	75,998
7 " "	'10.....	658,759	358,782	299,978	243,362	56,616

CLEVELAND, PAINESVILLE & EASTERN RAILROAD.

1 m., July,	'11.....	$41,297	$19,577	$21,720	$8,113	$13,608
1 " "	'10.....	41,990	17,990	23,890	8,252	15,639
7 " "	'11.....	205,015	111,533	93,481	51,029	36,452
7 " "	'10.....	195,459	101,828	93,632	56,328	37,304

NORTHERN OHIO TRACTION & LIGHT COMPANY.

1 m., July,	'11.....	$278,431	$141,003	$137,428	$44,321	$93,108
1 " "	'10.....	262,020	131,938	130,082	43,357	86,725
7 " "	'11.....	1,501,107	838,026	663,081	310,428	352,653
7 " "	'10.....	1,349,355	756,168	593,187	303,274	289,914

Traffic and Transportation

Essay Awards in St. Louis

The United Railways, St. Louis, Mo., has awarded the prizes in the essay contest which it started some time ago among its employees. The subject of the essay was "The Safe and Pleasant Transportation of Passengers and the Prevention of Accidents," and the length of the essay was limited to 500 words. Ten prizes were awarded to motormen and ten to conductors. The first prize in each case was $100, the second $50, the third $25, the fourth $15, and six additional prizes of $10 each. About 300 essays were submitted by motormen and 200 by conductors. The officers of the company acted as judges of the contest, the papers being read by a number of officials, including those in the claim department. The trainmen displayed great interest in the contest, and at the public meeting at which the names of the winners of the prizes were announced there was a large attendance of employees. The first prize for motormen was awarded to Jacob Ruehl, who has been in the service of the company seven years. Mr. Ruehl's essay follows in part:

"The motorman should represent the company in a quiet, dignified, businesslike manner. He should keep himself neat and clean, and he must not drink. He should answer all questions politely and briefly, but should not allow anything to distract his attention from his work. He should report for duty in time to read carefully all bulletins, and to examine the apparatus and signs on car. He should start and stop the car gently and without jerking and conveniently for passengers at authorized stopping places. Be obliging and cheerful about opening the front door. The front door must not be opened until car is stopped, and car should not be started until all passengers are off.

"Run slowly over track crossings, and do not dispute as to right of way. At steam railroad crossings do not cross until signaled by the conductor or other competent authority, and even then the motorman should satisfy himself that all is clear. Run carefully where vision is obscured. If car is blockaded in fog, have the following car flagged. Approaching vehicles in track, sound gong, but do not antagonize teamsters by constant ringing. Do not quarrel with teamsters. When passing vehicles, watch for children who might dart suddenly across the street. When passing school houses and children playing on street, sound gong and run slowly. When passing cars, sound gong to warn people who might be crossing behind the car, and run slowly where the car is stopped. It is a safe rule not to run down grade faster than a car will run up grade. Never back a car without proper signal from conductor, and then be sure he is on the rear end."

The first prize for conductors was awarded to Emil Glarman, who has been in the service of the company fifteen years. Mr. Glarman's essay follows in part:

"In street railroading the wares are street car rides. The passengers are our patrons and we should make their rides so pleasant that each passenger will wish to ride with us again. To do this it is necessary for the conductor to be neat and tidy in appearance and to be a total abstainer from the use of alcoholic liquors. In his intercourse with passengers he should be polite and obliging, but must not allow his attention to be distracted from his duties. He should keep himself informed regarding streets, parks, hotels, places of amusement, etc., that he may be able to answer questions regarding these places. He should call out important streets and transfer points, and notify passengers who have requested to be let off at these points.

"He should use tact in his dealings with passengers and in no case is tact more necessary than in issuing and receiving transfers. He should be careful to register his fares as soon as collected and avoid disputes over change. Do not give the starting signal until satisfied that no one is getting on or off the car. Assist children, aged people, etc., and watch carefully intoxicated persons, as they are apt to fall.

"In taking car out in the morning inspect your end of the car to see that signs are properly placed and that everything is in order and clean. In turning in at night report any defects observed in the car. Make careful reports of any accident and report any information which may come

to you regarding other accidents in which the company is interested. Keep a passageway open on the platform so that passengers may enter and leave the car comfortably."

New Express Rates in Illinois

A general reduction in express rates, applying to all shipments within Illinois and ranging from 10 per cent to 25 per cent, has been ordered by the Illinois Railroad & Warehouse Commission to take effect on Oct. 1, 1911. The reductions were promulgated by the commission in "Express Tariff No. 2." The tariff prescribes a new schedule of rates per 100 lb., according to distance, and also a new system of "graduate scales," applying on shipments of less than 100 lb. weight. The most important single reduction is in the rate for 100-lb. shipments for distances up to 30 miles, which is placed at 40 cents. The express companies have been charging 50 cents. This covers the Chicago suburban district. The reductions in the graduate scales, however, cover practically all kinds of shipments.

By Sept. 15 the companies are ordered to submit for approval a form of receipt for charges paid, by Sept. 25 to establish through routes and joint rates and classifications, and by Oct. 1 to file with the commission a certified copy of all contracts or agreements with other express companies and with railroads. A time is to be fixed later for a further hearing on the subjects of a general classification of express matter, the joint through rates, receipts, and other related topics. The schedule of merchandise 100-lb. rates ranges from 40 cents for 30 miles or less up to $2 for 500 miles. Between 30 and 60 miles the rate is 50 cents and between 90 miles and 120 miles it is 60 cents. These rates are not comparable with the present charges because the rates are not now consistently based on distance. In a statement accompanying the schedule the commissioners, O. F. Berry, B. A. Eckhart and J. A. Willoughby, say in part:

"The commission realizes the magnitude of this business and realizes that it is impossible by the issuance of one schedule of rates to accomplish all that should be accomplished along express lines. But in this, as in all other matters of progression, the first step must be taken. We put this schedule into operation in the hope that it will be accepted by the companies and given a fair trial not only by the companies but by the public in general.

"There are a number of other matters of importance that will receive early attention and consideration by this commission. The question of classification, through rates, the operation of the several express companies with each other, the schedule of rates governing two or more express companies, the district or territory in which each company shall deliver goods, etc., are all matters for further consideration. The commission desires all of the information it can obtain upon this subject and the assistance of all persons who are interested in bringing about a proper adjustment of express matters, rates, classification and routes."

Pay-Within Cars in Milwaukee

Following the plan which it adopted just before the first pay-as-you-enter cars were placed in operation in Milwaukee, the Milwaukee Electric Railway & Light Company recently exhibited at three different points in that city for the benefit of its patrons the first of its pay-within cars. At the same time the company advertised the proposed new service in the daily papers, showing a picture of one of the cars with a passenger in the act of boarding and another alighting. In this advertisement the company said that it was rebuilding 300 of its city cars and "changing them to an improved type of pay-as-you-enter car, in order that the public may be provided with more up-to-date equipment and better service." This was followed by a statement giving the locations at which the cars would be stationed for three days so that the public might become familiar with them. In addition the company, in its advertisement, said:

"The public is invited to inspect these cars, as they embody the latest ideas in the city car construction, the car being entirely closed when in motion. These cars have no inside doors—thus greatly facilitating the movements of passengers.

"The co-operation of the public in the operation of these cars is respectfully asked, and passengers are requested to please observe the following, which have proved helpful to our patrons in their use of the first type of pay-as-you-enter cars."

Then followed the usual rules requesting passengers to have their fares ready, etc.

The daily papers aided the company greatly in its campaign of publicity by carrying news articles illustrating the cars and pointing out wherein they differ in detail from the cars placed in service previously.

Baltimore Company Commended.—William A. House, president of the United Railways & Electric Company, Baltimore, Md., has received a letter from the agents for the North German Lloyd Steamship Company, expressing the thanks of the company for the excellent car service to Locust Point which the United Railways & Electric Company furnished during the tourist season. Especial reference was made to the sailing of the *Friedrich der Grosse* on June 28, 1911, when it is stated more than 3000 persons visited the North German Lloyd pier.

Freight and Express Service Between Rochester and Syracuse.—The Rochester, Syracuse & Eastern Railroad has made a contract with the Wells-Fargo Express Company for the transportation of its express and freight over the entire line from Rochester to Syracuse, N. Y. This service is already in operation. This gives the Wells-Fargo Express Company entrance into a new territory, it never before having had access to Syracuse and Central New York. The railroad company has also inaugurated an express service of its own between these points.

Superintendent of Investigation and Adjustments.—Departments called the "department of investigation and adjustments" have been substituted by the Puget Sound Electric Railway, the Pacific Traction Company and the Tacoma Railway & Power Company, Tacoma, Wash., for their claim departments, and the former claim agent is now referred to as the "superintendent of investigation and adjustments." It was thought best to eliminate the words "claim agent" and "claim department" on account of the mental suggestion conveyed to the average person that a claim should be entered against the company.

Rochester, Syracuse & Eastern Railroad Completes Signal Installation.—The Rochester, Syracuse & Eastern Railroad has completed the installation of the Union Switch & Signal Company's automatic electric block signals on the west end of its line between Macedon and Rochester. The road, which is 86 miles long, is entirely double tracked. The phenomenal increase in traffic has made necessary the close operation of trains, and as the schedules are exceedingly fast, the signals will provide an additional safeguard. Private right-of-way is used entirely between cities and villages, and more than 60 m.p.h. is frequently made on much of the private right-of-way by the sixteen limited runs.

Transfers in Seattle.—The Seattle, Renton & Southern Railway, Seattle, Wash., has appealed to the United States Supreme Court from the decision of the State Supreme Court to the effect that transfers shall be exchanged with the Seattle Electric Company upon a basis of 50 per cent., contending that such an exchange is unfair to the company and should be made upon a mileage basis. W. R. Crawford, manager of the Seattle, Renton & Southern Railway, was sentenced on Sept. 8, 1911, to serve thirty days for violating the Public Service Commission's ruling prohibiting more than a 5-cent fare without transfer privilege within the corporate limits of Seattle. Mr. Crawford was released by the Superior Court on a bond. The question of transfers in Seattle was referred to in the ELECTRIC RAILWAY JOURNAL of Sept. 2, 1911, page 408.

Long Island Railroad's Tunnel Traffic.—The Long Island Railroad has completed its first year's operations of trains to and from New York city by means of the Pennsylvania Railroad's four East River tunnels. The company during the year handled about 6,000,000 passengers at the Pennsylvania station and operated 87,600 trains with a total of about 400,000 cars. The growth of this traffic obliged the company to double the capacity of the waiting room used by passengers of the Long Island Railroad. Ralph Peters,

president of the company, is quoted as stating that if the city authorities had provided a subway on Seventh Avenue, New York, to connect with the Pennsylvania Railroad station, the Long Island Railroad would have carried at least 15,000,000 passengers and the present overcrowded condition at the Flatbush Avenue terminal in Brooklyn would have been relieved.

Electric Bells at Dangerous Railroad Crossing Insufficient.—In an opinion prepared by W. J. Wood, chairman, the Indiana Railroad Commission has desired the application of the Vandalia Railroad to be released from the terms of an ordinance of the Council of Lyons requiring the company to maintain a watchman at the Broad Street crossing in that town. The company contended that the electric bells installed at the crossing and the reduced speed of trains afforded sufficient protection. The commission held that the General Assembly has made it the primal duty of local authorities to govern the operation of trains and cars at railroad crossings, and the commission has issued a special order requiring the company to maintain a watchman at the Broad Street crossing in Lyons. Asked if the same ruling would apply to crossings of interurban railroads where danger exists, Chairman Wood said the commission would not prejudge a case, but he believed the same ruling would apply to interurban railways since the statute covers the operation of trains and cars at railroad crossings of all kinds in towns and cities.

St. Louis Terminal Electric Sign.—The Illinois Traction System, H. E. Chubbuck, vice-president executive, Peoria, Ill., will install a large electric flashing sign above its new St. Louis terminal passenger station. The sign will be about 25 ft. wide by 60 ft. high, with lettering large enough to be read from a distance of six or eight blocks down Twelfth Street, an important St. Louis thoroughfare. The sign will be illuminated by about 2000 5-watt tungsten lamps. It is planned to reproduce on the sign a large interurban passenger car and a block-signal post and blade showing the signal in operation and conveying the impression of a moving car. The sequence of the flash features will be such that the signal blade, approximately 10 ft. long, will "clear"; then a gong or whistle will sound, a large electric headlight will flash from the front of the car, the wheels apparently will revolve and the track pass under them to the rear. The sign will cost about $2,500, and will be a permanent advertising feature. It will be operated from dusk until midnight. The sign will be constructed with an angle-iron framework, including 3-in. x 3-in. uprights and 1½-in. x 1-in. cross braces. The flasher will be inclosed in a metal house on the roof of the terminal passenger station. The sign, when completed, will be the largest flashing sign in St. Louis.

Interchange Order Vacated in Oregon.—In accordance with the ruling of the United States Circuit Court, made in July, the Railroad Commission of Oregon has vacated its order providing for a physical connection between the United Railways and the Southern Pacific Railroad, near the Jefferson Street Depot in Portland, and the interchange of traffic. Judge Wolverton, of the Circuit Court, held that Section 27 of the Railroad Commission Law, which provides for the interchange of traffic between connecting lines, was invalid, being so broad in its terms as necessarily to include interstate traffic. A demurrer of the Railroad Commission to the bill of complaint of the Southern Pacific Company was then overruled by Judge Wolverton, who continued the temporary injunction against the enforcement of the order. Clyde B. Aitchison, chairman of the Railroad Commission, issued a statement in which he said: "Ever since the orders of the commission were made the Railroad Commission has urged the shippers to present the same complaint to the Interstate Commerce Commission that they presented to us. Since the amendment to the Interstate Commerce Commission Act, approved June 18, 1910, the United Railways has had a right to petition the Interstate Commerce Commission to enforce a connection and interchange of traffic for interstate shipments if needed. The commission will not appeal from the order of Judge Wolverton, but instead will ask the Legislature to amend Section 27 so that the objection raised by him will be clearly met and the intent of the section to apply only to purely State traffic will be clearly manifest."

Personal Mention

Mr. B. G. Hutchins has resigned as first vice-president of the Chicago (Ill.) Railways. Mr. Hutchins has been elected vice-president of the National Bank of Commerce of New York.

Mr. John D. Garretson, for a number of years auditor of the Oakland Traction and the San Francisco, Oakland & San José Railway (Key Route), has been transferred to San Francisco, as auditor of the United Properties Company.

Mr. W. A. Fox, treasurer of Commonwealth-Edison Company, Chicago, Ill., has been elected a director and vice-president of the Chicago & Oak Park Elevated Railroad, Chicago, Ill., to succeed Mr. Redmond D. Stephens.

Mr. James Walker has been appointed a member of the engineering staff of the electrification commission of the Chicago Association of Commerce. Until recently Mr. Walker was chief engineer of the Metropolitan West Side Elevated Railway.

Mr. H. D. Murdock, who resigned recently as superintendent of the Indianapolis & Louisville Traction Company, Scottsburg, Ind., as noted in the Electric Railway Journal of Aug. 5, 1911, has become connected with the Westinghouse Electric & Manufacturing Company, East Pittsburgh.

Mr. D. B. Butler, formerly manager of the Albuquerque Gas & Electric Company, has been appointed manager of the Trinidad Electric Transmission, Railway & Gas Company, owned by the Federal Light & Traction Company, which also controls the Albuquerque Company.

Mr. W. M. Moran, who has been associated with Townsend & Reed, Chicago, Ill., and Indianapolis, Ind., as electrical and operating engineer, has been appointed superintendent of the Jersey Central Traction Company, with headquarters at Keyport, N. J. Mr. Moran entered upon his new duties on Sept. 1, 1911.

Mr. E. Smith, Canal Dover, Ohio, has been appointed general manager of the Toledo, Fostoria & Findlay Railway, Fostoria, Ohio, to succeed Mr. F. W. Adams, whose resignation as vice-president and general manager of the company was announced in the Electric Railway Journal of Aug. 19, 1911. Mr. Smith has been connected with the Reeves Manufacturing Company for some years.

Mr. B. W. Fernald, auditor of the Tonopah & Tidewater Railroad, has been appointed auditor of the Oakland Traction Company, San Francisco, Oakland & San José Railway, East Shore & Suburban Railway and California Railway, to succeed Mr. John D. Garretson, who has become auditor of the United Properties Company, San Francisco, Cal. He will continue to act as auditor of the Tonopah & Tidewater Railroad.

Mr. J. M. Campbell, general manager of the Buffalo, Lockport & Rochester Railroad, Rochester, N. Y., since it was taken over by the Bebee syndicate in January, 1911, has resigned and Mr. Campbell's duties have been taken in hand by the general officers in the various departments of the Bebee system. Mr. Campbell was one of the receivers of the road and when it was taken over by the Bebee syndicate he was appointed general manager. He will hereafter devote his entire attention to various other enterprises in which he is interested.

Mr. F. R. Newman has resigned as general manager and purchasing agent of the Southern Cambria Railway, Johnstown, Pa. Mr. Newman served from 1895 to 1899 as motorman, conductor, street aid and inspector on various lines in New England. In 1900 he was appointed superintendent of transportation of the Citizens' Electric Street Railway, Newburyport, Mass., and in 1901 was given full charge of operation under the general manager. In 1902 he was appointed superintendent of the railway department of the San Juan Light & Transit Company, San Juan, Porto Rico. He was appointed general superintendent of the York (Pa.) Railways in 1906 with jurisdiction over 16 miles of city railway, 66 miles of interurban railway and the electric light and heat departments of the company. In 1910 Mr. Newman was made general manager of the Southern Cambria Railway, a 1200-volt direct-current line under construction, of which 12 miles have been completed and placed in service under his direction.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS.

***Pacific Electric Railway, Los Angeles, Cal.**—Incorporated in California to merge the interurban lines of the following subsidiaries of the Southern Pacific Company: Pacific Electric Railway, Los Angeles-Pacific Company, Los Angeles & Redondo Railway, Los Angeles Interurban Railway, Riverside & Arlington Railway, San Bernardino Valley Traction Company, Redlands Central Railway and the San Bernardino Interurban Railway. Capital stock authorized, $100,000,000; divided into 1,000,000 shares of a par value of $100 each. Incorporators: William F. Herrin, San Francisco; R. C. Gillis, Los Angeles; W. C. Martin, San Francisco; Epes Randolph, Tucson, and Paul Shoup, Los Angeles.

***San José Terminal Railway, San José, Cal.**—Application for a charter has been made in California by this company to build a 12-mile electric railway between San José and Alviso. The company plans to operate a line of steamers from Alviso to San Francisco in conjunction with the interurban railway from San José. Capital stock, $2,500,000; $1,500,000 common stock and $1,000,000 preferred stock. Directors: M. J. Gardner, Stockton; H. H. McClosky, San Francisco; Hugh Center and Valentine Koch, of San José; and John A. Mehling, San José, has been chosen treasurer.

***Norwalk & New Canaan Street Railway, Norwalk, Conn.**—Application for a charter has been made in Connecticut by this company to build an electric railway between Norwalk and New Canaan.

***American Traction & Power Company, Wilmington, Del.**—Incorporated in Delaware to build electric railways and power plants in the Southern States. Capital stock, $50,000. Officers: H. C. Brubaker, Indianapolis, Ind., president; P. P. Dew, Blacksburg, S. C., treasurer; G. E. Bruce, Indianapolis, secretary, and W. A. Calhoun, Buffalo, N. Y., chief engineer.

***La Salle County Electric Railroad, Ottawa, Ill.**—Application for a charter has been made in Illinois by this company to build an electric railway between Ottawa and Mendota, a distance of 26 miles. Construction will be begun this fall. Capital stock, $500,000. Officers: G. H. Dodge, president; Boyd Weaver, secretary; O. D. Weaver, Jr., treasurer; Fred S. Abraham, chief counsel; Edward Horseman, director, all of Chicago.

***Olympic Electric Railway, Port Angeles, Wash.**—Application for a charter will be made by this company in Washington to build an electric railway from Lake Crescent, through Port Angeles to Oak Bay, from which point a fast ferry service will be established to Seattle. Capital stock, $2,500,000. Among the board of directors are: T. T. Aldwell, J. A. Adams, A. H. Henderson, B. J. Bugge, Wood Beal, William Bishop, M. J. Carrigan, J. P. Christianson, W. F. Delabarre, W. A. Doelle, Frank P. Fisher, C. J. Farmer.

FRANCHISES.

Van Buren, Ark.—The Ft. Smith Light & Traction Company, Ft. Smith, has asked the City Council for a franchise in Van Buren.

***Los Angeles, Cal.**—The Board of Public Utilities has been asked to consider the application of W. H. Workman for a franchise on Soto Street, in Los Angeles, from the southern city limits to Alhambra Street, and on Alhambra Street to Mission Road.

Santa Ana, Cal.—The Pacific Electric Railway has asked the City Council for a franchise to use electricity on the steam road tracks on East Second Street in Santa Ana from Bush Street to the S. P. reservation.

Hartford, Conn.—The Senate has approved the amendment of the Connecticut Company's charter so as to provide for important extensions in Hartford. One proposed extension is through Washington Street and Farmington Avenue, and the other is an extension of Chestnut Street through Kelsey Street.

Macon, Ga.—The Macon Railway & Light Company has asked the City Council for a franchise to build a double track line on Hardeman Avenue in Macon.

Savannah, Ga.—The Savannah Electric Company has asked the City Council for a franchise to extend its tracks in Savannah.

East St. Louis, Ill.—The Southern Railway has received a franchise from the City Council of East St. Louis to use the municipal free bridge.

Oak Park, Ill.—The Chicago & Oak Park Elevated Railroad has formally accepted the terms of the ordinance of the Oak Park Board regarding the elevation of tracks through Oak Park.

Tama, Ia.—The Tama & Toledo Electric Railway, Toledo, has asked the Council for a franchise in Tama.

Louisville, Ky.—The Board of Public Works of Louisville will sell at public auction on Sept. 22 a franchise for a street railway on Sixth Street south of Hill for a mile in Louisville. The franchise will be purchased by the Louisville Railway, which will extend its Sixth Street line to the plant of B. F. Avery & Sons. [E. R. J., Aug. 26, '11.]

Hagerstown, Md.—The Hagerstown & Clearspring Electric Railway has applied to the County Commissioners for a right-of-way over the county road, from Hagerstown to the Pennsylvania State line. The company also proposes to construct a railway from Hagerstown to Maugansville, Middleburg, Greencastle and Mercersburg. [E. R. J., May 20, '11.]

Medford, Mass.—The Boston Elevated Railway, Boston, has asked the City Council for a franchise to relay its tracks on Main Street from Medford Square to the Somerville city line at Winter Hill.

Peabody, Mass.—The Boston & Eastern Railway has asked the Selectmen for a franchise in Peabody. [E. R. J., Sept. 9, '11.]

Wakefield, Mass.—The Bay State Street Railway has received a franchise from the Board of Railroad Commissioners to change the site of its tracks on Albion Street in Wakefield.

Dearborn, Mo.—The Kansas City, Clay County & St. Joseph Railway, Kansas City, has received a franchise from the City Council for a right-of-way through Dearborn. George S. Beardsley, Kansas City, is interested. [E. R. J., July 29, '11.]

Liberty, Mo.—The Kansas City, Clay County & St. Joseph Railway, Kansas City, has received a franchise from the City Council in Liberty. The company will soon ask the County Court of Clay County and the City Council of Excelsior Springs for franchises. Grading has been begun at Harlem. The line will extend from Kansas City to St. Joseph, with a branch from Harlem to Excelsior Springs via Liberty, Dearborn and Faucett. The right-of-way between Harlem, Dearborn and Faucett has been contracted for and the announcement of the final route from Faucett to St. Joseph will be given within a short time. C. F. Enright is interested. [E. R. J., July 29, '11.]

McMinnville, Ore.—The Portland & West Coast Railroad & Navigation Company, Portland, has received a franchise from the Common Council for a right-of-way over E Street and part of St. John's Street in McMinnville. The line will first be operated by steam until the company's power house at Blaine has been completed. This is part of a plan to build an electric railway between McMinnville and Bay City via Willamina, Grand Ronde, Tillamook, Sheridan and Pacific City. W. H. Fitzgerald is interested. [E. R. J., Aug. 19, '11.]

***Scranton, Pa.**—P. F. Cusick, representing the Ridge Row Railway, Scranton, has asked the City Council for a franchise in Scranton.

***Dallas, Tex.**—John T. Witt, Dallas, has asked the City Commissioners for a twenty-five-year franchise to build an electric railway on Elm Street from Market Street west to the Dallas city limits. It is expected to continue this line through West Dallas, northward to Denton or southward to Cleburne or Corsicana. Financial arrangements have been made to build this line westward from Dallas, and construction will be begun as soon as the franchise is granted.

TRACK AND ROADWAY

Birmingham & Edgewood Electric Railway, Birmingham, Ala.—This company has let the contract to Howard N. Bowder, Birmingham, Ala., to extend its Edgewood line from its present terminus to the Edgewood Country Club. at Birmingham.

Mobile (Ala.) West Shore Traction Company.—Preliminary arrangements have been made for the construction of the company's proposed electric railway to connect Mobile, Alabama Port, Coden, Bayou la Batre and Pascagoula, Miss. H. Austell, Mobile, president. [E. R. J., Aug. 12, '11.]

British Columbia Electric Railway, Vancouver, B. C.—Plans are being considered by this company for the construction of an extension to Blaine.

Pacific Electric Railway, Los Angeles, Cal.—This company's extension between Glendale and Burbank was placed in operation on Sept. 6.

***San José, Cal.**—C. A. Nonas, San José, is promoting an electric railway from San José to the Almaden quicksilver mines.

***Denver & Crown Hill Railroad, Denver, Col.**—This company placed in operation on Sept. 10 its 1½-mile electric railway in Denver from Twenty-ninth Avenue and Sheridan Boulevard to Crown Hill Cemetery. Capital stock, $50,000. Officers: George Olinger, president; J. P. Havlick, vice-president; Paul Forman, secretary; Frank Beeler, treasurer, and Vernon Davis, general manager.

Baltimore & Washington Transit Company, Washington, D. C.—This company has placed in operation its line between Fourteenth Street and Kennedy Street and Takoma Park.

Albany, Ga.—Jesse & Earnest, general agents of the Dixie Pecan Orchards Company, 206 South La Salle Street, Chicago, Ill., advise that a company will be incorporated soon to begin construction about Jan. 1, 1911, on a 30-mile loop electric railway to connect Albany, Pecan City and Hardaway and Albany. [E. R. J., July 22, '11.]

Atlanta (Ga.) Northeastern Railroad.—Work will be begun at once by this company on its projected 47-mile line between Atlanta, Roswell, Creighton, Alpharetta and Cumming. The company's charter has been changed so that the line will extend from Midway Church to Creighton. The capital stock has been increased from $50,000 to $1,200,000. J. L. Jones, Atlanta, secretary. [E. R. J., April 22, '11.]

Middle Georgia Railway, Jackson, Ga.—W. F. Smith, Jackson, reports that gasoline motor cars will be used by this railway. [E. R. J., July 29, '11.]

Nampa & Caldwell Electric Railway, Nampa, Idaho.—Contracts will soon be awarded by this company to build its 10-mile electric railway between Caldwell and Nampa. W. E. Pierce, Boise, promoter. [E. R. J., July 15, '11.]

Evansville, Henderson & Owensboro Traction Company, Evansville, Ind.—This company advises that it has not yet organized but that it expects to begin the construction of its 10-mile electric railway between Evansville and Henderson within sixty days. The company will rent power and will operate four cars. Capital stock authorized, $250,000; capital stock issued, $150,000. W. A. Carson, general manager. [E. R. J., Aug. 26, '11.]

Wabash & Rochester Electric Railway, Wabash, Ind.—This company has about 40 per cent of its line graded, right-of-way secured and ready for bridging and ties. It expects to complete its financing during the winter and in the spring will be in the market for construction supplies. [E. R. J., March 12, '09.]

Covington, Big Bone & Carrollton Traction Company, Covington, Ky.—It is reported that this company is arranging a bond issue to enable it to begin construction. This is part of a plan to build a 22-mile electric railway between Covington and Big Bone. M. J. Crouch is interested. [E. R. J., Nov. 5, '10.]

Southwestern Kentucky Electric Railway, Light & Power Company, Hickman, Ky.—This company, which proposes to construct a line from Paducah, Ky., west to the Mississippi River, is stated to be associated with the American Traction & Power Company, Indianapolis. Arrangements have been made to secure the rights-of-way from Paducah to Mayfield owned by the Paducah Southern Railroad. C. W. Williams and W. A. Calhoun, Buffalo, are in charge of the engineering work, and will make the necessary surveys. Edward F. Weaton is in charge of organization work. [E. R. J., Sept. 9, '11.]

Maysville Street Railroad & Transfer Company, Maysville, Ky.—R. M. Wallingford & Son have been awarded the contract for filling the ravine between Carmel Street and Dieterich's Grove, in Maysville, thus eliminating the wood trestle that is now in use by this company. Improvements all along the line are being made, and about $70,000 will be spent, including the new carhouses and the new cars for the line.

New Orleans Railway & Light Company, New Orleans, La.—This company's extension in St. Bernard to the plant of the American Sugar Refinery at Chalmette has been placed in operation.

Springfield (Mass.) Street Railway.—The Board of Railroad Commissioners has approved this company's East Street extension to Victoria Park, in Springfield.

Detroit (Mich.) United Railway.—This company began work on the Hamilton Boulevard line, in Detroit, on Sept. 11. This line will extend from Holden Avenue to the city limits. The company will soon begin to rebuild its tracks on Portage Street, in Kalamazoo.

Omaha & Western Iowa Traction Company, Omaha, Neb.—Surveys have been completed by this company on its projected 100-mile electric railway from Omaha to Council Bluffs, Honey Creek, and up the east side of the Missouri Valley, through Iowa to Sioux City. K. B. Ward, Omaha, chief engineer. [E. R. J., Dec. 10, '10.]

Trenton (N. J.) Street Railway.—This company has just completed 1 mile of double track on Broad Street, 1 mile of double track on State Street and 1 mile of double track on Hamilton Avenue, in Trenton. The company recently purchased 5000 new ties, 900 Atlas joints and renewed 7 miles of trolley wire.

Schenectady (N. Y.) Railway.—This company has begun work on the new track on Nott Terrace, in Schenectady. The rails weigh 95 lb. Steel ties are being used.

North Carolina Traction Company, Danbury, N. C.—This company will immediately proceed with the construction of its extension in Rock Hill. Storage battery cars may be operated.

Cincinnati (Ohio) Traction Company.—Work will be begun within the next few weeks on this company's extension to Bond Hill. The line will be single track and extend from Reading Road to Paddock Road, to the Baltimore & Ohio Railroad tracks in Bond Hill.

Fremont, Ohio.—Grading is nearly completed for an electric railway to connect Tiffin, Fremont, Columbus, Marion and Ballville. A company will soon be organized. A. H. Jackson, Fremont, will be made president, and A. S. Close, seventh floor, Spitzer Building, Toledo, secretary and general manager. [E. R. J., Aug. 5, '11.]

***Middletown, Ohio.**—Robert Wilson and associates plan to construct an electric railway in Middletown and will ask for a franchise within a short time.

Coos Bay & Eastern Electric Railway, Mansfield, Ore.—Surveys are being made by this company from Marshfield to Roseburg, via Myrtle. Taggart Aston, Marshfield, chief engineer. [E. R. J., Oct. 9, '09.]

Oregon Electric Railway, Portland, Ore.—Contracts have been let for the rails for this company's extension from Salem to Albany. Orders were issued to rush the work. Guthrie & McDougal, who have the contract for the construction of the roadbed, have arranged to establish offices in Portland.

Southern Cambria Railway, Johnstown, Pa.—This company advises that it has placed a contract with the Cambria Steel Company for rails for 11 miles of new track on its extension from Johnstown to Ebensburg.

Lancaster & York Furnace Street Railway, Millersville, Pa.—During the next few weeks this company will place contracts to replace a long wood bridge with a steel structure.

Beaver Valley Traction Company, New Brighton, Pa.—This company will build 1 mile of new track.

Pittsburgh (Pa.) Railways.—Plans are being considered by this company for a belt line connecting and encircling the downtown districts of Pittsburgh and the North Side.

Frankford, Tacony & Holmesburg Street Railway, Tacony, Pa.—This company will relay 1 mile of track with 80-lb. 7-in. girder rails. The contract for the rails has been awarded to the Pennsylvania Steel Company.

Greenville, Spartanburg & Anderson Railway, Greenville, S. C.—Contracts will be awarded by this company to build lines to connect Riverside and the Orr villages and for a line to connect the present Belton line with the Murray property on which the company's freight yards are to be built. Grading will be begun as soon as the contracts are awarded. W. S. Lee, Charlotte, vice-president.

Sioux Falls (S. D.) Traction Company.—This company has completed its Main Avenue extension in Sioux City.

Jonesboro, Tenn.—The city of Jonesboro is reported to have voted $25,000 of bonds in aid of the proposed electric railway from Jonesboro to Johnson City. Work is expected to begin about Jan. 1. A company is now being organized to construct this line. W. P. Shipley, secretary, Jonesboro Board of Trade. [E. R. J., Feb. 25, 1911.]

Houston (Tex.) Electric Railway.—Before the end of the year this company intends to relay that portion of Washington Avenue between the Southern Pacific Railway's crossing and the Houston Heights Boulevard, replacing the present construction with 70-lb. rail on concrete foundation and brick pavement. The Brunner line, from the junction of Washington Avenue and the Houston Heights Boulevard to the end of the line, will be rebuilt and the present 45-lb. rail will be replaced with 70-lb. rail and ballasted with gravel. Later the San Felipe line will be reconstructed, the construction to be similar to the Brunner line. It is also planned to double track the Louisiana lines from Dallas and Louisiana to Bagby and Tuam. The Woodland Heights line also will be double tracked from Dart to the Missouri, Kansas & Texas Railway tracks.

Elkins (W. Va.) Electric Railway.—This company is extending its tracks in Elkins, but will not let contracts for any of the work.

Milwaukee Western Electric Railway, Milwaukee, Wis.—This company advises that it will award a contract within a few days for grading, but will not enter into any further contracts until it has completed its financial arrangements for building extensions.

SHOPS AND BUILDINGS

San José Terminal Railway, San José, Cal.—This company is considering plans to build a terminal station at Alviso.

Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind.—This company has decided to postpone the erection of its proposed new car houses on Spy Run Avenue for a year or more in order to give first attention to the work of rebuilding streets in Ft. Wayne over which its cars pass.

Bay State Street Railway, Boston, Mass.—This company's carhouse at Neponset has been enlarged to take care of the recently established electric express service. A new freight house has been built at Quincy and others will be erected at various points as system develops.

Morris County Traction Company, Morristown, N. J.—The new repair shops and carhouse of this company will be completed and ready for occupancy about Sept. 15.

Niagara Gorge Railroad, Niagara Falls, N. Y.—This company advises that it may build a new carhouse at Niagara in the near future.

Scioto Valley Traction Company, Columbus, Ohio.—This company has awarded the contract to Gartner & Reichle, Chillicothe, for the construction of its new passenger and freight station on East Main Street, in Chillicothe. The cost is estimated to be about $25,000.

Oregon Electric Railway, Portland, Ore.—It is reported that this company has purchased two blocks of land in Portland on which it will build a terminal depot.

Beaver Valley Traction Company, New Brighton, Pa.—This company has let a contract to the Anderson & Cook Company, Beaver, to construct an addition to its repair shop in Rochester. The cost is estimated to be about $8,000.

Galveston-Houston Electric Railway, Galveston, Tex.—This company has completed its passenger station in Galveston and one has been constructed at the foot of Texas Avenue, in Houston.

Seattle-Tacoma Short Line, Seattle, Wash.—Work has been begun by this company on the construction of a new depot at Puyallup.

POWER HOUSES AND SUBSTATIONS

Birmingham Railway, Light & Power Company, Birmingham, Ala.—This company has awarded a contract for one 6250-kva Allis-Chalmers horizontal steam turbine, which will be installed in its main power station. Contract has been placed for jet condensing equipment to be operated in conjunction with the turbine, and also with two 3000-kw General Electric turbines. This condensing equipment is manufactured by the Westinghouse Machine Company. Contract has also been awarded to Henry R. Worthington, New York, for three cooling towers, which will be operated in conjunction with the condensing apparatus. The cooling towers will be in the square of ground adjoining the power station. The company has also let a contract to the Westinghouse Electric & Manufacturing Company for one 1000-kw rotary converter to be used in the railway service.

Oakland (Cal.) Traction Company.—Ralph D. Mershon, New York, is investigating the electric-generating plants and electrical equipment of this company, a subsidiary corporation of the United Properties Company. An increase in the capacity of these plants will be necessary to provide for the projected extensions of the Key Route and Oakland Traction lines.

Winona Interurban Railway, Winona Lake, Ind.—The substation of the Winona Interurban Railway, near Milford, Ind., was badly damaged by an accident which occurred at the plant recently.

Kentucky Traction & Terminal Company, Lexington, Ky.—This company has let a contract for the erection of its power house, the equipment for which was purchased several weeks ago to the Combs Lumber Company, Lexington. The Pittsburgh Bridge & Iron Company was given the contract for the erection of the structural iron work on the building.

Trenton (N. J.) Street Railway.—This company is planning to install a 750-kw turbine in its power house in Trenton.

Lancaster & York Furnace Street Railway, Millersville, Pa.—This company advises that during the next few weeks it will purchase a turbine or direct-connected unit of 500 kw, 25 cycles, three-phase, for its power plant in Millersville.

Beaver Valley Traction Company, New Brighton, Pa.—This company advises that it expects soon to purchase a compound 150-cu. ft. Westinghouse air compressor and two Liberty turbines.

Jackson Railway & Light Company, Jackson, Tenn.—This company advises that during the next few weeks it will purchase one second-hand 500-kw turbo-generator, 2200 volts, 60 cycle, three-phase, 150 lb. steam pressure, 3600 r.p.m., for its power house in Jackson.

Lakeview Traction Company, Memphis, Tenn.—This company has let contracts for the machinery for its power house, and will begin operations in a few weeks. The amount expended in the equipment of the plant is $60,000. The company has decided to use alternating instead of direct current. A suburban line from Memphis to Lakeview is to be operated.

Galveston-Houston Electric Railway, Galveston, Tex.—This company's main power station at Clear Creek has been completed at a cost of $275,000, and the company has installed two 1500-kw generators and three 520-hp boilers. The three substations are located at La Marque, South Houston and at League City and are completed.

Elkins (W. Va.) Electric Railway.—This company advises that it will build a new power house in Elkins this fall. The company will not award any contracts for the work.

Manufactures & Supplies

ROLLING STOCK

Lewiston, Augusta & Waterville Street Railway, Lewiston, Maine, is in the market for a snow plow.

Cincinnati (Ohio) Traction Company has ordered ninety Brill 39-E trucks from The J. G. Brill Company.

Hull (Que.) Electric Company expects to purchase six double-truck, semi-convertible pay-as-you-enter cars.

Moncton Tramways, Electric & Gas Company, Moncton, N. B., has ordered one snow sweeper from The J. G. Brill Company.

Auburn & Syracuse Electric Railroad, Syracuse, N. Y., has ordered two 20-ft. motor-car bodies from the G. C. Kuhlman Company.

Montreal (Que.) Street Railway has ordered seventy Brill 27-GE-2 trucks without wheels and axles from The J. G. Brill Company.

Brooklyn (N. Y.) Rapid Transit Company has ordered twenty Brill 39-E trucks without wheels and axles from The J. G. Brill Company.

Ontario & San Antonio Heights Railway, Ontario, Cal., has ordered six Brill 39-E trucks, through Pierson, Roeding & Company, from The J. G. Brill Company.

Peninsular Railway, San Jose, Cal., has ordered seven 42-ft. 8-in. California type car bodies from the American Car Company, through Pierson, Roeding & Company.

Warren (Pa.) Street Railway has ordered five double equipments of No. 307 motors with type K-36-F control from the Westinghouse Electric & Manufacturing Company.

Muskegon Traction Company, Muskegon, Mich., has ordered one quadruple No. 307 motor equipment with K-35-D control from the Westinghouse Electric & Manufacturing Company.

Sapulpa (Okla.) Interurban Railway has ordered one double equipment of 101-B-2 motors with type K-10-A control from the Westinghouse Electric & Manufacturing Company.

Boston (Mass.) Elevated Railway has ordered fifty additional quadruple motor equipments of No. 306 motors with type HL control, from the Westinghouse Electric & Manufacturing Company.

Shamokin & Edgewood Street Railway, Shamokin, Pa., is in the market for several second-hand side-dump cars, one second-hand double-truck car and one second-hand single-truck car body.

Columbia Gas & Electric Company, Columbia, S. C., has ordered six double-motor equipments with No. 306 motors and type K-36-F control from the Westinghouse Electric & Manufacturing Company.

Jacksonville (Fla.) Traction Company, noted in the Electric Railway Journal of Aug. 19, 1911, as having ordered ten double-truck, straight-sided, single-end cars from the St. Louis Car Company, has specified the following details for these cars:

Length of body...29 ft. 6½ in.	Destination signs....Hunter
Over vestibule...41 ft.	Fare boxes.....Johnson
Width over all... 8 ft. 4 in.	Headlights .....U.S.
Sill to trolley base. 6 ft. 3⅛ in.	Motors.....2 G E-219
Body .....semi-steel	Registers .....International
Air brakes.....G E	Seats.....H. & W.
Control.....G E K-36	Seating material.....rattan
Couplers .....Hovey	Trolley retrievers...Knutson
Curtain fixtures...Cur. S. Co.	Trucks.....Standard O-36
Curtain material..Cur. S. Co.	

TRADE NOTES

Chicago Pneumatic Tool Company, Chicago, Ill., has appointed Luther H. Bryan to act as its representative at Birmingham, Ala.

Johnson Fare Box Company, New York, N. Y., has moved its office from 1 Madison Avenue to 239 Fourth Avenue, New York.

Galt Car & Coach Company, Galt, Ont., is erecting an addition to its plant, 60 ft. x 200 ft., and proposes to install additional sawmill equipment.

Pennsylvania Equipment Company, Philadelphia, Pa., is in the market for a turbo-generator of 300 kw to 400 kw, 250 volts, 150 lb. steam, 26-in. to 28-in. vacuum, in one or two units.

Baldwin Locomotive Works, Philadelphia, Pa., have moved their office in Portland, Ore., from the Couch Building to the Spalding Building. The company plans to build an extension, 500 ft. long, to its plant at Eddystone, Pa. The addition will be made to the present erection shop.

General Equipment Company, New York, N. Y., has appointed Frederick M. Nellis Western representative, with headquarters in Chicago. Mr. Nellis was formerly New England representative of the Westinghouse Air Brake Company and the Westinghouse Traction Brake Company.

Peter Smith Heater Company, Detroit, Mich., reports the receipt of an order from the Louisville (Ky.) Railway for the installation of hot-air heating apparatus on 200 cars which are now in use, and on the thirty new cars which are now being built for the Louisville Railway by the Cincinnati Car Company.

Best Manufacturing Company, Pittsburgh, Pa., has appointed Benjamin T. Delafield to handle its line of valves, fittings, flanges, pipe bends, fabricated pipe and other power-plant material in the St. Louis and Kansas City territory, with headquarters in Kansas City, Mo. Mr. Delafield formerly represented the Lunkenheimer Company in the same territory.

Mesta Machine Company, Pittsburgh, Pa., has received an order from the Sistersville Electric Light & Power Company, Sistersville, W. Va., for one 20-in. by 24-in. twin tandem, horizontal, double-acting, four-cycle gas engine. The engine will operate with natural gas and is rated at 1000 b.hp, being arranged for direct connection to a 650-kw, 60-cycle, 2300-volt railway generator.

The J. G. Brill Company, Philadelphia, Pa., reports the receipt of the following orders for export: E. G. Long Company, New York, N. Y., thirty-two Brill 27-M-C-B-1 trucks, without wheels and axles, and twenty Brill 27-GE-1 trucks; Manuel Caragol & Son, New York, N. Y., one Brill 21-E truck without wheels; W. R. Grace & Company, New York, N. Y., three 18-ft. closed motor car bodies mounted on Brill 21-E trucks; Noyes Brothers, Wellington, N. Z., for the Wellington Tramways, twelve Brill No. 22 trucks without wheels and axles.

ADVERTISING LITERATURE

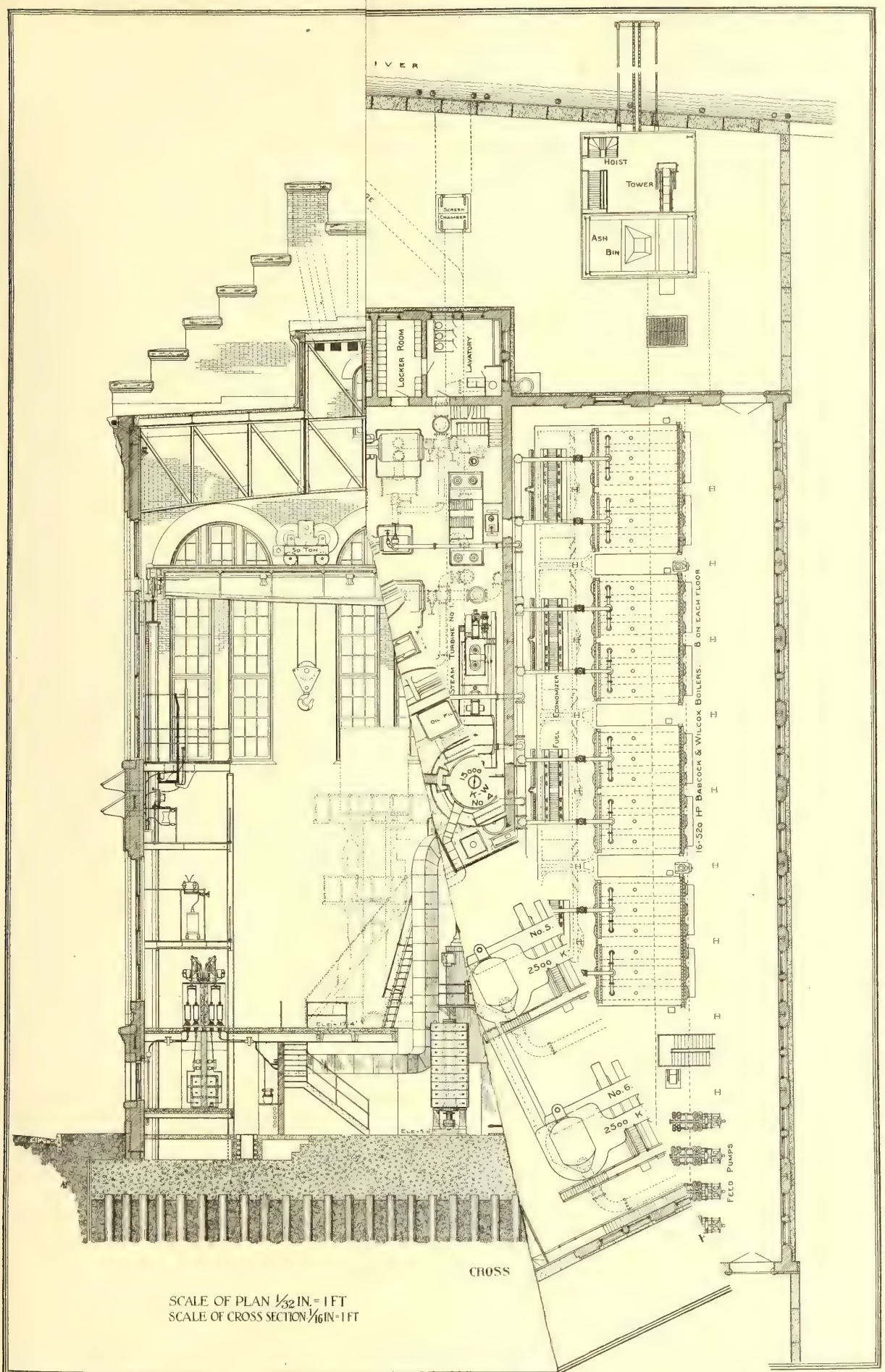
General Electric Company, Schenectady, N. Y., has issued Bulletin No. 4878, describing the uses and properties of its cloth pinions.

MacGovern, Archer & Company, New York, N. Y., have issued the September list of second-hand electrical and steam machinery, power-house equipment, cars, etc., which the company has on hand in readiness for immediate shipment.

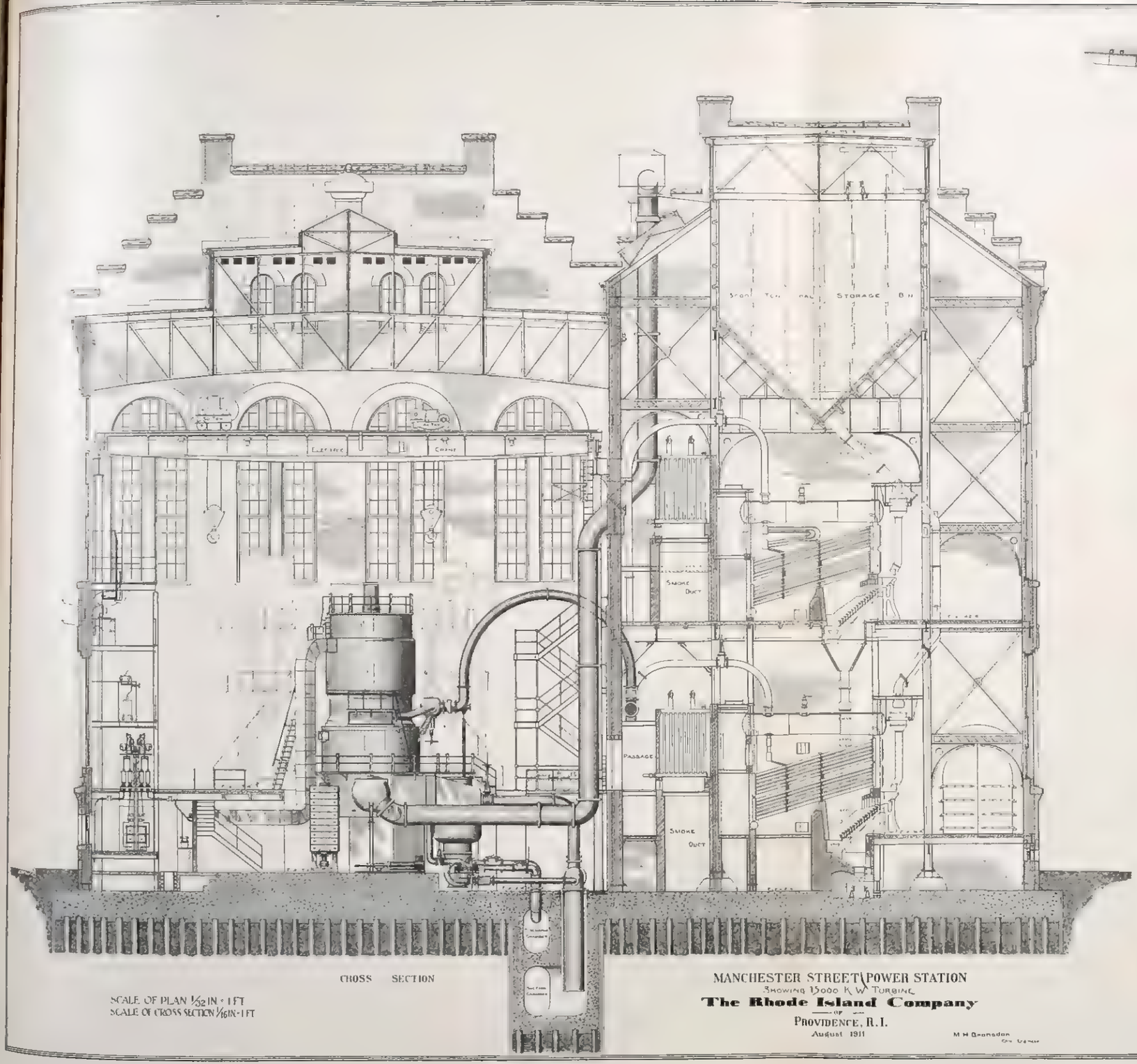
Sterling Varnish Company, Pittsburgh, Pa., has issued a folder discussing the improvement of linseed oil and its effect on paint. In the manufacture of Sterling iron enamel paints the company uses Sterling raw refined linseed oil, which is the product of a new process used in purifying ordinary oil.

D. & W. Fuse Company, Providence, R. I., has issued Circular No. 201, which describes its magnetic chucks. These chucks are built for stationary or rotary duty and all parts are readily interchangeable. Deltabeston wire is used to wind the magnets, and they can withstand temperatures as high as 400 deg. Fahr. without destruction.

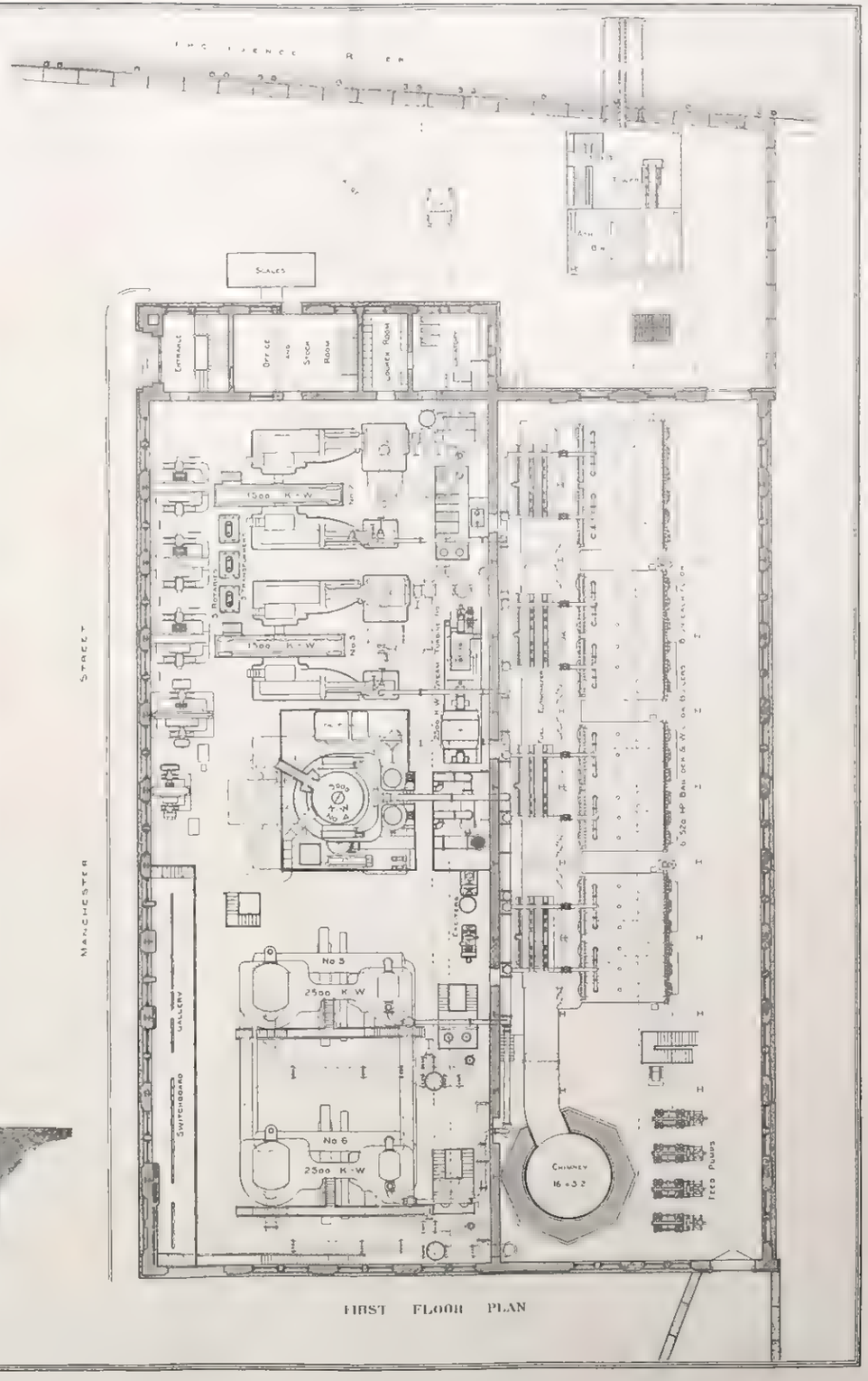
Frog, Switch & Manufacturing Company, Carlisle, Pa., has issued its 1911 catalog, in which is illustrated a complete line of T-rail frogs, switches, crossings, etc., which the company manufactures. Particular attention is called to the company's full display of manganese hard-center construction. The catalog contains 150 pages, and is divided into sections, as follows: Stiff frogs, spring frogs, manganese frogs, switches, switch stands, crossings, manganese crossings, solid manganese crossings and turnouts and special work for electric railways.



SCALE OF PLAN 1/32 IN. = 1 FT
SCALE OF CROSS SECTION 1/16 IN = 1 FT



CROSS SECTION



FIRST FLOOR PLAN

SCALE OF PLAN 1/32 IN = 1 FT
SCALE OF CROSS SECTION 1/16 IN = 1 FT

MANCHESTER STREET POWER STATION
SHOWING 15000 K.W. TURBINE
The Rhode Island Company
— OF —
PROVIDENCE, R.I.
August 1911

M H Brandon
Del. Draw

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVIII NEW YORK, SATURDAY, SEPTEMBER 23, 1911 No. 13

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President.
HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.
CURTIS E. WHITTLESEY, Secretary and Treasurer.
TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

HENRY W. BLAKE, Editor.
L. E. GOULD, Western Editor.
Associate Editors:
RODNEY HITT, FREDERIC NICHOLAS, WALTER JACKSON.
News Editors:
G. J. MACMURRAY, FRANK J. ARMEIT.

CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1021 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Thursday, 9 a. m., of the week of issue.

Copyright, 1911, by MCGRAW PUBLISHING COMPANY.

Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, SEPTEMBER 23, 1911.

CONTENTS.

State Control..... 483
The Burden of the Absent-Minded Passenger..... 483
The Field of the Gasoline-Electric Car..... 484
Tendencies in Electric Power Transmission..... 484
The Illinois Traction System..... 485
The Electric Terminal Arcade of the Oklahoma Railway..... 486
Power Plant Extension of the Rhode Island Company..... 488
The Log of a Gasoline-Electric Car..... 490
Railroad with Spiral Shaft..... 492
Chicago Meeting of Illinois Railways Association..... 493
Conference of Governors of States..... 497
Hearing on Transfers in New York..... 500
One Year's Results with Tantalum Lamps on Cars in Chicago..... 501
Light-Weight Side-Rod Car at Cincinnati..... 502
Hearing on Brakes and Height of Car Steps in New York..... 503
Convention Bulletin of Manufacturers' Association..... 503
Convention of Lubrication Experts..... 504
Welding Armature Shaft..... 504
Romapac Compound Rail to Be Tried in Chicago..... 505
Prepayment Car for Hutchinson, Kan..... 505
News of Electric Railways..... 506
Financial and Corporate..... 508
Traffic and Transportation..... 512
Personal Mention..... 514
Construction News..... 515
Manufactures and Supplies..... 518

State Control

The address of Governor McGovern of Wisconsin before the conference of State Governors, an abstract of which is published elsewhere in this issue, is an important summary of the policies underlying the Wisconsin commission law and the results that have been accomplished. While the address presents the point of view of the regulating authority rather than of the regulated properties, it aims to set forth fairly the good ends attained for the consuming as well as the investing public. It appears that the net effect of the changes in rates brought about by the activities of the commission has been a reduction in average return, notwithstanding the increases permitted in some localities. This is generally the history of public service commissions. That a reduction in rates produces increased consumption in certain classes of commodities, such as electric light and power and gas, has been proved in many cases, not only by the Wisconsin commission, but by progressive companies. This policy, however, is not applicable to all public utilities any more than to all kinds of private service of which we may take advantage from time to time. As the amount of electric railway mileage in Wisconsin is comparatively small, and as the activities of the commission have therefore been directed chiefly to other classes of utilities, Governor McGovern has little to say about companies of this character. The address, however, merits careful consideration because it is a comprehensive analysis of the work of a commission that is one of the foremost in the country and has established a deserved reputation for thorough and painstaking investigation of all cases and constant efforts to better service.

The Burden of the Absent-Minded Passenger

To forget is human nature, although some individuals are greater offenders than others in this respect. Few people among the general public realize that a carefully planned system is put into operation whenever a conductor picks up a lost article in a street car. This system is probably one which common law and honesty compel, but it is also one which makes the careless party a direct burden upon the company. It is consistent also with certain traits of the American public that a case not infrequently occurs where the individual unsuccessful in an endeavor to recover a lost article denounces the street car company and threatens suit to cover the loss. One large city company upon which there is an elaborate system of handling lost articles has found upon looking into the matter that the direct cost in wages amounts to $6 a day, not to mention the indirect charge, which cannot be calculated. With an average of about 100 lost articles a day this meant that every article

left on the cars cost the company 6 cents, or more than was paid for fare by the absent-minded passenger. The article itself sometimes passed through as many as seven hands and engaged the attention of nine different persons. When we consider that only about 45 per cent of the articles are claimed and that a great deal depends upon the honesty of conductors, the question may well be asked whether it is to a company's interest to maintain any but a simple system which will cover the law and will insure the recovery of articles which have been turned in if they are called for. On the other hand, the argument is not infrequently advanced that railroads should go even further and should advertise daily the lost articles in the newspapers. We have never been able to see the utility of such a demand. A man who has left an umbrella, a package or a pair of spectacles on a car usually realizes the fact soon after he has left the car and he does not need the reminder of a paid advertisement. The justice of such a requirement is even more remote. The company is put to considerable expense at best in having the article returned to its lost and found department and in storing it there. Part of this expense may be recouped by the sale of unclaimed articles, but as a rule the articles thus sold are those which are of such little value that the owner does not take the trouble to recover them. On the other hand, there should be no objection to a company occasionally publishing statistics to inform the public of what it is doing at considerable expense in the interest of its absent-minded passengers.

The Field of the Gasoline-Electric Car

"The Log of a Gasoline-Electric Car," which appears elsewhere in this issue, is of unusual interest because the detailed statistics of its operating costs and performances indicate so clearly what can be expected from well-designed cars of this class. These statistics are not invalidated in the least by the fact that the storage-battery car proved to be more economical for the special conditions set forth in the article. This result could not have been anticipated, because prior to the inauguration of these experiments no makers of storage batteries were willing to sell them with a maintenance cost per mile guarantee. The pioneer work of the Third Avenue Railroad has therefore greatly simplified the problem of selecting the proper type of self-contained vehicle for a given service. One great advantage of the storage-battery car was that it could be very lightly constructed to meet satisfactorily the small stresses encountered at such low schedule speeds as 6½ m.p.h. to 7 m.p.h. On the other hand, the gasoline-electric car had to be more massively proportioned to absorb the shocks of gasoline-engine operation quite regardless of the speed of the car. Furthermore, the equipment of the storage-battery car was intended simply to satisfy the modest operating requirements of the old horse car lines, whereas the gasoline-electric car showed that it could meet much harder conditions of speeds, stops and accelerations. In short, it was too good for the purpose. While no universal dictum can properly be laid down from isolated tests of this kind, they would seem to point to the conclusion that the field of the gasoline-electric car on sparsely patronized lines is not so much a slow-speed, short-run city service, where current is cheap and ample time can be permitted for charging batteries, as upon longer runs at higher speeds under conditions more like those usually encountered in suburban and interurban operation.

TENDENCIES IN ELECTRIC POWER TRANSMISSION

The development of larger markets for the sale of hydroelectric power is bringing about many changes in transmission methods. A comparison of present practice in sections of the country where improvements are being made in the production and distribution of electricity with the ways and means of operation in vogue less than a decade ago at once discloses a new viewpoint on the part of progressive companies. The conditions differ radically from those prevailing in the populous areas served by modern central station organizations. The demand for cheap power, either from water or from coal mined near the generating plant, extends over such wide areas in those parts of the country where such service is most highly developed that the present transmission companies tend to dominate hundreds of square miles along lines similar to those followed by great railroad organizations.

In the remote regions occupied by electric transmission circuits of from 60,000 to 100,000 volts the incidental features of the work are of no small significance. The growth of the power market renders better service imperative, and standards of engineering construction which would have passed criticism five years ago are now tolerated only on old work. The cost of maintaining a staff of high technical skill in distant localities blessed with few of the amenities of life except climate and scenery is far from low, but the need of supplying consumers with constant and reliable service is so great that it has become common for the larger hydroelectric enterprises to have remarkably efficient engineering and operating organizations. This means that many industrial and social phases of life fall within the jurisdiction of these power companies, and not a few problems of transportation, intercommunication, housing and even sustenance devolve upon them. In some cases the provision of educational courses for apprentices and the establishment of scholarships in higher institutions of learning have followed the successful occupancy of a given territory by a power company. These broader human aspects of developing systems in the transmission field are of increasing interest to the engineer privileged to make an examination of such properties, for they show the efforts being made to train a more efficient class of workers in the responsible operation of highly complex aggregations of apparatus. They also emphasize the importance which these companies attach not to overlook anything which will help to solve problems of a technical or economic character in fields of great area.

In its purely technical aspects, power transmission is advancing along the parallel lines of improved mechanical construction and a larger knowledge of the properties of ultra high-voltage circuits. In both stations and lines the use of inexpensive but effective disconnecting switches is becoming general on one or both sides of oil switches which carry dangerous voltages. The installation of clock-driven recording meters on important lines and even on the premises of consumers is giving excellent results in the

shape of more accurate data regarding loads and demands. The careful study of causes of interrupted service is bearing fruit in the specification of better shapes of high-tension terminals for transformers, and the design of positive lever or switching control of line grounding has done much to render the outside man's duties safer. In not a few instances the establishment of high-voltage transmissions over mountainous regions which impose severe weather conditions upon the lines has led to the more economical use of wire through the stiffening of the tension in the spans, and the adoption of auxiliary steel messenger construction with special strain or suspension insulation, combined with the more thorough guying of poles and towers, has done much to reduce the frequency of interruptions.

The use of the oscillograph and the making of careful tests of voltage drop, charging current and other line phenomena have given a new insight into the possibilities of power transmission. Such tests can no longer be dubbed academic when one considers the importance of making large investments in equipment with the minimum loss of capacity. It is not too much to say that the means are now at hand to investigate the functions of a 100,000-volt line 75 or 100 miles in length with almost laboratory precision.

THE ILLINOIS TRACTION SYSTEM

Following the practice of previous years, the Illinois Traction System includes in its annual report for 1910 the details of gross earnings and other statistics of interest to holders of securities and operating officials and also a concise statement by the vice-president executive, Mr. Chubbuck, of the most notable events in the progress of the year. An abstract of the report was published in the issue of the ELECTRIC RAILWAY JOURNAL for June 3, 1911, page 991.

Owing to the acquisition by the company of the properties of the Topeka (Kan.) Railway, the Topeka Edison Company and the Des Moines (Iowa) Electric Company the statement of earnings is compiled in different ways. One statement shows the total gross earnings of the system as operated, that is to say, the gross earnings of the old system with those of the newly acquired properties from the date of their acquisition. The amount thus shown is slightly less than that in the table which was prepared to indicate the gross earning capacity of all the companies comprised in the system at the end of the fiscal year.

The first table mentioned may be taken for the purpose of this discussion. It shows total gross revenue of $6,106,250, comparing with $4,584,634 for the preceding year, or a gain of 33.2 per cent. As in the preceding year, the largest proportion of the revenue was furnished by the railway lines and more was contributed by the interurban system than by the local street railway properties. The proportions of the revenues contributed by the various departments were as follows: Interurban, $2,304,945, or 37.7 per cent; local street railway, $1,966,317, or 32.2 per cent; gas, $357,315, or 5.9 per cent; electric, $1,287,471, or 21.1 per cent; steam heating, $164,062, or 2.7 per cent; miscellaneous, $26,140, or 0.4 per cent.

The railway lines are shown by this compilation to have furnished 69.9 per cent of the total gross revenue from all sources. In 1909 the interurban system contributed 43.2 per cent and the local railway lines 29.9 per cent, or a total of 73.1 per cent. If the comparison is carried back two years earlier the proportions are about the same. In 1908 the interurban lines yielded 45.1 per cent and the local railway properties 31.3 per cent, or a total of 76.4 per cent. In 1907 the proportion was 42.6 per cent for the interurban and 32.5 per cent for the local street railways, or a total of 75.1 per cent.

A comparison of the operations of these two principal departments in 1907 and 1910 shows that in this period the interurban gross earnings gained 43.1 per cent and the local street railway properties 60.3 per cent. The 1910 revenues from local lines were increased materially by the inclusion of the earnings of the Topeka Railway, which was acquired in that year. As the gross revenues of that property amounted in 1909, according to the figures made public for that year, to $382,764, it appears that, allowing only for a normal rate of increase, they are now at the rate of well over $400,000 a year. A notable betterment for the interurban system was placed in operation during the year, but the bridge across the Mississippi River and the St. Louis entrance and terminal were not available until near the end of 1910 and the revenues for the period under review did not show the effect of this great undertaking.

The comparative table of earnings for two years, as published in the report, permits a showing of the gross earning capacity of all the properties embraced in the system at the conclusion of the fiscal year and of the increase in the 1910 results as compared with 1909. It should be added that the net results are harmonized with the other statement by the deduction of the net earnings of the Des Moines and Topeka properties prior to the purchase of these systems. With this rearrangement the total gross earnings are stated to be $6,218,038, which compares with $5,363,384, the total revenue for 1909 of the properties that composed the system at the end of 1910. This indicates a gain of 15.9 per cent.

While the full details of operating expenses are not stated in the report an explanatory note states that during 1910 $904,045, or 14.6 per cent of gross earnings, was expended for maintenance. This figure is appended to the statement given to indicate the gross earning capacity of $6,218,038, but it probably did not differ materially in the other statement which includes the gross returns for the Topeka and Des Moines properties from the time of acquisition instead of for the entire calendar year. Appropriations of $300,000 for depreciation and of $84,262 for bond discount of controlled companies should be mentioned because they are in addition to the operating expenses, including taxes of $3,608,023.

While the Illinois Traction Company is the well-known large property of the McKinley interests, it by no means measures the full activities of these owners and operators in the territory served. With the addition of the Western Railways & Light Company, which operates several railway and other public utility properties in Illinois, the gross earnings of the companies controlled in Illinois, Missouri, Iowa and Kansas probably aggregate $8,000,000.

The Electric Terminal Arcade of the Oklahoma Railway Company

This Terminal Is One of the Most Complete in the Country and Has Recently Been Finished

BY H. C. MARTIN, ADVERTISING MANAGER OKLAHOMA RAILWAY COMPANY

For its size no city in the world can boast of more pretentious or modern electric terminal facilities than Oklahoma City. The Terminal Arcade, located at the corner of Harvey Street and Grand Avenue in the heart of the business district, is just completed and represents the last word in terminal building for street and interurban railways. This terminal arcade was constructed by the Oklahoma Electric Terminal Company, a subsidiary organization of the Oklahoma Railway Company, for the use of all local and interurban cars of the railway company as well as the El Reno Interurban Railway Company, whose line connects



Oklahoma Terminal—Arcade from Southeast Corner

Oklahoma City with Yukon, 19 miles west, and will eventually extend to El Reno, 30 miles west of Oklahoma City.

The officers of the Oklahoma Electric Terminal Company have been considering proper electric terminal facilities for years. They realized that the time would surely come when Oklahoma City would have grown large enough and the electric railway system have become extensive enough to demand a terminal station convenient to the down-town district, where passengers could congregate and wait for cars without having to stand upon the street corners exposed to rain and sun.

They laid their plans well in advance and acquired the property now occupied by the Terminal Arcade, paying a high price for it in order to be prepared to meet the demands of the future. It speaks well for the progressive ideas of the company when it is known that no city in the country with a population double that of Oklahoma City has ever attempted anything nearly so adequate or elaborate.

A great deal of study and thought was devoted to the subject of proper terminal facilities before the plans were finally approved. The best ideas incorporated in terminals throughout the country were considered and special attention was paid to the terminal buildings at Indianapolis and Los Angeles.

The Terminal Arcade consists of four buildings and a train shed. One building faces south on Grand Avenue and three face east on Harvey Street.

THE TERMINAL BUILDING PROPER

The Terminal Building proper consists of six stories and basement. The materials used in its construction were reinforced concrete, faced with red vitrified paving brick and trimmed with white terra cotta. The inside finish is unique in the Southwest, the doors, window frames, baseboards and picture molding being of steel. All windows are of wired glass and every room in the building has large outside windows.

The building has its own refrigerating plant and pure, soft water is supplied by a well, 225 ft. deep, just west of the building. The water, after passing through the refrigerating plant, is distributed to all floors, where artistic marble drinking fountains are located.

The floors in the corridors, as well as all stairways, are of marble. The stairway railings are of Vermont marble and the steps of Massachusetts marble equipped with Mason safety tread.

There are two passenger elevators of the very latest type, capable of a speed of 350 ft. per minute, equipped with the Armstrong signal system. Elevators are fitted with wired glass and steel doors. The other appointments of the building are of the very latest type, skilfully planned for the maximum of convenience to occupants.

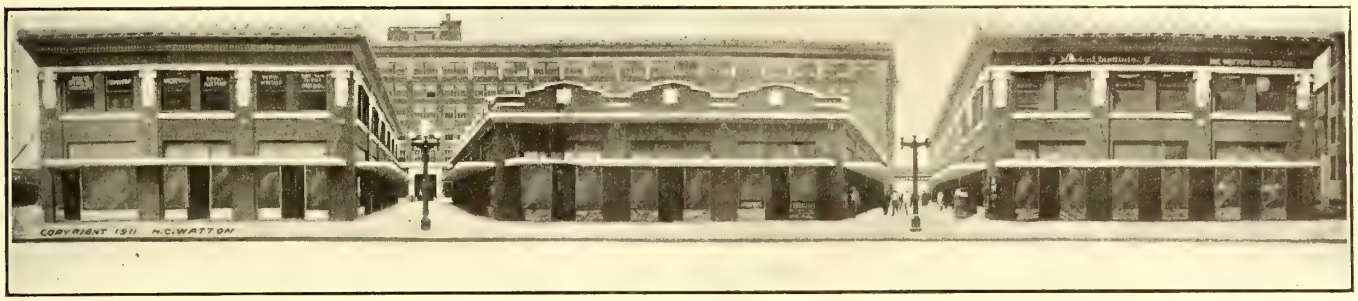
The basement and rear half of the ground floor has been planned for an up-to-date café, with a room in basement 55 ft. x 65 ft. for tables. The first-floor room is 44 ft. x

45 ft. and is now occupied by a high-grade dairy lunch room. The kitchen is located in the basement, as are also the refrigerating and storage rooms. A tunnel leads from the basement north under building "C" to the alley. This tunnel will be used for carrying supplies to and from the basement.

In the basement is also located the heating plant for the entire arcade, consisting of a 150-hp tubular boiler, equipped to burn either coal or gas. Steam is supplied from this boiler to every office and storeroom in the entire arcade.

The first floor of the Terminal Building is occupied by the Classen Company, real estate dealer; the second floor and part of the third by the executive offices of the Oklahoma Railroad Company, and the sixth floor by the railway company attorneys. The other floors of the building are cut up into office rooms and suites and are occupied by many different and representative firms.

The three arcade buildings facing east on Harvey Street are patterned after the main building, the same general architectural scheme being carried throughout the entire arcade.



Oklahoma Terminal—Group of Buildings



Oklahoma Terminal—Office Building and Train Shed

BUILDING "C"

Building "C" is two stories high and 156 ft. deep by 55 ft. wide. The rear of the first story has been fitted up as waiting rooms for whites and negroes, ticket offices and transfer station. An open porch faces the railway tracks on the west, over which the train shed, 60 ft. x 106 ft., extends. The train shed is built entirely of steel and iron, the beams and columns being of structural steel and the roof of corrugated iron. A picket fence incloses the terminal yards and entrance and exit are had only through the arcades leading in from Harvey Street, Grand Avenue and Main Street.

COLLECTION OF FARES

A system of turnstiles is now being installed and all passengers in waiting rooms will pay their fare upon passing through turnstiles. Thus the collection of cash fares and the making of change by conductors as regards passengers who board cars within the station will be eliminated.

When a passenger pays his fare at a turnstile he receives a check which entitles him to board any car within the station inclosure, but is not good at any other point. This check is collected by the conductor and is treated by him like any cash fare, and transfers to intersecting lines are issued upon it.

Passengers who are brought into the terminal station on cars and desire to transfer to other lines receive terminal transfers which entitle them to ride on any line except that by which transfer was issued. These transfers are good only within the station inclosure.

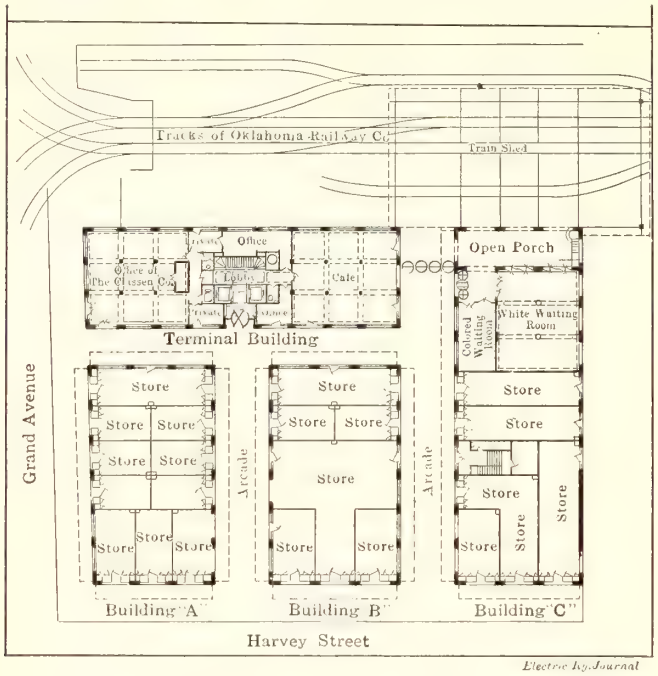
A regular transfer slip is issued to passengers who transfer at points outside the terminal station. All transfers and passenger checks of the company have the day of the month printed upon the face of the transfer in large red letters, the name of the month being punched in the margin by the transfer clerk or conductor. Line transfers for points outside the terminal are only good upon date issued, at the point of transfer, in the direction indicated and within time punched.

The waiting rooms are fitted with heavy, artistic oak settees, toilet rooms and other conveniences for the comfort of passengers. The woodwork is finished in a light green.

All cars of the company, both local and interurban, pass through the terminal station. Four sets of tracks, besides side tracks, switches and turn-outs, are provided for this service. There is an inspectors' booth with telephone and other necessary supplies in the train shed and all dispatching of cars is handled from that point.

The front portion of building "C" downstairs is occupied by small, attractive shops and part of the upper floor by

office rooms, studios, etc. The rest of the second floor of building "C" is used by the trainmen and other employees of the railway company. Here are a general assembly room



Oklahoma Terminal—Plan of Terminal Buildings

where instructions to trainmen are given, a billiard and pool room, a barber shop, shower baths and a reading and lounging room. These quarters are connected with the general offices by an overhead cement passageway which leads across the arcade to the general maneger's office.

BUILDINGS "A" AND "B"

Buildings "A" and "B" are 57 ft. wide by 95 ft. deep each. The latter is one story in height and is devoted to storerooms. Building "A," on the corner, is two stories high. The second floor consists of offices, while the ground floor is divided into shops.

ARCADES

The two passageways, 24 ft. wide, leading east to Harvey Street and the passageway leading south to Grand Avenue are paved with cement. All of the arcade buildings have heavy metal canopies which extend outward 7 ft., and thus leave only a small space in the center of the passageway not protected from the sun and rain. These canopies are hung with heavy wrought-iron chains and are studded with hundreds of electric bulbs. White Way lighting standards adorn the sidewalks on Harvey Street and Grand Avenue and illuminate the entrances to the Terminal Arcade. It is the intention to make this corner one of the most effectively lighted corners in the United States.

ARCHITECTS AND BUILDERS

William A. Wells, architect, of Oklahoma City, drew the plans for the Terminal Arcade and the Selden-Breck Construction Company, of St. Louis, was the builder.

One of the projected works at Christiania, Norway, is a tunnel for the street railways, to enable them to reach a resort on a hill 3 miles away. Consul-General Bordewich states that the company to address is Christiania Elektriske Sporvei, Valkyrie gade No. 21, Christiania.

THE POWER PLANT EXTENSION OF THE RHODE ISLAND COMPANY

BY M. H. BRONSDON, CHIEF ENGINEER RHODE ISLAND COMPANY

The power requirements of the Rhode Island Company's system are supplied from the Manchester Street power station. For some time past it has been evident to the officials of the company that additions to the generating apparatus in this station would be necessary to supply the expected demands for power during the winter of 1911-1912. Hence, a very thorough study of conditions and apparatus was made to determine the equipment which would show the greatest economy not only immediately but for as long a series of years as possible. It is the intention of this article to describe the different plans considered and give the reasons for the selection of that adopted.

Referring to the plan of the station on the accompanying inset sheet, the generators in the engine room, before alterations, had ratings as shown in Table I:

TABLE I.—PRESENT CAPACITY OF STATION.

	Normal.	Maximum.
1	2,500 kw, a.c.	3,700 kw
2	1,500 kw, a.c.	2,250 kw
3	1,500 kw, a.c.	2,250 kw
*4	1,600 kw, d.c.	2,400 kw
5	2,500 kw, d.c.	3,750 kw
6	2,500 kw, d.c.	3,750 kw
	12,100 kw, d.c.	18,100 kw

*Shown in dotted lines.

REJECTED PLANS

The first plan considered to increase the generating capacity was to build an extension to the present building

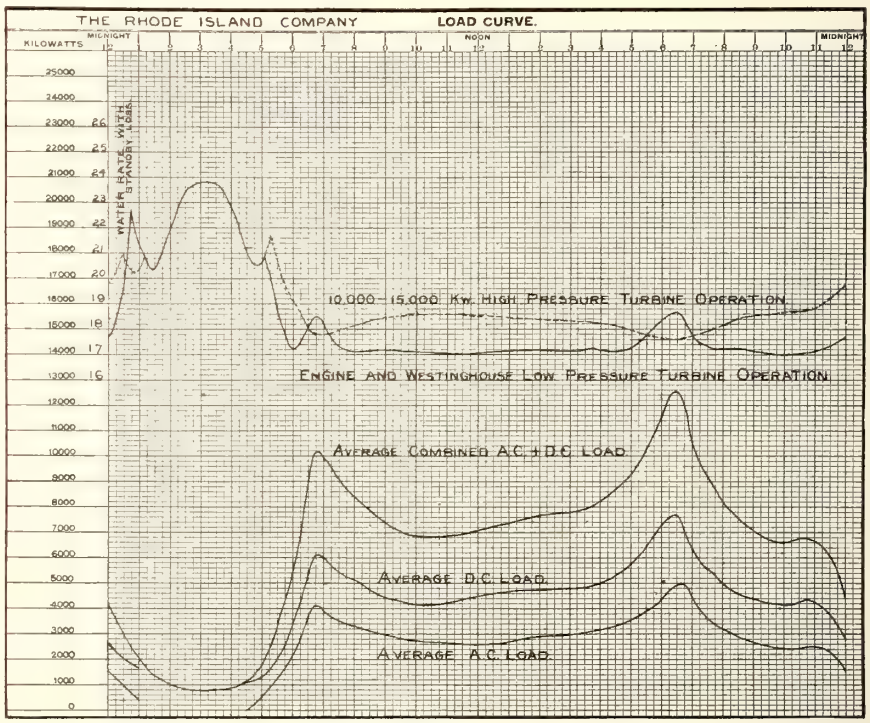


Fig. 1—Load Curve and Estimated Water Rate for High-Pressure and Low-Pressure Turbine Operation

in which would be installed turbo-units of such capacity as seemed best to fit the load conditions. This plan was abandoned on account of the cost of the building extension, because, owing to the fact that there are more than 50 ft. of mud under the ground surface, very heavy piling and other expensive construction would be required.

The second plan considered contemplated the removal of the units marked 2, 3 and 4 from time to time as the demand increased and substituting in the space made available 3000-kw turbo-units, but this plan was abandoned on

account of the cost of installation and because the operating costs would not be very materially bettered.

The third plan considered was the application of low pressure turbo-units to the existing reciprocating units. As fuel represents approximately 70 per cent of the cost of power plant operations and as the steam per kw-hour was lowest with low-pressure turbines connected to the existing units, every consideration was given to this plan. Various applications of the low-pressure turbine were considered as follows:

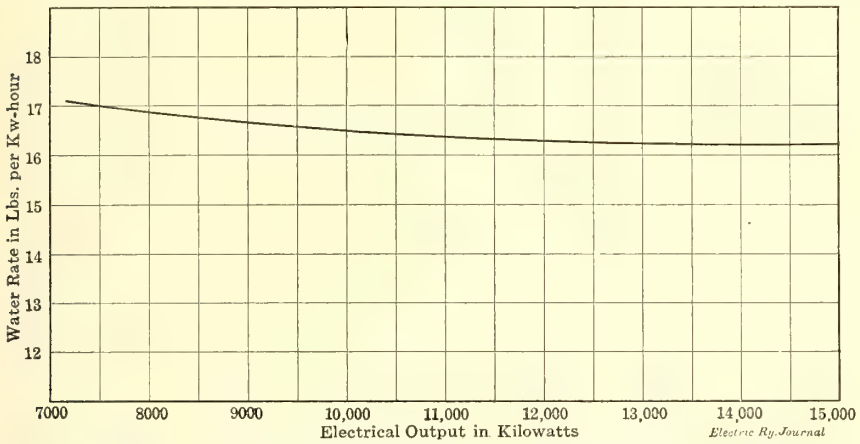


Fig. 2—Guaranteed Steam Consumption of High-Pressure Turbine at 145 lb. and 75 Deg. Superheat

(a) One low-pressure turbine to each of the existing units.

(b) One low-pressure turbine to units Nos. 2, 3 and 4 and one low-pressure turbine to units Nos. 5 and 6.

(c) Two low-pressure turbines which would receive steam from a regenerator taking the exhaust steam from engines 2, 3, 4, 5 and 6, with the exhaust piping so arranged that either or all of the existing engines could be operated condensing should it be found desirable or necessary when the low-pressure turbo-units were out of service.

The proposed application of low-pressure turbo-units was abandoned for the following reasons:

(a) The space being limited, convenient installations could not be made.

(b) The maximum output of the station would be increased from 18,100 kw (12,100 kw normal at present) to 23,070 kw, and as this output was approached, an expensive extension to the building would be necessary to accommodate further additions to the generating capacity.

(3) The necessity of continuously overloading existing generators beyond their normal rating to secure the lowest steam consumption of the combined unit.

(d) Expense of repairs to existing reciprocating units would increase owing to their increased loading.

THE ADOPTED PLAN

The fourth plan considered the use of high-pressure, condensing turbo-units in sizes of 10,000-kw normal, 15,000-kw maximum rating, one each of these turbines to occupy the space made available by the removal of existing units Nos. 2, 3 and 4. This plan, it was found, would give an installation as shown in Table II:

TABLE II.—FUTURE CAPACITY OF STATION UNDER PLAN FINALLY ADOPTED.

	Normal.	Maximum.
1	2500 kw	3750 kw
2	10,000 kw	15,000 kw
3	10,000 kw	15,000 kw
4	10,000 kw	15,000 kw
5	2,500 kw	3,750 kw
6	2,500 kw	3,750 kw
	37,500 kw	56,250 kw

This fourth plan was finally adopted for the following reasons:

(a) The cost per kw-hour at the busbars will be less by this plan than by either of the other plans, owing to the reduced cost of engine repairs, attendance, lubricants and stand-by losses.

(b) Greater reliability for continuous service.

(c) Continuous reduction in steam per kw-hour, as the load on the plant increases.

(d) By additions to the boiler plant the ultimate capacity of the engine room (56,250 kw) can be accommodated.

(e) Additions to boiler plant can be made at much lower cost proportionately than to the entire building.

INSTALLATION OF 10,000-15,000-KW TURBINE

One 10,000-15,000-kw turbo-unit has already been ordered and is being installed as shown in full lines on the plan as unit No. 4. Before the company finally decided upon the use of large sizes of high-pressure turbines, load curves were traced for a period of one year and an average curve was deducted. This curve is shown in Fig. 1. There are, of course, much higher peaks during snowstorms in the winter months, but the load curve shown on Fig. 1 was considered to be a very fair average of all the curves for one year. As a matter of fact, the turbo-unit now being installed has a maximum capacity of 17,000 kw, and it is expected that it will care for the entire load in the nineteen hours between 6 a. m. and 1 a. m. during upward of 300 days per year and until such time as the average peak load exceeds the maximum capacity of this machine. Should it be found economical or desirable to place one of the other existing units in operation to help over the peaks, these existing units will be ready for the purpose.

During the five hours from 1 a. m. to 6 a. m. one of the smaller existing reciprocating units will be operated.

The corresponding estimated steam per kilowatt is shown directly over the load curve on Fig. 1, both for high-pressure and low-pressure turbo-operation.

It will be noted that the steam requirement is less with the low-pressure unit than with the high pressure unit. It will be noted also that the steam requirement drops down as the load increases, and it will be a matter of a few years only before the regular demand will be such that the steam consumption curve of the high-pressure turbine will approximate the steam curve of the low-pressure turbo-unit. But, as already stated, the estimated cost of current per kw-hour is lower with high-pressure turbines than with low pressure turbines, owing to lower charges for attendants, repairs, lubricants, supplies, stand-by losses, etc.

Fig. 2 shows a curve of the guaranteed steam consumption of the 10,000-15,000-kw high-pressure turbo-unit, based upon 145-lb. gage pressure, 75 deg. F. superheat and 28-in. vacuum. It is the intention of the company to operate this unit with 160-lb. gage pressure and 150 deg. F. superheat, which will reduce this steam requirement about 7 per cent.

ESTIMATED COST OF STATION EQUIPPED WITH HIGH-PRESSURE TURBINES

It is the writer's belief that ultimately power will be generated by large a.c. units in plants of large capacity, situated where tidewater deliveries of fuel can be made, with an abundance of fresh water for boiler and other purposes. The alternating current will be distributed to transformer stations by high-tension lines at 10,000 to 50,000 volts, or higher. A power plant of this type, properly designated and located, should be built for $75 per kilowatt and should generate busbar current at less than 4 mills per kw-hour, at points along the Atlantic coast, where coal will be delivered at from $3.10 to $3.25 per ton alongside.

The Log of a Gasoline-Electric Car

Complete Operating and Transportation Statistics Are Presented of a New York City Experiment with This Type of Self-Contained Car.

In November, 1909, the Third Avenue Railroad, New York, placed a gasoline-electric car in passenger service. With but one important interruption, this car was in operation until the middle of September, 1910. It was then removed from the line and its motive apparatus applied to a snow sweeper as described at the end of this article.

The purpose of this installation was to compare the operating and maintenance costs of sample gasoline-electric and storage-battery cars in order to determine which of the two was more suitable for the replacement of this company's horse cars. The performance of both types was better than expected, but the storage-battery car was chosen eventually because under the conditions, which were somewhat unusual, the storage battery car was cheaper than the gasoline-electric car in first cost, in energy expenses and in general maintenance. Furthermore, the upkeep of the storage batteries was taken over by the battery manufacturer on a basis of guaranteed cost per mile. Consequently, it was needless for the Third Avenue Railroad to add special mechanical facilities or to employ special help, as would have been necessary had the gasoline-electric car been adopted. These factors are dealt with in more detail in the paragraphs immediately following.

FIRST COST

The first cost of the gasoline-electric car was practically double that of the storage-battery design, partly on account of the heavier car body and truck and partly on account of the more complicated power equipment. The actual weight per seated passenger was 857 lb. for the gasoline-electric car assuming a capacity of 28, but only 557 lb. for the storage-battery car on a capacity of 26 and a weight of 14,480 lb. when completely equipped. The non-stressing character of the all-electric chain drive was demonstrated by the fact that old horse cars were found serviceable for accumulator service merely by installing new trucks and overhauling the car bodies without altering the main framework. The principal body changes were the addition of vestibule doors, the substitution of open-end bulkheads for the body doors and the construction of battery crates under the longitudinal seating. The truck manufacture and body work, including painting and the installation of equipment, was done in the railway company's shops for about $375 per car. The same trucks and motive apparatus were applied also to twenty-five new car bodies, making a total of thirty cars. More recently thirty-five additional storage-battery cars have been ordered from The J. G. Brill Company. It is plain from the foregoing that first-cost considerations certainly were greatly in favor of the storage battery.

ENERGY COST

The cost of gasoline alone per revenue mile, as shown in the accompanying tables, was never less than 4.61 cents. On the other hand, the cost for electrical energy was exceptionally favorable because the total energy requirements of the accumulator cars constituted but a negligible factor at the power station. The only items which could properly be posted in figuring the cost per kw-hour supplied were coal, attendance and charging-station equipment. The energy consumption of these cars averaged 75 watt-hours per ton mile, or 450 watt-hours per car mile. Assuming a charging loss of 50 watt-hours for every car mile operated and an estimated total energy cost of two cents per kw-hour, the cost of energy will be not more than one cent per car mile, or at least one-fourth of that for the gasoline-electric car.

MAINTENANCE COST

The third factor in favor of the storage-battery car was lower maintenance. It was taken for granted that the upkeep expenses for the motors and controllers of both types would be practically equal. The serious problem was whether the gasoline engine or the storage batteries would require the higher maintenance charges. In any event, the care by the railway of either of these items would have burdened it with an extra shop and stockroom, as well as with especially skilled workmen. A very satisfactory solution was found by making a contract with the storage-battery manufacturer who equipped the first thirty cars whereby the latter for a fixed price per car mile guaranteed to keep the cells in a condition equivalent to at least 75 per cent of their rated output. The maintenance cost guarantees of this manufacturer and of the second battery company, which is equipping the thirty-five new cars, are actually less than the cost of gasoline alone. The rest of the equipment on the storage-battery cars requires no extraordinary maintenance measures.

TRIAL CONDITIONS

Although the storage-battery and gasoline-electric-battery cars were competitors for the modernization of the horse car routes, they were tried out under very diverse conditions. The storage-battery car was placed in service on the same tracks over which the horse cars were operated, and it was not required to average more than 6.5 m.p.h. to 7 m.p.h. schedule speed, including about nine stops per mile. The gasoline-electric car was placed in service, on the electrically operated 125th Street cross-town line, where it was run in regular turn between standard cars on two and one-half minute headway for 15 hours a day without lay-overs on a route 2.1 miles long, averaging seven to ten stops per mile and at a schedule speed of about 8 m.p.h. In addition to this regular passenger service, in which it operated most satisfactorily, from both the engineering and transportation standpoints, the gasoline-electric car was subjected to a large number of special tests in order to determine its possibilities to the utmost. These tests demonstrated clearly that there is a field of economical usefulness for a car of this type under conditions where grades, higher average speeds and electric-energy costs are more important factors than on the recent animal traction lines of the Third Avenue Railroad. The conditions which so greatly favored the storage battery have already been dwelt upon at length.

DESCRIPTION OF EQUIPMENTS

It may be well to describe both types of cars briefly before presenting the detailed log of the gasoline-electric car. The first accumulator car (see Electric Railway Journal, page 735, April 23, 1910) was 17 ft. 10 in. long over the corner posts and had 4-ft. platforms, making a total length of 25 ft. 10 in. over all. The truck was home-made of commercial riveted angles. The batteries were of the Gould Storage Battery Company's type, T. H. pasted design, composed of 29 plates per cell and 44 cells per set, rated 520 amp-hours at 84 volts. The two chain-driven motors were of the GE-1029 automobile type, 5-hp, 1200 r.p.m. The controllers were of the S 34-D type. The current-saving features installed were roller bearings in the journal boxes, ball bearings in the armature bearings and tungsten lamps for inside lighting and headlights. This car averaged 83⅓ watts per ton mile when running at an average speed of 6.33 m.p.h., including 9.62 stops per mile. The remainder of the first thirty cars were 26 ft. 5 in. long

over all, but have 4½-ft. instead of 4-ft. platforms. The storage batteries were of the same type, but were increased in number from 44 to 58 cells. The motors were of the same general design, but of 7½-hp capacity each instead of 5-hp. The only important change in the storage-battery cars as embodied in the last order, and also to be incorporated in the present cars, is the use of gearing instead of chains.

The gasoline-electric car (see ELECTRIC RAILWAY JOURNAL, page 988, Nov. 6, 1909), was of the single-truck type, with drop sash and vestibules. It was 19 ft. long over the body and frame, 26 ft. long over all and had 4½-ft. platforms. The total weight was 12 tons, as against 7 tons for the storage-battery car. The generating equipment, which was mounted on one truck of 7 ft. 6 in. wheelbase, consisted of a four-cylinder, four-cycle engine direct-connected to a generator and exciter. The gas engine ran at constant speed, the car being operated electrically with P-15 controllers. The tungsten lamps on this car were supplied with current from the exciter. The car was heated by the cooling water of the engine. The truck was built by the American Locomotive Company, but the power equipment was furnished by the General Electric Company.

TABLE I—SHOWING OPERATING COST OF GASOLINE CAR, THIRD AVENUE RAILROAD

Date	Gasoline per Revenue Mile, Gal. Price	Gasoline per Revenue Mile, Amount. Gal.	Gasoline per Revenue Mile, Cost	Cylinder Oil per Revenue Price	Cylinder Oil per Revenue Mile, Amount	Cylinder Oil per Revenue Mile, Cost	Gasoline per Mile of Gross Miles, Amount	Gasoline per Mile of Gross Miles, Cost	Cylinder Oil per Mile of Gross Miles, Amount	Cylinder Oil per Mile of Gross Miles, Cost	Platform Expenses per Mile of Gross Miles.	Motor Grease per Mile of Gross Miles
1 Two days of October and first 15 days of November, 1909	18	.553	9.95	45.5	0.01	0.50	.53	9.60	.01	.49	$7.29	
2 Last 15 days of November, 1909	11.75	.513	6.02	45.5	0.01	0.61	.50	5.80	.01	.59	7.47	
3 First 7 days of December, 1909	11.75	.411	4.83	45.5	0.011	0.48	.40	4.70	.01	.47	7.51	
4 Next 2 days of December, 1909	11.75	.392	4.61	38.5	0.008	0.30	.38	4.47	.008	.29	7.48	
5 Thirty-one days, January, 1910	11.75	.536	6.29	38.5	0.018	0.68	.52	6.11	.02	.66	7.79	
6 Twenty-eight days, February, 1910	11.75	.533	6.27	38.5	0.014	0.54	.52	6.10	.014	.53	7.72	
7 Twenty-one days, March, 1910	11.35	.556	6.31	38.5	0.013	0.51	.54	6.14	.013	.49	7.46	0.36
8 Thirty days, April, 1910	11.35	.427	4.85	38.5	0.016	0.63	.42	4.73	.016	.61	7.09	.0002
9 Nine days, May, 1910	11.35	.462	5.24	38.5	0.016	0.62	.45	5.09	.016	.60	7.63	

	Platform Expenses per Revenue Mile	Motor Grease per Revenue Mile	Miscellaneous Expenses per Revenue Mile	Total Expenses per Revenue Mile	Miscellaneous Expenses per Mile of Gross Miles	Total Expenses per Mile of Gross Miles	Total Revenue per Revenue Mile	Total Revenue per Mile of Gross Miles
1	$7.55		$2.57	$20 57	$2.48	$19.86	$32.62	31.50
2	7.70		1.40	15.73	1.36	15.26	35 40	34.40
3	7.70		0.71	13.72	0.69	13.37	30.97	30.19
4	7.70		7.16	19.77	6.95	19.18	29.73	28.84
5	8.01		1.30	16.28	1.26	15.72	31.85	30.92
6	7.93		1.46	16.20	1.42	15.76	30.37	29.55
7	7.67	0.3630	1.50	16.35	1.46	15.91	29.99	29.17
8	7.26	.0002	1.20	13.94	1.17	13.61	28.56	29.88
9	7.47		1.08	14.41	1.05	14.38	30.31	29.48

gasoline consumption was very low indeed. Despite the fact that this car weighed 12 tons, the amount of fuel required never exceeded 0.553 gal. per revenue mile, and it was always less than 0.5 gal. under favorable weather conditions. The first grade of gasoline tried cost 18 cents per gallon, but more economical results were secured with two lower grades, costing in turn 11.75 cents and 11.35 cents per gallon. As shown in Table I, the cost of gasoline per revenue mile varied from 4 cents to 6 cents. The cost of cylinder lubrication added about 0.5 cent per revenue mile, but that for motor lubrication was negligible. The foregoing charges, plus platform and miscellaneous expenses, make the total expenses per revenue mile range from 13 cents to 16 cents, the difference depending mainly on weather conditions. The number of dark or non-revenue miles did not increase these costs materially, as the car was stored within one-quarter mile of its route.

Table I also shows that the total gross earnings per revenue car mile varied from 28.5 cents to 35.4 cents. Roughly speaking, the gross earnings per car mile were about twice the operating expenses, excluding 3.1 cents for fixed charges, 2 cents for car maintenance and 0.25 cent for track maintenance. It is interesting to add that the earning power of this twenty-eight-passenger, single-truck car proved to be practically as high as those of the regular

LOG AND PERFORMANCE OF THE GASOLINE-ELECTRIC CAR

From Oct. 29, 1909, to May 9, 1910, inclusive, a detailed daily record was kept by the engineers of the Third Avenue Railroad of every important operating feature in connection with the gasoline-electric car. As shown in Table I, this log gave the amount and cost of the gasoline, cylinder oil and motor grease per revenue and gross mile; likewise the platform expenses, miscellaneous charges and revenue per revenue and gross mile. The total figures on which the foregoing unit costs are based are printed in Table II. A study of the figures in these tables should prove interesting.

TABLE II—SHOWING OPERATING STATISTICS OF GASOLINE CAR, THIRD AVENUE RAILROAD

Date	Revenue Fares	Transfers and Passes	Revenue Miles	Dark Miles	Gasoline in Gallons	Cylinder Oil in Gallons	Motor Grease	Platform Expenses	Other Expense.
Two days of October and 15 days of November, 1909	6,289	1,638	964	34	532.0	10.75		$72.77	$24.77
Last 15 days of November, 1909	5,938	1,447	839	26	430.0	11.25		64.62	11.76
First 7 days of December, 1909	3,345	944	540	14	222.0	5.75		41.60	3.82
Next 2 days December, 1909	773	238	130	4	51.0	1.00		10.02	9.31*
Thirty-one days, January, 1910	12,758	3,343	2,003	58	1,072.5	35.50		160.48	25.97
Twenty-eight days, February, 1910	10,969	3,310	1,806	50	963.0	25.50		142.62	26.28
Thirty-one days, March, 1910	12,084	3,833	2,015	56	1,121.0	26.50	7.32	154.54	30.25
Thirty days, April, 1910	13,352	3,853	2,372	58	1,013.0	38.75	0.42	172.24	28.51
Nine days, May, 1910	3,862	1,192	637	18	294.0	10.24		47.60	6.90
One hundred and seventy days			11,306	318					

* From Dec. 19, 1909, to part of Jan. 1, 1910, inclusive, car out of service for overhauling.

In the first place it was assumed that this car would be capable of operating 30,000 miles per annum. The record shows that a total of 11,624 miles (11,306 revenue and 318 dark miles) actually was run in 170 days. This is equivalent to practically 25,000 miles per annum. The assumed mileage could have been easily attained, as the heating records show that the car could have been operated without trouble for 20 per cent longer every day. On this maximum mileage basis the expenses per car mile were estimated as 3.1 cents for the fixed charges and 2 cents for the maintenance. Depreciation was figured at 8 per cent.

Referring now to Table I, it will be noted that the

double-truck cars on this route. However, the earnings over the storage-battery routes would have been so much less that the gasoline-electric car would have been operated at a heavy loss.

A footnote in Table II states that the gasoline-electric car was out of service from Dec. 10, 1909, to Jan. 1 following. This long interruption was due to the breakage of a defective shaft. Otherwise this car operated as smoothly as could be desired.

Some very interesting and instructive tests were made jointly by the engineers of the General Electric Company and T. F. Mullaney, chief engineer of the Third Avenue Railroad, to determine the characteristics of the gasoline-electric equipment. These tests uniformly were favorable and in some cases the results were even better than the builder's guarantee. Thus the car actually climbed an 8

Table III.—Showing Energy Consumption of Gasoline Car, Third Avenue Railroad

Duration of Trips	Total Power, Kw-Hours	Kw-Hours per Car Mile	Watt-Hours per Ton Mile
No. 1 28½ minutes	5.20	1.30	108.0
No. 2 28½ minutes	4.88	1.22	101.7
No. 3 28½ minutes	5.14	1.29	107.5
No. 4 28 minutes	4.87	1.22	101.5
Average performance		1.26 guarantee	104.5
Total gasoline consumed.....8.0 gal.		....	
Gasoline per car mile.....0.5 gal.		0.6	
Schedule speed, m.p.h.....8.45		7.0	

Table IV.—Showing Acceleration Test Made with Gasoline Car Feb. 17, 1910

Run	Grade per Cent	Time in Seconds	Distance in Feet	Acceleration M.P.H.P.S.
No. 1 Down....	0.65	7.40	50	1.25
No. 1 Down....	0.72	11.40	100	1.05
No. 2 Up.....	0.78	8.60	50	0.92
No. 2 Up.....	0.72	12.50	100	0.87
No. 3 Down....	0.65	7.80	50	1.12
No. 3 Down....	0.72	11.70	100	1.00
No. 4 Up.....	0.78	8.40	50	0.97
No. 4 Up.....	0.72	12.80	100	0.83
No. 5 Up.....	0.83	8.80	50	0.88
No. 5 Up.....	0.77	13.30	100	0.77
No. 6 Up.....	0.83	8.30	50	0.99
No. 6 Up.....	0.77	12.80	100	0.83

Note: Tests were made on Hancock Place, between St. Nicholas and Morningside Avenues.

Table V.—Showing Temperature Test Made with Gasoline Car, March 4, 1910

West End, Leave	East End, Arrival	No. of Stops	Schedule Speed, M.P.H.	Time Blocked, Minutes	East End, Leave	West End, Arrival	No. of Stops	Schedule Speed, M.P.H.	Time Blocked, Minutes
12.09	12.265	21	6.86	..	12.28	12.47	18	7.06	02
12.48	1.01	18	8.27	..	1.03	1.19	20	7.27	..
1.20	1.37	22	7.06	..	1.39	1.55	22	7.50	..
1.55	2.14	25	7.27	02	2.14	2.31	21	7.06	..
2.32	2.50	23	6.66	..	2.50	3.08	23	6.66	..
3.09	3.28	22	6.32	..	3.28	3.44	22	7.74	..
3.44	4.06	18	6.85	04	4.06	4.24	23	6.85	..
4.24	4.41	17	7.05	..	4.42	5.02	22	6.66	02
5.03	5.21	21	6.48	..	5.22	5.39	28	6.85	..
5.40	5.57	23	7.06	..	5.58	..	..	..	..

Engine stopped at 6:09 p. m. at Eighth Avenue, as gasoline in tank was entirely consumed. Car was taken directly to the carhouse for the temperature readings.

	Temperatures. Motor No. 1	Motor No. 2	Generator	Exciter
Armature coil	..	..	72	68
Armature winding..	55	69	74	67
Field	42	51	68	73
Commutator	65	77	72	61
Air, outside	12	12	12	12
Air, inside	15	15	15	15

Motor No. 2 near engine muffler.

per cent grade, although 5 per cent was the assumed limit.

Table III gives some particulars of a fuel and power consumption test made on Feb. 11, 1910, over the 125th Street line between the Hudson and East Rivers. The run began at 1:15 a. m. and ended at 3:08½ a. m. In the interim of 1 hour 53½ minutes the car ran four round trips of 4 miles each and made eight 5-second stops per mile. The gasoline consumption per car mile under these conditions was only 0.5 gal., compared with a guarantee of 0.6 gal. At the same time the schedule speed was 8.45 m.p.h., an excess of 1.45 m.p.h. over the guaranteed speed for such service. The wattmeter in this test showed an average power consumption of 104.5 watt-hours per ton mile, compared with 83.3 watt-hours per ton mile for the storage-battery car, which was equipped with anti-friction journal and armature bearings.

Table IV gives the data on acceleration experiments made on Feb. 17, 1910, over some light grades. In these runs the car showed such excellent accelerations as 1.05 m.p.h.p.s. when going down and 0.83 m.p.h.p.s. when going up a grade of 0.72 per cent.

Table V is the record of a test made on March 4, 1910, to determine the temperature rise after six hours' running as per the schedule given in the table. However, the car actually was in service for 11 hours 25 minutes, during which time it operated 84.68 miles and carried 689 passengers. The schedule speed varied from 6.66 m.p.h. to 7.74 m.p.h. Temperature readings were taken with a Centigrade thermometer at the motors, generator and exciter. The temperature specification called for a heating limit of 65 deg., but it was exceeded in this test because the car was making nine to thirteen stops instead of the eight stops per mile upon which the 65-deg. specification was based, and, furthermore, the readings were taken at the end of a much longer run than six hours. The higher temperatures occurred in motor No. 2 near the muffler.

RE-USE OF GASOLINE EQUIPMENT

The equipment of the gasoline-electric car is now in place on a snow sweeper which was formerly drawn by eight to ten horses upon the 110th Street storage-battery line. The sweeper consisted originally of a flat car on which the gasoline engine, generator and exciter were mounted, after which a housing was built about them. The radiators are built into the side of the housing. The motors are placed on the axles.

RAILROAD WITH SPIRAL SHAFT

At the meeting of the British Association for the Advancement of Science, Aug. 30-Sept. 7, W. Yorath Lewis described a novel type of motive power designed specially for subways. The cars engaged with a roller grip a shaft which extended the entire length of the line and was provided with a spiral thread. The speed of the cars would be proportional to the pitch of the spiral engaged. To give low speed at station points the pitch would therefore be close, and to enable high speeds to be obtained between stations the pitch would be six or eight times greater while the necessary acceleration and deceleration were obtained by a graduated pitch. The return of over 80 per cent of the kinetic energy of the cars during deceleration was claimed and that the use of brakes and signal apparatus and other accessories essential to existing forms of electric traction would be obviated. The shaft was carried in cradle roller bearings of the anti-friction type which while providing for the clear passage of the engagement would enable the energy consumption of shaft rotation to be kept low.

Driving motors were to be inserted at intervals of a quarter of a mile, and the construction of the spiral thread was the only part of the system presenting any real difficulty. Such a system was no doubt more adapted to straight and level routes than to routes having curves and changes of grade. At the ends of the route a semi-circle of small radius would be provided and the cars would be picked out of engagement with the last spiral of one shaft and put into engagement with the first spiral of another shaft.

It was proposed to employ five-seat cars which when loaded would weigh only one ton, and the pressure between engaging rollers and the edge of spiral on guiding shaft would be under 20 lb. in all uniform low and high-speed sections. In the accelerating and decelerating sections the pressure would be gradually increased to a maximum not exceeding 600 lb.

Chicago Meeting of Illinois Railways Association

At This Meeting the Principal Subjects Discussed Were Publicity and Its Relation to Electric Railway Traffic Promotion.

Forty railway and associate members of the Illinois Electric Railways Association met at the La Salle Hotel in Chicago on Sept. 15 to discuss publicity and its relation to electric railway traffic promotion. H. E. Chubbuck, president of the association, was in the chair. The morning session began with the roll call, which showed that a majority of the electric railway properties in the State were represented at the meeting by one or more officials. The various committees then reported. E. C. Faber, chairman of the executive committee, stated that no meeting of that committee had been held since the last association meeting. Richard Breckenridge reported for the membership committee that Will Arnold, the chairman of that committee, recently sailed for a year's travel in Europe. Joseph O'Hara, Chicago, Aurora & DeKalb, was appointed acting chairman of the committee and Robert E. Belknap was appointed a member of the committee. Secretary Flenner read a letter of application for associate membership from George Keummerlein, Jr., superintendent of the Milwaukee Electric Railway & Light Company.

L. E. Gould, ELECTRIC RAILWAY JOURNAL, reported for the block signal committee that it had held no meetings recently and was awaiting the report of the joint committee on block signals of the American Electric Railway Engineering and Traffic & Transportation Associations.

Mr. Chubbuck called attention to the continued use which his company was making in its advertising matter of the safety feature of its 100 miles of automatic block signals. He showed a record of the monthly report of the block signal department and called attention to the remarkably small number of failures of the signals. During August the 94 signals installed had made 143,904 movements and there had been but 38 failures; thus the signals operated 99.973 per cent perfect. Sixty trains were delayed a total of 146 minutes by the signal failures during August. The signals made 3787 movements per failure and 2398 movements per train stop and 986 movements per minute of train delay. Of the 38 signal failures during the month 24 were caused by lightning storms, which burned out fuses and in two cases broke the line wires. Nine so-called failures were caused by power being shut off from the transmission system. Three failures were creditable because they had been reported as failures, although trains were in the block, and two failures were caused by grounds in lightning arresters.

Mr. Flenner announced that Chester Willoughby, assistant secretary Illinois State Electrical Association, Mayer Building, Peoria, Ill., had for distribution copies of the laws affecting public service corporations passed by the last Legislature.

A general discussion was held on the desirability of having carefully compiled statistics of the electric street and interurban railway properties in Illinois. The president stated that notwithstanding the proportionately large amount of advertising done by the Illinois roads the general public had no real idea of the immensity of the electric railway investments in the State. He also spoke of the value of newspaper advertising. He said that the newspapers were the best medium for publicity. As a matter of interest the Illinois traction sleeping cars during one month handled more than 5000 people.

Fred Buffe, Illinois Traction System, suggested that the association compile data on the electric railway industry in Illinois, have it published in pamphlet form and placed on file at each newspaper office for reference purposes. The association then instructed the president to appoint L. E. Gould, Western editor ELECTRIC RAILWAY JOURNAL, statistician with authority to collect electric railway statistics under the guidance of and for the use of the executive committee. The association also voted that a subcommittee on publicity of the executive committee be appointed by the chairman of the executive committee.

ELECTRIC RAILWAY ADVERTISING

A paper on "Electric Railway Advertising," by Fred G. Buffe, manager publicity department Illinois Traction System, was read by the author. This paper is printed in abstract on pages 495 and 496. Following the reading of his paper Mr. Buffe distributed among the members samples of advertising matter and exhibited an eight-sheet poster which had been displayed recently to advertise the Illinois Traction System and its service to the Illinois State Fair, at Springfield. These posters showed a large map of the system and pictures of automatic block signals in addition to the reading matter. The cost of 500 of these posters was about $240. In larger lots the cost would be approximately 30 cents each. The rental for billboard space was 18 cents for each poster displayed in St. Louis for one month.

Mr. Buffe also described the large painted billboard signs which his department had installed at St. Louis. The tracks of the Illinois Traction System extend for a distance of thirty-nine blocks into the center of the city and at nearly all curves adjoining property had been purchased to reduce the curvature of the track by cutting across the street corners. At these corners where space was available signboards about 40 ft. x 10 ft. in size had been built. These were covered with galvanized iron and displayed advertisements of the Illinois Traction service painted in bright colors. Mr. Buffe had found that these signboards could be erected at about the cost of renting similar poster display space in St. Louis.

Mr. Buffe described a plan tried last year of publishing a monthly advertisement of the theatrical bookings along the line in connection with the timetables. While this advertising matter brought good results from the traffic standpoint, it had to be discontinued because of the impossibility of obtaining early information from the theater managements. The Illinois Traction System carried no announcements on the outside of its cars, but reserved space on the interior, in the sign racks.

George Quackenbush, traffic manager Illinois Traction System, described a new theater-ticket-selling scheme now being handled by his station agents. The theater managers of Peoria, Springfield and some other cities had agreed to give a 50 per cent reduction in the cost of seats if the Traction company would sell theater ticket coupons in connection with the regular local tickets. This was being done and brought forth considerable additional evening riding at no promotion expense for the road.

Mr. Buffe mentioned the permanent building of the Illinois Traction System on the State Fair Grounds at Springfield. This building was new and a duplicate of a standard passenger depot. During the fair last year the publicity department distributed from its headquarters about 250,000 pieces of advertising matter, of which the colored picture postal cards were most in demand. This year 200,000 postal cards will be available for distribution. Mr. Chubbuck said that if other Illinois roads desired to furnish the Illinois Traction System with supplies of their publicity matter these would be placed for distribution from the Illinois Traction building on the fair grounds.

TRAFFIC PROMOTION

Richard Breckinridge, general freight and passenger agent Aurora, Elgin & Chicago Railroad, read a paper on

"Traffic Promotion," which will be found in abstract below. In the discussion E. C. Faber, Aurora, Elgin & Chicago, said that at certain times his company displayed from the Chicago billboards twenty-four-sheet posters. As many as 200 of these posters, which cost $4.80 apiece for printing, had been displayed at one time. Mr. Flenner mentioned that the Aurora, Elgin & Chicago was successful in the use of advertising space of from one-quarter page to full pages in the Chicago daily papers. Several members complimented the Aurora, Elgin & Chicago for the excellence of its illustrated folders, which contained a large lithograph map of the route. Mr. Faber said that the plates for this map cost about $450.

J. J. Rockwell, manager special service department Electric Railway Journal, was to have made an address on "Publicity," but was unavoidably absent.

The president then introduced Ralph H. Beach, Federal Storage Battery Car Company, who described the storage-battery cars built according to his designs which were now in operation on several steam and electric roads. The fastest car yet built had just been placed in service on a road at Muskogee, Okla. This car ran 38 m.p.h. and consumed 650 watt-hours per car mile. A 21-ft. car designed for city service with a speed of 9 m.p.h. and a capacity for running 100 miles per charge would cost about $6,500. The low energy consumption of these cars was due to their light weight and the design of their running gear. Each wheel rotated on its axle and had Rollway roller bearings. The motors drove the cars through chains instead of gears, because Mr. Beach had found the chains to be about 10 per cent more efficient. The chains used had a life of about 100,000 miles.

INSPECTION TRIP

Thirty-five members of the association were the guests of C. N. Wilcoxon, general manager Chicago, Lake Shore & South Bend Railway, during the afternoon and were taken in a special car over the 6600-volt single-phase road to the headquarters and repair shop at Michigan City. On this trip a sustained speed of a mile a minute was made for a distance of 22 miles. Mr. Wilcoxon stated that because of the very high-speed characteristics of the motive-power equipment the engineers of the Westinghouse Electric & Manufacturing Company were now installing on all motor cars of this road a special-limiting device which would open the line-control switch when the car attained a speed of 58 m.p.h. The excursion party returned to Chicago at 6 o'clock.

President Chubbuck announced that the next meeting would be held on Jan. 19. This will be the annual meeting. The November meeting is to be omitted, because of several other conventions and meetings which will be held during October and November.

Abstracts of the papers read by Messrs. Breckinridge and Buffe follow:

TRAFFIC PROMOTION

BY RICHARD BRECKINRIDGE, TRAFFIC AGENT AURORA, ELGIN & CHICAGO RAILROAD

Advertising on the Aurora, Elgin & Chicago Railroad is under direct supervision of the general manager and current publicity is discussed freely at the weekly traffic meetings, at which he presides and which are attended by various interested officials. To these gentlemen is due the chaste and esthetic style which characterizes our work. The execution and details only are left to the traffic department of the road.

The basic ideas of our advertising are as follows: We believe the foundation of good railroad advertising is a good railroad, and, although good advertising may sell poor transportation, our problem is more to keep the advertising standard up to the road's standard and to bring out its features and those of the territory which it serves. Granting that we have a good road furnishing good service to a good territory, the next step is to acquaint the public with the fact. To do this a good map is absolutely essential, and we issue a rather elaborate folder, one-half of which is given up to a comprehensive map, lithographed in several colors, showing our lines and connections, with terminals and principal points boldly displayed. The rest of the folder is given to the cover design and half-tones of scenes along the line, with the necessary descriptive text. This folder is supplemented by many lesser ones, covering our parks, excursion trips, principal cities, side trips, etc. These are of more or less conventional form and need not be described in detail.

After the prospective patron has learned where the road runs and where trains may be taken the next essential is a time card. This want is supplied chiefly in the form of a large folder of standard steam railroad size and design showing every train and car we run, with notes calling special attention to limited trains, dining cars, etc., and the usual pages devoted to general information and rates. These timetables are distributed at all ticket offices and are also placed in Chicago hotels, railroad stations, information bureaus, etc. We also issue about twenty forms of pocket time cards between Chicago and principal points, and a quarter-sheet printed in two colors on heavy cardboard. These cover all principal points and are placed in public places throughout our territory.

With regard to publicity, some is good, but more is bad. There is nothing that brings us results like newspaper space, particularly in a few Chicago papers. We wait until weather and other conditions are favorable, then strike hard, using anywhere from a quarter-page to a full page. The copy is enlivened with pictures of scenes along our line and the text briefly outlines trips or suggests outings and mentions prominently the location of our terminal. The scenes used nearly always include a picture of our standard three-car trains. We seldom issue any advertising literature without this cut, which we use fully as much as we do our trade-mark and with much greater effect. Sometimes we use with good effect a map of the line in place of the pastoral scenes. We have a beautiful outing country along our line and try to make all Chicago enjoy its beauty and incidentally increase our passenger receipts.

When we have a special event in any of our towns we usually use small spaces stating only the event, place, date and time of trains. The copy is usually all type. In our advertising we avoid extravagant claims, bizarre effects and anything sensational, believing that what might be good advertising for a brewery would be bad for a railroad company and that it would cause unfavorable comment rather than sell tickets.

After newspaper advertising in importance and benefit comes billboard space. During the past season we have used twenty-four-sheet bills, lithographed with a colored design of a three-car train passing a wooded and watered scene and also the name of the road and the location of the terminal in Chicago. Following these, we use a large number of one-sheet posters containing nothing but type. These are placed at railroad platfoms and stations in Chicago and refer usually to special events. Consequently they are changed frequently. When there is a special attraction in Chicago, such as an aviation meet, military tournament, land and stock show, we put cars and posters or handbills in all cars, both interurban and city, and in all stations and at platforms. The printed matter is nearly always furnished without charge by the promoters of the event. In some cases this form of advertising undoubtedly helps traffic to a marked extent, but generally speaking we can cover our territory most completely and effectively by the use of space in the Chicago newspapers.

Our advertising has made famous locally at least not only the road, but the Fox River Valley. It helped to build towns along the line and has turned farms into thriving sub-

divisions. We have done good in getting people from the discomforts of the city to the country, some for a day, some for a permanent home. While our methods may not be perfect from an advertising point of view, they have put passengers on our cars, and we are reasonably satisfied.

ELECTRIC RAILWAY ADVERTISING

BY FRED G. BUFFE, MANAGER DEPARTMENT OF PUBLICITY ILLINOIS TRACTION SYSTEM

In its application to the electric railway business advertising covers a broad field. It presents problems which ordinary advertising work does not have to consider. Being so intimately related to the policy of the company and including in its scope so much more than the creation of business, it deserves the most rigid personal attention of the management. Because of these things electric railway advertising should be considered from the broader standpoint of publicity. This not only includes straight advertising but the many other important things which arise in the relations between an electric railroad and the public.

Electric railway advertising resolves itself into an effort to make the public along the lines partners with you in the enterprise. This does not mean that your advertising merely attracts business, but it also influences that intangible and most powerful factor—public opinion—in your favor.

DIFFERENCE IN RELATION WITH PUBLIC OF ELECTRIC RAILWAY AND STEAM RAILROAD

The electric railway occupies a peculiar position in transportation circles. It is closer to the people than are the steam roads. There is a more intimate connection between the farmer and the local car that picks him up at his crossroad station than there is between him and the long train of Pullman cars that dashes through his farm. The officials of the steam railroad are to him an unknown quantity. He knows there is a president and a general manager, but an acquaintance with the foreman of a section gang is generally the only one which he has with railroad official life. With the electric line it is different. Its officials live in his neck of the woods. He sees them often, and these things make a personal connection between an electric road and its patrons not found elsewhere.

The preservation of this sentiment is in a large measure up to the publicity department. Through its advertising and publicity the management is addressing its patrons. It is holding and preserving this interest.

You are advertising service—not breakfast food. The man who rides in your cars does not give a rap whether or not Blank Shredded Sawdust serves up to the printed word, but the failure of the line on which he rides to do so becomes with him a personal affront. Successful advertising will popularize the line. It makes the people know that they and the management are friends.

The publicity department for these reasons should be under the close surveillance of the general manager. Companies have made the mistake of giving the advertising department a desk at the end of a hall, telling it to spend so much money and then being satisfied with a dodger stating that on such and such a date a low rate will be in effect for a picnic at Jim's Grove. While this is necessary it is but a small part of the work.

THE WORK OF THE PUBLICITY DEPARTMENT

The work of a publicity department may be roughly divided into two divisions—permanent, carefully planned twelve-months-in-the-year advertising and the special work demanded for rate and attraction announcements. In the first division come the booklet, timetables and newspaper work planned to place the name of the road in the minds of the people every day in the year. It does not take into account excursion rates and special trains, but is continually hammering away at the excellence of the service, the improvements being made, and the enterprise and resourcefulness of the line.

In the other division will be found the fliers, posters, window cards and newspaper advertising, telling of special rates and events, special car service, etc. The more thorough the work has been in the permanent advertising the more effective will be the business-getting ads of this kind. Keeping still about the good things you do and letting the other fellow tell about the mistakes is not only keeping your light under a bushel but is putting out the light. People won't know what you are doing if you don't tell them.

ILLINOIS TRACTION ADVERTISING MATTER

On the Illinois Traction we have secured good results from standardizing in a way our permanent advertising matter. I mean by this that certain features are worked up in all our advertising. When you see an Illinois Traction "ad" you may always expect the map, the slogan and some suggestion of safety and service.

Two years ago we adopted for a slogan "The Road of Good Service," and we have kept putting this before the people in small convenient packages sugar-coated and tied with pink ribbon until it stands for something. We have tried to make the words "Illinois Traction System" and "convenient, frequent, fast, clean and safe service"—"good service"—mean the same thing.

In our last issue of timetables we followed a new scheme which has worked out most successfully. Instead of placing the trains one after the other in the sequence of their arrival and departure we have placed all the limited trains on



Typical Newspaper Advertisement—Illinois Traction System

one side of the names of the towns and the local trains on the other. This is on the theory that the two classes of service are used by two different classes of customers. The traveling man who makes jumps from terminal to terminal does not care to be bothered with local trains, and an arrangement of this kind prevents him from making the mistake of riding on a local. In our timetables we attempt to impart the necessary information so that it can readily be understood. The location of stations in all terminals is given; the names, titles and addresses of officials, station index and miscellaneous information are also included. These tables are not elaborate and are of convenient size to carry in the pocket. I think a mistake is made when a road's official timetable is included with descriptive matter, advertisements, pictures, etc. These things make it bulky and cumbersome and for this reason it will be thrown away. It is a timetable's business to tell the arrival and departure of trains, necessary information for a traveler and nothing else.

OUTSIDE ADVERTISING SCHEMES

In this connection on the Illinois Traction we have adopted a policy of keeping clear of outside advertising schemes. I do not think a day passes without some fellow coming into my office for permission to issue a timetable free of charge, a booklet of some kind or an illustrated write-up of towns along the Illinois Traction. I believe these things do more harm than good. The merchants along

your line must surely get tired of the importunities of these solicitors, and they have the right to think that the Illinois Traction or any other road is big enough to get out its printed matter without the help of outsiders. We get out our own printed matter, design the sketches, write the copy and sign the vouchers, and our timetables are not made a medium for a miscellaneous bunch of advertising secured from the business men upon whom we depend.

DESIRABLE PLANS

Another good feature which may be worked out successfully is a booklet calling attention to the attractions to be found in the cities and parks along the line. This should be well printed and well illustrated and with no more reading matter than is necessary to tell the story. It should contain a condensed limited timetable and should have in it pictures of the equipment.

Another advertising feature which we find very successful is the souvenir postal card. These should be well printed and the subjects should be appropriate. Last year at the State Fair we had a booth from which we distributed advertising matter, and I had a good opportunity of observing the attractiveness of various forms of advertising matter. As an experiment we would offer the postal cards at intervals, and while the people would take our booklets, timetables, etc., they would mob the booth when the postal cards were offered. This year I intend to give them what they want and have ordered 200,000 of these cards for use at the fair.

Once a year we have a big newspaper edition, and this is perhaps our biggest advertising stunt. An eight-page section of the newspaper is devoted entirely to the Illinois Traction System. It is full of illustrations, and the reading matter is all straight information with the advertising feature eliminated. It is the kind of stuff that any paper is glad to print in its news columns. Arrangements are made with about fifty of the leading papers down the State and these sections are furnished them with their heading and date for circulation in their regular edition. Last year we circulated 186,000 of these papers at a cost of about $2,300.

After a great many different trials we finally hit upon a terminal time card which we think fills the bill. It is well printed on heavy cardboard and shows the trains one after another with the leaving time in large figures and after that the arrival of the train at the various terminals. One can run his finger down the leaving-time column, find the train he wants and after that its arrival at his destination.

During the year we get out cards devoted to freight and express service. These cards are for the convenience of shippers and besides the map and leaving times of the various fast freight trains show prominently the station list.

PERMANENT NEWSPAPER CAMPAIGN

Backing up this line of permanent advertising we keep up a continual newspaper campaign. Any time we do anything that we think is pretty good we are not at all modest about it and are not afraid to toot our own horn. These stories are written in newspaper style and are mailed to the various papers with a request to run them or not as they see fit. Not a day passes but the Illinois Traction System will be found in headlines in down-state papers.

SPECIAL ADVERTISING

Our special advertising follows the usual forms and we get out dodgers and posters and use newspaper space. We also find window cards very effective for excursion work. I think that in this advertising, as well as all others, attractiveness should not be sacrificed to economy. A few more dollars spent on designs and printers' ink will make your fliers read where an unattractive smudgy dodger will go in the discard. In all this work we try to make our advertising lively. For instance, in a recent excursion in connection with a steamboat trip on the Illinois River the ad was headed with the following jingle:

"Know electric travel joys;
See the Upper Illinois."

In our copy we also run little catchy lines like the following:

"The Illinois Traction is the road of satisfaction."
"Travel is perfection under I. T. block protection."
"Traction parks for summer larks."
"Traction trip leaves pleasant memories."

If possible, in our "ads," we run a cut or some design. We also keep impressing the people with the comfort and cleanliness of electric travel. In all our advertising matter we convey the idea of safety by a block signal cut. Once a year for the State Fair at Springfield we have a billboard campaign of a month. This takes in all the towns on the line and we practically cover the lower part of the State. Eight-sheet posters are used, got up in colors. These posters carry the map and a signal picture and not only serve the purpose of advertising the State Fair, but also impress the idea of safety, which is the real object aimed at.

RELATIONS WITH NEWSPAPERS

This brings us to the last but to my mind the most important part of the publicity man's work, and that is the newspaper. We have contracts with over 300 papers. These are on a mileage basis. I am inclined to think that this is about the only way to handle the newspaper advertising. In most cases newspapers have no difficulty in securing passes, and in issuing mileage you get something in return.

I think there is no doubt that the newspaper is the most valuable medium. Too much cannot be said upon the relations between the company and the press. The newspaper men anywhere want to be fair, and if they are met half way these relations redound to the benefit of the company. Don't forget for a minute that a reporter is paid to get and print the news. The measure of his success lies in the stuff that he prints, not in the excuses he makes. The best asset any road can have is the friendship and co-operation of the boys along the line. Some managers take the stand that the reporter is a pest, prying into things that do not concern him. They resent his visit and wave him aside as a person of no consequence. You cannot expect the reporter to entertain any too friendly feelings after treatment of this kind. He comes into your office doing the work for which he is paid. It is his business to get the news. Treat him with consideration and you will find his friendship can be depended upon at all times. I believe that the newspaper boys are the lowest paid, the brightest, most energetic and enthusiastic workers we have.

Don't overlook the fact that the reporter works while you sleep. He may be a cub getting $10 a week, but when he talks he does so to ten, twenty or thirty thousand people. His good will is worth having. He is the one person on earth that is not impressed by wealth, power or position. The story is the thing, and when he is on the hot end of a good yarn all look alike.

The newspaper boys along the Illinois Traction are our friends. We do everything possible to help them in their work. If we have trouble they know that the details will be given out at headquarters as readily as if the story was a favorable one. You cannot expect a newspaper fellow to help you out printing stories of good things you do and then when a real big story breaks thank you for attempting to suppress the news. This is the most important work of the publicity department, and it is something which the steam roads seem entirely to overlook.

Electric railway advertising sums itself up in keeping everlastingly at it with good snappy printing matter, telling of the advantages of electric travel, letting the people know, through the press, what you are doing for their benefit, and in never forgetting that your success is measured by the esteem in which you are held by the people along the line. If they like you they will boost and ride.

Conference of Governors of States

The Proceedings at the Closing Sessions Included an Address by Governor McGovern of Wisconsin on State Control of Public Utilities

Governor Hadley of Missouri and Governor Aldrich of Nebraska delivered before the Governors in conference at Spring Lake, N. J., on Sept. 14, addresses on "The Right of the States to Control Intrastate Commerce." These papers, with miscellaneous business, occupied all of the morning session. At the afternoon session Governor McGovern of Wisconsin spoke on "State Control of Public Utilities." In the ensuing discussion the subjects of intrastate commerce regulation and state control of public utilities were treated together.

This discussion centered around a proposal made by Governor O'Neal of Alabama that a committee of the Governors be appointed to argue before the Supreme Court of the United States the right of the states to regulate commerce within state borders. The Minnesota rate case, in which Judge Sanborn, of the Federal Circuit Court of Minnesota, held that the states had no right to regulate rates, on the ground that such regulation would interfere seriously with the regulation of interstate commerce, and similar litigation affecting other states, will reach the Supreme Court of the United States at an early date. The discussion showed that the Governors were practically unanimous in their support of Governor O'Neal's motion. Under an amendment offered by Governor Stubbs of Kansas and accepted by Governor O'Neal, the motion that the committee should consist of Governors Harmon of Ohio as chairman, Hadley of Missouri and Aldrich of Nebraska was carried with only one dissenting vote. The meeting was united, however, in its belief that if the states are denied the right to regulate commerce within their respective borders they will be without one of the most important powers inherent in government, and that all powers not specifically granted by the Constitution to federal authority should be retained by the individual states.

STATE CONTROL OF PUBLIC UTILITIES

The address of Governor McGovern of Wisconsin on "State Control of Public Utilities" was in part as follows:

"The basic legal principles underlying governmental regulation of public utilities, however novel may be their application to present industrial conditions, are as old as the common law. They are founded upon the very elementary distinction between a public and a private calling. One is clothed with a public use and interest, while the other is not; and this public interest has always in the eye of the law justified regulation in behalf of the people as a whole. The nature and character of the business of utilities is such that competition is inoperative in determining service or rates, and the only choice left to the public is between regulated and unregulated monopoly. It goes without saying that the right of the state to supervise monopolies is as ancient as it is obvious.

"But it may be urged that the exercise of this power, the enforcement of this right, is a legislative function which cannot lawfully be delegated to an administrative board or commission. This is very true; it does not, however, militate against the practical utility of these commissions. Most assuredly it is the Legislature and not the commission that has power to regulate. It is the Legislature that does regulate. It is the Legislature that creates the commission, defines its powers, establishes rules for its guidance and determines the entire policy to be pursued. The commission merely ascertains the facts of each case as it is presented, and applies to these facts the law already laid down by the Legislature. It is purely an administrative body with administrative functions only, although these functions have become so immensely difficult and important that we sometimes conceive them to be either legislative or judicial in nature, or both. Upon the other hand, the rule laid down by the Legislature is often a very simple and elementary one; in the case of Wisconsin utilities merely that the service and facilities furnished shall be reasonably adequate and the rates charged shall be reasonable and just. Manifestly the difficulty here is not in formulating a rule of action, but in applying it.

THE COMMISSION

"The Wisconsin commission is appointive, not elective; its members hold for a term of six years, and receive annual salaries of $5,000 each and expenses; they are required by law to be experts in the business committed to them, and are strictly forbidden from engaging in any other work or becoming interested directly or indirectly in any utility it may be their duty to supervise. Employed under them are about one hundred clerks and engineers, some of whom receive salaries equal to those of the commissioners themselves. The engineering staff, upon whom the members of the commission rely for all field and laboratory work, as well as for expert and technical examinations, is divided into groups, each working along some special line under the direction of an experienced chief. These men, wherever possible, co-operate with the members and employees of the tax commission, and when convenient do their laboratory work in conjunction with the scientists at the University of Wisconsin. Thus organized and supported, this staff is considered by many one of the most efficient ever organized for work of this kind.

"The Wisconsin law makes no distinction between privately and publicly owned utilities. Both are amenable to the same regulations. Both report their financial condition in the same manner and according to the requirements of a uniform system of accounting. This seems reasonable, for the patrons of municipal plants are entitled to the same protection against inefficient management as those of private plants, and a comparison of results obtained under these different systems of ownership has been of real assistance in the regulation of both.

INDETERMINATE PERMIT

"The mere fact of regulation of public utilities contains the implication that they are virtual monopolies; otherwise, supervision of them might not be expedient or even justifiable. The Wisconsin statute goes farther and frankly recognizes this condition by providing for the so-called indeterminate permit. Considering that where effective regulation exists competition is neither necessary nor desirable, the Wisconsin law provides that the short-lived franchises held by existing utility companies when it was enacted may be surrendered for intermediate permits. This enabled the utility to secure a monopoly of the territory it occupied, during good behavior or until the plant should be acquired by the public at a fair valuation. In this way unnecessary duplication of equipment, unnecessary augmentation of fixed charges and cut-throat competition are prevented, and a more economic and satisfactory service is secured. By doing away with short-time franchises, moreover, a speculative element is eliminated from public utility investments, and the cost of financing enterprises of this sort is reduced.

"Thus commission control is protective as well as regulatory—protective of the utility, I mean. The requirement that every person desiring to start a new utility shall first obtain from the commission a certificate of public convenience and necessity further exemplifies this policy. In order that each existing company, so long as it properly serves the public, may be free from fear of invasion of its

field by rivals possibly more powerful than itself, it is provided that every utility having an indeterminate permit shall have an exclusive monopoly of the business in which it is engaged, except in those rare cases where the commission after hearing may determine that public convenience and necessity require a second utility to divide the field or to supplement inadequate or defective service. 'Sandbagging' and 'paralleling' are thus very properly and effectively outlawed.

"The last report of the Railroad Commission shows that seventy-two corporations representing 37 per cent of the gross earnings from utility business in Wisconsin, immediately upon this law going into effect, decided to exchange their franchises for indeterminate permits. Many others came in afterward. Stability in investments was thus obtained, as appears from the fact that the securities of utilities operating under a permit as a rule command a higher price in the market than those that operate under the old-time franchises. The period within which utilities might thus exchange limited-time franchises for indeterminate permits was at first definitely prescribed by the Legislature, then extended from time to time, and the last session made the indeterminate permit universal and compulsory. At present, therefore, there are no special franchises in Wisconsin.

STOCK AND BOND LAW

"Another important feature of the Wisconsin law is control of stock and bond issues. The capitalization of utility companies is limited to the actual value of the property used in the public service. The reason for this requirement is obvious. Stock watering is always and everywhere an evil of far-reaching and especially baneful significance, but nowhere is it more mischievous than in the case of public service corporations. Wisconsin has abolished it, so far at least as public utilities are concerned. Besides, experience teaches us that to be effective public regulation must be complete. It cannot be complete without control of the issue of corporate securities. In determining what is adequate service or a just rate account must be taken in every case of the value of the plant. The value here spoken of is, of course, the actual, true value. There is no reason in the world why with complete control this value should not correspond with the stock and bond value, taking these securities at par. If so, control will be facilitated, the interests of inexperienced investors safeguarded, and the utility placed on a stable and conservative basis.

PROCEDURE

"Should a court review of the order of the commission be desired the statute provides for a speedy hearing. The aggrieved party must begin his action within ninety days, and all such actions are given precedence over any civil cause of a different nature pending in court. Up to the present time only seventeen orders of the Wisconsin commission have been called in question in this way, and in no case has any order been reversed.

RATES

"What now is the basis of a just or equitable rate? Some railway managers and superintendents of public-utility plants contend that it is the value of the service to the shipper and consumer. But this method of fixing rates at 'what the traffic will bear' has become so odious and is so manifestly a cloak merely for extortion, discrimination and favoritism that extended discussion of it is no longer profitable. It involves so many elements, some subjective and some objective, and so varies with differences in person, time, place, commodities and other conditions, as to afford really no scientific basis whatever for rate-making. Entirely aside from its whimsicality and the favoritism it invites, it is too indefinte and uncertain to be formulated into a workable basis for rate-making in even a majority of cases. Practically every commission, legislature and court which has seriously considered the subject has rejected this criterion for the more definite and scientific idea of the cost of service. This basis is definite, fair, ascertainable and economically justifiable. It bears out the same relation to rates that the cost of production does to the price of commodities; and just as the cost of production of wares and merchandise determines their normal value which market price constantly approximates, but with which it seldom coincides, so the cost of service rendered by public utilities determines normal rates toward which actual schedules should steadily be made to approach.

VALUATION

"Many interesting and highly important data have been gleaned as to the relation under varying conditions of production of fixed investment or 'overhead charges' to variable or current expenses, and the ratio of each of these in turn to the value of the product. First of all, the owners of utilities are entitled to a fair return upon the reasonable value of the property devoted to public use. This calls at once for a valuation of the physical property of the plant. But this is not all. To it must be added something for the 'going value' of an established concern and possibly something also for outlays and services expended in the past in upbuilding the plant.

"The Wisconsin law requires the commission to value 'all the physical property' and 'all the property used and useful for the convenience of the public' belonging to every public utility in the State. As there are more than a thousand of these plants and the commission has appraised only about one hundred, it is evident that this is work that cannot be quickly dispatched. But it should be understood that among the one hundred valuations made are included all the steam railroads, the Milwaukee Electric Railway & Light Company and many of the more important among the minor utilities of the State. Indicative of how well this work has been done is the fact that no appeal has ever been taken, either by a utility or a municipality, from any valuation made by the commission, and in some instances the utilities admitted that the inventories prepared by the commission were the best that had ever been taken.

UNIFORM ACCOUNTING

"With accurate information as to the value of the plant and proper distribution of the cost of the service according to modern systems of accounting it is possible to make rate schedules that are equitable to all classes of consumers, that yield a reasonable rate on the investment and that eliminate waste while promoting the maximum usefulness of the plant.

"When this act went into effect the commission called upon the utilities to submit a statement of their financial condition. The naïveté of the response has been so well described by F. L. Holmes, of Madison, that I take the liberty of quoting from his account of it. 'The returns,' he says, 'were amazing and amusing. Some companies kept no books; the accounts of others were mere memoranda or check-book stubs which meant nothing. The bookkeeping affairs of one municipal plant were recorded in a vest-pocket account book, tied with a woolen string. Often the owner and manager carried the affairs of the corporation in his head. Few plants carried a depreciation account, and fewer managers understood the purpose of such a fund. Where several utilities had been merged one general account was maintained for credit and another for debit. Business system was unknown. A majority of municipal plants received no credit for the service rendered the city. The revenue went into the general fund, and when there was any expense the city made an appropriation. Often city employees attended to the detail labor of the plant, but the salary for services was paid out of the general fund.'

"As required by law the commission put an end to this rule-of-thumb work and prescribed a uniform system of cost accounting for all the utilities of the State. The result was most gratifying. By introducing system where chaos reigned and compelling uniformity both public and private plants were for the first time placed upon a basis of

efficiency and economy, and an enduring foundation was laid for intelligent future supervision. It should be some satisfaction to the commission after all this educational work has been done to know that its classification of accounts has since been voluntarily adopted by utilities in other states, in Canada and even in Mexico.

RESULTS

"It is interesting to contrast the predictions of disaster made by the opponents of railway and public utility regulation with the actual results of the operation of these laws. 'Radical,' 'populistic,' 'revolutionary' were some of the mildest terms used. It was pointed out that the entire country, and especially the State of Wisconsin, had prospered under the *laissez faire* régime of earlier days, and it was said that any such restriction of commercial liberty as these laws proposed would result in a system of bureaucratic control, which must inevitably disorganize business and destroy prosperity.

"In striking contrast to these lugubrious forecasts stand the actual results of commission control. Most emphatically has it been a good thing, not only for the public, but for the utilities also. The public has made an immense financial gain, just how much it is difficult to state with entire accuracy, for many orders of the commission concerning rates lowered some and raised others. But it has been conservatively estimated that in the matter of freight rates alone there has been an average annual saving of at least $1,200,000, in passenger fares of not less than $800,000, and in other forms of public service a proportionately large amount.

"This, of course, is not all clear gain. The commission has done a great deal of work, most of it of an expensive sort, and this cost has been borne in large part by the public. In the regulation of railway rates it has been necessary to separate State from interstate traffic, freight from passenger service, and to apportion the gross cost of transporting freight among the various commodities and classes of merchandise submitted for shipment. Substantially the same sort of analysis and discrimination has been necessary in the case of the other utilities. It is work that calls for a very high order of ability and expert training. In round figures the cost of maintenance of the commission, including the expense of hearings, of furnishing transcripts of the proceedings free of charge to all interested parties, of appraisals, of publications and of service and accounting inspections, is about $100,000 a year.

"A large outlay, an expensive commission, you will say; but in view of the fact that the railroads and other utilities are invariably represented at every important hearing by the very ablest engineers and experts the State cannot afford to indulge in cheap or short-sighted economy.

"But hereafter at the prescribed rate of $1 for each $1,000 of the face value of corporate securities thus issued the revenue derived from the operation of the stock and bond provision alone will in all probability be sufficient to defray the entire cost of the commission.

"Hand in hand with reduction in rates has gone an equally important improvement in service.

"The genuinely constructive and enduring character of this method of control is best demonstrated, however, by the fact that while the people have thus gained enormously, the utilities have not suffered. On the contrary, under this system they have prospered as never before. Lower rates have not been followed by diminished income, but by inviting larger patronage have resulted instead in an actual increase in revenues. To the utilities, therefore, the net outcome has been a gain. As evidence of this prosperity the last annual report of the Wisconsin commission shows that during the year the operating revenues of electric utilities increased 20 per cent, their net income 29 per cent and new construction for the year 145 per cent. The operating revenues of water utilities meanwhile increased 7 per cent, their net income 13 per cent and new construction 24 per cent. Gas utilities increased their operating revenues 8 per cent, their net income 15 per cent and new construction 24 per cent. Telephone utilities increased their operating revenue 11 per cent, their net income 9 per cent and construction for the year 14 per cent. Railway and traction lines on the average increased their operating revenues 13 per cent, their net income 8 per cent and construction an equal amount.

"All utilities in Wisconsin are in a more flourishing condition now than ever before, and are planning to extend their operations far into the future. What Brandeis and Emerson have been doing for private corporations and the railways of the country, the Wisconsin commission has done for the utilities of its State.

"Taking a longer period, as we may in the case of railway regulation, which was begun earlier, the results are even more striking. For the fiscal year ended June 30, 1905, the total mileage of railroads in Wisconsin was 6,931 and the total operating revenue $50,144,702. This was the year immediately before commission regulation of railroads began. Five years later, or during the fiscal year ended June 30, 1910, the total mileage had increased to 7209, an increase of 278 miles, and the total operating revenues amounted to $65,055,928, an increase of nearly $15,000,000. Thus, notwithstanding the decrease in transportation rates and improvement in service enforced by the Railroad Commission, the operating revenues of the railroads of Wisconsin increased approximately 30 per cent. As an indication of the general prosperity of the State meanwhile, it may be worth mentioning that under these new policies the deposits in commercial and savings banks in Wisconsin increased in round numbers during this five years from $187,000,000 to $276,000,000, or 51 per cent.

DISCRIMINATION ABOLISHED

"Not only have rates been lowered as a whole to the advantage of both the people and the utilities, but discrimination among patrons has been abolished. Nothing could be more desirable. Speaking of the condition of affairs when these laws went into effect, Prof. B. H. Meyer, formerly chairman of the Wisconsin commission, but recently appointed member of the Interstate Commerce Commission, has said: 'The whole State of Wisconsin was streaked and plastered with discrimination in the rates of utilities,' and he mentioned thirty-two telephone companies, every one of which gave at least eight subscribers out of every 100 either free or reduced-rate service. It goes without saying that the cost of this service was not borne by the telephone companies, but by the subscribers who paid full rates. When the Wisconsin law went into effect it was estimated that discrimination and rebates to favored customers of telephone, water, heat and light companies amounted to as much as $2,000,000 annually. Even as late as August, 1909, 52 per cent of the telephone companies, 60 per cent of the water plants, 35 per cent of the gas companies and 58 per cent of the electric lines admitted they still maintained discriminatory rates.

"Since then there has been a change. All schedules and rates are now on file with the commission, and these are the only rates that can be collected. Discrimination is absolutely forbidden, and the law in this respect is well obeyed. The effect of this change upon industrial and commercial enterprise and the elevation in moral tone of the communities where these abuses formerly existed cannot easily be exaggerated. Peace, contentment and self-respect have taken the place of suspicion, injustice and guerilla warfare.

WHOLESOME EFFECT UPON PUBLIC LIFE

"Times were in Wisconsin when the railroads ran or tried to run the government of the State and the minor utilities frequently sought to boss the cities, towns and even villages. They contributed liberally to campaign funds, urged their supporters and lobbyists to become candidates for public office, and in close election districts colonized voters

in the old conventional way. Now, one and all, they are in this sense absolutely out of politics. There is indeed no reason now why public service corporations in Wisconsin should wish to dabble in public affairs. Their relations to the people of the State have been definitely and finally determined. They no longer have anything to gain or lose by intermeddling in politics, and apparently they have decided to retire for good. What the elimination of public service corporations from participation in political campaigns signifies in the purification of public life no one here needs to be reminded.

MAKES INVESTMENTS SECURE

"The operation of the stock and bond law, the indeterminate-permit provision and other cognate requirements of the public utilities law have encouraged investment in the securities issued by these corporations. Most gratifying of all is the recent tendency toward local investment in these securities and consequent local support of the utilities. The natural result is the establishment of better and friendlier relations between the utilities and the public. That the operation of the Wisconsin law has brought additional stability to investments of this sort is shown by the fact that practically every trust company and dealer in stocks and bonds engaged in selling the securities of plants located in Wisconsin advertises regularly in the financial journals the fact that these securities are issued under state regulation. The whole tendency of commission control is to remove public utility securities from the field of speculation and place them upon the solid basis of conservative and staple investments.

CONCLUSION

"A product of constructive legislation somewhat novel in conception, the system has, nevertheless, worked admirably. It is comprehensive, effective, prompt and progressive—a demonstrated practical success. It proceeds upon the theory that these corporations are the servants, not the masters of the people. As servants it has protected, encouraged and instructed them in all matters of economy and efficiency, just as it has summarily suppressed all assumption on their part to the rôle of masters. But in relentlessly enforcing fairness to the people it has not forgotten to be fair to the utilities. It has made the monopoly of each company within its appropriate field even more secure than it was before. It has systematized methods of accounting, and so given to the most backward the advantages of the very latest improvements in management. By control of stock and bond issues it excludes opportunity for wild-cat speculation and the altogether too familiar methods of 'frenzied finance.' It compels the maintenance of each utility at the point of maximum efficiency, and so safeguards legitimate investment. While protecting the citizen against extortionate rates and inadequate service, it insures to capital a reasonable return and to labor a fair wage. In a word, it has transformed what were formerly speculative ventures bent on exploiting the public into safe and conservative business establishments operated for the benefit and convenience of all."

LARGE SIGNS ALONG ILLINOIS TRACTION SYSTEM

The "Associated Retail Stores of St. Louis," sixty in number, have erected large signboards at intervals of 1 mile along the right-of-way of the Illinois Traction System for a distance of 20 miles north of St. Louis. Each signboard is about 8 ft. x 30 ft. in area and carries a painted announcement that any St. Louis retail store belonging to the association will refund the round-trip fare of passengers making substantial purchases and traveling less than 20 miles in each direction.

Work on the subway in Buenos Aires will begin some time in September. The tube will be constructed three blocks at a stretch in order to reduce the disturbance of street traffic to a minimum.

HEARING ON TRANSFERS IN NEW YORK

At the continued hearing on the rates of fare upon connecting or intersecting street railways in the borough of Manhattan, held before the Public Service Commission of the First District of New York on Sept. 19, 1911, Newton M. Hudson, who is auditor of the Second Avenue Railroad Company, placed the total value of all the property used in the operation of the Second Avenue Railroad at $4,048,663, and submitted in evidence an itemized statement showing the individual values which went to make up this total. For the six months ended June 30, 1911, the interest on this valuation at 6 per cent was $121,458, and upon this basis the proportion of the cost of transporting each passenger was 1.1 cents on the Second Avenue division, 1.76 cents on the First Avenue division and 1.81 cents on the Eighty-sixth Street division. On the whole system the cost per passenger was 1.39 cents. Adding the operating expenses, taxes and the interest on the value of the property employed in operation, the average cost of transporting a passenger on the Second Avenue main line for the six months ended June 30, 1911, was 5.06 cents; for the First Avenue division, 6.78 cents; for the Eighty-sixth Street division, 6.84 cents, and on the Second Avenue Railroad as a whole, 5.79 cents. A similar statement for the period previous to the receivership had not been prepared because the books of the company were not available.

Edward A. Maher, president and general manager of the Third Avenue Railroad, was recalled. He said that so many factors entered into an exact determination of how much it costs to carry a passenger a mile that it was impossible to determine the cost. Short-haul passengers were vital to the life of a street railway system under a flat rate of fare. The transfer system tended to reduce the number of short-haul passengers. Even carrying passengers for the proposed 3 cents for one transfer and 2 cents for a second transfer would result in loss of revenue to the company, but should be done as a matter of policy.

Mr. Maher said that the present rate of fare was inadequate to yield a fair average return upon the value of the property actually used in the public service. The conditions that exist to-day compared with conditions a few years ago in respect to cost of operation, wages paid and various other items entering into maintenance and operation left the margin of profit very slight, except in cities where traffic was dense and the mileage small. As soon as the universal system of transfers was abolished in the Bronx the receipts of the Union Railway increased and the abolition of the free transfer system between the Union Railway and the Westchester Electric Railway and the Yonkers Railroad resulted in an increase in receipts. The greatest abuse of the transfer privilege was on Sundays and holidays by people whose purpose was pleasure riding. It was not infrequent before the abolition of the transfers for a fourteen-bench open car carrying sixty passengers to leave Yonkers with only two cash passengers.

Asked what in his opinion would be the result of a free transfer system instead of the proposed 3-cent and 2-cent joint rate, Mr. Maher said:

"It would be most disastrous, not only to the company, but to the public. It would mean a very large decrease in the net earnings. The company could not keep up its equipment and property as it is now doing and the wages of the employees would have to be decreased. The greatest sufferers would be the public. The present system, which the Third Avenue Railroad has built up, with its lines carrying people 13 miles or 14 miles for 5 cents, is doing all that it ought to be asked to do. The company ought to be encouraged to continue the competition that it has energetically worked up since the appointment of the receiver."

The hearing was adjourned until Sept. 21, 1911.

The platform guards of the Union Elevated Loop in Chicago use megaphones for announcing trains.

RESULTS WITH TANTALUM LAMPS IN CHICAGO

The engineering department of the Chicago Railways Company has completed a twelve months' investigation of the life and service of tantalum lamps on its cars. An article describing the methods followed in studying the behavior of tantalum lamps on Chicago Railways cars was presented on page 1189 of the ELECTRIC RAILWAY JOURNAL for Dec. 17, 1910. The results of twelve months of study confirm the information obtained during the test period and presented in the earlier article. In general these results are that the renewals on 32-cp lamps are 272 per cent per year and the renewals on 16-cp tantalum lamps are 100 per cent per year. These average results are based on 10,350 car months and 27,708 lamp renewals during the period from May 23, 1910, to May 31, 1911.

At the beginning of the test period the lamp installation consisted of five 32-cp clear, pear-shaped globes placed two on the platforms, three along the center of the upper deck and two lamps in the headlights, and twenty 16-cp lamps with clear, pear-shaped globes placed nine on each side of the deck rail and two in the sign boxes. The type of lamp used is rated at 2.3 watts per candle on 115 volts and is manufactured by the Bryan-Marsh Lamp Company. It has a standard winding. The lamps used first were rated at 35 watts for 16 cp and 70 watts for 32 cp, but the heavier filament has since been adopted. During the year of observation and after 644 cars had been equipped the 32-cp lamps in them gradually were replaced by 16-cp lamps, which show longer life. Previous to the replacement these 32-cp lamps were operated, seven to a car, for 4350 car months, during which time 6956 renewals were made. A summary of the data obtained follows:

Columns 5, 6, 7 and 8 show the progress of replacement of 32-cp lamps by 16-cp lamps. Columns 5 and 6 indicate the number of cars in which 32-cp lamps were replaced by 16-cp lamps each month and show that the replacements in 495 cars were made by the engineering department and in eighty-seven cars by the carhouse foremen. Column 7 is the total for columns 5 and 6. Column 8 gives the car months equivalent to the fractions of months which the cars carrying 32-cp lamps operated before 16-cp lamps were substituted. Columns 9, 10, 11 and 12 show the car months and the renewals of 32-cp lamps. Thus a total of 6956 renewals was made on 32-cp lamps during 4350 car months of operation with the original installation of seven lamps per car. Columns 13, 14 and 15 refer to 16-cp lamps. Column 13 shows the number of car months during which 16-cp lights were used only for the side and sign lighting. Column 14 shows the number of car months during which all the lighting was done by 16-cp lamps and column 15 shows the 16-cp lamp renewals for each month. Thus column 4 = column 12 + column 15, and column 3 = column 9 (or column 13) + column 14. It is noted that columns 9 and 13 are the same because each covers the same period for the mixed installation of 32-cp and 16-cp lamps.

In connection with column 15, if it is desired to divide this by column 13 + column 14 in order to get the renewals on a full-car basis, the figure taken from column 13 first should be multiplied by $20 \div 27$, there being but twenty 16-cp lamps out of a total of twenty-seven lamps on the cars with mixed equipment.

RESULTS OF YEAR'S OBSERVATION

Referring again to the table, it will be noted that the total of column 4 divided by the total of column 3, that is, $27{,}708 \div 10{,}350 = 2.64$, or the number of mixed renewals per car month, also that the total of column 12 divided by the total of column 9, $6956 \div 4350 = 1.60$, or the number of renewals per car month for 32-cp lamps with seven installed on each car. Similarly using the totals of columns 14 and 13 with the factor as earlier noted, $6000 + 20/27 \times 4350 = 9222$ full car months, and the total of column 15, $20{,}752 \div 9222 = 2.25$ lamp renewals per car month, or twenty per car year.

Presented in another manner, a mixed installation of lamps, that is twenty 16-cp and seven 32-cp lamps installed in each car, would require renewals as follows:

Renewals of 16-cp lamps = 20/27 of 2.25 = 1.67 renewals per car month, or twenty per car year.

Renewals of 32-cp lamps, as earlier shown, require 1.60 renewals per car month or nineteen per car year.

A full 16-cp lamp installation of twenty-seven lamps on one car would require, as earlier derived, 2.25 renewals per car month, or twenty-seven renewals per car year, or 100 per cent per car year; and the nineteen renewals on the seven 32-cp lamps in a car are equal to 272 per cent.

The present investigations showed that the average burning was close to 1500 hours per car per year and former investigations showed that with 64-watt carbon lamps the renewals were about four per car month as compared with 2.25 per car month for tantalum lamps. A comparison of the energy saving by the use of 37-watt tantalum lamps, as compared with 64-watt carbon lamps with twenty-seven lamps in a car, shows the energy demand during the burning hours to be 729 watts less for the tantalum than for the carbon lamps. With 1409 cars equipped the reduction in average demand during the burning period is 1027.16 kw; and for a year of 1500 hours the total energy saving is 1,540,741 kw-hours. At 1 cent per kw-hour, which is a low figure because the lamps are burned during the hours of peak load when energy is the most expensive, the yearly saving is $15,407.41, or approximately $11 per car per year.

Some tests have also been made with Mazda lamps. These tests were made during the three summer months and thus do not cover the period of heavy burning. During 394 car days with twenty-seven Mazda lamps in a car but twenty lamps had to be renewed. These lamps were 20-cp, 25-watt rating and most of the time were installed on six cars. The results so far indicate that the renewals with Mazda lamps will be twenty per car per year with twenty-seven lamps installed on a car.

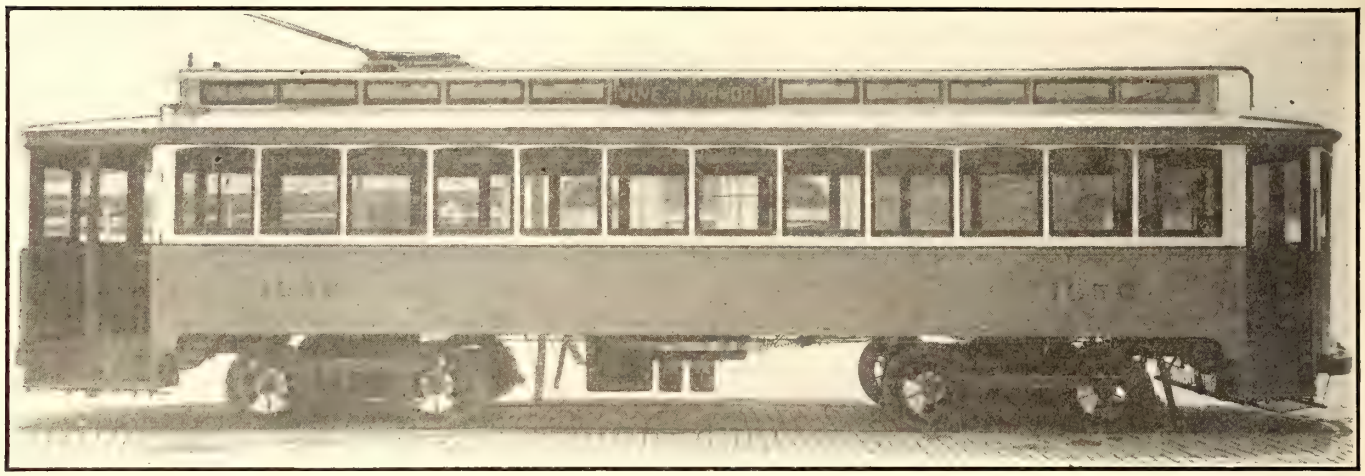
SUMMARY FOR 1910-11 TANTALUM LAMP INSTALLATION CHICAGO RAILWAYS COMPANY.

	Period, 1910-1911	Cars Equipped.	Car Months.	Total Renewals.	No. of Cars on Which 32-Cp. Center and Headlight Lamps Were Replaced by 16-Cp. Lamps — By Eng. Dept.	By Foreman.	Total.	Equiv. Car Mo. 32-Cp.	Renewals 32-Cp. Lamps. — Car Months	Center.	H. Light.	Total 32-Cp.	Car Months 16-Cp. Lamps — Side and Sign Equip. 16-Cp. Only	Whole Car Equip. 16-Cp.	Re-newals, 16-Cp.
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1910	5/23— 8/1	647	558	1,218	...	..	...	..	558	510	267	777	558	0	441
	8/1 — 8/31	649	644	1,109	...	..	...	..	644	431	258	689	644	0	420
	9/1 — 9/30	650	644	1,230	...	..	...	..	644	523	244	767	644	0	463
	10/1 —10/31	829	689	1,781	20	..	20	7	631	576	324	900	631	58	881
	11/1 —11/30	895	878	2,330	116	..	116	68	576	659	292	951	576	302	1,379
	12/1 —12/31	1,016	950	2,940	139	..	139	46	415	577	283	860	415	535	2,080
1911	1/1 — 1/31	1,073	1,004	3,707	59	19	78	21	312	529	241	770	312	692	2,937
"	2/1 — 2/28	1,179	1,080	3,382	63	19	82	33	242	307	152	459	242	838	2,933
"	3/1 — 3/31	1,276	1,244	3,614	96	19	115	66	160	192	157	349	160	1,084	3,265
"	4/1 — 4/30	1,356	1,300	3,098	2	..	2	1	93	154	51	205	93	1,207	2,893
"	5/1 — 5/31	1,409	1,359	3,289	...	30	30	13	75	169	60	229	75	1,284	3,060
	Total.....	....	10,350	27,708	495	87	582	255	4,350	4,627	2,329	6,956	4,350	6,000	20,752

LIGHT-WEIGHT SIDE-ROD CAR AT CINCINNATI

The Cincinnati Car Company has just completed for the Cincinnati Traction Company the first of fifty cars that embody several features of particular interest. Six of these cars will have trucks with connecting rods, thus utilizing the single motor on each truck for driving both axles. This feature of construction will be given a trial before any large number of cars are equipped with it. The cars here described were designed by Thomas Elliott, chief engineer of the Cincinnati Traction Company. The cars are of the pay-within type, the first to be constructed for the Cincinnati lines, and are light weight. Those cars with connecting-rod drive are equipped with two 75-hp motors instead of four 40-hp motors, with which the other double-truck cars in Cincinnati are operated. The bodies are arranged for single-end operation.

The general dimensions of these new cars are as follows:



Side View of Cincinnati Side-Rod Car

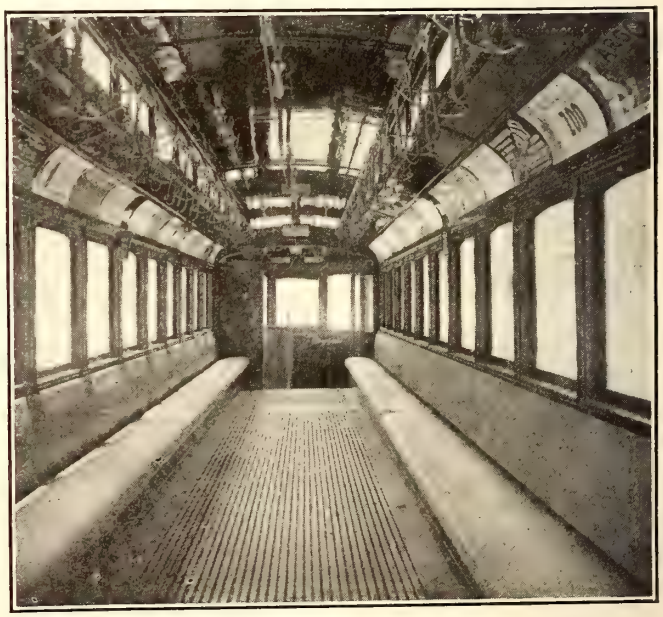
The bottom frame of car body is of steel construction. The side sills are formed of 4-in. x 3-in. x ⅜-in. steel angles, extending for the full length around the sides and ends of the car body. The side walls are formed of 5/32-in. x 32-in. steel plates. The end sills are formed of 3/16-in. x 12-in. steel plate reinforced with 3-in. x 3-in. steel angle at the bottom, forming a bearing for the platform floor. The cross joists are made of 2½-in. x 3-in. steel angle, with wood filler to receive the flooring. The platforms are supported by two outer knees formed of 7-in. x 3½-in. x ½-in. steel angle.

There are twelve windows on each side of car, all arranged to drop into pockets clear of the sash rail. The roof is of the regular monitor deck pattern with removable type hoods at each end. Both ends of the car are vestibuled and the vestibules are inclosed on the devil-strip side of car. The step opening of the rear vestibule is provided with two sets of swinging doors forming exit and entrance, and these doors are operated by the conductor. The front vestibule step opening is provided with one set of swinging doors controlled by the motorman.

The interior finish of car body is of mahogany, including the headlining, which is of mahogany veneer. There are no end bulkheads at either end of the car. Seats are of the longitudinal type, on each side of car, upholstered with



View of Truck



Interior View

General Dimensions:

Length over corner posts	33 ft.	0	in.
Length over bumpers	44 ft.	0	ft.
Length of rear vestibule	6 ft.	0	in.
Length of front vestibule over dash	4 ft.	6	in.
Width over side posts	8 ft.	0	in.
Height from bottom of sill to top of roof	8 ft.	5½	in.
Height from rail to underside of sill		36½	in.
Truck centers	21 ft.	0	in.
Wheel base of truck	5 ft.	4	in.
Diameter of wheels		33	in.

rattan. The car is heated by means of the Peter Smith No. 3-P forced-ventilation hot-air heater, located on the front platform on the devil-strip side. The body bolsters are formed of steel channels.

The trucks, as will be seen from the engraving, are equipped with side connecting rods, dispensing with the ordinary journal boxes. Each truck is equipped with one Westinghouse No. 318 interpole 75-hp motor which is mounted on the rear axle. The type of control used is the K-40, single end. All the control wiring is run in iron conduit under car floor. The air brakes are the National Brake & Electric straight air, with 11-cu.-ft. compressor and 10-in. brake cylinder.

The weight of car body, exclusive of electrical or air-brake apparatus, is 14,486 lb. The weight of the car body complete, with electrical and air-brake apparatus, is 17,600 lb. Weight of two trucks with gears, 11,920 lb. The weight of the two Westinghouse No. 318 motors and gear is 6500 lb.

The weight of car complete and ready to run is 36,020 lb.

HEARING ON BRAKES AND HEIGHT OF CAR STEPS IN NEW YORK

Further testimony on the subjects of power brakes and heights of car steps was given before Commissioner John E. Eustis, of the Public Service Commission of New York, First District, at hearings on Sept. 18 and 20, 1911.

POWER BRAKES

Counsel for the Coney Island & Brooklyn Railroad called as a witness the company's instructor of motormen, who expressed the opinion that motormen take more chances with power brakes than with hand brakes and the percentage of accidents on hand-brake cars was less than with cars equipped with power brakes. He thought cars weighing less than 30,000 lb. could be operated with hand brakes more safely than with power brakes.

S. W. Huff, president Coney Island & Brooklyn Railroad, said all of the company's cars weighed 25,100 lb. or less with the exception of twenty, which weighed approximately 32,000 lb. He was willing to equip these twenty heavy cars with air brakes.

W. G. Gove, mechanical superintendent of the Brooklyn Rapid Transit Company, was next called. He testified that his company operated 500 double-truck closed cars weighing 25,100 lb., 630 double-truck open cars weighing 26,460 lb., 120 double-truck open cars weighing 23,070 lb. and 563 double-truck semi-convertible cars weighing from 28,000 lb. to 35,000 lb., all of which were equipped with hand brakes only. In addition the company operated 452 semi-convertible cars weighing from 48,000 lb. to 52,000 lb. which were equipped with air brakes. He estimated the cost of equipping hand-brake cars with air brakes at $400 per car. If all double-truck hand-brake cars were so equipped the total cost would be about $730,000.

E. G. Connette, transportation engineer of the commission, was put on the stand at the opening of the hearing on Sept. 20. He described the method of arriving at the weight of 25,000 lb. which was proposed for the limiting weight of cars equipped with hand brakes. Accident statistics of all lines in the city for 1909 and 1910 had been compiled and classified by the weights of the cars involved in the accidents and the types of brakes. An undue preponderance of accidents had been reported to cars equipped with hand brakes and weighing more than 25,000 lb. The average number of accidents per 100 hand-brake cars in service on all lines was 32.4 and per 100 air-brake cars 25.2. He referred to a test made on Sept. 19 with a car weighing 38,000 lb. and equipped with air brakes and Peacock hand brakes. From an initial speed of 17 m.p.h. the car was stopped with the air brakes in 128 ft. and with the hand brake in 144 ft. He thought if all hand-brake cars were equipped with as efficient a hand brake as this the conditions would be improved materially. With regard to the motormen taking chances with air brakes he thought this was a matter of discipline. There was no use in making improvements in any detail if the men themselves were not kept up to the same standard of efficiency. With the maximum traction trucks used in New York he thought that hand brakes probably were as efficient as air brakes.

Commissioner Eustis when asked if the commission proposed to draw the line absolutely at 25,000 lb. weight said that reasonable latitude would be allowed.

Several operating officials of the Second Avenue Railroad were put on the stand and all testified that in their opinion cars weighing less than 30,000 lb. could be operated through the congested districts traversed by that road more safely with hand brakes than with air brakes. The average schedule speed was about 7½ m.p.h. and there were numerous grades. Air brakes which were powerful enough to hold loaded cars in descending these grades would cause the wheels to skid on level track with an empty car if applied with full force. It was instinctive on the part of a motorman to apply the brakes with full force in an emergency.

On the completion of this testimony the hearing was closed.

HEIGHT OF CAR STEPS

On Sept. 20 the subject of height of car steps was taken up.

W. G. Gove, mechanical superintendent Brooklyn Rapid Transit Company, produced a statement of height of steps of the closed cars of that company. The only cars in which the height of the first step exceeded 15 in. were 452 semi-convertible cars which had steps 15⅝ in. high. He said these steps could be dropped easily by substituting longer hangers.

C. S. Banghart, general superintendent New York & Queens County Railway, was asked about the height of steps of the cars of that company. Most of these cars had steps exceeding 15 in. in height, the maximum being 16½ in. The New York & Long Island Traction Company had four cars with double steps which were 13 in., 9¾ in. and 8¼ in. respectively from the ground. The witness thought that double steps could be applied to most of the cars of the New York & Queens County at a cost of from $60 to $75 per car.

The hearing on this subject was adjourned until Sept. 27, 1911, at which time the matter of folding steps and platform doors will be taken up.

CONVENTION BULLETIN OF MANUFACTURERS' ASSOCIATION

The exhibit committee of the Manufacturers' Association has sent out a final bulletin relating to the arrangements for the Atlantic City convention. About 74,000 sq. ft. of exhibit space has been assigned to date, and applications have been made for 300 ft. of track space for cars.

EXHIBITS

The offices of the association will be on the left of the main entrance to the Pier, and will consist of the following: Registration, executive committee, president and secretary, vice-president in charge of exhibits, finance and entertainment committees; an information bureau in charge of competent clerks, who will take care of all incoming and outgoing mail, telegrams and wireless messages; messenger boys, or anything else from calling a taxi to ordering a dinner at the hotel, which can be done from the booths. It is the intention to have sufficient pages and maids to give good service. All mail, cards and telegrams will be delivered at the booths as they arrive at the office. Badges for employees should be secured for all employees. They may be obtained from the exhibit committee on the payment of $1, which will be returned on receipt of badge after the convention.

Owing to the large increase in exhibits, which means a corresponding increase in electric signs, special lighting, rugs, furniture and decorations, including plants and flowers, to say nothing of the call for help of all kinds and the rush at the last minute, caused by delays in transit of shipments, or possible bad weather previous to opening, it is most important to place all orders for any of these items at once, and not wait until arrival at Atlantic City. The exhibit committee has done everything in its power to have everything ready for the exhibitors, but the exhibitors can do much for themselves if they will look ahead and do all they can in the way of making prompt and early shipments and placing orders now for everything needed. The director of exhibits will open his office on the Pier Sept. 26, after which all correspondence should be sent there.

CONVENTION OF LUBRICATION EXPERTS

The twentieth annual convention of the mechanical experts of the Galena-Signal Oil Company was held at the company's general offices at Franklin, Pa., Sept. 11 to 15, inclusive. The company makes a practice of bringing to these meetings its representatives from all parts of the world, and this year more than one hundred of its experts and salesmen were in attendance. As in previous years, the discussions were confined to specific questions relating to lubricating methods and practices. These questions for the most part were submitted by the experts themselves for the purpose of eliciting information from others regarding their experience in handling particular lubrication problems. The Galena-Signal Oil Company has specialized on railway lubrication for the past forty years, and these annual conventions have proved of great value to the representatives who attend them, not only in the exchange of information on the floor of the convention, but also in the informal conversations after the meetings have adjourned.

At the convention this year a total of 102 questions were submitted for discussion. These were divided into five groups, as follows: Locomotive lubrication, car and coach lubrication, power house machinery lubrication, electric-car journal and motor lubrication, and miscellaneous lubrication problems. Some of the representative questions discussed under these headings included the following: Why is more trouble experienced from a hot box when it originates at either end of the journal than when it originates in the center? What improvement has been made in the lubrication of railway motor cars? What lubrication troubles have been experienced in turbine power stations with different types of turbines? What is the best method of lubricating internally the air end of dry vacuum pumps? Has any new appliance been found to be better for use on railway motors than the Galena oil cup? What has been done to prevent water getting into oil cups? What progress has been made in economical and efficient lubrication of gears, and is there any device for using oil on gears? What is being done to prevent wear on bearing shells and housings of old and new-type motors? What have been the developments regarding the lubrication of roller and ball bearings? Has a limit been placed on the oil supply by any electric road similar to that in vogue on most steam lines, and if so with what success? Are hot journals frequently caused by improperly hung brakes, and how can it be determined if the brakes are causing the trouble?

During the convention many of the representatives in attendance took advantage of the opportunity to visit the oil field on Point Hill, across the river from Franklin. This field is about ½ mile wide by 2 miles long and produces a grade of crude petroleum known as Franklin heavy oil, which is found nowhere else in the world. The Galena-Signal Oil Company has a standing contract for the entire output of this field. The oil taken from this field is much heavier than the ordinary Pennsylvania oil, and it is said to be the finest natural lubricant produced by any oil field in the world. It is this heavy crude petroleum oil which is used in conjunction with other lubricating materials in compounding the oils made by the Galena-Signal Oil Company.

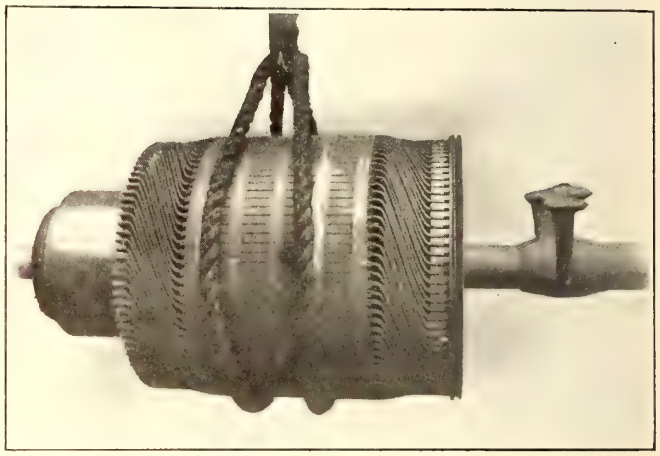
COMMUNICATION

WELDING ARMATURE SHAFT

New York, Sept. 18, 1911.

To the Editors:

I note in your issue of Sept. 2 an editorial on the subject of welding armature shafts in which mention is made of the methods followed in San Francisco and also of the fact that the oxy-acetylene process might possibly be adapted to this class of repair work. No mention was made of the Thermit process and I thought you might be



Welded Armature Shaft

interested in knowing that this process is not only adapted to the work but has been used very extensively and with marked success.

The accompanying illustration shows a Thermit weld on a 3-in. armature shaft used in the motor of a 50-hp electric hoist on a 50-ton Shaw electric crane. Welds on armature shafts of trolley motors have been made in the same manner and at slight cost with a very considerable saving in time. The surplus metal around the weld, shown in the illustration, is easily machined off where necessary.

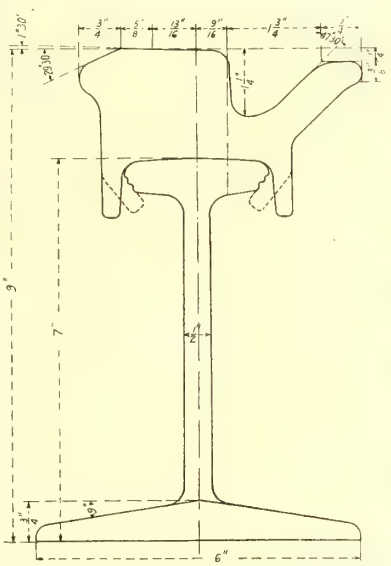
Goldschmidt Thermit Co.,
Wm. C. Cuntz, General Manager.

In a report to the Bureau of Manufactures of the Department of Commerce and Labor of the United States Church Howe, consul at Manchester, England, says that the corporation of Manchester, which controls the tramways in that city, grants one week's holiday each year with pay to each employee, provides uniforms, gives free rides on cars to and from duty and half pay during sickness for a period of one month, after which each case is considered on its merits. A bonus of 25 cents per week is paid to each motorman who for thirteen consecutive weeks has been free from blamable accidents and whose current-consumption records have been satisfactory during such period. These concessions cost the department about $278,363 per year. Taking into account the privileges described, the wages of motormen average about $8.70 per week, while conductors average $8.45. In describing the freight and express business of the lines Mr. Howe said that its operations extend 8 miles to 10 miles from the center of the city in all directions on and between all routes of the system. Approximately 1,000,000 parcels per year are handled.

ROMAPAC COMPOUND RAIL TO BE TRIED IN CHICAGO

The Board of Supervising Engineers of Chicago Traction has approved the installation of 4 miles of Romapac rail, which in October and November will be laid by the Chicago Railways Company and the Chicago City Railway. The design of the rail, which is of the two-part type, is illustrated. The upper contour of the head and the size of the base and web are identical with those of the present rails prescribed by ordinance in Chicago. The contours of the upper part of the base and the lower part of the head where the union is made will follow the designs of the Romapac system. This type of rail with its renewable head is being introduced into this country by Walter Del Mar, of London, England, who represents the English interests controlling the patents. An American company, known as the Continuous Rail Company, of New York, with offices at 17 Battery Place, New York, has been formed to promote the use of the rail in this country.

The Romapac rail is designed to effect a considerable saving in renewals. It consists of two parts, as shown in the illustration—a lower base and an upper head with flanges which are crimped about the enlargement at the top of the base section. Rails of this type are in use in Leeds, England, and were described at the time, with the machine used for applying the rail heads, on page 361 of the STREET RAILWAY JOURNAL for March 3, 1906. The rails in Leeds are said to show no signs of corrugation after five years of service. The composite rails laid in Leeds weigh 121 lb. per yard, and since they were put down in 1906 have carried 1,350,000 axles weighing 12,300 lb. each, at speeds up to 18 m.p.h., in addition to exceptionally heavy truck traffic. It is said that they are good for another five years of service before it will be necessary to renew the heads. Two curves have been built of this type of rail on the Paris tramways system—one on the subway and one on the surface lines—and the rails there are said to show excellent wearing qualities.



Romapac Compound Rail

The chief feature of the Romapac rail is the renewable head. As designed for use in Chicago this head will weigh 81 lb. per yard and the base will weigh 77 lb. per yard. The combined weight of 158 lb. thus exceeds the weight of the present Chicago rail, 129 lb., by 29 lb. per yard, and the first cost for steel is increased accordingly. However, when a renewal has to be made only the head of the Romapac rail need be renewed. With the present type of girder rail it is necessary to renew the entire rail weighing 129 lb. per yard. With the Romapac type the renewed portion will weigh only 81 lb. and thus there will be a saving on renewals of 48 lb. per yard.

Another large saving expected is that for paving work at the time of renewal. The Chicago work contemplates that if the foundation at the time of renewal is in good condition it will not be disturbed. Only the head of the Romapac rail will be renewed and this can be done with a minimum disturbance of the pavement. Only the stretcher blocks will have to be removed during the renewing process. An estimate made by the Board of Supervising Engineers shows that the total cost of renewal with the Romapac rail will be $8,000 less per mile than the cost of renewing with the present track rail.

The Carnegie Steel Company is now making rolls to supply this rail, and the Chicago City Railway and the Chicago Railways have each ordered 250 tons of base and 263 tons of head, a total of 4 miles of single track.

The flange head of the Romapac rail is applied to the base by cold rolling. This work is done by a steam-driven machine carrying rollers which bend the lower flanges of the head securely into place about the bulb on the base. The rolling machine operates under its own tractive power and makes several passes over the rail head to perform the cold-bending process. The capacity of the machine is about 700 ft. of rail per hour and the rolls operate on one rail at a time. The cost of operating one of these machines is estimated at 56 cents per hour.

When renewal is made the rollers on the machine are replaced by rolling cutters which make a V-shaped groove on the side of the head at the point of maximum bend. The lower flange is then broken off by claws attached to the rolling machine and thus the head is released and the base made ready for the addition of a new head section.

PREPAYMENT CAR FOR HUTCHINSON, KAN.

The Hutchinson (Kan.) Interurban Railway has recently received from the Danville Car Company the single-truck pay-as-you-enter car shown in the accompanying illustration. The striking features of this car are the use of completely inclosed platform cabs for the motorman and conductor and wire screens instead of sheets of metal for the



Cab-on-Platform Car for Hutchinson, Kan.

dashers. The principal dimensions are as follows: Length of the car over all, 32 ft.; length of the car body over the end panels at the sill, 21 ft.; width of car at sill, including panels, 7 ft. 9½ in.; width of car body over posts above the belt rail, 8 ft. 2 in. The bottom framing consists of 4¾-in. x 7¾-in. long-leaf yellow pine covered with ⅜-in. x 8-in. plate; 3¼-in. x 5-in. white oak end sills, and 4½-in. x 6¾-in. white oak center cross-joists. The body framing consists of 3¾-in. corner posts and 2¼-in. side posts. The sweep of the posts is 2¼ in. The roof is a monitor deck, strengthened by ⅝-in. concealed steel rafters. The doors at each end of the car are of the double sliding type.

The platforms are each 5 ft. 6 in. long and are furnished with wire screens. They have the usual dividing rail for entering and leaving passengers and can be closed by folding gates as shown. The right-hand diagonal corner of each platform is inclosed to form a cab for the platform man. The entrance to this cab is from the platform. The cab door has a sliding opening, through which the conductor can make change in bad weather. The fare box, therefore, is arranged to be hung from the cab window when necessary. In that portion of the bulkhead which separates the cab from the main passenger compartment an iron screen door pocket is used in place of glass. Through this opening the conductor announces streets while he is standing in the cab.

News of Electric Railways

Interurban Terminal in Cleveland

Warren Bicknell, of the Warren Bicknell Company and the Cleveland Construction Company, Cleveland, Ohio, is in charge of plans for the construction of a large interurban railway terminal at the southwest corner of Ontario Street and Prospect Avenue, Cleveland. Most of the land needed is under option and work on the plans for the building is under way. In connection with the terminal, a new high-speed electric railway will be built from the city limits through Kingsbury Run and the Cuyahoga River valley to the terminal to give an entrance to the cars of the Northern Ohio Traction & Light Company, the Cleveland, Youngstown & Eastern Railway and the Cleveland, Painesville & Eastern Railway, all of which now use the tracks of the Cleveland Railway. The roads operating into Cleveland from the west will probably enter the terminal through West Third Street.

Mr. Bicknell stated that the finances had been arranged and that work on the improvement would probably be begun before spring, but he would not make known the names of those who are interested in the terminal. A train shed with capacity for a dozen interurban lines will be built and there will be ample provision for waiting rooms, ticket offices, baggage rooms, etc. Mr. Bicknell denied that the station will be a steam railroad depot as well as an interurban terminal. The Kingsbury Run high-speed line was mentioned in the Electric Railway Journal some months ago, when the Shaker Heights Land Company was preparing to expand. The new terminal will be only a short distance from the Public Square and the business portion of the city.

Statement by C. S. Mellen

C. S. Mellen, president of the New York, New Haven & Hartford Railroad, the Connecticut Company and other controlled companies, on Sept. 14, 1911, authorized the following statement:

"Some day last week there was received by Mr. Mellen through the road's press department an article from a newspaper which for reasons that will occur to all he does not wish to name, full of insinuation and innuendo regarding his connection with the New York, New Haven & Hartford Railroad, and stating that his early retirement from the presidency was a foregone conclusion, or words to similar effect. This article was presented to him with the request from the paper that he affirm or otherwise the report of his retirement. He wrote upon the request that he was to retire, but the date was not yet fixed. He believed this was a statement the real meaning of which was perfectly transparent, as in the very nature of things he must retire some time. Mr. Mellen further says that he was on the road, extremely busy, and nettled at the article, which he regarded as malicious, and the request for a statement under the circumstances he deemed impertinent. He regrets if people have been misled, for it was far from his disposition to be party to any deception.

"Mr. Mellen sees no reason in anything that has happened up to the present time why consideration should be given the matter of New York, New Haven & Hartford Railroad dividends. The dividend of Oct. 1, 1911, has been declared, and has been amply earned. Unless something occurs more than he believes is likely to happen, that is, some cataclysm in business impending which he cannot see, the question of a reduction should never be raised. Business is slow and the approach of the presidential election always makes for caution, but the property should, with careful handling, weather such conditions without endangering dividends, and subsidiaries which are now under construction will soon be earning something to help pay the burden the New York, New Haven & Hartford Railroad has heretofore been carrying without return. The only reason he has for feeling cautious about a too positive statement regarding this matter is the uncertainty regarding future legislation and the labor question. With these two things no worse than at present he is confident of maintaining fairly and honestly (and serving the public with equal facility) the present rate of dividend. The matter of a reduction of the dividend has never to his knowledge been considered by the directors of the New York, New Haven & Hartford Railroad, and has never been discussed with him by any of the directors."

Thomas P. Fowler, president of the New York, Ontario & Western Railway, issued a statement in which he said:

"Charles S. Mellen has been severely criticised of late for acquiring electric railways and other railway properties. So far as the purchase of the stock of the New York, Ontario & Western Railway is concerned, it has not only thus far been a profitable investment for the New York, New Haven & Hartford Railroad, but has protected a rate situation which saves many thousands of dollars annually to the New York, New Haven & Hartford Railroad, as well as to coal consumers throughout the New England territory. The New York, New Haven & Hartford Railroad would have failed utterly to meet modern requirements, or to serve properly the growing needs of the section of country in which its lines are located, had Mr. Mellen not had the ability and courage to do what he has done. In the end his stockholders will reap a benefit instead of meeting disaster, which would inevitably have followed old and narrow methods, had they been persisted in. Within the last few years thousands of miles of railway lines have been constructed and hundreds of millions expended in the development of Pacific Coast traffic and in the construction and extension of transcontinental lines, while we in the East have been oblivious to the fact that the population of Westchester County and the Boroughs of Manhattan and the Bronx far exceeds that of the entire Pacific slope. What will the value of the Westchester lines be in another decade? And suppose that Mr. Mellen had sat still and not developed his property, its connections and the territory which it serves—then surely the press and the public would have had reason for criticism."

Terms of Proposed Los Angeles Franchise to Be Changed

Unable to agree on the proposed general franchise ordinance to govern the granting of franchises in Los Angeles, members of the Board of Public Utilities, the legislative committee of the City Council and representatives of the street railways have practically determined to have an entirely new ordinance drafted for their consideration. E. O. Edgarton, secretary of the Municipal League, recommended that an entirely new ordinance be drawn to embody all of the suggestions and ideas that had been advanced, and the plan was agreed to tentatively.

At a conference of the members of the committee on legislation of the City Council of Los Angeles, Cal., the members of the Board of Public Utility Commissioners of Los Angeles and the representatives of the street railways of Los Angeles on Sept. 7, 1911, W. E. Dunn, of the Los Angeles Railway Corporation, urged the appointment of City Engineer Hamlin, Chief Engineer Kuhrts, of the Los Angeles Railway Corporation, and a business man as a commission to visit the principal cities of the country where the girder rail is installed to study its utility and cost, the expense of the commission to be divided between the company and the city. Paul Shoup, vice-president of the Pacific Electric Railway, suggested the establishment of a girder rail district, including the business and industrial sections. He is quoted as follows: "As I have studied the reports on the girder rail which have been made to me it seems to me to be a matter of the district where the rail is used. In the business districts, particularly the industrial districts, where the traffic justifies the use of a very heavy rail laid on a good foundation, the girder rail meets with approval. In outlying districts it has been a failure. If a girder rail district could be established it would give us better streets where the traffic is heavy without preventing extensions into new residence territory on account of the increased cost of construction."

In a statement which he issued in connection with the

discussion of franchise conditions H. E. Huntington, president of the Los Angeles Railway Corporation, said in part:

"In the first place, the policy of the Los Angeles Railway has, I believe, been more liberal as to extensions than that of any other railroad system with which I am familiar in the country. There has never been a time since I have owned the road when any section of the city has been neglected as to transportation facilities.

"The carrying out of this policy has resulted, of course, in lessened earnings per mile, and the company even under very favorable climatic conditions is operating on a percentage of its gross earnings much greater than in any city with which I am familiar. In the future there are but two policies which may be pursued: The first, to which I am inclined, is the building of additional lines under franchise requirements which will protect both the investor and the public. The second is to adopt the Eastern plan and force the building up of the city within its present limits. Los Angeles is bound to grow, and it is merely a question as to whether or not the growth shall be along the lines of expansion or congestion. Personally, I prefer expansion, as I believe that the attractive feature of outlying homes is one of the advantages which the Easterner finds in Southern California which is not offered in any other section of the country.

"I have been quoted as saying that I would build no more lines in Los Angeles if the ordinance as originally drawn becomes a law. It is hardly necessary to comment on this, as your committee is already changing the impossible features of the ordinance, with a view of getting it into a workable form. The statement I made was perhaps not diplomatic, but it was certainly a statement of fact, and I think that the members of your committee will now agree with me that it would be impossible to build extensions under the draft of the ordinance as published.

"A franchise is made up of a chain of provisions covering the rights of each party. This chain is only as strong as its weakest link, and the franchise is only as fair to the investor as the most confiscatory clause which it may contain. One such clause may bring the whole enterprise to destruction, and certainly will cause an investor to hesitate before advancing his money in that direction. It may not be amiss for me to call attention to the fact that the president of the Board of Public Utilities stated that, as an attorney, he would advise a client against the purchase of securities issued for construction under a franchise that contained some of these clauses. Your committee has, I believe, felt the same way about the clauses particularly referred to, and I understand they are being changed. It is my belief that your committee will work out a carefully considered ordinance which will be fair both to the companies and to the people, as their interests are identical in this particular. Unnecessary and improper restrictions in regard to operations must in the end redound to the disadvantage of our patrons as well as ourselves.

"If the franchise ordinance is to be a success, its framers should bear in mind the fact that Los Angeles is in its infancy as compared with the cities most frequently used for examples, and that many of the quoted conditions in these cities do not obtain in Los Angeles."

Railway Line Desired in Euclid Avenue, Cleveland

Councilman Samuel E. Kramer has prepared a resolution to be presented to the City Council of Cleveland instructing G. M. Dahl, street railway commissioner, to communicate in writing with all the property owners on Euclid Avenue between East Twenty-second Street and East Fortieth Street asking them to consent to the construction of a street railway along that portion of the street. This was formerly one of the most exclusive sections in the city, and as the Cleveland Railway could not secure consents, it was compelled to divert cars by way of Prospect Avenue. Business houses are encroaching on this section to some extent, and Mr. Kramer believes that the property owners will now allow the company to build on the street, as the new line would permit the company to reduce the time to the eastern part of the city.

C. E. Ruthenberg, candidate for Mayor on the Socialist ticket, challenged Newton D. Baker, the Democratic candidate, on Sept. 14 to debate the amendments to the Tayler franchise which were adopted by the City Council some time ago. Mr. Baker declined the challenge, stating that such a debate would only intensify differences of opinion upon questions of methods rather than questions of principle.

Workmen said to number about 10,000 are preparing to petition for a belt line through "the flats," a lumber and factory district along the Cuyahoga River, which they claim is inadequately served.

The statement of operation of the Cleveland Railway for August shows a deficit of $59,512.25.

The Steinway Tunnel

William R. Willcox, chairman of the Public Service Commission of the First District of New York, has asked T. P. Shonts, president of the Interborough Rapid Transit Company, whether that company was still ready to consider the turning of the Steinway tunnel between Forty-second Street, Manhattan, and Queens to public use on the terms he proposed fifteen months ago. At that time Mr. Shonts expressed willingness to open the tunnel to traffic and construct a connection between it and the subway at the Grand Central Station without charging passengers to and from Long Island City more than the regular 5-cent fare. The offer of the Interborough Rapid Transit Company with regard to the Steinway tunnel to which Mr. Willcox refers was part of a proposal for the third-tracking extensions and also new lines along Jerome Avenue and Webster Avenue, in the Bronx. It was sent on June 10, 1910, and negotiations proceeded along the line laid down by Mr. Shonts till the whole matter was put in abeyance by the question of the new subways. Then everything was subordinated, but after the Brooklyn Rapid Transit Company had obtained the award, the Interborough Rapid Transit Company requested that the third tracking and the Bronx extensions be taken up separately.

Important changes in the proposed new charter for New York City are announced by Chairmen Cullen and Foley, of the joint cities committees of the Legislature, which have been sitting in New York since Sept. 7. The Mayor and other elective officers are made removable by the Governor. No change is announced of the provision affecting the Mayor's veto power over franchises. Ten-year revocable privileges to be granted by the Board of Estimate are to be stricken out. In a letter addressed on Sept. 19, 1911, to Corporation Counsel Watson, Mayor Gaynor declared that he did not wish the much-discussed veto power over subway construction contracts, and he made a suggestion as to the terms on which the operation contract of the new subways should be granted to the Brooklyn Rapid Transit Company. He also suggested that the Brooklyn Rapid Transit Company should grant transfers to its Manhattan subways not only to passengers on its elevated lines, but also to those on its surface cars.

Conference on Toledo Fare Ordinance

A special committee of the City Council of Toledo, Ohio, has been appointed to confer with a committee of the Toledo Railways & Light Company in regard to the Schreiber 3-cent fare ordinance, which has been approved by the Council committee of the whole. This committee will consist of Mayor Whitlock, City Solicitor Schreiber, Councilman Merrill, chairman of the committee of the whole; Councilman Spitzer and Councilman Robson. Attorney Rathbun Fuller, representing the company, has agreed to the plan, and he and Albion E. Lang, president of the company, will probably be members of the committee representing the company. Mr. Fuller in addressing the Council said that the lines could not be operated successfully at a fare of 3 cents and universal transfers. The committees will seek information from the books of the company as to a rate of fare that will allow the company a proper return on the money invested. Nothing further will be done with the ordinance until the committees report, it is said. Mr. Fuller stated that the average fare in Cleveland is 3⅛ cents, as change is not given when a passenger presents a nickel in payment of fare. The figures of the Toledo Railway & Light Company taken from the report of Nau, Tanner & Rusk for 1909 show this rate to be impossible. During 1909

32,748,055 passengers were carried. The income at a 3-cent fare would have been $982,441.65, while the operating expenses, not including interest, were $1,880,155. At present the operating expenses are $3.94 per car mile, which would make the proposed low rate impossible.

On the evening of Sept. 12 T. J. Mulligan, contractor, on the authority of the Village Council of Perrysburg, tore up about 150 ft. of the track of the Maumee Valley Railways & Light Company at a street crossing in the town. The Toledo Railways & Light Company had neglected to pay what the village claimed was its portion of the paving expenses at the street crossing. The tracks in question were abandoned a year ago after being damaged by a flood. The Maumee Valley Railways & Light Company is a subsidiary of the Toledo Railways & Light Company.

Annual Convention of Railroad Commissioners.—The annual convention of the National Association of Railway Commissioners will be held at Washington, D. C., beginning Oct. 10, and will continue for five days. The meeting will be held in the hearing room of the Interstate Commerce Commission.

Condemnation Proposed in Seattle.—An ordinance has been introduced in the City Council of Seattle, Wash., providing for the purchase under condemnation by the city of that part of the Seattle, Trenton & Southern Railway within the city limits. This is in accordance with the plan of the city to operate the property as a municipal line.

Pittsburgh Subway Ordinance.—Members of City Council of Pittsburgh, Pa., sitting as the committee on public service on Sept. 15, 1911, approved a subway ordinance that allows any company to bid for the franchise. The measure was to be acted on finally at the meeting of the Council on Sept. 19, 1911. Reference to the new ordinance was made in the Electric Railway Journal of Sept. 16, 1911, page 472.

Des Moines Arbitrators Named.—The Des Moines (Ia.) City Railway has named N. T. Guernsey, of Guernsey, Parker & Miller, formerly counsel for the company, to represent it as a member of the board of arbitrators which is to consider the differences between the company and its employees. A. L. Urick, president of the State Federation of Labor, has been named to represent the men. The third arbitrator has not yet been chosen.

Additional Powers Proposed for Los Angeles Board.—In response to a communication of the Board of Public Utilities of Los Angeles, Cal., and in direct line with the message of the Mayor of that city, sent to the City Council recently, the committee on legislation of the Council has directed the city attorney to prepare an ordinance to vest the Board of Public Utilities with power to ascertain the amount of money invested by the street railways which operate in Los Angeles and the earnings of the companies, and, if necessary, to fix fares.

Opening of Wentworth Institute.—Wentworth Institute, which received an endowment of about $3,500,000 from Arioch Wentworth, of Boston, will be officially opened on Sept. 25, 1911. It is located on Huntington Avenue, Boston, Mass., directly opposite the Museum of Fine Arts, and its aim is to teach trades and to train young men to be foremen in building construction and in manufacturing business. There will be electrical and power laboratories and one and two-year courses. The tuition fees are $6 per term for day students and half that rate for evening students. The principal is A. L. Williston, for twelve years head of the School of Science and Technology at the Pratt Institute, Brooklyn, N. Y.

PROGRAM OF ASSOCIATION MEETING

Kansas Gas, Water, Electric Light & Street Railway Association

It was arranged to hold the annual meeting of the Kansas Gas, Water, Electric Light & Street Railway Association at the Carl Leon Hotel, Independence, Kan., on Sept. 21 and 22, 1911. The program contained three papers of interest to street railway officials, as follows: "Relation of Public Utilities to Public Utility Commission," by Carl C. Witt, Topeka; "Laws Relating to Public Utilities," by Attorney Hyatt Parsons, and "Better Insulation," by L. G. Martin, Chicago.

Financial and Corporate

New York Stock and Money Market

September 20.

Prices declined in the early trading on both Monday and Tuesday, rallying toward the close. Rumors of federal action against the Steel Corporation and possibility of lower wages at its mills furnished sufficient material for a heavy selling movement to-day. Steel common dropped to 67⅞ and preferred lost 3⅛ points from yesterday's close. Foreign labor troubles and unsettled conditions upon European exchanges assisted in the downward trend.

New York banks have loaned large amounts during the week to German interests. Rates in the money market to-day were: Call, 2⅛@2½ per cent; ninety days, 3½@3¾ per cent.

Other Markets

Fractional losses were registered on Monday in Philadelphia Rapid Transit and Union Traction. Trading to-day was in small volume, but prices were well sustained.

Local issues in Chicago are showing signs of weakness. There has been little interest shown in public utilities.

In Boston trading has been narrow and prices generally firm.

The Baltimore market is dull and, aside from an advance of nearly a point in United Railways 4s on Tuesday, the list has shown a downward tendency.

Quotations of traction and manufacturing securities as compared with last week follow:

	Sept. 13.	Sept. 20.
American Light & Traction Company (common)	a300	a298
American Light & Traction Company (preferred)	a107	a107
American Railways Company	a44	a44
Aurora, Elgin & Chicago Railroad (common)	a43½	a43½
Aurora, Elgin & Chicago Railroad (preferred)	a87	a87
Boston Elevated Railway	a127½	a127¼
Boston Suburban Electric Companies (common)	a14	a14
Boston Suburban Electric Companies (preferred)	75	a75
Boston & Worcester Electric Companies (common)	a13	a12
Boston & Worcester Electric Companies (preferred)	a52	a51
Brooklyn Rapid Transit Company	73	73¼
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	83¾	84
Capital Traction Company, Washington	a130¾	a130
Chicago City Railway	a190	a190
Chicago & Oak Park Elevated Railroad (common)	a3	a3
Chicago & Oak Park Elevated Railroad (preferred)	a7	a6
Chicago Railways, ptcptg., ctf. 1	a97	a95
Chicago Railways, ptcptg., ctf. 2	a30	a30
Chicago Railways, ptcptg., ctf. 3	a11¼	a10½
Chicago Railways, ptcptg., ctf. 4	a7	a6
Cincinnati Street Railway	a132½	a132
Cleveland Railway	a101	a100
Columbus Railway (common)	83	a83
Columbus Railway (preferred)	95	a95
Consolidated Traction of New Jersey	a76	a75
Consolidated Traction of N. J., 5 per cent bonds	a104½	a104
Dayton Street Railway (common)	a25	a25
Dayton Street Railway (preferred)	a101	a101
Detroit United Railway	a70	a70
General Electric Company	149	149
Georgia Railway & Electric Company (common)	a158	a158
Georgia Railway & Electric Company (preferred)	a93	a93½
Interborough Metropolitan Company (common)	14⅛	13¾
Interborough Metropolitan Company (preferred)	41⅜	41¼
Interborough Metropolitan Company (4½s)	79	78½
Kansas City Railway & Light Company (common)	a19	a18
Kansas City Railway & Light Company (preferred)	a42	42
Manhattan Railway	134⅛	137
Massachusetts Electric Companies (common)	18¼	a17
Massachusetts Electric Companies (preferred)	a88	a88¼
Metropolitan West Side, Chicago (common)	*27	*27
Metropolitan West Side, Chicago (preferred)	*75	*75
Metropolitan Street Railway, New York	15	15
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	65¾	65½
Northern Ohio Light & Traction Company	58	a57
Northwestern Elevated Railroad (common)	30	*30
Northwestern Elevated Railroad (preferred)	70	*70
Philadelphia Company, Pittsburgh (common)	a51	a50
Philadelphia Company, Pittsburgh (preferred)	a42½	42½
Philadelphia Rapid Transit Company	22¼	a21¾
Philadelphia Traction Company	a85⅜	82
Public Service Corporation, 5% col. notes (1913)	*94	*94
Public Service Corporation, ctfs	a106	a104
Seattle Electric Company (common)	a109	a110
Seattle Electric Company (preferred)	a105	a101
South Side Elevated Railroad (Chicago)	*95¼	*95¼
Third Avenue Railroad, New York	9	8½
Toledo Railways & Light Company	a6½	6½
Twin City Rapid Transit, Minneapolis (common)	a106	a106¾
Union Traction Company, Philadelphia	a50	a49½
United Rys. & Electric Company (Baltimore)	a17¾	17¾
United Rys. Inv. Co. (common)	32	29
United Rys. Inv. Co. (preferred)	57½	56
Washington Ry. & Electric Company (common)	a43½	a43½
Washington Ry. & Electric Company (preferred)	a89	a89
West End Street Railway, Boston (common)	a86½	a87
West End Street Railway, Boston (preferred)	a100½	a101½
Westinghouse Elec. & Mfg. Co.	61½	60⅛
Westinghouse Elec. & Mfg. Co. (1st pref.)	a118	a118

aAsked. *Last sale.

ANNUAL REPORT.

Brooklyn Rapid Transit Company.

Earnings of the Brooklyn Rapid Transit Company for the year ended June 30, 1911, compare with the preceding year as follows:

Revenue from Operation.	1911	1910
Transportation	$21,716,486	$20,746,876
Miscellaneous	270,057	232,639
Total	$21,986,543	$20,979,515
Operating expenses:		
Maintenance of way and structure	$1,423,108	$1,384,581
Maintenance of equipment	2,125,580	2,070,814
Operation of power plant	1,339,552	1,498,712
Operation of cars—trainmen's wages	3,714,683	3,451,414
Operation of cars—other expenses	1,584,180	1,543,049
Damages	750,854	656,502
Legal expense in connection with damages	232,616	198,906
General law expenses	60,115	66,130
Other general expenses	707,369	689,522
Freight and mail expenses	227,004	174,289
American Railway Traffic Company—expenses	1,306	3,192
Total	$12,166,367	$11,737,111
Net revenue from operation	$9,820,176	$9,242,404
Income from other sources	297,524	278,814
Total income	$10,117,700	$9,521,218
Deductions:		
Taxes	$1,465,535	$1,454,213
Interest and rentals (net)	5,503,686	5,455,410
Total	$6,969,221	$6,909,623
Net income	$3,148,479	$2,611,595
Special appropriations	88,535	108,560
Surplus from operation for the year	$3,059,944	$2,503,035
Profit from real estate disposed of	.....	69,185
Total surplus for year	$3,059,944	$2,572,220
Surplus at beginning of year	4,781,035	4,387,229
Total	$7,840,979	$6,959,449
Of this amount there has been appropriated:		
Old accounts written off	3,610	636
Additional reserves for taxes prior years	49,855	232,917
Adjustment of expenses prior	.....	13,281
Supersession and depreciation	105,609	.....
Refunds applying prior years	11,821	.....
Dividend on Brooklyn Rapid Transit Company stock outstanding	2,242,690	1,906,287
Total appropriations	$2,413,585	$2,178,414
Balance sheet surplus	$5,427,394	$4,781,035

The statement of President T. S. Williams includes an account of the rapid transit developments of the year. This in part is as follows:

"No basis of agreement with the interurban company having been reached by the committee during negotiations extending over several weeks, the Brooklyn Rapid Transit Company submitted to the joint committee a proposition under date of March 2, 1911, which was not intended to conflict with any rapid transit plans in the boroughs of Manhattan and the Bronx, but to furnish comprehensive and adequate transit facilities for the borough of Brooklyn and a large part of the borough of Queens, with the eventual extension thereof to the borough of Richmond.

"The plan which was proposed included, as an essential accompaniment of improved local transit in these boroughs, a suitable distribution subway system in Manhattan. Nearly two millions of persons reside in these two boroughs and a large proportion of them visit Manhattan daily for business or pleasure. Upon this daily human influx, increasing as rapidly as conditions will permit, depend to a large extent the stability and growth of Manhattan's material prosperity. It is the rising tide of suburban population, contributing to the commercial, financial and intellectual activities of a great city, creating increasing demands for employment and consumption, which marks the evolution of a metropolis. It is the opportunity for cheap homes amid healthful surroundings which relieves unwholesome congestion and stimulates the moral, physical and political welfare of a cosmopolitan community. Not without adequate transit, reaching from its municipal heart like great arteries to its outlying sections, can New York realize its best and richest development, and even the appreciation of material values in Manhattan, the business heart, must depend mostly upon the facility with which the resident population of the neighboring boroughs is brought into its territory. Until now this great outside army of residents has been brought only to the gateways of Manhattan. The handicap of double fares, change of cars and constricted terminals has been a retarding influence on municipal growth and public welfare. No system of transportation can be adequate which does not carry people quickly, safely and cheaply between their homes and the districts of their daily vocations.

"Your company, recognizing these considerations and its obligations toward them as the only public service corporation through which, by reason of its existing facilities, improvement of transit conditions in Brooklyn and Queens can be most promptly and effectually accomplished, proposed through its communication of March 2, not only new lines and enlargement of existing lines in those two boroughs, but a distributing subway line in Manhattan, from the Battery to Fifty-ninth Street, located mostly on Broadway, with suitable connections with the East River bridges and a new tunnel under the river.

"The plan of transportation thus proposed received instant and general public approval. It did not involve the use of any thoroughfare in Manhattan covered by negotiations between the city and any other railroad company. It did not conflict with any plans for the development of rapid transit in Manhattan and the Bronx nor in part of Queens. During the negotiations and conferences, however, it became evident that the city might not be able to agree with the Interborough company as to desired rapid transit lines in Manhattan and the Bronx if the Brooklyn company was to be allowed a distributing line for its passengers on Broadway. The joint committee therefore requested your directors to consider whether the company would include in its proposition all of such Manhattan and Bronx lines (with the exception of a line on Seventh Avenue south of Forty-second Street) and certain additional lines in Queens and Brooklyn. Assurance to this effect was furnished in the company's communications of April 25 and May 2.

"The Rapid Transit Act requires a certain procedure to be followed, including a public invitation for proposals, and these formalities are now to be undertaken by the Public Service Commission. Upon their completion and upon the award, if made in accordance with the declared policy and expressed sentiment of the two official bodies (the Board of Estimate and Apportionment and the Public Service Commission), your company, through the instrumentality of a new corporation to be organized for that purpose, and with the co-operation of existing railroad companies, will be furnished with the necessary authority to undertake the execution of a much larger plan of transportation than it originally proposed—involving the expenditure of much additional money and operation over a much wider territory. Your company, through its new instrumentality, while procuring its distribution line in Manhattan and the enlargements asked for in Brooklyn and Queens, will no longer be a local corporation, serving the people of two boroughs, but a Greater New York corporation, serving the people of five boroughs.

"The conditions which have brought about this situation have not been of our seeking, but the responsibility which it involves will not be evaded and the opportunity which it affords for public service will not be ignored. In the disinterested purpose and intelligent consideration which marked the precedent official conferences, and in the subsequent declaration of principles upon which the city's representatives acted, a new chapter was written in the history of municipal transit and a new standard of official conduct and performance was established. Your directors conceive it to be their paramount duty to insure, so far as the obligation rests upon them, the complete and satisfactory carrying out of the city's comprehensive and far-sighted policy for a unified transportation system, capable of indefinite expansion, constructed and equipped in accordance with the most improved methods and operated with the highest attainable efficiency and for a single fare.

"The radical safeguards to be embodied in the proposed contract for the protection of the city's interests make the terms severe. The rewards of successful operation are to be shared equally by the city and the operator, and the privilege of recapture after ten years is a financial handicap to the operator—but so much does the proposed new system offer for the development and welfare of the city that it would be an extremely short-sighted policy for an existing

transportation company, from motives of temporary expediency or profit, to refrain from co-operating for the accomplishment of these great results—in which, with the city and its people, the operator, so long as it fulfils its obligation faithfully and renders to the public the service called for, may be participant both as to pride and profit.

"Under the terms of the proposed contract the operator will be called upon to expend approximately $75,000,000 in construction and equipment. This money your directors have already arranged for. The plan of financing will be announced at the proper time.

"The system of transportation comprised in the proposed contract will traverse sections aggregating substantially nine-tenths of the area of Greater New York and will serve seven-tenths of the population. The only important section not covered is that which would be served by the construction of a rapid transit line on Seventh Avenue from Forty-second Street south, passing the Pennsylvania Railroad station. In the event that such a line should not be constructed and operated as a natural extension of the existing rapid transit railroad, it could be made a part of the new system with a northerly extension on the west side of Manhattan, which within a few years will probably be necessary for the relief of that growing population. It should be borne in mind, however, that without any extension on Seventh Avenue the lines already comprised in the new rapid transit system will bring within short distance of the Pennsylvania station several millions of people of Greater New York who now cannot reach it at all by rapid transit except with change of cars and for two fares. The train platforms in the Pennsylvania station will be only 500 feet farther from the proposed Broadway subway than the train platforms in the new Grand Central Station will be from the present subway station at Forty-second Street."

Total charges for maintenance and new construction during the year aggregated $4,848,077. Among the matters to which reference is made in this part of the report are the following:

"Two parlor cars were reconstructed as 'pay-as-you-enter' cars and two closed passenger cars as 'pay-within' cars and placed in operation for experimental purpose.

"Twenty-six snow sweepers and forty snow plows were completely overhauled and re-equipped; 1766 surface passenger cars, or 69 per cent of the total equipment, and all of the 928 elevated passenger cars were put through the shops, overhauled and revarnished; seventy salt and sand cars used on the surface lines and thirty-three elevated cars of miscellaneous types were also completely overhauled and repainted.

"Much progress was made in the substitution of rolled-steel wheels for cast wheels on the surface cars, and at the end of the fiscal year 73 per cent of the total number of wheels had been thus changed at considerable cost."

Traffic statistics for the last two years compare as follows:

	1911.	1910.
Per cent of increase in passenger earnings over preceding year	4.28	7.44
Passengers carried	571,881,446	569,438,773
Revenue mileage	79,619,831	77,984,651
Increase over preceding year, percentage	2.10	5.10
Earnings per revenue mile, cents	26.8	26.3
UNITS PER PASSENGER—CENTS.		
Passenger earnings	3.73	3.60
Miscellaneous earnings	.16	.14
Total earnings	3.89	3.74
Operating charges	2.14	2.08
Taxes	.26	.26
Interest and rentals	.96	.96
Total	3.36	3.30
Surplus	0.53	0.44
CHARGES PER CENT OF OPERATING EXPENSES.		
Repairs and renewals	16.21	16.53
General operating	34.59	35.21
Damages	3.43	2.66
Legal expense	1.34	1.75
Total operating	55.57	56.15
Taxes	6.69	6.96
Interest and rentals (net)	23.36	24.40
Special appropriations	.40	.52
Surplus	13.98	11.97
	100.00	100.00

The assessments of real estate, tracks and special franchises have been increased during the current year by $11,455,000. Attention is called to the fact that the charge to taxes represents over 14.6 per cent of the net income after deducting operating expenses and amounts to a sum equal to nearly one-half the net profits.

Annual Meeting of Philadelphia Rapid Transit Company and Union Traction Company

The annual meeting of the stockholders of the Philadelphia (Pa.) Rapid Transit Company was held on Sept. 20, 1911. Charles E. Ingersoll and C. S. W. Packard were re-elected to serve on the board four years. Charles O. Kruger was re-elected president when the board reorganized. Alexander Rennick was re-elected vice-president. E. T. Stotesbury was made chairman of the board of directors, and the following executive committee was elected: E. T. Stotesbury, Charles E. Ingersoll, C. S. W. Packard, Horatio G. Lloyd and T. E. Mitten, who was made chairman of the committee. The following statement of earnings for August, 1911, was made public:

	August, 1911.	Two Months to Aug. 31, '11.
Gross passenger earnings	$1,712,222	$3,488,243
Receipts from other sources	82,767	163,562
Gross receipts	$1,794,989	$3,651,805
Operating expenses	1,126,217	2,270,984
Net earnings from operation	$668,772	$1,380,821
Fixed charges	736,683	1,473,972
Deficit	$67,910	$93,151

The stockholders of the Union Traction Company also ment on the same day. All the directors were re-elected. They were to meet on Sept. 22, 1911 to organize. The receipts and disbursements of the Union Traction Company for the year follow:

RECEIPTS.		
Balance June 30, 1910		$1,517
Amount received from P. R. T. for fixed charges	$6,207,839	
Rental	1,800,000	
Maintenance of organization	5,000	
Real Estate Holding Company (awarded in condemnation proceedings Pattison Avenue property)	17,500	
Settlement of receivers for Guarantors' Liability Indemnity Company	507	
P. R. T. equipment trust certificates	1,500,000	
P. R. T. rental	150,000	
Interest	715	
		9,681,564
		$9,683,081
DISBURSEMENTS.		
Fixed charges	$6,207,839	
Dividends paid	1,800,000	
Maintenance of organization	5,102	
Investment on account of Union Traction stock	18,850	
P. R. T. equipment	1,500,000	
P. R. T. certificates of redemption	150,000	
		9,681,792
Balance		$1,289

The report of Jeremiah J. Sullivan, president of the Union Traction Company, was adopted. Mr. Sullivan said that the company had given consent to the extension for fifty years of the 5 per cent mortgage of the Union Passenger Railway, amounting to $500,000, and the 5 per cent mortgage of the People's Passenger Railway, amounting to $285,000, both to be hereafter on a 4 per cent basis. The report added that payments to the company had been made promptly by the Philadelphia Rapid Transit Company and that the properties were in good condition.

An abstract of the annual report of the Philadelphia Rapid Transit Company for the year ended June 30, 1911, was published in the Electric Railway Journal of July 22, 1911, page 170.

Boston (Mass.) Elevated Railway.—The directors of the Boston Elevated Railway, at a special meeting held on Sept. 13, 1911, voted to accept the legislative act providing for the construction of the Boylston Street subway, a subway from Park Street to the South Station and thence to Andrew Square, Dorchester, and the extension of the East Boston tunnel beyond Bowdoin Square to the vicinity of Lynde Street. The act also provides for the extension of the leases of existing subways and tunnels to July 1, 1936. There remains only the acceptance of the act by the City Council of Boston and the Mayor. The Boston Transit Commission will, upon acceptance by the Council and Mayor, proceed to the active construction of the tunnels and subways by asking for bids for the work.

Chicago (Ill.) Railways.—The Merchants' Loan & Trust Company, Chicago, trustee, has purchased for the Chicago Railways sinking fund approximately $273,000 par value

of the corporation's consolidated mortgage and sinking fund twenty-year 4-5 per cent bonds, series C, under the provision which calls for the expenditure of $250,000 per annum in the retirement of these bonds. The average price paid by the Merchants' Loan & Trust Company was 91½. After Feb. 1, 1912, the series C bonds outstanding carry 5 per cent interest as against 4 per cent prior to that date. On June 1, 1911, the net obligation of the Chicago Railways on account of these bonds was $2,731,273, now to be reduced to $2,458,273.

Chicago & Milwaukee Electric Railroad, Chicago, Ill.—Judge Peter S. Grosscup, Samuel Insull, president of the Commonwealth-Edison Company, and W. O. Johnson, receiver of the Chicago & Milwaukee Electric Railroad, inspected the lines of the company on Sept. 15, 1911. A decree for the sale of the road is expected to be entered this month. It is said that the reorganization will be effected on the following terms: A new corporation will issue $4,000,000 of first mortgage 5 per cent bonds, $4,000,000 of 4 per cent first income bonds, $5,000,000 of 4 per cent second income mortgage bonds, and $6,000,000 of stock, all of one class. New first mortgage bonds will be used to retire $1,000,000 of 5 per cent receivers' certificates, to retire the $1,080,000 underlying first mortgage bonds of the Chicago & Milwaukee Electric Railway, and to provide new capital. The underlying first mortgage bonds are callable on any interest date at 105 and interest. Other new securities will be distributed as follows: $4,000,000 of first income bonds exchanged dollar for dollar for $4,000,000 of first mortgage 5 per cent bonds of Illinois division of Chicago & Milwaukee Electric Railroad; $5,000,000 second income bonds exchanged for $10,000,000 Wisconsin division bonds. Holders of bonds of the Wisconsin division will also receive the entire issue of $6,000,000 stock.

Cincinnati, Georgetown & Portsmouth Railroad, Cincinnati, Ohio.—The following new officers have recently been elected by the Cincinnati, Georgetown & Portsmouth Railroad: President, Robert B. Hackney; vice-president, Judge Jesse Thompson, Georgetown, Ohio; secretary and treasurer, George W. Nichols, Cincinnati; general manager, E. W. White. Mr. White has been operating the road for some years. The Ohio River & Columbus Railway and the Felicity & Bethel branch, owned by a separate corporation, have been merged with the Cincinnati, Georgetown & Portsmouth Railroad.

Georgia Railway & Power Company, Atlanta, Ga.—The Georgia Railway & Power Company has applied for incorporation in Georgia, presumably to purchase or lease the property of the Georgia Railway & Electric Company and the Georgia Power Company. The company will be capitalized at $27,000,000, of which $15,000,000 will be common stock, $2,000,000 first preferred stock and $10,000,000 second preferred 4 per cent non-cumulative stock.

Hattiesburg (Miss.) Traction Company.—The property of the Hattiesburg Traction Company has been purchased by H. L. Doherty & Company, New York, N. Y.

Haverhill & Amesbury Street Railway, Merrimac, Mass.—The petition of the Haverhill & Amesbury Street Railway for authority to issue additional stock and bonds to the amount of nearly $400,000 was heard by the Railroad Commission on Sept. 20, 1911. Judge Samuel W. Emery, of Amesbury, counsel for the company, stated that it desires to make a bond issue of $110,000 and a stock issue of $260,000 to pay the cost of certain improvements, a complete schedule of which he presented. The commission took the matter under advisement .

Interborough Rapid Transit Company, New York, N. Y.—The Interborough Rapid Transit Company has applied to the Public Service Commission of the First District of New York for authority to make a new bond issue of $11,400,000, to be considered as part of the bond issue already authorized. The proceeds are to pay off outstanding notes of $10,000,000, incurred during the period of the construction of the subways, and $1,400,000 for contracts for installation of side doors on express trains, and to pay for outstanding contracts for side-door installation already ordered on local subway trains, and for additional machinery at the power stations.

International Traction Company, Buffalo, N. Y.—The Public Service Commission of the Second District of New York held a hearing at Albany on Sept. 14, 1911, on a plan of reorganization of the International Traction Company. A new corporation, to be known as International Traction Railways, proposes to purchase the securities of the International Traction Company, and aims ultimately to acquire all the latter's stock and that of subsidiary companies and to merge them. Only formal evidence was taken on Sept. 14, 1911, by the commission and the case was adjourned to Buffalo on Oct. 9, 1911.

Metropolitan Street Railway, New York, N. Y.—The sale of the property of the Metropolitan Street Railway under foreclosure has been postponed until Nov. 24, 1911. The plan for the reorganization of the company is still pending before the Public Service Commission of the First District of New York.

Middlesex & Boston Street Railway, Newtonville, Mass.—The Middlesex & Boston Street Railway has petitioned the Railroad Commission for authority to issue $1,483,000 refunding bonds. The proceeds of the issue will be used to refund the bond issues of subsidiaries of the Middlesex & Boston Street Railway, which amount to $1,015,000, as follows: $100,000 South Middlesex Street Railway first mortgage bonds, due Feb. 1, 1915; $40,000 Westborough & Hopkinton first mortgage bonds, due Nov. 1, 1922; $500,000 Newton Street Railway first mortgage bonds, due July 1 1912; $100,000 Waltham Street Railway first mortgage bonds, due Dec. 1, 1915; $75,000 Commonwealth Avenue Street Railway first mortgage bonds, due Feb. 1, 1916; $200,000 Newton & Boston Street Railway first mortgage bonds, due July 1, 1912, and for the payment of the company's floating indebtedness which amounts to $468,000. The company will issue the $468,000 refunding bonds immediately.

Mississippi Valley Interurban Railway, Springfield, Ill.—Application for the appointment of a receiver for the Mississippi Valley Interurban Railway has been made in behalf of the bondholders of the company.

New Hampshire Electric Railways, Haverhill, Mass.—A hearing on a petition to dismantle the Portsmouth & Exeter Street Railway, the securities of which are held by the New Hampshire Electric Railways, was given by Judge William M. Chase, A. S. Batchelder and Burns P. Hodgman, sitting as masters, in the United States Court at Portsmouth, N. H., on Sept. 15, 1911. The road, which is now being operated by receivers, is 12 miles long and was constructed and equipped at a cost of $350,000. Witnesses testified that the road was operated at a loss and that a large sum would have to be expended for improvements. D. A. Belden, president of the New Hampshire Electric Railways; Franklin Woodman, general manager of that company, and A. H. Hodges, of the Boston & Northern Street Railway, declared that the road could not be operated at a profit.

St. Johns Light & Power Company, St. Augustine, Fla.—The property of the St. Johns Light & Power Company, which includes 10 miles of electric railway, will be sold under foreclosure at St. Augustine on Oct. 2, 1911.

Scioto Valley Traction Company, Columbus, Ohio.—The annual meeting of the stockholders of the Scioto Valley Traction Company will be held on Sept. 26, 1911. The annual report of Frank A. Davis, president of the company, which accompanied the notice calling for the meeting, shows that during the year ended June 30, 1911, the company carried 1,352,691 passengers, an increase of 101,499 over the preceding year. Earnings per passenger were 26.83 cents, a decrease of 1.28 cents. The passenger car mileage was 1,025,854, an increase of 4488 miles. Earnings per passenger car mile were 35.28 cents, an increase of 8.5 mills per mile. During the same period the road carried 63,859,213 lb. of freight, an increase of 6,729,454 lb., and the receipts per 100 lb. were 8.68 cents, a decrease of 2.4 mills. Earnings per freight car mile were 35.61 cents, an increase of 2.08 cents per mile. The strike on the local lines in Columbus resulted in a loss of business to this company last summer. An accident also entailed the payment of $6,000 in damages. The passenger revenue for the year was $361,932, an increase of $10,190. The freight revenue was $55,418, an increase of $4,483. Power sales amounted to $14,873, an increase of $1,158; rent of buildings, $1,288, a decrease of $1.83; miscellaneous revenue, $4,596, a decrease of $636. The total revenue was $438,109, an increase of $15,194. Expenditures show $34,176 for maintenance of way and structures, an in-

crease of $2,860, and maintenance of equipment, $39,062, an increase of $9,825. Operating expenses were $116,676, an increase of $4,538. Miscellaneous expenses aggregated $64,640, an increase of $3,182. The net earnings were $185,551, a decrease of $5,311. Deducting bond interest of $80,000, taxes amounting to $14,437, federal corporation tax of $861 and dividends of $75,000, there remained $15,252 for the common stock, a decrease of $5,518. The reserve fund showed a balance of $25,542, while the total surplus was $58,834, and total surplus and reserve fund, $84,377.

Dividends Declared

Capital Traction Company, Washington, D. C., quarterly, 1½ per cent.

Chattanooga Railway & Light Company, Chattanooga, Tenn., quarterly, 1¼ per cent, preferred.

Cleveland (Ohio) Railway, quarterly, 1½ per cent.

Halifax (N. S.) Electric Tramway, Ltd., quarterly, 2 per cent.

Lake Shore Electric Railway, quarterly, 1½ per cent, first preferred.

Manila Electric Railroad & Lighting Corporation, Manila, P. I., quarterly, 1¼ per cent.

New York State Railways, Rochester, N. Y., quarterly, 1¼ per cent, preferred; quarterly, 1½ per cent, common.

Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, 1½ per cent, preferred.

Omaha & Council Bluffs Street Railway, Omaha, Neb., quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

Ottawa (Ont.) Electric Railway, quarterly, 2½ per cent.

Seattle (Wash.) Electric Company, preferred, 3 per cent; quarterly, 1¾ per cent, common.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., quarterly, 1¼ per cent, preferred.

Toronto (Ont.) Railway, quarterly, 2 per cent.

Union Railway, Gas & Electric Company, Rockford, Ill., quarterly, 1½ per cent, preferred.

Union Utilities Company, Morgantown, W. Va., preferred, 3½ per cent; quarterly, ½ of 1 per cent, common.

Washington Water Power Company, Spokane, Wash., quarterly, 2 per cent.

West End Street Railway, Boston, Mass., $1.75, common.

West India Electric Company, Ltd., Kingston, Jamaica, quarterly, 1¼ per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

AMERICAN RAILWAYS.

Period.			Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1m.,	Aug.	'11	$443,503	.....	.....	.....	.....
"	"	'10	428,324	.....	.....	.....	.....
BANGOR RAILWAY & ELECTRIC COMPANY.							
1m.,	Aug.	'11	$60,048	*$24,074	$35,974	$13,020	$22,954
"	"	'10	58,065	*25,915	32,150	11,795	20,355
2m.,	"	'11	115,725	*50,883	64,842	26,076	38,766
"	"	'10	112,073	*50,690	61,383	23,717	37,666
BROCKTON & PLYMOUTH STREET RAILWAY.							
1m.,	Aug.	'11	$16,202	$8,503	$7,700	$1,545	$6,155
"	"	'10	16,658	8,833	7,825	1,766	6,059
12m.,	"	'11	120,245	84,063	36,182	18,622	17,560
"	"	'10	123,724	90,753	32,972	21,098	11,874
EAST ST. LOUIS SUBURBAN RAILWAY.							
1m.,	Aug.	'11	$193,414	$105,666	$87,747	.....	.....
"	"	'10	215,316	112,539	102,777	.....	.....
8m.,	"	'11	1,480,821	796,123	684,698	.....	.....
"	"	'10	1,545,513	824,762	720,751	.....	.....
LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY.							
1m.,	Aug.	'11	$63,643	*$31,463	$32,180	$14,450	$17,730
"	"	'10	60,578	*32,619	27,959	13,132	14,827
2m.,	"	'11	123,983	*61,668	62,315	28,840	33,475
"	"	'10	121,022	*63,526	57,496	26,267	31,229
PENSACOLA ELECTRIC COMPANY.							
1m.,	Aug.	'11	$25,320	$14,734	$10,586	$5,851	$4,736
"	"	'10	24,236	13,654	10,582	5,279	5,303
12m.,	"	'11	285,249	166,429	118,820	67,208	51,612
"	"	'10	258,490	151,188	107,301	57,077	50,225
PORTLAND RAILWAY, LIGHT & POWER COMPANY.							
1m.,	Aug.	'11	$521,262	*$273,502	$247,760	$118,456	$129,304
"	"	'10	479,944	*241,629	238,315	118,972	119,343
8m.,	"	'11	4,179,778	*2,036,576	2,143,202	991,940	1,151,262
"	"	'10	3,616,280	*1,726,329	1,889,951	914,696	975,255
ST. JOSEPH RAILWAY, LIGHT, HEAT & POWER COMPANY.							
1m.,	Aug.	'11	$92,959	*$62,583	$30,376	$19,381	$10,995
"	"	'10	89,773	*52,128	37,645	18,583	19,062
8m.,	"	'11	715,656	*444,786	270,870	154,094	116,776
"	"	'10	674,715	*402,418	272,297	146,300	125,997

*Including taxes.

Traffic and Transportation

Fare Complaint Against Buffalo, Lockport & Rochester Railway Dismissed

The Public Service Commission, Second District, has dismissed the complaint of Milton J. Whedon, of Medina, which alleged that the New York Central & Hudson River Railroad and the Buffalo, Lockport & Rochester Railway are discriminating against Rochester in favor of Buffalo in the fares charged between Medina and these cities. Medina is 41 miles from both Rochester and Buffalo. The round-trip fare between Medina and Rochester is $1.60, and between Medina and Buffalo $1.20. No specific allegation was made in the complaint that the rates in effect between Medina and Rochester are unjust or unreasonable, and the commission holds that the facts presented do not show that the regular rate of 2 cents per mile now charged is excessive or unreasonable. The commission also holds that the existence of excursion and commutation rates and the sale of mileage books at a less price than the general level of the rate per mile do not justify a finding that such general level is excessive or unreasonable. The commission finds the reason for the difference in charge between Rochester and Buffalo is the competition of the International Railway with both roads from Lockport to Buffalo, and a round-trip rate from Medina to Buffalo is made to meet the competition, the sum of the fares from Medina to Buffalo upon the electric railway with the change at Lockport being $1.14 for the round trip.

Referring to the situation whereby the railroads are required to make a lower rate because of competition between Buffalo and Lockport, the commission says in its decision:

"It is a sound principle in rate making and well recognized by every governmental and other authority having control of such matters that it is permissible as well as good policy for a railroad to accept low rates on traffic which can be obtained only in this way. Traffic carried at such rates may be and often is unremunerative in the sense that its contribution to the general expenses of the company is inadequate; but so long as it contributes anything at all it may be worth the company's while to carry it."

The commission points out that the argument that the rate from Medina to Rochester must be reduced because it is greater than from Medina to Buffalo, if followed out, would demand a cut all over the lines of the New York Central & Hudson River Railroad to 1½ cents per mile. On the other hand, if the Buffalo rate were increased to 2 cents a mile the present Rochester rate would be reasonable and just. In conclusion the commission says that the rate from Medina to Rochester is the usual and accepted rate of the New York Central & Hudson River Railroad, is recognized and authorized by law, and no fact known to the commission justifies a finding that it is excessive. If a rate of 2 cents a mile from Medina to Rochester is excessive, the same rate from Rochester to Syracuse is excessive. It can scarcely be expected that the whole passenger rate system of the respondent should be torn up in order to give the people of Medina a peculiar advantage, when the only reason suggested therefor is that they are enjoying another.

Near-Side Single-Platform Cars in Operation in Buffalo

The International Traction Company, Buffalo, N. Y., placed in service on its Grant Street line on Sept. 17, 1911, thirty-five single-platform prepayment cars known as near-side cars. The first car carried as passengers Thomas Penney, president of the International Traction Company; Nelson Robinson, a large stockholder in the International company; Thomas E. Mitten, vice-president of the International Traction Company and president of the Chicago City Railway; Thomas W. Wilson, general manager of the International Traction Company; George Dreybus, traffic agent; Charles A. Coons, superintendent; R. T. Senter, master mechanic; John B. Olmstead, of the Public Service Commission; J. C. Calish, vice-president and assistant-treasurer

of the Buffalo & Lake Erie Traction Company; H. G. Tulley, of Chicago; W. I. Ohmer, of the Dayton Fare Register Company; Robert B. Liddell, of The J. G. Brill Company, and Louis A. Kling, also of The J. G. Brill Company.

Mr. Penney is quoted as follows: "The operation of the near-side car yesterday was very successful and clearly demonstrated that it will meet the requirements of the traveling public with the greatest convenience to passengers. The near-side car is a tremendous advance in street car building and officials of all the electric railways in the country are watching with interest the introduction of this car. Buffalo is the first city to try it out, and a number of street railway officials of other cities were here to observe its operation. It demonstrated its facilities for loading and unloading. We are greatly pleased with the success of the first day's trial."

The Buffalo near-side car was described and illustrated in the ELECTRIC RAILWAY JOURNAL of June 24, 1911, page 1112.

Accident in Erie, Pa.—A car of the Cleveland & Erie Railway, Girard, Pa., was overturned in a collision with a steam railroad locomotive at a crossing in Erie, Pa., on Sept. 16, 1911, and more than ten passengers were injured.

Heavy Labor Day Traffic.—On Labor Day the interurban cars of the Illinois Traction System handled more than 75,000 passengers. A single car running from Springfield to Danville, 120 miles, handled 950 passengers during a one-way trip.

President Taft in Detroit.—On the occasion of his visit to Detroit on Sept. 18, President W. H. Taft traveled by the interurban line of the Detroit (Mich.) United Company from Detroit to Pontiac and back to the Michigan State Fair, which he formally opened. As a souvenir the Detroit United Railway issued a Taft edition of its handsome folder map, on the cover of which was printed "President W. H. Taft, Detroit, Sept. 18, 1911," and inside over the face of the map was a large outline portrait of the president.

Hearing on Elevated Railway Service in New York.—The Public Service Commission of the First District of New York has issued an order for a hearing on the afternoon of Sept. 26, 1911, to determine whether the Interborough Rapid Transit Company should not be ordered to operate eight-car trains on the Manhattan Elevated Railway during rush hours and also to determine whether any additions to or changes in the Manhattan Elevated Railway should be required as necessary to the convenience and safe operation of such eight-car trains.

Complaint Against Buffalo & Lake Erie Traction Company Closed.—The Public Service Commission of the Second District has closed on its records the complaint of William Schuler as to alleged refusal of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., to carry his goods between Fredonia and Westfield on morning cars. Complainant alleged that his business suffered by reason of the company delaying the carrying of his goods until the afternoon cars. Arrangements have been made for the hauling of his goods on certain morning cars between the points in question.

New Station and Office Building in New Westminster, B. C.—The new interurban station and office building of the British Columbia Electric Railway at New Westminster has been opened. The building is two stories in height, of brick construction, the lower floor being used for passenger and freight traffic and the upper for the company's offices. From the station are operated the Westminster city lines, interurban lines connecting New Westminster with Vancouver over the three routes of the company between the cities, and the Fraser Valley branch running through the South Fraser Valley to Chilliwack.

Commuter Requests Refund of Fare.—A commuter on the New York, New Haven & Hartford Railroad has filed a complaint with the Public Service Commission of the Second District asking that the New York, New Haven & Hartford Railroad be required to refund the full amount of the conductor's receipt for a cash fare collected from a commuter who has forgotten his commutation ticket. The present practice of the company is to charge 5 cents in excess of the cash fare and give the rider a cash receipt redeemable for 5 cents. The petitioner asks that the ticket agents refund the full amount paid by commuter upon receipt of the conductor's receipt and the exchange of coupon from the commutation ticket. The complaint has been served upon the company.

Brooklyn Transfer Order.—The Public Service Commission of the First District of New York has issued an order to the Brooklyn Heights Railroad and the Nassau Electric Railroad of the Brooklyn Rapid Transit System the effect of which will be to establish two additional transfer points between two lines operated by the Brooklyn Rapid Transit Company in the South Brooklyn and Bay Ridge section. One of the lines is the Sixty-fifth Street and Bay Ridge Avenue line of the Brooklyn Heights Railroad, and the other is the line of the Nassau Electric Railroad between the Thirty-ninth Street ferry and the West End Terminal, Coney Island. The effect of the new arrangement will be to extend the scope of the 5-cent fare to Coney Island by the line which runs from Thirty-ninth Street ferry, South Brooklyn.

Transfers Between Washington and Maryland Lines.—The Interstate Commerce Commission has been asked to pass upon the question of the interchange of transfers between the Baltimore & Washington Transit Company and the Capital Traction Company, Washington, D. C. The matter came to the attention of the Interstate Commerce Commission from the District Electric Railway Commission, with which a complaint had been filed by a resident of Takoma Park, it being alleged that the Capital Traction Company had refused to accept transfers at Fourteenth Street and Kennedy Street northwest from the line of the Baltimore & Washington Transit Company. The District Electric Railway Commission decided that the matter was an interstate question, since the Baltimore & Washington Transit Company operates in Maryland.

New Rule Book of Michigan United Railways.—The Michigan United Railways, Jackson, Mich., of which A. W. McLimont is vice-president and general manager and George F. Faber superintendent of transportation, has issued a new rule book for interurban trainmen and employees, effective Sept. 1, 1911. The book consists of 123 pages and in addition to rules for the instruction of motormen, conductors, station masters, freight and ticket agents, section foremen and employees of the electrical department it includes a number of new departments. Paragraphs have been added on the subject of emergency straight air brake equipment, straight air brakes and instructions for the detection of causes of failure. Instructions for the treatment of persons suffering from electric shock are also given. The book is well indexed by subject and contains at the back pages for notations and reference to bulletins. The general rules follow closely those laid down by the American Electric Railway Association.

The Interborough Bulletin.—The following reference to the *Interborough Bulletin* is made in the annual report of the company, an abstract of which was published in the ELECTRIC RAILWAY JOURNAL of Sept. 16, 1911: "On Jan. 15, 1911, your company began the publication of a monthly periodical known as the *Interborough Bulletin* for free distribution among employees. This was done to place the various departments in closer touch with each other and with the employees generally for the purpose of creating a more perfect understanding of the working conditions connected with the operation of the property, and to secure by courteous and considerate treatment of passengers more friendly relations between employees and the public. It was also anticipated through this medium to obtain an interchange of views and opinions between all classes of employees, so far as they relate to the management and maintenance of the corporate business, by inviting suggestions from the men who come in personal contact with the traveling public as to the best manner of securing the convenience and comfort of passengers. The results so far obtained have been exceedingly gratifying and the usefulness of the publication is being extended with each issue. The bulletin is also being mailed to all stockholders of record, and the company will publish from time to time matters of interest exclusively to holders of its securities."

Personal Mention

Mr. Frank H. Plaice has resigned as general manager of the Winona Railway & Light Company, Winona, Minn.

Mr. J. D. McDowell has been elected secretary and treasurer of the Fremont (Ohio) City Street Railway, to succeed Mr. James G. Hunt, as secretary, and Mr. John N. Sherman, as treasurer.

Mr. Ensign Johnson, formerly division superintendent of the Cleveland, Southwestern & Columbus Railway, Elyria, Ohio, has been appointed superintendent of transportation of the Inter-Urban Railway, Des Moines, Ia.

Mr. James Weimer, formerly dispatcher on the Cleveland, Southwestern & Columbus Railway, Elyria, Ohio, has been appointed trainmaster of the Inter-Urban Railway, Des Moines, Ia., to succeed Mr. Benjamin Marriott, resigned.

Mr. Owen O'Hearn, who has been connected with the Cincinnati, Newport & Covington Light & Traction Company, Covington, Ky., for some time, has been appointed superintendent of construction of the company, a newly created position.

Congressman William B. McKinley, president of the Illinois Traction System and the Western Railways & Light Company, has sailed for Rome, Italy, to attend the International Parliamentary Peace Congress as the representative of the United States.

Mr. William H. Harton, Jr., engineer of maintenance of way of the Cincinnati, Newport & Covington Light & Traction Company, Covington, Ky., has had added to his duties the supervision of the construction of the water system in Bellevue and Dayton.

Mr. J. E. Ralston has been appointed superintendent of power of the Des Moines (Ia.) City Railway and the Des Moines Inter-Urban Railway. Mr. Ralston formerly was power-plant engineer of the Cleveland, Southwestern & Columbus Railway at Elyria, Ohio.

Mr. J. E. Welch, master mechanic of the Des Moines (Ia.) City Railway, has resigned. Mr. Welch formerly had charge of the power plant and rolling stock of the city and interurban properties at Des Moines. He has been connected with the Des Moines properties for the last ten years.

Mr. C. C. Elwell has resigned as engineer of maintenance of way of the Connecticut Company, New Haven, Conn., to become engineer of the Public Utility Commission of Connecticut. Mr. Elwell was connected with the Connecticut Company four years. He was formerly with the New London & Norwich Railroad.

Mr. J. B. Ingersoll has resigned as electrical engineer of the Spokane & Inland Empire Railroad, Spokane, Wash., to become electrical engineer of the British Columbia Electric Railway, Vancouver, B. C. Mr. Ingersoll was formerly connected with the Westinghouse Electric & Manufacturing Company, and supervised for that company the installation of electrical apparatus for the Coeur d'Alene line of the Spokane & Inland Empire Railroad. He afterward resigned from the Westinghouse Electric & Manufacturing Company to become connected with the Spokane & Inland Empire Railroad.

Mr. Ernest C. Webster, formerly assistant engineer of maintenance of way of the Connecticut Company, New Haven, Conn., has been appointed engineer of maintenance of way of the company to succeed Mr. C. C. Elwell, whose appointment as engineer of the Public Utility Commission of Connecticut is noted elsewhere in this column. Mr. Webster was born in Litchfield, Conn., and was graduated from the Sheffield Scientific School at Yale in 1904. After graduation he became associated with Mr. Albert B. Hill, now engineer of the New Haven Water Company. Mr. Webster has been connected with the Connecticut Company about five years.

Mr. R. G. Hutchins, Jr., who since March 1, 1911, has been first vice-president of the Chicago (Ill.) Railways, has resigned to accept the position of vice-president of the National Bank of Commerce, New York. Mr. Hutchins succeeds to the position made vacant by Mr. James S. Alexander, who was elected president of the National Bank of Commerce. During his short connection with the Chicago Railways Mr. Hutchins won the highest esteem and heartiest good will of his associates, and his departure is viewed with sincere regret. In leaving Chicago he expressed himself as deeply sensible of the good will and co-operation that have been a pronounced feature of his relations with the officials of the Chicago Railways.

Mr. Charles J. Davidson, who resigned recently as chief engineer of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., to become a member of the firm of Woodmansee, Davidson & Sessions, consulting engineers, Chicago, was tendered a testimonial dinner at the Hotel Pfister, Milwaukee, on Sept. 14, 1911, by about 100 of his business friends. Mr. C. N. Duffy, toastmaster, reviewed briefly the work carried out in the thirteen years Mr. Davidson was with the engineering department of the Milwaukee Electric Railway & Light Company. When Dr. Davidson assumed his duties at Milwaukee the total horse-power of the Milwaukee plant was 10,000; now it exceeds 100,000. The other speakers included Mr. Ernest Gonzenbach, president and manager of the Sheboygan Railway & Electric Company; Mr. Fred M. Prescott, Mr. W. C. Scott, Mr. Charles A. Cahill, who is Mr. Davidson's successor at Milwaukee; Mr. Henry Schoellkopf, Mr. J. D. Mortimer, vice-president of the North American Company and vice-president and general manager of the Milwaukee Electric Railway & Light Company, and Mr. Fay Woodmansee. Mr. Mortimer characterized Mr. Davidson as having a rare combination of engineering and business ability. He pointed out that the most important feature in Mr. Davidson's work for the Milwaukee company had been the design, construction and operation of the large Commerce Street generating station. Mr. Mortimer predicted that when the present additions to this station have been completed it will have a greater generating capacity per unit of floor space and will have been constructed at a smaller cost per unit of generating capacity than any other station of similar size in this country. At the close of the dinner Mr. Mortimer, in behalf of Mr. Davidson's friends, presented him with a collection of photographic views.

OBITUARY

George M. Place, secretary and treasurer of the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., and junior member of the Dempster-Place Company, is dead.

George H. Bentson, secretary-treasurer of the London (Ont.) Street Railway, died on Sept. 8, 1911, after a brief illness. Mr. Bentson was born in Toledo, Ohio, on Aug. 26, 1879. After attending the public schools in that city he entered the employ of the Toledo Traction Company, now part of the Toledo Railway & Light Company. He was employed in various capacities in the office of the company, and finally was made cashier, a position he held until he resigned in September, 1905, to become secretary-treasurer of the London Street Railway.

Employees of the Detroit (Mich.) United Railway to the number of about 1700 out of a total of 2400 went on strike on the morning of Sept. 20, 1911, to enforce their demands for a maximum wage of 30 cents an hour and a minimum wage of 25 cents an hour. Men who had worked for the company less than six months were receiving 23 cents an hour, those who had worked less than eighteen months 25 cents, and those who had worked more than eighteen months 28 cents an hour. The question of wages and terms of service has been before Judge James Phelan, representing the men, and George F. Monaghan, representing the company, since June last, but they have been unable to agree on the third member of the board. Judge Phelan and Mr. Monaghan were in conference from 2.30 p. m. to 5.30 on Sept. 20, but were unable to come to an agreement. At 8 p. m. the conference was resumed with Judge Phelan, F. W. Brooks, general manager of the company, and Milton McRae, who had previously been suggested as the third arbitrator, in attendance, and about 10 p. m. Judge Phelan left to present to the men a plan for a truce pending a final settlement and the men decided to return to work. The nature of this truce had not been made public up to the time that it was placed before the men for their consideration.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***California Terminal Company, San Francisco, Cal.**—Application for a charter has been made in California by this company to build an electric or steam railway between San Francisco and Sacramento, via Martin and other north of the bay counties, a distance of 95 miles, with an 18-mile branch extending into Petaluma and a 5-mile branch into Napa. Capital stock, $500,000. Directors: C. W. Conlisk, W. M. Rank and R. A. Morton.

West Side Railroad, San Francisco, Cal.—Chartered in California to build a 30-mile electric railway from Sacramento to Rio Vista. This company will use the Northern Electric Railway bridge across the Sacramento River. Incorporators: H. W. Furlong, president; B. P. Lilienthal, president of the Northern Electric Railway, and William Herlitz. [E. R. J., Sep. 9, '11.]

Georgia Railway & Power Company, Atlanta, Ga.—Application has been made for incorporation in Georgia by this company with an authorized capital stock of $27,000,000, consisting of $15,000,000 of common stock, $2,000,00 of 6 per cent cumulative first preferred, without voting power and $10,000,000 of 4 per cent non-cumulative second preferred stock. It is reported that the new company may acquire control of the Georgia Railway & Electric Company and the Georgia Power Company. Incorporators: Charles Magee, John M. McWhinney, George A. Kingston and Robert Mathison, Toronto, Can.; Jack J. Spalding, Forrest Adair, Alexander C. King, E. Marvin Underwood, Hughes Spalding and George W. Adair, Atlanta.

***East Rome Gasoline Railway, Rome, Ga.**—Application for a charter will be made in Georgia by this company to build a 3-mile railway in Rome and East Rome. It is the intention of the company to use gasoline motor cars. Capital stock, $50,000.

***Richmond & Eastern Indiana Traction Company, Richmond, Ind.**—Application for a charter has been made in Indiana by this company to build an electric railway to connect Portland, Union City, Bethel, Cox's Mills, Richmond, Brookville and Harrison. Capital stock, $50,000. Incorporators and directors: Adam H. Bartel, Sharon E. Jones, William F. Starr, Albert W. Gregg, Henry C. Burcham, Lee B. Nusbaum and H. W. Jordan.

***Caraopolis & Sewickley Railway, Coraopolis, Pa.**—Application for a charter will be made in Pennsylvania by this company to build an electric railway in Coraopolis, Moon and Sewickley. Incorporators: S. L. Tone, vice president of the Beaver Valley Traction Company, New Brighton, Pa.; W. B. Carson, C. S. Mitchell, A. W. Stevenson and J. L. Foster.

Snyder Avenue Railway, Philadelphia, Pa.—Chartered in Pennsylvania, as a subsidiary company of the Philadelphia Rapid Transit Company, to build a double track 7.66-mile electric railway on Snyder Avenue from Delaware Avenue to Thirty-sixth Street in South Philadelphia. Capital stock authorized, $140,000. Incorporators: Charles O. Kruger, president; Alexander Rennick, James J. Springer, George W. Mantz and W. L. Maize. [E. R. J., Aug. 19, '11.]

FRANCHISES

***Calgary, Alta.**—W. H. McLaws and L. P. Strong, representing the Southeast Calgary Corporation, presented a plan to the City Commissioners whereby the corporation proposes to construct an electric railway from the present terminal of the municipal railway to the Canadian Pacific Railway's industrial division in southeast Calgary.

San José, Cal.—The Peninsular Railway has received a franchise from the Board of Supervisors of the County of Santa Clara to construct a single or double track line in Santa Clara County, together with the necessary curves and side tracks, etc., upon Willow Street, Delmas Avenue and Lincoln Avenue in San José.

Canon City, Col.—F. B. Street and F. S. Kelsey, New York, have received a twenty-five-year franchise from the City Council to construct a line from the railway depot in Canon City to the top of Royal Gorge. [E. R. J., Sept. 2, '11.]

Mystic, Conn.—The Groton & Stonington Street Railroad, New London, has asked the approval of the Public Utilities Commission for the extension of its tracks from Mystic to Old Mystic.

***Rome, Ga.**—The East Georgia Gasoline Railway, Rome, has asked the City Council for a franchise in Rome.

***Valdosta, Ga.**—George L. Patterson will ask the City Council for a franchise to build a 4-mile electric railway in Valdosta over streets not traversed by the lines of the Valdosta Street Railway.

Jeffersonville, Ky.—Charles W. Kelly, Jeffersonville, and associates have received a franchise from the Board of County Commissioners to build a line in Clark County.

New Iberia, La.—F. W. Crosby, representing the Southwestern Traction & Power Company, New Orleans, has asked the Board of Trade for the right to build its tracks over certain streets in New Iberia.

***New Iberia, La.**—The New Iberia, St. Mary & Eastern Railroad has received a franchise from the City Council to operate over certain streets in New Iberia. F. M. Welsh, president.

Webster, Mass.—The Worcester Consolidated Street Railway, Worcester, has asked the Selectmen for a franchise to relocate its Cemetery Street line and extend it to the Oxford line.

Weymouth, Mass.—The Bay State Street Railway has received the approval of the Massachusetts Railroad Commission for the relocation of its tracks in Main, West and Front Streets at Liberty Square in Weymouth.

Detroit, Mich.—The City Council of Detroit, Mich., has refused to reconsider its action in granting the Detroit (Mich.) United Railway permission to loop the Brush Street line with the Hastings Street line.

Hastings, Minn.—The Interurban Construction Company, Hastings, has received a franchise from the City Council in Hastings. This line will connect St. Paul, Inver Grove, Hastings, Cannon Falls and Rochester. W. L. Sonntag, Hastings, general manager. [E. R. J., Sept. 9, '11.]

North Tonawanda, N. Y.—The Frontier Electric Railway, Niagara Falls, has received a 100-year franchise from the Common Council to build a double line and a single track terminal freight line in North Tonawanda over private way. The line will connect Buffalo, Niagara Falls and North Tonawanda. James S. Simmons, Niagara Falls, general manager. [E. R. J., Sept. 9, '11.]

Fremont, Ohio.—Albert H. Close, Toledo, and A. H. Jackson, Fremont, have secured a franchise for an electric road through Seneca County which will connect Fremont and Tiffin. They will apply at once for franchises in Tiffin and Fremont and also for the right through Sandusky County. This road would connect the Lake Shore Electric Railway, Cleveland, at Fremont with the Toledo, Bowling Green and Southern Traction Company, Finlay, and the Ohio Electric Railway at other points. [E. R. J., Sept. 16, '11.]

Eugene, Ore.—The Oregon Electric Railway, Portland, has asked the City Council for a franchise to build a loop through the business section of Eugene. As soon as it is granted the company will construct the Salem-Albany line to Eugene.

Johnstown, Pa.—The Johnstown Passenger Railway has received a franchise from the Councils for its Southmont extension.

***Salt Lake City, Utah.**—The Ogden, Logan & Preston Railway has received a franchise from the Cache County Commissioners to operate a line within the county. It is the intention of the company to construct an electric railway from Ogden through the Cache Valley to Preston. Negotiations for a franchise in Ogden are under way. A. W. Shaw, Chicago, and W. P. Funk and M. G. Gollightly, Salt Lake City, appeared before the Commissioners in the interest of the company.

Seattle, Wash.—Oliver T. Erickson has introduced an ordinance in the City Council directing the board to proceed with the construction of the municipal electric line in Seattle and extending through the Rainier Valley, for which bonds were voted in March. [E. R. J., March 25, '11.]

Vancouver, Wash.—The Washington-Oregon Corporation has received a franchise from the City Council to extend its tracks in Vancouver.

Wenatchee, Wash.—The Wenatchee Traction Company has received a franchise from the City Council in Wenatchee. The company has not yet secured a franchise from the County Commissioners to build its line over the county roads. [E. R. J., July 15, '11.]

TRACK AND ROADWAY

Birmingham, Ensley & Bessemer Street Railway, Birmingham, Ala.—This company, which is building a line between Birmingham, Emsley, Bessemer and East Lake, is reported to have elected the following officers: J. H. Morris, Philadelphia, president; J. M. Dewberry, Birmingham, vice-president, and P. S. Briggs, Philadelphia, secretary.

Montgomery (Ala.) Traction Company.—Within the next few days this company will have completed a new 3-mile line extending almost due south from the State Capitol in Montgomery to the intersection of the Carter Hill Road and Hall Street.

Ft. Smith Light & Traction Company, Ft. Smith, Ark.—Work has been begun by this company rebuilding with 80-lb. rails its line from Front Street to Thirteenth Street in Ft. Smith.

British Columbia Electric Railway, Vancouver, B. C.—This company has awarded to the Moore & Pethick Company the contract for grading 18 miles of its new interurban line on Vancouver Island running north from Victoria through the Saanich peninsula. The contractors will start work at once and the terms of the agreement call for the completion of the work in twelve months. The Saanich extension on Vancouver Island will be 22 miles in length, connecting Victoria with Deep Bay on the west shore of the Saanich peninsula near its northern point. Considerable preliminary clearing work has already been done on the right-of-way by the company. From the northern terminus of the line it is probable a ferry will be operated connecting fertile islands on the Gulf with the mainland.

Fresno, Coalinga & Monterey Company, Fresno, Cal.—Plans have been outlined by this company for three branch lines. One branch is to extend from Hollister to San José, another from Hollister to Santa Cruz, by way of Watsonville, and the other from Coalinga to Maricopa and Bakersfield. Efforts are now being concentrated on the plans for the main line between Fresno, Coalinga and Monterey. T. C. White, Fresno, president. [E. R. J., Sep. 9, '11.]

Pacific Electric Railway, Los Angeles, Cal.—Plans for a 5-mile track to be the connecting link of the Corona and Colton systems, and giving a clear run from Corona to Riverside and San Bernardino, were recently made by this company.

***Oakland, Martinez & Alhambra Railway & Ferry Company, Martinez, Cal.**—This company is being organized as a subsidiary company of the Oakland, Antioch & Eastern Railway, Portland, to build an electric railway between Oakland, Martinez via Walnut Creek and the Alhambra Valley, a distance of 13 miles. A wharf would be built at Martinez by this company and a ferry service established between Martinez and Benicia. The business men of the towns affected are requested to subscribe $150,000, for which stock in this new line will be issued. The Martinez Business Men's Association is interested.

Ontario & San Antonio Heights Railroad, Ontario, Cal.—An extension will be built by this company between Cucamonga and Upland, providing that a free right-of-way is secured. This line will eventually be extended to Etiwanda and San Bernardino. The company is also considering plans to extend the Glendora line to San Bernardino.

Cresent City Railway, Riverside, Cal.—Work will soon be begun by this company on its extension to Bloomington.

***San José, Cal.**—J. H. Mehling, San José, will ask the State Board of Harbor Commissioners for dockage privileges along the water front at San José in connection with his plan to operate steamers between South San Francisco Bay and the ferry building in connection with an interurban railway from the former place to San José. The right-of-way for the electric railway has been obtained from the northern city limits of San José to tidewater.

San Luis Obispo, Cal.—Walter G. Lincoln, San Luis Obispo, has completed preliminary surveys and is now making arrangements for the necessary bonds for the construction of an electric railway in the city and county of San Luis Obispo. [E. R. J., Aug. 26, '11.]

Vallejo & Northern Railway, Vallejo, Cal.—Grading has been begun by this company at Vallejo on the line that is to be the new connecting link between Sacramento and San Francisco.

Connecticut Company, New Haven, Conn.—Plans are being considered by this company to build an extension from Thomaston to Torrington.

Groton & Stonington Street Railway, New London, Conn.—This company placed in operation on Sept. 15 its extension from Mystic to Old Mystic.

Washington Railway & Light Company, Washington, D. C.—Work has been begun by this company double tracking its Congress Heights line, with the object of operating through cars from Washington to Congress Heights.

Georgia Railway & Electric Company, Atlanta, Ga.—An extension will be built by this company in Atlanta to Ansley Park.

City & Suburban Railway, Brunswick, Ga.—This company has begun work on its extension from Brunswick to the plant of the Southeastern Naval Stores Company, which is located several miles from Brunswick.

Quincy & Peoria Traction Company, Peoria, Ill.—The Allen Engineering Company of Chicago has completed a preliminary examination and report for this company to build an interurban line 121 miles long between Peoria and Quincy, following the Illinois River. [E. R. J., Aug. 5, '11.]

Waukegan, Rockford & Elgin Traction Company, Waukegan, Ill.—This company has placed in operation its line between Palatine and Wauconda. The line will eventually be extended to Lake Zurich.

Indianapolis, Crawfordsville & Western Traction Company, Indianapolis, Ind.—It is reported that this company has arranged to close the gap of 45 miles between Crawfordsville and Danville. Work is to be begun in the spring.

***New Albany, Ind.**—F. E. Seagraves, Toledo, Ohio, has gone over the route of the proposed road from New Albany to French Lick and West Baden Springs and expressed his ability to build the road and also his willingness to take hold of the project if he received encouragement from along the line.

Vincennes, Washington & Eastern Traction Company, Vincennes, Ind.—The 1 per cent subsidy election held in Washington and Jefferson Townships, Pike County, Sept. 14, in aid of the construction of this line from Vincennes to Tell City, a distance of 80 miles, was carried in both townships. The appropriation will amount to $18,000 and $10,000, respectively.

Union Traction Company, Coffeyville, Kan.—Plans have been completed and work will soon be begun by this company on the construction of the western loop in Coffeyville.

Shelbyville, Ky.—Plans for an electric railway from Shelbyville to Frankfort, Ky., are reported to have been abandoned by the business men who were interested originally in the construction of the line. [E. R. J., Aug. 5, '11.]

***Iberia, St. Mary & Eastern Railway, New Iberia, La.**—This company has awarded a contract to L. M. Linnan, Baton Rouge, for grading this interurban railway from New Iberia along the right-of-way of the Southern Pacific Railway to Oliver Station, thence to Jeanerette, Charenton, Franklin and Berwick. This line will cross the Teche River near Charenton and near Franklin on a steel bridge. It is planned to operate gasoline motor cars. F. M. Welsh, president.

New Orleans Railway & Light Company, New Orleans, La.—This company will double track its Common Street line from Baronne Street to Rampart Street in New Orleans.

United Railways & Electric Company, Baltimore, Md.—It is reported that this company plans to build a 5-mile extension from Ellicott City to St. Charles College.

Springfield (Mass.) Street Railway.—The new East Street extension of this company in Springfield was opened for traffic on Sept. 14.

Worcester (Mass.) Consolidated Street Railway.—Work has been begun by this company double tracking its Tatnuck line for about 1 mile. The company has completed its Clinton line extension in West Boylston.

Mankato (Minn.) Electric Traction Company.—This company will soon build about a mile of new track in Mankato.

***Yazoo City, Miss.**—A company is being formed to build an electric railway between Yazoo City and Canton. Among those interested are H. Wise, I. S. Reed, T. H. Campbell, H. H. Brickell and D. A. Swayze, all of Yazoo City.

Public Service Railway, Newark, N. J.—This company plans to build two extensions in the West Side section of Jersey City.

Fort Ransom, N. D.—E. S. Lovelace, Fort Ransom, and associates are making preliminary arrangements to construct an electric railway between Enderlin and Fort Ransom, with an extension later to Sheldon. [E. R. J., Jan. 7, '11.]

Tri-State Railway & Electric Company, East Liverpool, Ohio.—Plans are being made by this company for a new crosstown service over the River Road and North Side lines in East Liverpool.

***Marion, Ohio.**—At a meeting of business men at Bellecenter on Sept. 11, J. R. Snowball, capitalist of Philadelphia, proposed to furnish capital to build an electric railway between Belle Center and Marion, if they would secure a free right-of-way and secure money for the preliminary survey.

Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont.—Surveys have been made and plans are being made by this company to build an extension from Port Colborne to Bridgeburg, via the shore of Lake Erie.

Pittsburgh (Pa.) Railways.—The Committee on Public Service has approved an ordinance that is open to all bidders embodying an agreement with the Pittsburgh Railways relative to its tracks in Murray Avenue. Under the agreement the company will shift its tracks from a private right-of-way to the middle of Murray Avenue from Forward Avenue to Hazelwood Avenue in Pittsburgh.

West Penn Railways, Pittsburgh, Pa.—This company is said to be considering plans for two possible routes for an extension of its line from Phillips into Uniontown. Surveys are being made.

Pittsburgh (Pa.) Railways.—This company is said to be considering plans to build an electric railway from Beaver Falls to Koppel, and to build a bridge over the Beaver River, south of Rock Point, and extend the line into Ellwood City.

Abbeville, S. C.—Plans to construct an electric railway from Abbeville to Easley, 60 miles in length, via Anderson, have taken definite shape and work will soon be begun. The people of Abbeville County have agreed to raise $40,000 of the $150,000 needed to comply with the provisions of New York bankers who will finance the project. The town of Antreville, in that county, will raise an additional $10,000, and the remainder will be raised in Anderson and Pickens Counties. [E. R. J., June 10, '11.]

Middle Tennessee Traction Company, Nashville, Tenn.—This company has awarded the contract to McLaughlin & Company, Franklin, for grading the proposed 40-mile electric railway between Shelbyville and Franklin via College Grove. This will include a 50-ft. bridge. About 6 miles of the line has been graded. John Wilkes, 2 Berry Block, Nashville, chief engineer. [E. R. J., June 24, '11.]

Corpus Christi Street & Interurban Railway, Corpus Christi, Tex.—An extension of this company's loop in the South Bluff section of Corpus Christi will soon be built.

Tyler, Tex.—The bonus asked by Thomas O'Hara and Ralph E. Hoskot, Dayton, Ohio, to whom the City Council recently granted a franchise, has been raised. The construction of the line will begin not later than Jan. 1. [E. R. J., Jun. 10, '11.]

Washington & Old Dominion Railroad, Richmond, Va.—Preliminary arrangements are being made by this company on its electric railway which is to bisect the northwestern end of Alexandria County and serve, it is said, as a connecting link between the Great Falls & Old Dominion Railroad and the Bluemont division of the Southern Railway. Grading is under way. Charles M. Henckley, president. [E. R. J., Aug. 26, '11.]

Kenosha (Wis.) Electric Railway.—Plans are being made by this company for an extension of its lines in Kenosha.

Badger Railway & Light Company, Milwaukee, Wis.—This company has placed in operation its line between Pewaukee and Watertown. The line when fully completed will connect Lake Geneva, Elkhorn, Whitewater and Pewaukee. Gustav Pickhardt, Milwaukee, chief engineer. [E. R. J., Aug. 19, '11.]

Milwaukee Western Electric Railway, Milwaukee, Wis.—This company has awarded the first grading contract for the construction of its line into Central Wisconsin to P. J. Finnerty, Oconomowoc.

***Yellowstone Park, Wyo.**—E. J. Haynes and associates are considering plans to construct a gasoline motor line through Yellowstone Park.

SHOPS AND BUILDINGS

Oakland, Antioch & Eastern Railway, Oakland, Cal.—Work will be begun at once by this company on its new depot at Fortieth Street and Shafter Avenue in Oakland. The company's yards and freight houses are also to be built on Shafter Avenue near the terminal point.

Illinois Traction System, Peoria, Ill.—An entire block of property on Ninth Street, between Monroe Street and Adams Street, in Springfield has been purchased by this company. The building now occupying this block will be remodeled and converted into a freight depot. The company will then devote the present terminals in the rear of its passenger depot to the exclusive use of passenger traffic.

Worcester (Mass.) Consolidated Street Railway.—An addition will be built by this company at its Gates-Lane carhouse in Worcester. A sprinkler system will be installed at an aggregate cost of between $45,000 and $55,000 and a cistern for water supply will be built, costing approximately $3000. The carhouse will be equipped with fire doors and fire walls. These additions have been decided upon since the original plans were drawn.

Ohio Electric Railway, Cincinnati, Ohio.—This company will soon let the contracts for a new freight house to be erected on East Town Street in Columbus. The building will be 40 ft. x 150 ft. and will be constructed of brick, steel and concrete, one story high.

Lake Shore Electric Railway, Cleveland, Ohio.—This company and the Sandusky, Fremont & Southern Railway, Sandusky, and the Fostoria & Fremont Railway, Fostoria, will occupy the new Wheeling depot, which has just been completed in Fremont.

Hull (Que.) Electric Company.—This company will soon award contracts to build a new carhouse, having a capacity of twenty-seven cars, in Hull.

POWER HOUSES AND SUBSTATIONS

Wilmington & Philadelphia Traction Company, Wilmington, Del.—This company will erect a power house along the Brandywine River, near the one it now operates, at a cost of $50,000 exclusive of machinery, etc. The main building of the structure will be 107 x 112 ft. and will have an average height of 63 ft. It will be constructed of brick and steel and will contain a duplicate power house plant.

Des Moines (Ia.) City Railway.—This company has awarded a contract to the J. W. Turner Improvement Company, Des Moines, for the construction of an addition to its power plant in Des Moines.

New Hampshire Electric Railways, Haverhill, Mass.—This company advises that it has purchased two boilers with a capacity of 1000 hp for its power house in Haverhill.

Tri-State Railway & Electric Company, East Liverpool, Ohio.—This company has purchased a new 1500-kw Parsons steam turbine with surface condenser for its East Liverpool power house.

Rutland Railway, Light & Power Company, Rutland, Vt.—Plans are being considered by this company for a new power house and dam at Clarendon Gorge. The specifications call for a circular reinforced concrete dam with an ultimate height of 96 ft. The power station will be about 30 ft. x 20 ft. and will contain one 500-kw turbine and a water wheel of 1000-hp.

Manufactures & Supplies

ROLLING STOCK

Orange County Traction Company, Newburgh, N. Y., is said to be in the market for ten open prepayment cars.

Oregon Electric Railway, Portland Ore., expects to purchase six motor cars, sixteen coaches and one observation car.

Green Bay (Wis.) Traction Company is having a 4000-gal. Kennicott electric cataract sprinkling car built by the Kennicott Company.

Rutland Railway, Light & Power Company, Rutland, Vt., has ordered two 34-ft. semi-convertible motor car bodies from The J. G. Brill Company.

Connecticut Company, New Haven, Conn., has ordered two McGuire-Cummings standard long-broom steel-underframe single-truck snow sweepers.

International Railway, Buffalo, N. Y., has ordered three McGuire-Cummings standard long-broom steel-underframe single-truck snow sweepers from the McGuire-Cummings Manufacturing Company.

Fort Madison (Ia.) Street Railway has ordered two single truck one-man prepayment cars with McGuire-Cummings solid steel Columbian trucks from the McGuire-Cummings Manufacturing Company.

Geary Street Municipal Railroad, San Francisco, Cal., has completed plans and specifications for forty-three double-end pay-as-you-enter type closed steel motor car bodies and four extra trucks complete with axles, wheels and motors. The bids are returnable to the Board of Public Works on Nov. 1.

Kokomo, Marion & Western Traction Company, Kokomo, Ind., has ordered two double-truck interurban passenger smoker and baggage cars mounted on McGuire-Cummings 70-A high-speed trucks and one double-truck steel-underframe express car mounted on McGuire-Cummings 70-A high-speed trucks from the McGuire-Cummings Manufacturing Company.

TRADE NOTES

George L. Fowler, New York, N. Y., consulting mechanical engineer, has removed his office to 83 Fulton Street, New York, N. Y.

International Oxygen Company, New York, N. Y., has removed its New York offices from 68 Nassau Street to 115 Broadway, where increased facilities have been secured.

Q M S Company, Plainfield, N. J., has received orders for two Q M S special and two Q M S standard car-wheel grinders from the Portland (Ore.) Railway, Light & Power Company.

Ohmer Fare Register Company, Dayton, Ohio, has arranged to purchase 4½ acres of land at Edgemont, a suburb of the city, on which a modern manufacturing plant will be erected.

Cambria Steel Company, Johnstown, Pa., has appointed Leo Loeb assistant steam engineer in the steam engineering department. Mr. Loeb was formerly assistant professor of mechanical engineering at the Rensselaer Polytechnic Institute.

Electric Railway Maintenance Association, New York, N. Y., has been incorporated with $50,000 capital to engage in general consulting and electrical engineering business. Incorporators: A. B. Herrick, C. G. Boyden, New York, and J. K. Mann, Brooklyn.

American Rolling Mill Company, Middletown, Ohio, tendered a banquet on Sept. 1 to its entire sales and operating departments. Several addresses were made by members of the executive staff and heads of departments. The banquet was coincident with starting up of the company's East Side works.

National Carbon Company, Cleveland, Ohio, is building a new carbon plant at Niagara Falls which is to be ready for occupancy some time in October. The company will manufacture carbon electrodes exclusively at this plant. This is the second plant which the company has built during the past year, the other being at Toronto, Ont.

Universal Lubricating Company, Cleveland, Ohio, has appointed T. U. Franklin general sales manager, effective Oct. 1. Mr. Franklin was formerly associated with the Indian Refining Company and was for several years connected with the Toledo & Western Railway. Previous to that time Mr. Franklin was identified with steam railroad work in the Middle West.

Chicago Pneumatic Tool Company, Chicago, Ill., at a meeting of the board of directors on Sept. 26, will consider a plan for the acquisition of a controlling interest in the St. Petersburg (Russia) Pneumatic Tool Company, capitalized at $500,000. The company has recently established new branch offices at Brussels, Copenhagen, Stockholm and Christiania. Charles Booth has resigned as vice-president of the company on account of ill health.

Hall Signal Company, New York, N. Y., announces that W. A. Peddle, signal engineer of the company, in charge of estimating and construction, with office in Garwood, N. J., has been transferred to the sales department, with office in New York. H. L. Hollister, engineer for the Western district, with office in Chicago, succeeds Mr. Peddle. W. G. Hovey, recently with the Hall Signal Company, has become connected with the railway sales department of the Okonite Company, New York.

..**W. Frank Carr** has resigned as chief engineer of the Falk Company, Milwaukee, Wis., effective Oct. 1, 1911. Mr. Carr was born in Holyoke, Mass., in 1861 and was graduated from the Massachusetts Agricultural College (Amherst) in 1881 and as a civil engineer from the Massachusetts Institute of Technology in 1884. He was assistant bridge engineer of the Boston & Lowell Railroad the first year after his graduation, and then served for a year as a professor in the engineering department of the University of Minnesota at Minneapolis. Subsequently he opened an office in Minneapolis as a contracting and consulting engineer. In August, 1888, Mr. Carr became connected with the Minneapolis Street Railway, serving as assistant engineer during the construction of the Selby Avenue cable line in St. Paul. In 1890, at the time of the change of motive power of the company's line from cable to electricity, he was appointed chief engineer, in which capacity he had personal supervision over the electrification of 190 miles of road, including overhead and track construction, designing of rolling stock, etc. He resigned from the Minneapolis Street Railway in December, 1891, to accept the position of general manager and chief engineer of the Roanoke (Va.) Street Railway and the Roanoke Electric Light & Power Company, and supervised the reconstruction and extension of these systems. He was superintendent of electrical construction of the West Chicago Street Railway from March 1, 1895, to June 1, 1896, covering the period of change of motive power of this company from horse to electricity. From June, 1896, to April, 1899, he was chief engineer of the company, and during this time also superintended the electrification of the Lake Street Elevated Railroad. Mr. Carr became connected with the Falk Company as chief engineer in April, 1899, and had the entire management for the company of the special work department and the contract work for the construction of city and interurban systems. Mr. Carr is a member of the American Society of Civil Engineers and of the University Club of Milwaukee. He is succeeded in the Falk Company by W. C. Burdick, who is a graduate civil engineer from the University of Wisconsin. Mr. Burdick was employed by several railroad and manufacturing companies for four years, and for the last six years he has been assistant engineer of the special-work department of the Falk Company.

ADVERTISING LITERATURE

George W. Richardson, Chicago, Ill., has issued a folder which describes and illustrates the Richardson direct-reading slide rule.

J. J. McCabe, New York, N. Y., is mailing a circular which calls attention to the new style McCabe two-in-one heavy pattern double-spindle lathe.

H. M. Byllesby & Company, Chicago, Ill., have reprinted in pamphlet form the address delivered by H. M. Byllesby, president of the company, at the annual convention of the American Institute of Electrical Engineers, Chicago, Ill., on June 27, 1911. An abstract of this address was printed in the Electric Railway Journal of July 1, 1911.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVIII NEW YORK, SATURDAY, SEPTEMBER 30, 1911 No. 14

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. McGRAW, President.
HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.
CURTIS E. WHITTLESEY, Secretary and Treasurer.
TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

HENRY W. BLAKE, Editor.
L. E. GOULD, Western Editor.
Associate Editors:
RODNEY HITT, FREDERIC NICHOLAS, WALTER JACKSON.
News Editors:
G. J. MACMURRAY, FRANK J. ARMEIT.

CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1021 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Thursday, 9 a. m., of the week of issue.

Copyright, 1911, by McGRAW PUBLISHING COMPANY.

Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, SEPTEMBER 30, 1911.

CONTENTS.

Prompt Investigation of Accidents..... 519
Raising the Standard of Lubrication..... 519
A New Theory on Rail Corrugation..... 520
New Delegates at the Convention..... 520
The Problem of Old Motors..... 521
Parlor Cars on Interurban Roads..... 521
Sleeping-Car and Parlor-Car Service on the Illinois Traction System. 522
A New Theory of the Cause of Rail Corrugation..... 528
Trailer Cars of Ben Hur Route..... 530
Enclosed Arc Lamps for Street Car Headlights..... 531
Meeting of the Central Electric Accounting Conference..... 533
Electric Railway Exhibited at Glasgow..... 534
Atlanta Convention Special..... 534
Questions Involved in New Jersey Regulation..... 535
Preliminary Census Report on Poles Purchased in 1910..... 537
Car for Oiling Streets..... 538
New Utility Cars of the Denver City Tramway Company..... 539
Technical Libraries..... 539
Milwaukee Shelter Stations..... 540
Signaling with Track Trip Control..... 541
Public Utilities Discussed at Municipal Congress..... 541
Hearing on Elevated Railway Improvements in New York..... 542
Program of the American Association..... 542
Tests with Hand and Air Brakes in New York City..... 543
Single-End Pay-Within Cars for City Railway Company, Dayton.... 543
A Pole-Preserving Machine..... 544
News of Electric Railways..... 545
Financial and Corporate..... 547
Traffic and Transportation..... 549
Personal Mention..... 550
Construction News..... 551
Manufactures and Supplies..... 553

Prompt Investigation of Accidents

The old saying, "Forewarned is forearmed," should be the slogan of every electric-railway claim department. Some claim agents do not think it necessary to follow up an accident as soon as the telephone account is received, but wait until the formal reports of the platform men involved have been submitted. Others seek no further data when the accident reports seem to show that the accident is slight. This policy of delay may easily prove mistaken economy. The time to secure all possible testimony is immediately after the accident, when the injured persons, the damaged property and the witnesses of the occurrence are still on the ground or within easy call. The excitement of the moment often provides the only opportunity to secure a truthful account before the memories of the onlookers become clouded by time and prejudice. If the depositions of the witnesses are reinforced by drawings and photographs of the scene of the accident, which may easily be made at the time, and by a "pedigree" of the possible plaintiff the claim agent can surely afford to bide his time serenely before disputing the case either in or out of court. Anticipation of trouble may increase the total cost of field and office investigation, but it offers the opportunity of decreasing the large sums which otherwise are paid out for settlements and counsel fees.

Raising the Standard of Lubrication

Oiling cars is dirty work and it is usually delegated to the cheapest and least intelligent laborers around the carhouses and shops. For the most part it is done at night, even on those roads which make a practice of daylight inspection, and frequently the oilers are subject to practically no supervision. For these reasons it is not a matter of surprise that few companies are getting more than a small part of the real value out of the oil which is used. Since the safe and continuous operation of the cars depends in no small degree upon the care and skill with which the motor and journal bearings are lubricated and inspected, too much emphasis cannot be laid on the necessity of establishing a high standard in this department of rolling stock maintenance. The company which is desirous of improving its lubrication practice should begin at the bottom and improve the standard of the men who apply the lubricants. No printed or verbal instructions, however complete they may be, will entirely supplant experience and the exercise of good judgment on the part of the oilers. They should be able to tell at a glance when the waste is thoroughly saturated and when it is charred and needs renewal. Some

incentive to prevent waste of oil without skimping the amount necessary for proper lubrication would go far to reduce excessive consumption. This might take the form of a bonus on the oil saved, with strict accounting for every hot bearing, or the limitation of the amount of oil supplied per month to each carhouse. Most of the steam railroads allow their enginemen fixed quantities of oils of various kinds for each 100 miles run and the tendency is constantly to decrease the allowances as the enginemen, who are the oilers, become more expert in the use of oil. The surest way of reducing the waste and improving the practice of lubrication, however, is to replace the ignorant and irresponsible oilers now employed with men who can be taught to do their work properly and can be trusted to do it the way they are taught. It may cost a little more in wages, but the advantages will make it worth while.

A New Theory on Rail Corrugation

We take pleasure in publishing this week a new and ingenious theory on the cause of rail corrugation, by Mr. Pellissier, although we are not prepared to accept it as the final explanation of this baffling phenomenon. Briefly, Mr. Pellissier attributes the comparative immunity of T-rail from corrugation to the rounded shape of the head of the rail. Because of this form he believes that the maximum intensity of the wheel pressure on a T-rail occurs near the center of the head of the rail, where it is distributed with fair uniformity throughout the cubical contents of the head, whereas in girder rail the stresses are concentrated in a much smaller area near the edge of the rail. There is no doubt that in railway practice even small wheel loads will impose at the point of contact a pressure far in excess of the elastic limit of the steel in the head of the rail. Thus, it has been shown that a load of 4500 lb. on a 33-in. cast-iron wheel resting on a T-rail will exert on the area of contact an average pressure of 50,000 lb. per square inch, and that a load of 12,000 lb. under the same conditions will exert a pressure of 126,000 lb. per square inch. But if corrugation was dependent entirely upon the size of the area of contact and its position on the head of the rail it would follow that all rails of the same section held on the same foundations by the same attachments and subjected to the same traffic would develop corrugation to an equal extent. This does not appear to be the case. Moreover, the theory presupposes that the load on T-rails or on those rails which do not develop corrugation is normally carried at the center of the head and that on girder rails which develop corrugation at the side of the head. But we believe that both new T-rail and girder-rail track will show their first signs of wear along the edge of the head next to the gage line, and that later in both types of track, on account of the wear of the wheels and the wearing away and cold flow of the metal in the rail, the area of the contact becomes broader and finally extends across or nearly across the rail head. It is quite possible that other objections to Mr. Pellissier's theory will occur to readers of this paper, but there are objections to every theory which has been proposed to explain the cause of rail corrugation. Probably one reason for the large number which have been proposed is that it is about as difficult to prove a theory to be wrong as to prove it to be right.

NEW DELEGATES AT THE CONVENTION

By Oct. 1 most railway companies that intend to be represented at the convention will have selected their delegates or will be about to do so. To those men who have been chosen for the first time a few words of suggestion might be offered. We hardly believe that their companies expect them to obtain so much information at Atlantic City that they will be able on their return to solve immediately all of the problems which exist on every property. On the other hand, they will be expected to derive at least enough knowledge of possible benefits to the companies with which they are associated to warrant the expense incurred in sending them there. Hence it would be well for each delegate who is being sent for the first time by a member company to the convention to give some thought to the matter before he starts and to learn if possible, from those who have attended previous conventions, how best to profit by the trip. He should then plan his time accordingly.

Each new delegate should also remember that his duty at the convention is twofold; one obligation is to the company which sends him, the other is to the association. The first we have already mentioned. He should derive as much benefit as he can from attendance at the meetings, from talking with other railway men and from the exhibits. The latter should be studied to see to what extent the apparatus shown may be applied with profit to conditions on his own line. His responsibilities to the association are equally important. If every delegate went to Atlantic City for the purpose of receiving information only, the meetings would result in failure. Each man who is to attend the convention this year for the first time should therefore resolve to contribute his share to the discussions, and should remember that an account of failures and the reasons therefor is usually as valuable in deciding upon the best course to follow as a statement purely of successes. There is nothing which a delegate can do which will encourage his company to send a larger representation each year than to care for the interests of his company and of the association in the manner described.

Finally, the companies themselves can contribute greatly to the success of the convention by having each department well represented by the best men in those departments. The opportunity of attending a national convention occurs only once a year, and it is useless to say that the heads and responsible men in the different departments can derive nearly as much good by a careful reading of the reports of the meetings as by actually being present. We believe that everyone who has read the report of a discussion on a subject in which he was particularly interested has felt that he could understand the situation better if he could have been present. This is partly because no printed report can fully convey the entire spirit of a meeting, even if it should contain everything which is said. But even if a man can gather from a report of a meeting all that he would gain from attendance, he would still lose all the other benefits of convention week, such as the exchange of views with other railway men and the opportunity of inspecting the exhibits. In the opinion of many men who have attended conventions, each of these matters is of equal value with attendance upon the meetings themselves.

THE PROBLEM OF OLD MOTORS

Almost every electric railway which has been in operation for ten years or more is daily confronted with the problem of what to do with the older types of motors under its cars. As compared with the more modern types, these old motors are expensive to maintain and lubricate, and the frequent repairs to which they have been subjected have not improved their originally low mechanical and electrical efficiency. They require a stock of extra parts to be kept on hand, and as the manufacturers of some of these types of motors have long since gone out of business, these parts have to be made up in the railway company's own shop or in some outside shop which charges fancy prices for such work. At the same time, these old motors with proper care are capable of propelling cars, and for this reason alone they are retained in use.

There has been almost as much improvement in railway motor design in the last ten years as has taken place in power-generating machinery. Simple engines and belted generators in the early days were rapidly displaced by compound direct-connected units, which in turn are giving way to turbo-generators. The machinery removed from power houses to make room for more modern machinery seldom has been completely worn out, but it has lost its place because it was less efficient than the new apparatus installed. If this is justifiable practice in the power house where the energy is produced, it is an equally justifiable practice when applied to the motors where the energy is expended. If the extra cost of maintenance and lubrication and the loss of revenue on cars pulled in for motor trouble were added to the electrical and mechanical losses as compared with modern motors, the annual cost of keeping these old motors in service would more than equal the saving made in the power house by reason of the substitution of the most efficient generating apparatus for moderately economical engines and generators.

The economical life of a railway motor is a variable period, and no rule can be laid down for determining when economical maintenance ceases and expensive and continuous rehabilitation begins. But it is safe to say that when the annual cost of maintenance of an old motor exceeds the cost of maintenance of a new motor plus the interest on the investment in the new motor, it is along the lines of true economy to make the change. Thus, if the average cost of maintenance of a modern 50-hp interpole motor for the first five years is 50 cents per 1000 motor miles and its first cost is $700, the annual cost, assuming 25,000 miles per year and interest at 5 per cent, would be $47.50. As compared with this figure, one company in the East is spending $3.24 per 1000 motor miles for the maintenance of the few G.E-1000 motors which it still has in service. On the basis of 25,000 motor miles these old motors are costing the company $81 per year, or $33 more than new motors would cost. The maintenance of old motors will never cost less as time goes on, and the improvements in modern types of motors should keep the future cost of maintaining these equipments at a moderately low figure for a long period of years. Those companies which have a large number of old motors in service would profit by analyzing the maintenance and lubricating costs of each type of motor and eliminating as rapidly as possible all of the old equipment which is costing more than it is worth.

PARLOR CARS ON INTERURBAN ROADS

The more luxurious equipment of the through trains operated by steam railroads has been one of the chief reasons why the competing interurban roads have not been able to secure a larger share of the long-distance traffic. The American public likes comfort and is willing to pay for it, especially when traveling. The interurban roads for the most part provide fast and convenient schedules and good roadbeds, with no smoke and no dirt, but the largest and finest coaches which they operate are not to be compared from the standpoint of comfort with the parlor, dining and café cars of the steam railroads. An individual seat which can be reserved in advance at a moderate cost is a large consideration in the mind of a traveler in the selection of a route for his journey. It is not surprising, therefore, that many of the larger interurban systems in the Central West and the Far West are adding parlor cars to their equipment in an effort to build up through traffic on an equal competitive basis with the steam railroads. The results in most cases have been encouraging if not immediately productive of large increases in revenue.

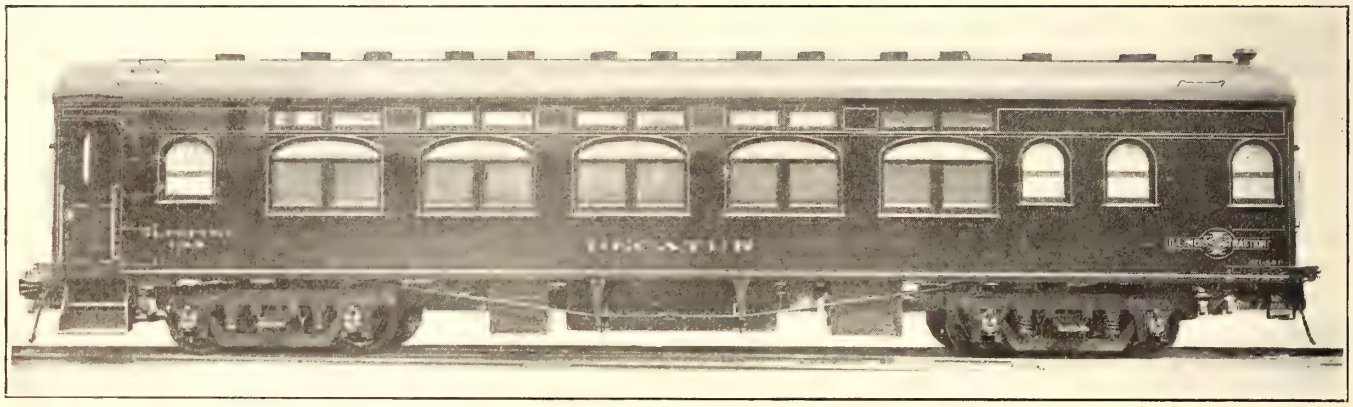
The Illinois Traction System, which was the pioneer in operating interurban sleeping cars, only recently put into service two parlor-car trains in each direction daily on all divisions. The lengths of the runs vary from 100 miles to 227 miles. The large scale on which this service was inaugurated is an indication that the management was convinced that it would be profitable. Certainly the revenue obtained from the sleeping-car service of the Illinois Traction System, which is described elsewhere in this issue, has been large enough to warrant an effort to obtain an equal if not larger share of the through travel in the daylight hours. The new parlor cars of the Illinois Traction System are as complete and luxurious in their appointments as any similar cars operated by competing steam roads, and the rates of fare for seats average about the same as those charged in Pullman cars.

One of the principal operating objections to parlor cars is the limited seating capacity which they provide. The parlor cars of the Illinois Traction System, for example, have seats for only thirty-five passengers, whereas a coach of the same size will seat fifty-six passengers. When parlor cars are operated as trailers, however, and are hauled by a motor coach the cost of operating the two-car train is only slightly more than for a single car. A porter for the parlor car at $50 a month represents the only additional labor expense. As regards power consumption, the tests made by the Illinois Traction System show that a two-car train consisting of a motor coach and trailer parlor car consumed only 650 kw-hours in a run of 175 miles, as compared with 504.5 kw-hours for a single motor coach. The total extra cost of operating a parlor car as a trailer works out then at less than 2 cents per mile for power and wages, whereas the total extra revenue from thirty-five passengers at 2½ cents would be 87½ cents per mile. This should leave a large margin of profit.

Sleeping-Car and Parlor-Car Service on the Illinois Traction System

A Description of the Latest Types of Parlor and Sleeping Cars Is Given, Together with a Statement of the Operating Revenues and Expenses of the Sleeping-Car Service

During the past two years the Illinois Traction System has made many improvements in the character of its passenger service, particularly by the installation of sleeping and parlor car service. It is the only electric railway regularly operating sleeping cars, and is one of the few interurban roads operating parlor-observation cars on long runs. The sleeping and parlor-car services are considered very profitable by the management of the road because they are good advertisements and encourage a class of travel which otherwise would use the competitive steam lines.



Illinois Traction System—Exterior of New Sleeping Car

The first sleeping cars to be operated by the Illinois Traction System were built by the Holland Sleeping Car Company about six years ago. These cars were equipped with motors and were operated as single cars between Springfield and St. Louis, a distance of 100 miles. While these cars were inferior in their accommodations as compared with the later types of sleeping cars, they proved to the management that electric railway sleeping-car service was a possibility. Accordingly in the fall of 1909 an order was placed with the American Car & Foundry Company for two sleeping cars of novel design. The plans for these cars were made by J. M. Bosenbury, superintendent motive power and equipment, under the supervision of H. E. Chubbuck, vice-president executive. The principal innovations in the new sleeping cars were the windows in the upper berths, permanent bulkheads between sections, hinged berth frames with springs and mattresses 6 ft. 2 in. long, individual electric lights and wall safes in each berth, a system of automatic ventilation and an especially rugged design of car body with an arch roof. The constructional features of these cars were described in the Electric Railway Journal for March 19, 1910, page 476. The results obtained last year from the operation of sleeping cars of the improved type were so satisfactory that an order was placed with the Barney & Smith Car Company for two more sleeping cars of the same design. These cars were put in service on April 1, 1911, replacing the Holland sleeping cars, one of which will be refitted as a day coach.



Illinois Traction System—Two-Car Train with Sleeping Car

LATEST TYPE OF SLEEPING CARS

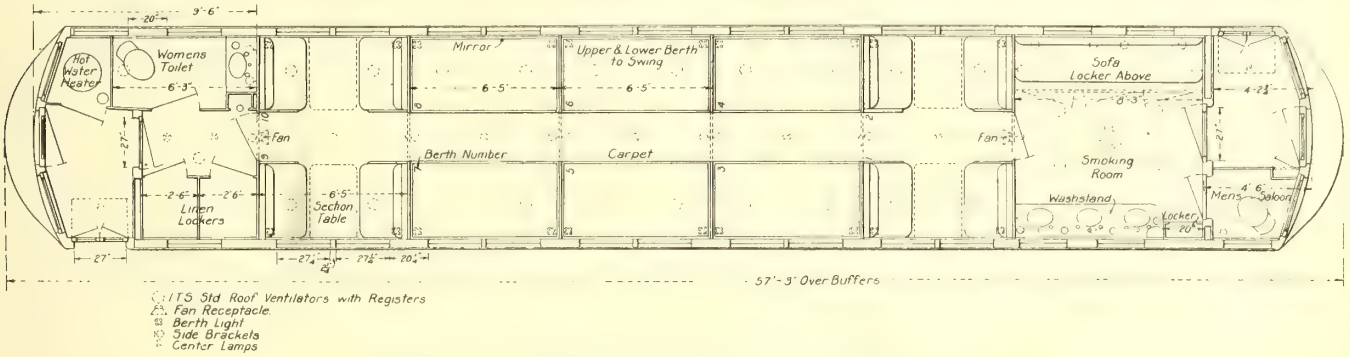
The two cars built this year are similar in general design to those built in 1910. They are 3 ft. longer than the cars built last year, however, and this space has been added to the men's wash room. The new cars are 57 ft. 3 in. long over buffers, and 9 ft. 4¾ in. wide over the sills. The floor plan, a cross-section of the body and an elevation of the side finish in one section are reproduced. The designs for the body, berths, fittings and ventilating apparatus were prepared by the rolling stock engineering department of the Illinois Traction System.

All sleeping cars are runs as trailers and are mounted on M C. B. steam coach trucks, which have steel frames and quadruple full-elliptic bolster springs. The Illinois Traction System cars are all equipped with M. C. B. type radial

couplers having an extended guard arm on one side, a receiving shoulder on the other side and a 14-in. knuckle. These couplers are mounted at standard M. C. B. height, and may be operated from the side of the car.

The bodies of these new sleeping cars are supported on composite wood and steel underframes of heavy design with six steel sills and a sub-floor to hold a 4-in. layer of sound-deadening material. The roofs are of the arched type and the bodies are about 8 ft. high from the floor to the trolley plank. They are 8 ft. 8¼ in. wide between the interior finish, thus affording room for berths only 1 in. narrower than Pullman standard. The equipment of these cars includes Illinois Traction standard automatic ventilators, Westinghouse electro-pneumatic conductor's train signals, Westinghouse automatic air brakes, Hedley anticlimbers, Symington journal boxes, storage-battery electric lighting equipment and Peter Smith hot-water heating system.

Entrance steps are provided at diagonally opposite corners and end doors at both ends. The interiors of the cars are arranged as follows: The men's smoking and wash room is at one end of the car and occupies the full width of the body for a length of 8 ft. 3 in. An interior view showing the generous space allotted to the wash room is shown. The men's toilet room, which contains a flush hopper, is set off from the vestibule space and is about 3 ft. 10 in. in length, opening into the smoking room. This toilet room occupies about one-third of the platform space. The equipment of the smoking and wash room includes a sofa seat 8 ft. long on one side and a washstand with three bowls on the other side, a dental bowl at one end, a water cooler and several large mirrors. The washstand and plumbing fittings are made of "Nickeline". Four exhaust ventilators are provided in the ceiling of the wash room and one above the toilet room. The wash room is illuminated by fourteen tantalum lamps. All the lamps in the car are inclosed in rectangular-shaped frosted glass shades, held in cast bronze fixtures supported by cast-bronze square tubing.

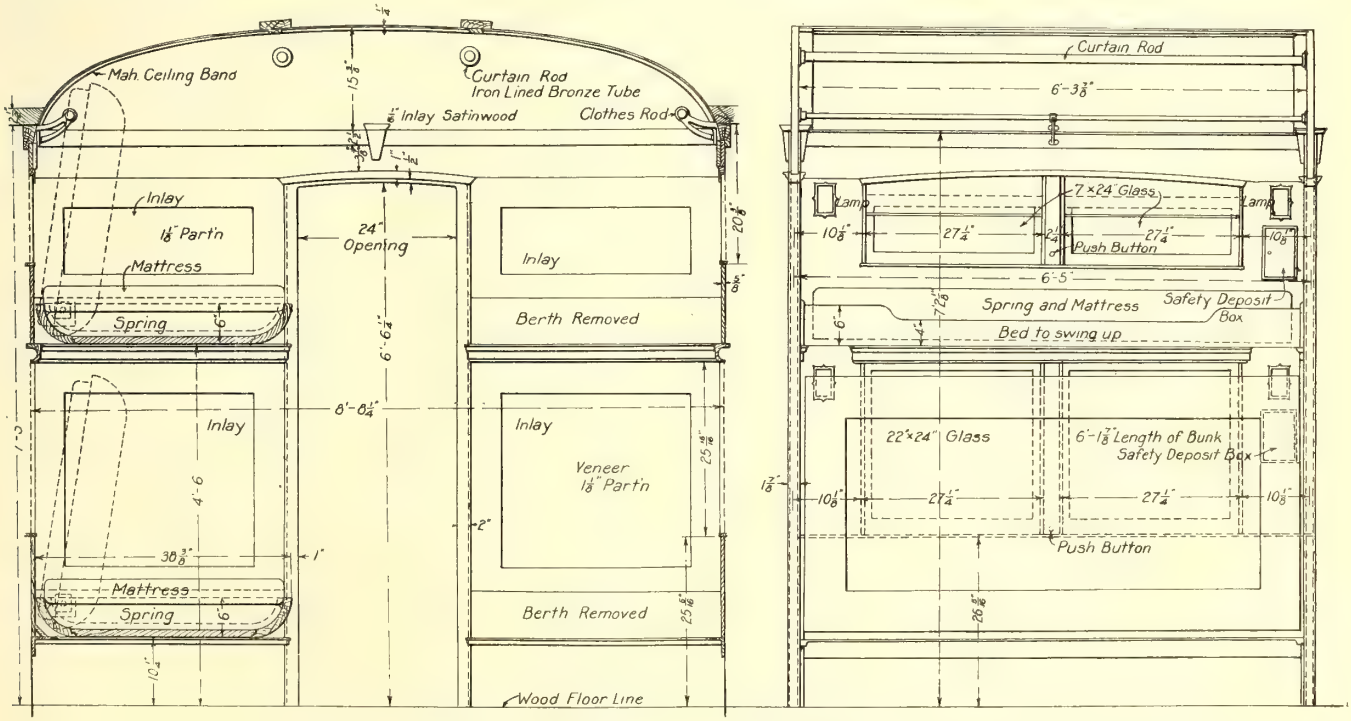


Illinois Traction System—Floor Plan of New Sleeping Car

The women's saloon is at the opposite end of the car from the men's. It includes toilet fixtures similar to those in the men's room, and occupies a space of 6 ft. 3 in. long on one side of the center aisle. Across the aisle from it are two linen lockers, each 2 ft. 6 in. square in plan and reaching to the ceiling. A Peter Smith hot-water heater is installed in a steel-lined closed compartment on the platform space adjoining the women's salon. This location for the heater avoids taking coal and ashes in and out of the car body.

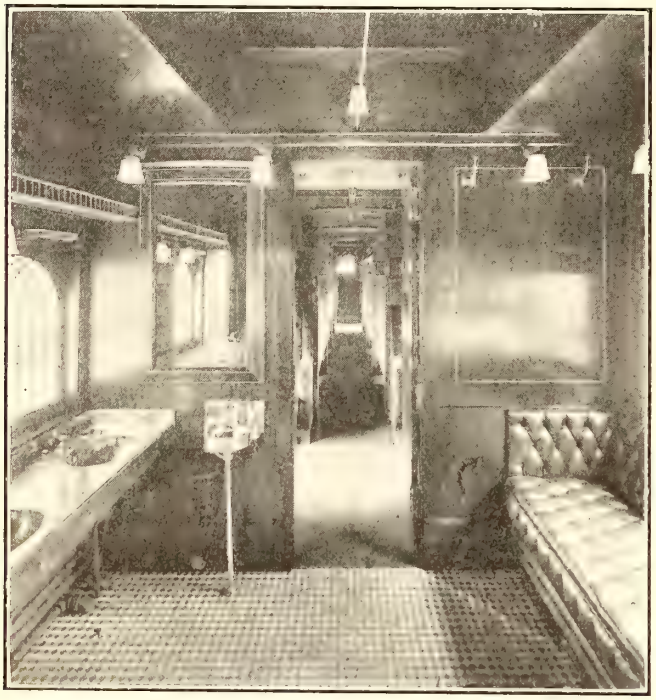
The center of the car body is divided into five sections. The end sections contain Pullman type berths on each side of the aisle. The three center sections have hinged berths fitted according to the designs of the Illinois Traction System. In these five sections of the car twenty berths are provided, each of which is 6 ft. 5 in. long and 38⅜ in. wide. Seats for 16 people are provided in the two-end Pullman sections.

The arrangement of the hinged berths is shown in the



Illinois Traction System—Details of Berth Sections of Sleeping Car

cross-section of the car. They are installed between rigid bulkheads, which extend from side to side of the car, and greatly increase the strength of the car body. Two win-



Illinois Traction System—Men's Saloon in Sleeping Car

dows and two ventilators are provided for each upper berth, and all berths have individual electric lamps, supplied with current from the storage battery lighting system. The center aisle of the car is illuminated by thirteen lamps. Steel safety deposit receptacles in which occupants of the berths may place their valuables are installed in the car sides at the head of each berth.



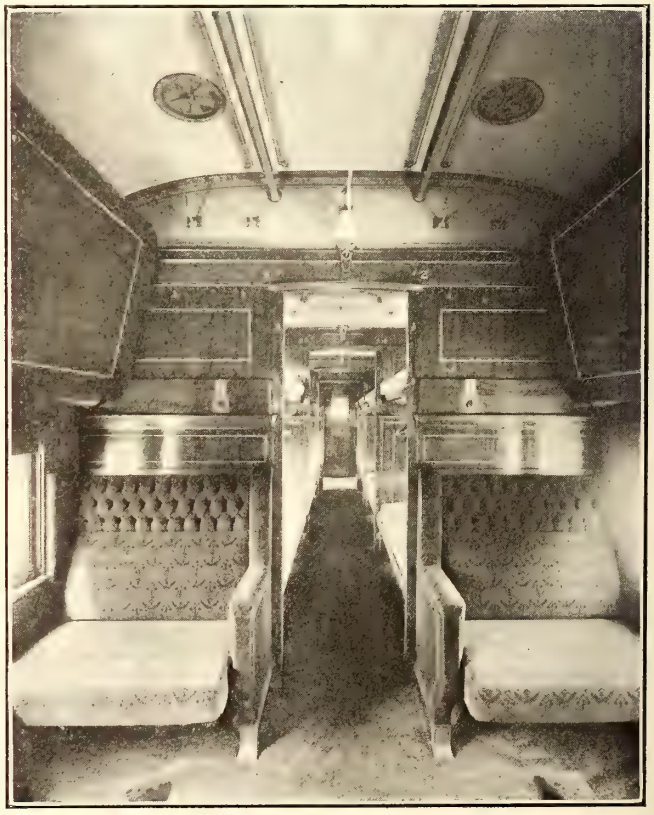
Illinois Traction System—Sleeping Car Section with Lower Berths Down

The interiors of these sleeping cars are finished in figured mahogany highly polished. The upholstery of the smoking room is Spanish leather. Interior trimmings are of statuary bronze. The floor covering in the main compartment is Wilton carpet and in the smoking room and toilet rooms the floor has an inlaid rubber surface. The cars are equipped with an annunciator system with push-buttons in all berths and other subdivisions of the cars. Double windows with full-size bronze wire screens are provided for both upper and lower berths.

The combination motor coaches which haul the sleeping car trains were described in the Electric Railway Journal for Feb. 2, 1911, page 275. These cars are 52 ft. 6 in. long, 9 ft. 5⅜ in. wide and 12 ft. 10 in. high from the rail to the top of the roof. The bodies are of heavy design with arch roofs, and are mounted on Curtis trucks equipped with four GE-205 motors and type M control. The interiors of the bodies are subdivided into three compartments, one for milk, one for express and a passenger compartment seating sixteen. These combination motor cars, of which the company has four, were built by the McGuire-Cummings Manufacturing Company.

SLEEPING-CAR SERVICE

The sleeping-car service is operated daily in both directions between Peoria and Springfield and St. Louis. The run of 175 miles between Peoria and St. Louis is made from 11:30 at night to 7:05 in the morning. The southbound sleeping-car train arrives at Springfield at 2:15 a. m. and picks up a Springfield-St. Louis sleeping car. Similarly the sleeping-car train which leaves St. Louis at 11:45 p.m. and arrives in Peoria at 7:40 a.m. carries two sleeping cars, one of which is set off at Springfield at 5 a.m. The sleeping cars at all terminals are ready for occupancy at 9 p. m. and may be occupied until 7:30 a. m. The schedules of the sleeping-car trains are so arranged that the southbound train out of Peoria at 11:30 at night makes connection at Mackinaw Junction at 12:18 a.m. with a local train from Bloomington. Thus the Peoria sleeping car serves both of the northern terminals of the road.



Illinois Traction System—Sleeping Car Section with Berths Up

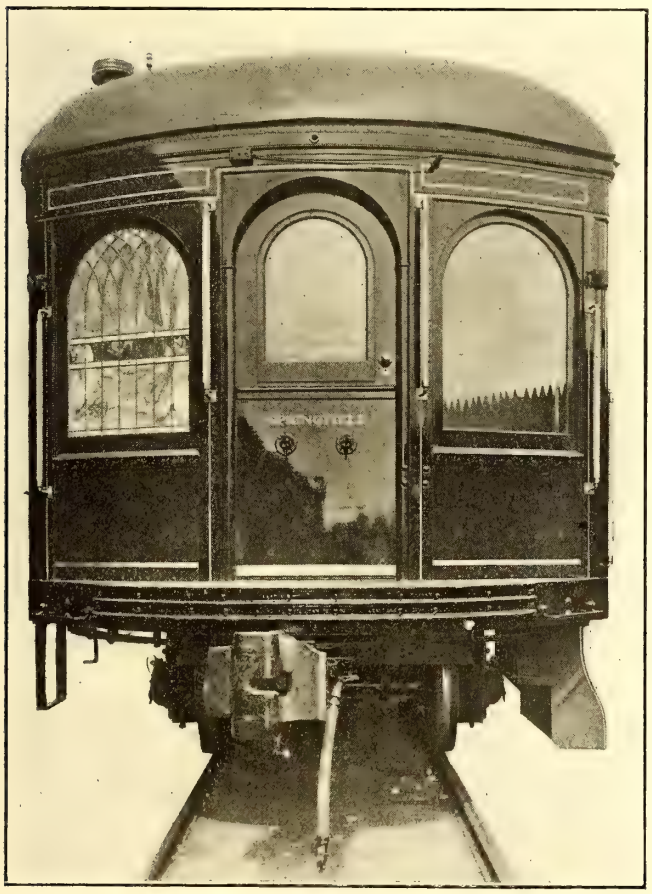
Similarly in the morning the northbound sleeping car from St. Louis makes connection at Mackinaw Junction at 6:55 a.m. with the local train for Bloomington. The average speed of the sleeping-car trains, which are made up of one combination motor coach and one or two sleeping cars, is about 24.5 m.p.h. including stops.

The reservations for berths on the sleeping cars are handled in a way similar to that followed in steam railway practice. All agents are prepared to sell berth tickets and make reservations, confirming them by telephone.

The publicity department of the Illinois Traction System devotes considerable space to advertising the sleeping-car service. The following statements regarding the service are included in the general timetable folder, together with illustrations of the cars:

"The Illinois Traction System when it offered to the traveling public its unique sleeping cars gained the distinction of being the only electric railroad in the world to operate sleeping cars. Two more of similar design have recently been delivered. These have more room in the smoking section and wash room and in several respects are improvements over the first ones built. Like the parlor cars, these cars are of the arch-roof design, giving them added strength and solidity.

"The berths are 6 in. longer than in the standard Pullman sleeping car, and there is more head room between the lower and upper berths. The berths do not make down



Illinois Traction System—End View of Sleeping Car

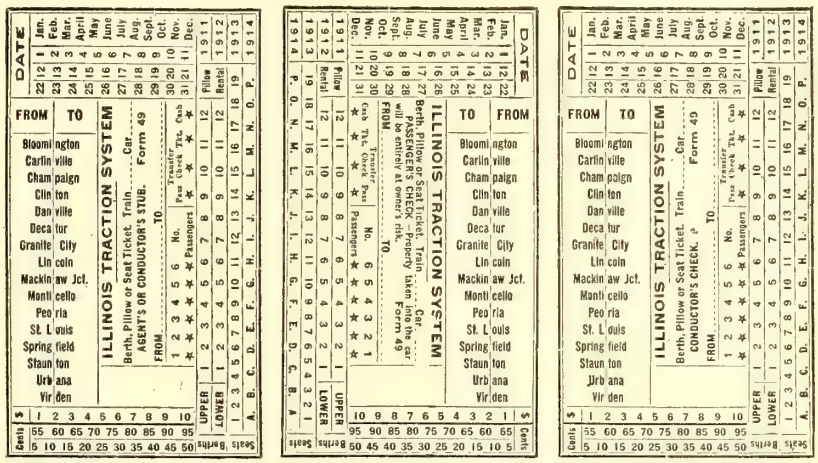
in the seat, being built for sleeping purposes only. A 6-in. spring box mattress covered with one of felt placed on these long even berths makes a bed without a bump or break, which is more comfortable than is possible in a car of other design.

"An innovation in these cars never before seen in a sleeping car is the window in the upper berth. These are easily opened, are supplied with screens and make the upper berths as comfortable as the lower berths. An abundance of fresh air is also supplied by the roof ventilators. Every berth is supplied with electric lights, current for which is furnished from storage batteries.

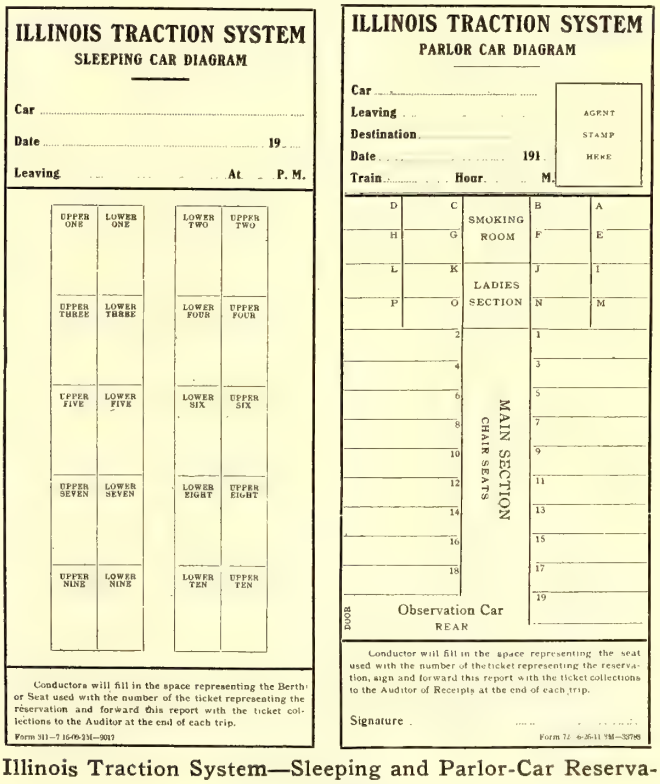
"In the wall of the car at the head of each berth is placed a plush-lined steel safety deposit box. The passenger is supplied with a key and one is kept by the porter. When locked, both keys are necessary to open the box.

"These cars have electric fans and every possible convenience. The porters are courteous and tips are not necessary to insure cheerful and prompt service. In the morning coffee and rolls are served without extra charge.

"These cars run between Peoria, Springfield and St. Louis, leaving each city after the theater and arriving early the next morning."



Illinois Traction System—Triplex Ticket for Sleeping and Parlor-Car Fares

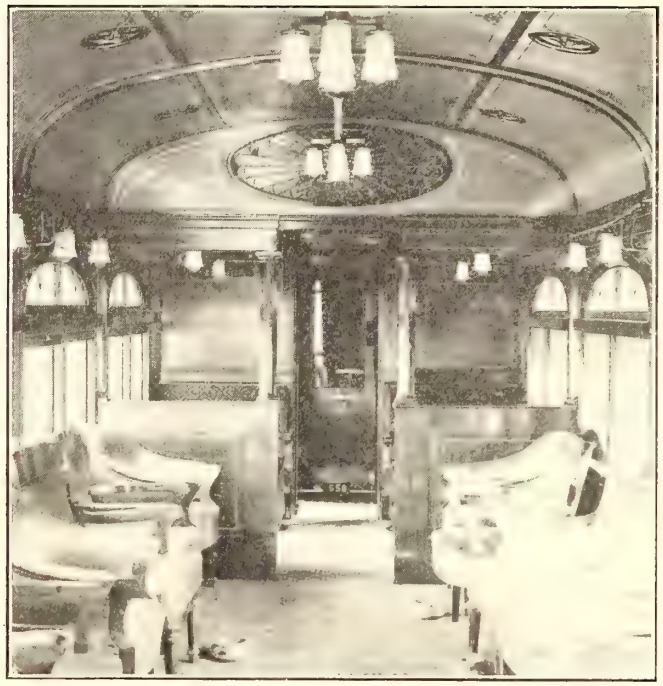


Illinois Traction System—Sleeping and Parlor-Car Reservation Diagrams

EARNINGS FROM SLEEPING-CAR TRAINS

A statement of the sleeping car earnings for August, 1910, was presented in the ELECTRIC RAILWAY JOURNAL for Oct. 8, 1910, page 620. During that month two of the new

type of sleping cars and one of the Holland type were in operation. These cars each made one trip a day and earned from passengers only a total of $2,557.56, in addition to which the two motor cars hauling the two new-type sleeping cars earned $1,009.97. The total earnings



Illinois Traction System—Interior of Parlor-Observation Car

from the three sleeping-car trains were $3,667.53 for one month.

The accompanying table shows the revenue and expenses for the sleeping-car trains operated between Peoria, Springfield and St. Louis from February, 1911, to July, 1911, inclusive. It should be noted that the statement does not include the express, baggage and milk revenue earned by these trains. It does include, however, the traffic earnings from the passengers in the combination motor cars which haul the sleeping-car trains. The two trains which this financial statement covers operate in each direction daily between St. Louis, Springfield and Peoria.

Referring to the table, the sleeping-car revenue is made up of the rental of berths and seats. The rates for berths between Peoria and St. Louis are $1.50 for a lower berth and $1.25 for an upper berth, and between Springfield and St. Louis, $1 for any berth. The column headed "Train Traffic Revenue" represents the tickets and cash fare collections for transportation of the sleeping-car and motor-coach passengers. It will be noted that the average earnings per month for the six months as shown were $3,632.99; or, in other words, this average which includes the months of February, March and April, is only $34.54 less

Earnings and Expenses of Sleeping-car Trains—Illinois Traction System.

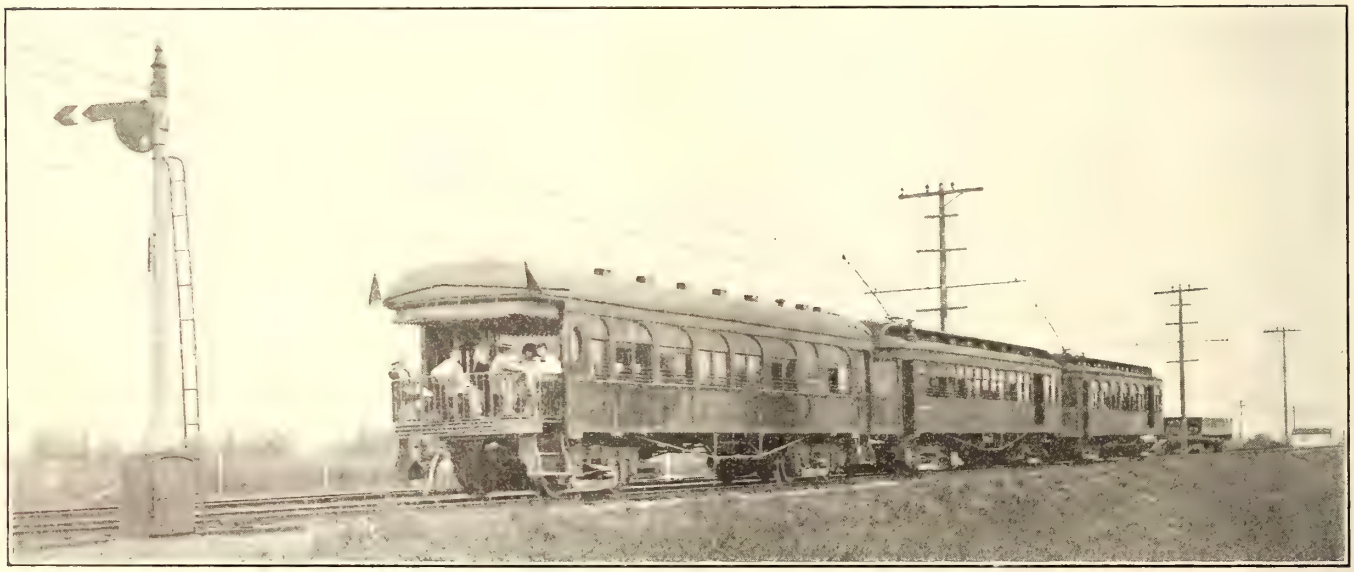
	Sleeping Car Revenue.	Train Traffic* Revenue.	Total Earnings.	Total Expenses.	Net Earnings.
July, 1911.....	$895.25	$2,941.30	$3,836.55	$2,776.04	$1,060.51
June, 1911.....	974.25	2,987.28	3,961.53	2,366.13	1,595.40
May, 1911.....	1,064.25	3,036.21	4,100.46	2,645.63	1,454.83
April, 1911.....	910.75	2,580.33	3,491.08	2,558.28	932.80
March, 1911.....	876.00	2,562.44	3,438.44	2,802.60	635.84
Feb., 1911.....	793.25	2,176.63	2,969.88	2,287.68	682.20
Six months.....	$5,513.75	$16,284.19	$21,797.94	$15,436.36	$6,361.58
Aver. per month..	918.96	2,714.03	3,632.99	2,572.73	1,060.26

*Does not include express, baggage or milk revenue.

than the earnings for the month of August of the previous year. The "Total Expenses" column covers all operating expenses, including power, crews, proportionate wear and tear of track, cost of coffee and rolls given passengers each morning, linen supplies, monthly salary of $100 for the supervisor of sleeping cars, porters' wages, maintenance of equipment and overhead charges on the sleeping-car equipment. On this basis the net earnings for the two sleeping-car trains are $1,060.26 per month. The average total expense of operation is approximately 71 per cent of the train revenue, not including the revenue from express, milk and baggage.

PARLOR-CAR SERVICE

The parlor-observation cars, which are of an attractive design, were put into service on all divisions of the Illinois Traction System on Aug. 1 of this year. The schedules provide one morning and one afternoon parlor-car train in each direction on each division of the road except between St. Louis and Springfield, on which division parlor-car trains leave the terminals in the morning, at noon and in the afternoon, three parlor-car trains being run in each direction daily. Parlor-car trains consist of a standard interurban motor car and one of the new observation trail cars. These trains weigh 81 tons complete. The two cars are connected by the Illinois Traction standard high-knuckle M. C. B. radial couplers and by a Westinghouse electro-pneumatic signal system. The crew of one of these two-car trains consists of a motorman, a conductor and a parlor-

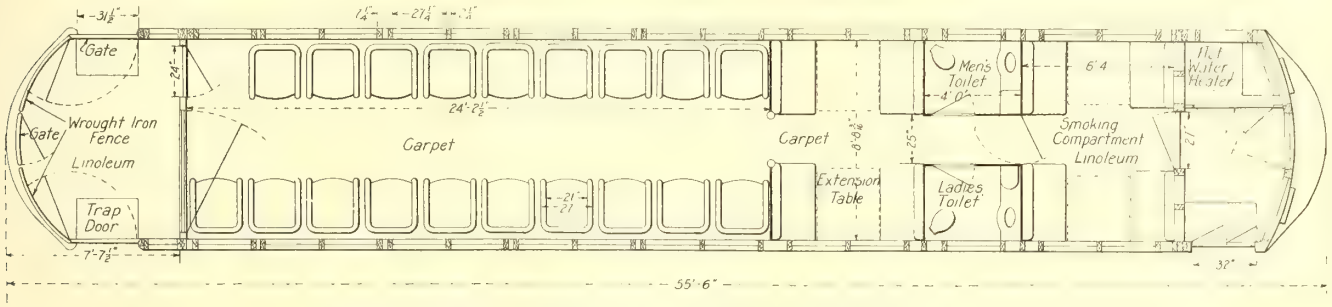


Illinois Traction System—Three-Car Train with Parlor-Observation Car

car porter, who is paid $50 per month. The trains are operated only in limited service, and the average speed between terminals is 27 m.p.h. The lengths of the runs range from 100 miles to 227 miles.

PARLOR-CAR EQUIPMENT

An illustration is presented showing the interior of the five new parlor-observation cars, which were built by the Danville Car Company from the designs made by the engineering department of the Illinois Traction System. The new parlor-observation cars have the same type of underframe and body framing as the latest type of passenger coach for the McKinley System, which was described in detail in the ELECTRIC RAILWAY JOURNAL for July 8, 1911, page 76. The general dimensions of these cars are as follows: Length over buffer plates, 55 ft. 6 in.; width over sheathing, 9 ft. 6 in.; width between wainscotings, 8 ft. 6 1/16 in.; height from top of rail to top of roof, 12 ft. 10 in.; truck-center distance, 32 ft. 3 in. The bodies are of substantial design and have arch roofs. The underframe consists of four I-beam center and intermediate sills and two deep plate side sills. All sills are reinforced by wooden stringers. The chief difference between the standard passenger coaches and the new parlor-observation cars is in the arrangement of the rear platform and the interior subdivisions.



Illinois Traction System—Floor Plan of Parlor-Observation Car

The parlor-observation cars have an open-hooded rear platform at the rear of sufficient size to accommodate ten seated passengers comfortably. The platform is covered with interlocking rubber tile and the platform is surrounded by an ornamental rail made of iron and brass. The steps are covered by Edwards trap doors. The main interior compartment is finished and furnished in an especially attractive style. The arch roof with its mahogany ceiling bands is tinted a light green to harmonize with the African mahogany woodwork, which is inlaid with narrow lines of white wood. The floor is covered with a figured green Wilton carpet. Chairs of special design with mahogany frames and upholstered in green Spanish leather are provided for nineteen passengers. These chairs conform to the three special designs made by the engineers of the road.

At the forward end of the main compartment are four fixed double seats arranged so that card tables may be placed between them. These seats are set off from the main compartment by a pair of columns and a bulkhead which extends across the car above the window level. In the center of this bulkhead is an oval-shaped art-glass design, including the initials of the road.

The forward compartment of the observation car is set off from the main compartment by a mahogany bulkhead with a swinging door. This forward compartment, which is reserved for smokers, has four fixed double seats upholstered in leather and so arranged that card tables may be placed between them. Lavatories for men and women on opposite sides of the center aisle are located between the smoking compartment and the main compartment. A Peter Smith hot-water heater is installed on the left-hand side of the forward platform.

Excellent illumination has been provided in these cars. In the rear observation compartment a 16-cp tantalum lamp is placed at each single and double window post, and there are four four-lamp chandeliers along the center line of the ceiling. The lamps are all held in heavy cast-bronze fixtures provided with substantial cast-bronze shade holders. Ventilation is afforded by fourteen exhaust ventilators located above the arch roof and connecting with the interior through adjustable registers. Camp chairs are provided for use on the observation platforms, and periodicals, including monthly magazines and daily newspapers, are carried on the cars for the free use of the passengers.

The arrangements for selling seats on the observation parlor cars are practically the same as those followed by steam roads in their chair-car service. The extra charge for a seat in a parlor car is ½c per mile. All agents sell seat tickets, and will make reservations for the seats in these cars in the same manner as for berths in the sleeping cars. The parlor-car seat tickets consist of three sections, one of which is collected by the conductor, one by the porter and the third is retained by the passenger.

ENERGY CONSUMPTION OF LIMITED TRAINS

Complete observations recently were taken of the energy consumption of a parlor-car train consisting of a standard motor passenger car and one of the new parlor-observation cars operating in regular service on the 175-mile limited run between Peoria and St. Louis. The total weight of this train was 81 tons. The motor car was equipped with four GE-205 motors rated at 100 hp each and fitted with 21-tooth pinions and 53-tooth gears. The accompanying table shows the characteristics of the run and the energy consumption as compared with two similar runs made by a single motor car of the same type and same electrical equipment. These two single-car runs are designated as motor A and motor B, and an average of the two runs of motors A and B, both southbound, is shown. The ratios between the results of operation with the motor and trailer and the average of the two single motor runs also are presented. Sixty-one stops were made by the two-car train on its run of 175 miles, and it was delayed en route by a broken trolley wire.

ENERGY CONSUMPTION OF ONE AND TWO CAR TRAINS.

Trains.	Total Weight Tons.	Total Running Time.	Net Running Time.	M.P.H. While Running.	Total Kw-hrs.	Kw-hrs. per Train Mile.	Watt-hrs. per Ton Mile.
1. Motor A	45	6.35	5.50	31.9	511	2.92	64.88
2. Motor B	45	6.10	5.30	33.2	498	2.84	63.20
3. Average, A and B	45	6.22½	5.40	32.4	504.5	2.88	64.06
4. Motor and trailer	81	7.37	6.09	28.8	650	3.71	45.85
Ratio 3/4	1.8	1.198	1.085	0.89	1.29	1.29	0.716

The Milwaukee Electric Railway & Light Company installs fuse-testing clips in the panel boxes at the ends of many of its cars. By the use of these clips the trainmen can determine whether or not a cartridge fuse is in good condition. The testing sets consist of four dry cells wired in series, one terminal being connected through a bell to one fuse clip and the other terminal being connected directly to a second fuse clip. By placing a fuse in the spring clips the circuit will be complete and the bell will ring if the fuse is in operating condition.

A New Theory of the Cause of Rail Corrugation

The Author Attributes Corrugation to the Form of the Rail Head and Suggests That Girder Rails Be Rolled with a Rounded Head

BY G. E. PELLISSIER, SUPERINTENDENT GOLDSCHMIDT THERMIT COMPANY

The writer first became interested in the subject of rail corrugation when acting in the capacity of engineer maintenance of way for an electric-railway company, and since that time he has had an opportunity to inspect a great deal of corrugated rail in many cities of the United States and Europe. His study of the question has been directed to an effort to find an explanation of this phenomenon which would not only fulfil the conditions of possibility but also those of probability.

In considering the various theories which have already been advanced as to the causes of corrugation one must necessarily be impressed with the fact that while all of the causes mentioned might be responsible for corrugations under certain particular conditions, they fail to fulfil the requirements of probability, because these causes, while continually operative, are assumed to produce corrugations only where they happen to appear, whether it is in the middle of a straight rail or on a curve, while on the remainder and greater portion of the track they have no effect. In some cases the rail not affected is less than 5 ft. distant from the one that is.

For instance, taking only one of the theories advanced, it hardly seems probable that dust or grit blown upon the track could be responsible for corrugations as found, since the chance of this dust being continually deposited on one rail and not on the other rail, only 5 ft. away, or in places in the track 50 ft. or 100 ft. apart, is very small.

The same argument might be applied to other theories which attribute all corrugations to chattering of the rolls when the rails are rolled, to vibration, hard spots in the rail, elongation of the fibers, due to the rolling action of the wheels, etc., as they in no way account for the fact that the corrugations appear only on widely distributed parts of a system of tracks, while the causes mentioned are operative over the entire system.

Approaching the question, therefore, from the point of probability the writer came to the conclusion that the corrugations themselves must be due to certain definite causes, which in turn might be the result of one or several conditions; that these conditions of necessity had to be operative where the corrugations occurred and not operative where they did not occur, and that there must be a reason for the change of conditions.

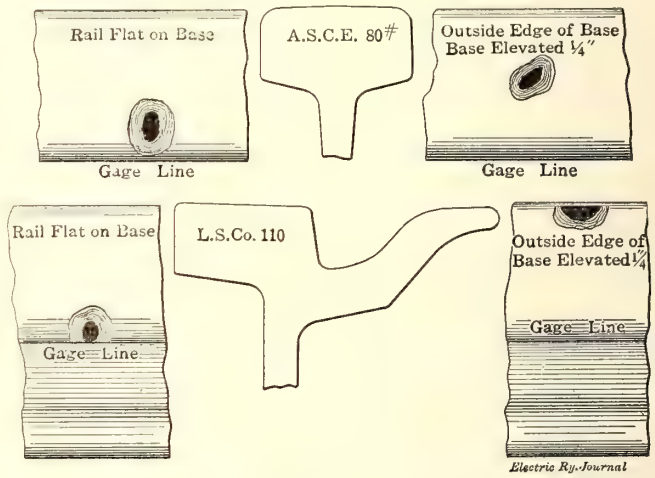
Proceeding on this assumption, the conditions under which corrugations appear were investigated and the following significant facts noted:

Corrugations rarely appear on steam roads, and rarely, if ever, on interurban track laid with T-rail, except at or near stations or under abnormal conditions; that T-rail in paved streets is not much affected; that high girder rail in paved streets is most susceptible to corrugation; that corrugations are often found on the outside rail of long radius curves, but rarely, if ever, on very short radius curves provided with a guard rail; that corrugations are more apt to appear where the rail is laid on a solid foundation with solid paving against the side of the rail; that rails which corrugate in one location sometimes wear smooth if taken out and laid elsewhere; that corrugations sometimes occur in parts of one rail and not in the remainder of the same rail.

In addition to the above facts, which it is believed are generally accepted, the writer has seen evidences of corrugations in less than forty-eight hours after track was laid under conditions which will be noted later.

Any explanation of the phenomena of corrugation which is advanced must necessarily account for the facts above mentioned in order to be satisfactory. The writer has evolved the following theory, which it is believed fulfils these conditions:

That corrugations are directly due to non-uniformity of pressure between the tread of the carwheel and the surface of the rail, and between the flange of the wheel and the side of the rail head, and they occur only when the pressure at the point of maximum intensity of pressure exceeds the elastic limit of steel at that point; that any condition or set of conditions which produce this non-uniformity of pressure will cause corrugations if the maximum intensity of pressure exceeds the elastic limit of the rail material; that comparatively few combinations of circumstances cause the maximum intensity of pressure to exceed the cubical elastic limit of steel; that any conditions which cause the position of a point of maximum intensity of pressure to move away from the approximate center of the rail head to the edge where any particles are not restrained, but free to move in one or more directions, reduce the elastic limit to



Figs. 1 and 2—Contact Areas on Girder and T-Rail

its linear value, which is not more than one-third of its cubical value, according to good authorities; that the shape of the rail head, wheel tread and wheel flange, and the position of the one relative to the other under traffic, has great influence on the position of the point of maximum intensity of pressure, and thus is responsible for most of the corrugations; that by so designing the rail head, wheel tread and wheel flange and so laying the rails that the maximum intensity of pressure will occur near the center of the tread surface of the rail and as far as possible from the corner or edge of the side of rail, most of the corrugations can be eliminated; that corrugations produced by pressures exceeding the cubical elastic limit of steel (such as might occur with quick braking of heavy, fast trains) can be eliminated only by raising the elastic limit of the steel, increasing the area of contact between the wheel and rail, or by making the acceleration (positive or negative) so uniform that a uniform cold flowing of the metal will follow.

In support of this theory a few facts regarding the intensity of pressure and its point of application may be of interest. Considering the surface of the rail a horizontal plane and the wheel a right cylinder, the contact between the two would take place along a straight line, neglecting

for the moment elasticity. If, however, the surface of the rail is a plane and the wheel is conical, the contact between the two occurs at a point, unless the wheel or the rail are free to move until an element of the cone coincides with an element of the plane. Since, however, in the case of rails laid in pavement it is not possible to obtain this adjustment of wheel and rail, and because we not only have coned wheels, but rails whose heads are not plane surfaces, we obtain contacts between the two varying from a point to a line, modified by the elasticity of the metal to a spot and an irregular area across the head of the rail.

Actual measurements of the area of contact made on various types of rails by placing a pair of standard 20-in. wheels fixed on an axle and then applying a pressure of 5 tons to each wheel showed the area of contact to vary from less than 0.25 sq. in. to about 0.75 sq. in., depending on the type of rail and its position relative to the wheel.

The accompanying sketches, Figs. 1 and 2, show roughly the relative size and location of a contact area. These, of course, are only representative and would be modified when the car was in motion and when the load and diameter of wheels were varied.

As the wheel load of 5 tons is not excessive, since in practice 6 tons or 7 tons are not uncommon, the areas found by experiment may be used to calculate the unit pressure on the rail. Assuming the intensity of pressure to be uniform over the entire area of contact, where the area of contact was 0.25 sq. in. the intensity of pressure would be 40,000 lb. per square inch, which is certainly close to, if it does not exceed, the linear elastic limit of ordinary rail steel.

When we consider, however, that the intensity of pressure is not uniform, but varies from nothing at the edge of the contact area to the maximum at the center, and that these figures are materially increased by loading, impact, breaking, etc., it is readily seen that the linear elastic limit of steel must often be exceeded. It must not be forgotten also that in producing these contact areas new wheels and rails were used, that care was taken to place them so that the maximum area of contact would be developed, and that the rails were merely laid on a cast-iron bed plate, so that they were free to adjust themselves under pressure.

With rails as laid in track and subjected to traffic we find quite a different set of conditions. The rails are held together by tie rods or supported by rail braces and are embedded in pavement so that they are not entirely free to adjust themselves under pressure. The position of the point of maximum intensity of pressure, therefore, is determined largely by the shape of the wheel and rail. Secondly, the track is rarely laid so that the wheels will make contact with the rail at corresponding points along its entire length. Thirdly, on account of defective gage of track and wheels the contact cannot always take place between the tread of the wheel and the surface of the rail, but somewhere along the gage line. Fourthly, flanges sometimes ride either on the bottom of the groove or on the inside of the groove. Fifthly, centrifugal forces tend to make the wheels climb outside the rail when going around curves. Other differences could be noted, but the above are the most important.

It will readily be seen from the sketches shown in Fig. 3 that in all the cases illustrated the area of contact must be materially reduced. If the rails were free to adjust themselves under pressure all the other conditions mentioned would be of small moment, as the point of maximum intensity would tend automatically to keep away from the edge of the rail, both on the tread and side of head. When, however, the rail is not free to adjust itself the rail head and wheel tread must be so shaped that under traffic conditions the point of maximum intensity of pressure will not fall at the edge of the rail. This, of course, can be accomplished in many ways, but the simplest way which naturally presents itself is to make the tread of the rail approach the arc of a circle instead of a plane, as most girder rails are rolled. The radius of the curves at the gage lines should also be such as to bring the flange pressure under traffic conditions well below the edge of the rail, as illustrated in Fig. 5.

Analyzing the occurrence and non-occurrence of corrugation on the basis of this theory, it is not difficult to see why corrugation rarely occurs on steam roads, as not only is the rail free to adjust itself so that the point of maximum intensity of pressure falls near the center of the head, but the shape of the head is such as to obtain this result even though the rail was not free to move. Fig. 6 shows rounded-head rails used by the Pennsylvania Railroad. In exceptional cases where slight evidences of corrugation have been found in steam roads, in yards or near stations, the cubical elastic limit of the steel of the rail undoubtedly has been exceeded, due to the combination of wheel loads and tractive forces exerted in starting and stopping trains, and as the positive or negative acceleration is not uniform the result is a non-uniformity of pressure. On some curves where there is no doubt that the cubical elastic limit of steel has been passed, but where there is no necessity for stopping and starting, a uniform cold flowing of the metal of the steel of the rail will be found. The same argument holds, of course, for interurban track.

With nearly all T-rails laid in paved streets the shape of the rail head tends to keep the point of maximum intensity of pressure near the center, but as the rail is not free to move all the cases illustrated in Fig. 3, except the top one, can produce corrugation. In the case of outside rails on long radius curves the wheel flange presses against the side of the rail with a pressure varying with the speed. When the rail is not properly shaped the tendency is for the wheel to climb the rail, lifting the thread of the wheel from the rail surface and bringing the maximum intensity of pressure

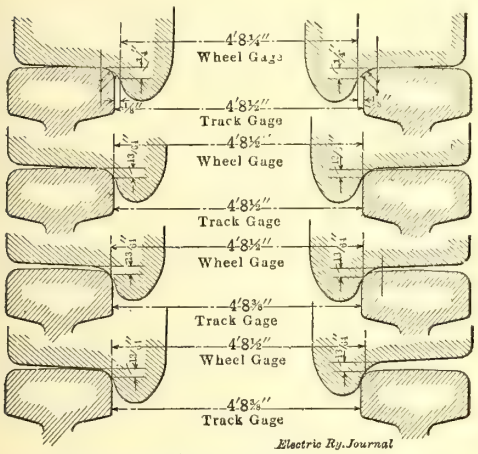
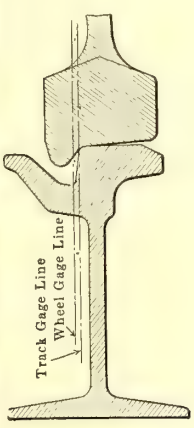
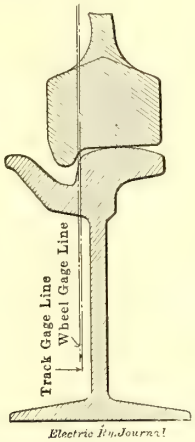


Fig. 3—Relation of Variable Wheel and Track Gages





Figs. 4 and 5—Flat Head and Proposed Rounded Head Girder Rail

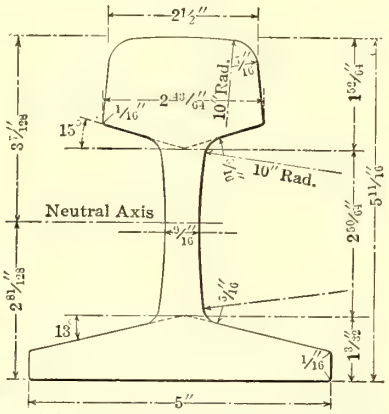


Fig. 6—Pennsylvania Railroad Standard 100-lb. T-Rail

at the very edge of the rail. As soon as this pressure exceeds the linear elastic limit deformations occur and the wheel drops until the area of contact is sufficient to reduce the pressure below the elastic limit, when the wheel again starts to climb. As the time required for the wheel to drop a certain distance is constant and the speed of the cars varies, it will readily be seen that the length of the corrugations thus produced will be a function of the speed of the cars.

Quite a different effect is obtained on short radius curves. The speed is not sufficient to cause climbing due to flange pressure, and as the inside of the flange makes contact with the guard the area of contact is certain to keep the maximum intensity of pressure below the elastic limit, even if the point of maximum intensity falls near the edge, which it does not, as shown by the wear on the guard rail.

This theory further explains why in some cases grinding removes corrugations and why in other cases it does not. If the grinding simply removes the inequalities of the rail surface without changing the relation of wheel tread and rail surface, corrugations will again appear, while if the grinding does change this relation, taking the center of pressure away from the edge of the rail, corrugations will not occur. The occurrence of corrugation under various other conditions could be explained by this theory, but the above will be sufficient, it is believed, to demonstrate its soundness.

It is the intention of the writer to make some experiments with a view of determining the actual intensity of pressure between wheel and rail with various types of wheels and rails under different conditions as soon as opportunity offers.

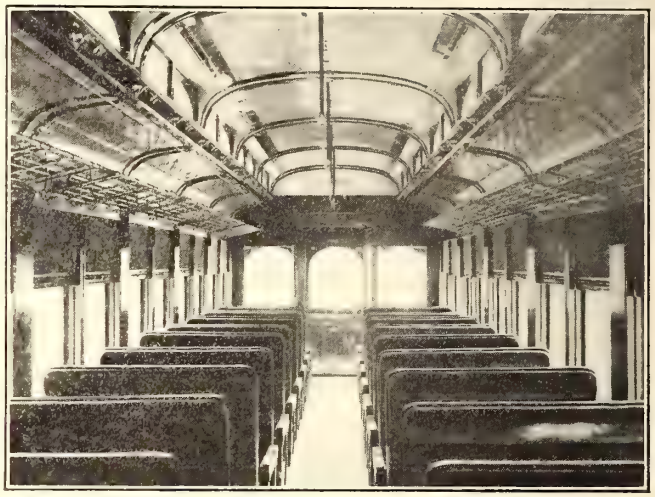
TRAILER CARS OF BEN HUR ROUTE

The Indianapolis, Crawfordsville & Western Traction Company, known throughout Indiana as the "Ben Hur Route," has a high-speed 45-mile road connecting Crawfordsville with Indianapolis. C. E. Morgan, general manager of the Ben Hur Route, recently placed in service four trailer cars which in general design conform to the standards of the company's motor cars, although they are not so long. These trailers were built by the Danville Car Company and were designed to have an especially strong bottom frame. The bodies and running gear are so built that electrical equipment can be added if desired.

The accompanying engravings show interior and exterior views of the cars. In ordinary service the motor cars haul one trailer. The general dimensions of the new trailers are as follows:

Length of body	35 ft.
Length over vestibules	44 ft. 2⅛ in.
Width over sills	9 ft. ¼ in.
Width over belt rails	9 ft. ⅞ in.
Height, bottom of sill to top of roof	9 ft. 9 in.
Height, top of rail to bottom of sills	3 ft. 6½ in.

The principal members of the underframe are two 12.25-lb., 6-in. I-beam center sills and two side and two intermediate sills of 6-in. x ⅜-in. x 9-in. angles. All the sills are reinforced with timber and the side sills are further reinforced by ¼-in. x 18-in. plates. These stiffening plates are reinforced at the top by angle irons. The cross members are spaced 32¼ in. apart and consist of 3-in. x 6⅛-in. timbers reinforced with plates and angles. The center and intermediate sills extend from bumper to bumper. Both buffer blocks carry Hedley anti-climbers and are sheathed with ⅝-in. x 8-in. steel. Tomlinson M.C.B. radial couplers are fitted to both ends of the new cars and are standard for all equipment of this road. The bodies are carried on Baldwin 72-22 A.T. M.C.B. trucks with 36-in. rolled-steel wheels and cast-steel bolsters. The truck-center distance is 24 ft. 6 in.



Interior of Ben Hur Route Trailer Car

The bodies seat forty-six passengers in Brill walkover seats having arm rests. These seats are upholstered in green plush. Additional fittings and equipment of these new trailers include: Westinghouse schedule AMT air brakes, Peacock hand brakes, Dayton Manufacturing Company's brass trimmings, Peter Smith hot-water heaters, Symington journal boxes, Pantasote curtains with Curtain Supply Company's No. 88 ring fixtures, Ohmer registers, Edwards sash fixtures and Mason safety treads.

The bodies are painted according to the Murphy A.B.C. system and weigh 26,000 lb. The interior finish of the bodies is mahogany.



Train of Motor Car and Two Trailers Operated by the Ben Hur Route

A horse car that had been in retirement for seventeen years was used recently for an outing by the employees of the Rhode Island Company who have been longest in the company's service.

Inclosed Arc Lamps for Street Car Headlights

This Article Gives a Description of the Different Types of Arc Headlights and Hints as to Their Maintenance

BY A. T. BALDWIN, RESEARCH LABORATORY OF THE NATIONAL CARBON COMPANY

Inclosed arc headlights for street car service may be divided into two classes, depending on the position of the carbons with respect to the vertex of the reflector. In both types the carbons are aligned with each other. In one type they are mounted at an angle to the vertex of the reflector. This is known as the inclined type. In the other class the carbons are held perpendicular to the base of the lamp, and are so placed that the arc is maintained directly in front of the vertex of the reflector. This is called the vertical type. The lamps may also be classified as automatic or hand feed, depending on whether the clutch which controls the upper carbon is operated by means of an electromagnet or by means of suitable hand-operated springs and releases. All inclosed arc headlights have stationary lower carbons and are therefore non-focusing except in so far as the lower carbon is moved by a hand-controlled device in order to maintain the arc in focus with the vertex of the reflector.

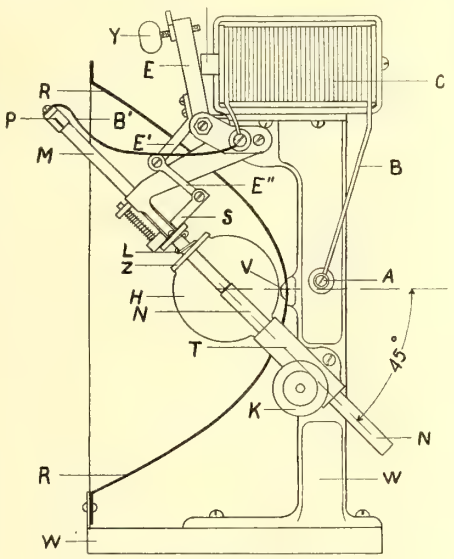


Diagram Showing Construction of Arc Headlight

CONSTRUCTION OF D.C. HEADLIGHTS

Since d.c. lamps with automatic feed control are most commonly used, we shall confine our attention to them. To illustrate the method of operation of these lamps reference is made to the accompanying generalized sketch of an inclined type lamp. The sketch shows all the essential parts except the case, which is usually made of japanned sheet iron properly punched and pressed into shape so as both to protect and to ventilate the lamp proper. The essential parts of the lamp are the base plate and frame *W*, which may be made of one or more iron castings, the magnet *C*, the clutch control levers *E*, *E'* and *E"*, the clutch *S*, the upper and lower carbons *M* and *N*, the lower carbon holder *T* and knurled feed wheel *K*, the inclosing globe *H*, the gas cap *Z* held in place by the spring *L*, and the spun aluminum or silver-plated parabolic reflector *R*.

From the resistance in series with the lamp the current flows to the binding post *A*, which is completely insulated from the frame *W*. From here the current passes to the magnet *C*, through the lead *B*, then by the lead *B*, through the cap *P*, to the upper carbon *M*. The lower carbon *N*, not being insulated from the frame *W*, allows *W* to serve, so to speak, as the negative terminal of the lamp. The lamp frame is either grounded to the trucks through the dash or to the grounds in the controller box.

Arc headlights are of the constant arc length or constant potential type. The current passing through the magnet energizes it and the lever *E* is drawn toward the core *D*, in this way lifting the clutch and striking an arc. Increased arc length decreases the current flowing until the magnet is no longer able to hold the lever *E*, which falls, releases the clutch and allows the carbons to feed together, and then re-establishes a normal arc. The arc length and voltage are determined by the thumb screw *Y*, which limits the movement of *E*. The lower carbon is fed up into position from time to time by means of the knurled feed wheel *K*.

The vertical lamps are also of the constant potential type and operate similarly to the inclined type. In some vertical lamps the upper carbon passes through the center of the magnet and its feed is controlled by a clutch operated by this magnet. Other vertical type lamps have the upper carbon holder outside the magnet and controlled by the usual clutch. In this type of lamp the clutch is operated by one long lever, generally directly attached since the magnet has an upward pull. It might be mentioned here that hand-feed lamps are of the vertical type, where the clutch is controlled by releasing or compressing a suitably placed spring.

Since these lamps are built to operate at from 2 amp to 5 amp, with 75 to 80 volts at the arc, an external resistance must be used between them and the trolley circuit. Some users put the headlights in series with the heaters, the car lights or the head and tail lanterns. This policy is not recommended, because it is safer, in order to secure constant operation, to have the headlight on a separate circuit. This is accomplished by means of a lead coming directly from the trolley to a resistance box supplied by each manufacturer as part of the lamp equipment. These resistances are usually of the porcelain spool or coiled wire type. They are caged and have marked terminals to indicate the connections from the trolley and to the lamp. It is usually customary to place these resistances under the car platform or to hang them from the platform roof, carefully avoiding grounds and protecting them from the weather. A lead from the resistance is run to one or both bumpers and fastened in a plug socket, which is so placed that driving rain will not ground it.

In the vertical-type lamps, where carbons of the same diameter (⅜ in. or over) are used, the upper carbon is usually 1.5 times the length of the lower. In this way ample life, compatible with sufficiently frequent inspection, is secured, and at the same time there is a stub of suitable length for future use as a lower carbon. In the inclined type of lamp the same size carbons may be used as upper and lower, but better practice calls for a 5/16-in. upper carbon with a ⅜-in. lower carbon. Here the upper carbon is twice as long as the lower in order to secure the maximum life from the lower with minimum stub length, since under such conditions both stubs are useless. All carbons are solid and the life of twenty to thirty hours claimed by various manufacturers for their headlights is not exaggerated if the lamps are operating normally.

Both types of lamps are subject to practically the same troubles, and it is doubtful if one type has any great advantage over the other. There are reasons, however, why the inclined type gives a better light distribution. In both types the upper carbon is positive, and from its crater issues about 85 per cent of all the light given by the lamp, the remaining 15 per cent being distributed about equally between the arc itself and the crater of the negative (lower) carbon.

In the inclined type the carbons are held at an angle of 45 deg. with the focal axis. Consequently practically all the light from the positive crater falls on or near the vertex of the reflector *V*, from which it is reflected in parallel

lines, when the arc is at the focal center of the parabolic reflector. This results in a more intense and far-reaching beam of light. The use of a smaller upper, positive carbon is of further advantage, since, for the same amperage, it affords a higher current density at the crater. This increases the candle-power and gives a whiter light for the same quantity of current consumed. In the vertical type, the crater being at an angle of 90 deg. with the focal axis, a smaller percentage of the light falls on the vertex of the reflector, and, consequently, the reflected beam of light is not so intense as it would be were the reflected rays issuing mostly from the vertex of the reflector back of the arc.

It is very important that the position of the arc be so regulated by the trimmer and operator that it casts the incident rays as near the vertex of the reflector as possible. Many manufacturers draw attention to some fixed mark upon the reflector to which the carbons should be trimmed. If a gage is not provided to regulate the distance of the lower carbon from the globe top, each trimmer and motorman should provide himself with one. Attention is drawn to this because motormen frequently complain of a black spot in the center of the area lighted by the headlight. This spot is not caused by the arc wandering, but because the positive crater is out of focus. Properly trimmed carbons will burn in focus for at least half an hour and quite often for an hour, after which the motorman should raise the low carbon to its proper height, when the black spot will not appear on restarting the arc.

HEADLIGHT TROUBLES AND THEIR REMEDIES

Short life, dim or bluish light and globe melting are among the more common troubles experienced in headlight operation. In general, these are quite to be expected as part of the necessary limitations of the lamp. At best, railway service is a severe test on an inclosed arc lamp and one can hardly expect to avoid troubles that would not be tolerated in lamps on circuits maintained for them alone. Headlights are subjected to continual rapid jarring, which makes it difficult to maintain a constant arc length. Uniform inclosure in the case of headlights must not be secured by clamping the globes so rigidly that the constant jarring will cause excessive breakage.

Carhouse conditions are such that it seems impracticable to use the same headlight on the same car each night, yet such a practice would certainly work toward efficiency. The reason for this is because much of the trouble starts with the resistances. Although these are undoubtedly carefully made and tested, the service demanded of them is such that within even a year they are sometimes no longer reliable. Observations at various carhouses have shown it to be a difficult matter to find two resistances that would operate the same lamp properly at 3.5 amps with 75 volts at the arc. The amperage often varies from three to seven, while the voltage reading sometimes differs by 50 volts. That such conditions were due to the resistance was clearly demonstrated by using the test lamps with resistances just received from the factory. These always operated satisfactorily.

When the resistance is such as to allow the lamp to operate at high amperage a shortening of the trim life immediately results. Although it is not a hard and fast rule, it is generally true that if the amperage is doubled the life of a trim will be but one-third to one-half normal. With high amperage low voltage results, and if the arc voltage drops below 65, proper operation of the lamp is all but impossible. In this case the carbons are close together, since the voltage will not maintain the proper arc length and the lower carbon tip obscures the light from the positive crater. The greatest trouble resulting from low voltage is graphitization and mushrooming of the points, accompanied by dim light. The globes are often blackened, and if this condition lasts long enough the carbons unite and the only light is a dull glow at the point where the carbons touch. This extreme condition is seldom realized, the usual condition being the formation of a cup-shaped crater of graphite on the upper carbon, which fits down over a point built up on the lower. With the high amperage to aid it, the arc soon moves to the rim of the crater and burns the carbon behind it, giving rise to an unsteady, constantly breaking arc. This is commonly known as "chasing."

When the conditions are reversed, i. e., the voltage is high and the amperage is low, the light does not have the proper volume or penetrability and is highly tinged with the violet light that is characteristic of high voltage in inclosed arcs. With arc voltages as high as 85 and 95 volts ten minutes generally is sufficient time for the high-voltage flame to crack or melt the globe. With the open arc and conditions so obtained, it is doubtful if a new trim would last for a single night's service. To avoid the excessive blue or violet light and the globe melting the arc voltage should be kept below 80. Quite frequently fresh trims will flame during the first few minutes' burning, but this can be minimized if the lower carbon point has already been burned. This applies to lamps where the stub of the upper is used as the lower on a succeeding trim, when it is recommended that the already burned point be again put in the arc. To prevent the flaming and globe melting which results from jarring and jamming of the parts, it is customary for some manufacturers to recommend that the motormen snap the lights off and on at least once an hour during burning. In the vertical type of lamps the jarring not infrequently drops the upper carbon down on to the lower, resulting in graphitization of the points and globe blackening.

The life of a trim is determined by the amperage at which the arc burns, the degree of inclosure and the uniformity of the carbon. If the amperage is normal and constant and the inclosure is complete and constant it would require an excessive lack of uniformity in the carbons to give poor operating results. If for any reason the globe becomes so broken that open arc conditions prevail, it is doubtful if a trim will last throughout a single night's service. If a very small chip is taken out of the bottom of a globe it will shorten the life more than an equal-sized opening at the top of the globe. In all types of lamps where the gas cap is held in place by a spring, it will be well to recognize the fact that the heat within the reflector soon weakens this spring to such an extent that the inclosure made by the gas cap is not constant and that often a jar will readily shake the globe free from the gas cap. The results of this condition are open arc conditions within the globe and probable interference with the proper feed of the upper carbon. Not infrequently globes have been found which were held so loosely that they could be easily spun around.

When operated under normal conditions inclosed arc headlights are efficient and reliable. They are, however, subject to some limitations, and it has been the object of this paper impartially to lay the proper emphasis on some of them. It is hoped that the facts noted will impress upon users the importance of having their entire headlight equipments in proper operating condition in order to secure efficient service.

Among the prominent English electrical engineers who attended the convention of the Association of the Edison Illuminating Companies at Spring Lake, N. J., Sept. 19-21, were S. Z. de Ferranti, of Sheffield; Charles H. Merz and Arthur Wright, of London, and H. A. Couves, of Newcastle. On the evening of Sept. 29 Samuel Insull, president Commonwealth Edison Company, Chicago, Ill., gave a large dinner in New York at which the English visitors were the guests of honor.

Meeting of the Central Electric Accounting Conference

At This Meeting the Principal Subjects Discussed Were the Report of the Standing Committee on Freight Accounts and Affiliation with the C. E. R. A.

The eighteenth regular meeting of the Central Electric Accounting Conference was held at the Claypool Hotel, Indianapolis, Ind., on Saturday, Sept. 23. The meeting was called to order at 10 a. m. by the president, A. F. Elkins, auditor Columbus, Delaware & Marion Railway.

The report of the committee on freight accounts was the first subject on the program. This report follows:

REPORT OF STANDING COMMITTEE ON FREIGHT ACCOUNTS

"The committee had held two meetings and the subject of interline billing was discussed fully.

"Whereas, The necessity of extending interline billing arrangements in this territory is fully apparent, and in order to make such extension it is deemed necessary to adopt a more uniform way of handling the accounts, therefore be it

"Resolved, That this conference recommend the following:

"FIRST: Forms.

"That conference standard freight forms be adopted and numbered as follows:

"Form 1. Interline waybills, 1/3 = 5 2/3 in. x 14 in.; ½ = 8½ in. x 14 in.; whole = 17 in. x 14 in.

"Form 2. Passing records, 8½ in. x 14 in.

"Form 3. Waybill correction, 8½ in. x 11 in.

"Form 4. Abstract of interline waybills received, 8½ in. x 14 in.

"Form 5. Division sheet, 14 in. x 8½ in.

"Form 6. Statement of differences, 14 in. x 8½ in.

"Form 7. Correction account, 14 in. x 8½ in.

"Form 8. Summary, 8½ in. x 14 in.

"SECOND: Arrangement for Interline Billing with Audit Office Settlements.

"Interline waybills should be used only between such stations and over such lines as have been agreed upon by auditors of the interested carriers.

"Agents at junction stations should be instructed to be careful to ascertain whether audit office settlement has been adopted by all roads interested in interline waybills before passing them. In case unauthorized interline waybills are received junction agents will issue correction, changing destination of waybill to last junction point to which interline billing is in effect, and junction settlement will be made at such corrected waybill destination, connecting line to re-bill to the final destination.

"THIRD: Waybills.—Form of Waybill and Method of Distribution of Copies.

"Form F-1 to be a blanket waybill printed on lightweight manila paper from which five carbons can be made easily at one writing.

"Original waybill to accompany shipment to destination, originating agent to make sufficient copies so that auditor of each road over which shipment moves will receive a copy; such copies to be sent daily through the auditor's office to the originating carrier.

SPECIAL CONDITIONS NOTED ON WAYBILLS

"Separate waybills on regular form to be used for order—notify shipments; making agent should write in full 'order—notify' and, if practicable, use a rubber stamp, instructing destination agent as follows:

" 'The surrender of the original order bill of lading, properly indorsed, shall be required before the delivery of the property.'

"It is recommended that the bills of lading fully accomplished should be forwarded daily to the accounting department with waybill reference plainly indorsed thereon.

"Agents issuing waybills for order shipments should render a report of such waybills daily or weekly to accounting department. A record of order shipments moved on waybills issued by other carriers may be prepared in the accounting department or a separate report thereof may be required of the junction agents.

"These reports of order waybills should be checked by the auditor against accomplished bills of lading sent in to him by the agents.

"FOURTH: Waybill Corrections.

"When errors in billing are found by originating carrier correction on Form 3 shall be issued and copies furnished, through the auditor's office, to auditors of each road over which the shipment was moved, as well as a copy for the destination agent.

"The destination carrier shall be held responsible for the collection of the proper revenue and shall issue waybill corrections, furnishing copies through the auditor's office to the auditors of each road over which the shipment was moved, as well as one copy for the originating agent.

"As foreign roads' tariffs are not on file at small agencies, it is recommended that junction agents of destination carrier be supplied with joint tariffs and be held responsible for proper rates on shipments to stations on the line of their company. When an error is found by such junction agent a change shall be made on the waybill in red ink and the notation 'Corrected at ——— station, ———, 1911, ——— authority of ———,' made on the face of the waybill and signed by the agent making such change. The destination agent will issue correction.

"Agents at important stations will be furnished with such tariffs when possible and when so supplied will be expected also to verify rates on waybills received, both local and interline, covering shipments originating on other lines.

"FIFTH: Abstracts and Division Statements.

"A report on Form 4 of all interline waybills received shall be rendered by the receiving line on or before the fifteenth day of the succeeding month and shall include all waybills received during the month for which the report is rendered; the original report, accompanied by a division statement on Form 5, showing the apportionment of earnings between all lines interested, shall be mailed to the forwarding line and legible copies of such reports and division statements shall be mailed to all intermediate lines interested. The report and division statement as rendered by the receiving line shall be accepted as a basis for settlement and all errors or omissions shall be taken up with the receiving line and adjustment made in the next month's report.

"SIXTH: Statement of Difference and Correction Account.

"Discrepancies discovered by forwarding or intermediate carrier in the abstract or division statements, as rendered, shall be taken up with the receiving carrier in a statement of differences, Form 6.

"The items in the statement, if approved by the receiving carrier, shall be embodied in a correction account, Form 7, which shall also include discrepancies found in the abstracts of division statements, although attention may not have been called thereto by any other carrier.

"Discrepancies in correction accounts shall be handled in the same manner as those in the original statement.

"When the receiving carrier has reported waybills to one

intermediate carrier that should have been reported to another the original settlement thereof shall be made void by correction account and such waybill shall be reported via the proper route in the current abstract.

"Seventh: Summary and Statement.

"A summary (Form 8) of division sheet and correction account should be made by the receiving road to all roads interested. The net balance as shown by summaries should be settled by draft on or after the twenty-fifth day of the following month.

"Eighth: Tracing Unreported Waybills.

"Waybills not reported by the receiving carrier in the current or succeeding month's account should be immediately traced for by the billing carrier, who should attach copies of such waybills, noting thereon the junction passing report reference."

After full discussion it was decided to authorize the committee to have the various blanks printed and distributed to the members in connection with the usual report of the meeting. Final action on the adoption of a uniform system of interline freight billing with uniform blanks was deferred, however, until the next regular meeting of the conference.

As the report of the committee had been successful in promoting discussion on the subject of interline billing, the president was directed to appoint a similar committee on passenger accounts. Both of these committees are to be standing committees. Any member of the conference who wishes to ask questions relating to either passenger or freight accounting will write to the secretary, who will refer the matter to the chairman of the committee concerned for report and action at the ensuing meeting of the conference.

At the conclusion of the morning session those who attended the meeting were entertained at lunch at the Claypool Hotel by the officials of the Terre Haute, Indianapolis & Eastern Traction Company.

Owing to the absence of W. H. Forse, Jr., chairman of the committee on constitution and by-laws, no action was taken on the subject assigned to the committee. The report will be received at the next meeting in December.

OTHER BUSINESS

H. J. Davies, secretary Cleveland Railway, was unable to be present, but forwarded his paper on the subject "Legislation Affecting Electric Railway Accountants." This supplements a paper presented by Mr. Davies on this subject at the meeting of the conference held at Springfield, Ill., on June 24, and published in the Electric Railway Journal of July 1, 1911, page 26. It is probable that the conference will have the complete paper published for the use of the members and others interested.

The work of the committee on uniform comparative statistics was discussed and it developed that it would be impossible for the committee to arrive at a definite plan that would promote the adoption of uniform blanks for general statistics. Each company requires forms especially adapted to its purposes. The committee therefore felt that it should be relieved by the conference of further study of this subject. The committee was discontinued.

Walter Schroyer, chairman of the membership committee, reported that, pending the action of the conference on the proposed affiliation with the Central Electric Railway Association, the committee did not feel justified in soliciting new members. As the subject of affiliation was to be settled at this meeting, the committee was requested to begin an active campaign for membership, soliciting every company in the Central Electric Railway Association. In the past the membership fee has been $5 per year. Under the arrangement for affiliation the representatives of the accounting departments of lines which are members of the Central Electric Railway Association will pay no dues other than those to the railway association. No more representatives of lines that are not members of the railway association will be taken into the Accounting Conference, but those that are already represented in the conference will be continued as members with the same dues as heretofore.

AFFILIATION WITH THE CENTRAL ELECTRIC RAILWAY ASSOCIATION

The final subject on the program was the report of the joint special committee of the association and the conference dealing with the subject of affiliation. This committee consists of H. A. Nicholl, R. A. Crume and M. J. Insull, representing the association, and the following representing the conference: E. L. Kasemeier, L. T. Hixson and J. D. Maynes. This report was adopted and is as follows:

"First—The Central Electric Accounting Conference to be taken in as a whole and become an auxiliary of the Central Electric Railway Association.

"Second—The present members of the conference representing lines not members of the Central Electric Railway Association to pay the present dues. The proportion of expense of the non-member lines above $5 per year to be prorated per member.

"Third—Lines members of the Central Electric Railway Association to pay no additional dues to the Central Electric Railway Association.

"Fourth—No more representatives of non-member lines to be taken into the Accounting Conference.

"Fifth—The Accounting Conference to elect its own officers except the treasurer. The treasurer of the Central Electric Railway Association shall be the treasurer of the Accounting Conference.

"Sixth—The president of the Accounting Conference, or other designated officer thereof, shall represent the conference as a member of the executive committee of the Central Electric Railway Association, provided such officer shall represent a member company of the Central Electric Railway Association."

If the proposed plan of merger is approved by the Central Electric Railway Association, the Accounting Conference, which was organized in 1907 at Dayton, Ohio, will become an auxiliary of the general organization.

The annual meeting of the conference will be held in Toledo, Ohio, on Dec. 16.

ELECTRIC RAILWAY EXHIBIT AT GLASGOW

An unusual feature of the conference of the Municipal Tramways Association, which was to have been held in Glasgow Sept. 27 to Sept. 29, was an exhibition of electric railway appliances for which space was provided in one of the carhouses of the Glasgow Corporation Tramways. James Dalrymple, general manager of the tramways, is also president of the association. Among the exhibits announced are the Ackley no-staff brake, the C-H amp-hour meter, the Titanium Alloy Manufacturing Company's products, Warner non-parallel axle motor truck, Atlas bearing metals, a trackless trolley brake, steel-back brake shoes, various forms of track and overhead line fittings, electric mechanical brakes, etc.

THE ATLANTA CONVENTION SPECIAL

Arrangements have been made for a special train to the coming Atlantic City convention from Atlanta, Ga., and neighboring cities. Special cars have been provided on train No. 38 Southern Railway, leaving Atlanta Oct. 7, 11:00 a. m., and arriving at Atlantic City Sunday noon, Oct. 8. Reservations may be made through P. S. Arkwright, president Georgia Railway & Electric Company, or F. L. Markham, 623 Forsyth Building, Atlanta, Ga. Delegates along the road may join the special train, but it is necessary to apply for reservations as noted.

Questions Involved in New Jersey Regulation

Discussion by Thomas N. McCarter, President of the Public Service Corporation, on Issues Before Board of Public Utility Commissioners Involving Gas and Electric Rates

Thomas N. McCarter, president of the Public Service Corporation of New Jersey, made an address before the New Jersey Board of Public Utility Commissioners at Newark on Sept. 27 in reference to an investigation which the board is making into gas and electric rates. Mr. McCarter took up the questions of recognition of outstanding securities in any plan of rate-making, valuation, depreciation and other subjects of like importance. He said in part:

"While, of course in a small way, the electric industry was pushing its way forward in the decade between 1880 and 1890, the great development of that industry for purposes of light, power and traction took place in the decade from 1890 to 1900. The latter half of that decade was a period of unexampled prosperity the country over in all kinds of business, and the people, flushed with commercial and economic success and inspired by the wonders of the new inventions, entered upon an era of development and of exploitation which, however much it may have been accompanied by evils, has on the whole added greatly to the comfort of living and the convenience of the public.

"This was the picture as it looked at the close of the decade ending with 1900. But another century was dawning and in the early years of its first decade it soon became apparent that all that glittered was not gold; that the laying down of steel rails under legislative authority upon public highways was not of necessity immediately followed by fabulous wealth to the owners of those rails; in short, that the inexorable laws of trade applied to the new business in very much the same way as they did to any other commercial pursuit.

"About 1903 the larger of the street railway systems of the State had become financially embarrassed, and some plan of reorganization was absolutely imperative. The electric properties of the State were in a fair financial condition. Some were sound and some were not. The gas properties were sound but had very largely exhausted their capacity for new capital. As the enormous expenditures for the development of the business, to which I have before referred, had practically exhausted their bond issues, a very serious question was presented as to their future financing. At this juncture Public Service was formed with $10,000,000 of full paid cash capital, without a drop of water in it, to take over and acquire these various properties, by lease or otherwise, to resuscitate the dilapidated railroads, to build up the electric properties and to provide the necessary additional capital for the gas companies. To-day the cash capital of Public Service is $25,000,000 and it has sold $30,000,000 of its bonds, making a total financial investment of $55,000,000, and from the date of its inception to the present date there has not been a drop of water in the entire enterprise.

"The policy of Public Service has been to lower its rates in all branches of its business as rapidly as was possible, and in addition thereto, so far as its gas and electric business is concerned, to establish an absolute uniformity of rate for its commercial business, and this is now so as to both branches of its business throughout the broad territory served, except that in two of the divisions the gas rate is $1 flat, whereas in the other four the rate is $1.10 with 10 cents a thousand discount for payment within a certain number of days. After years of consideration of the matter I am satisfied that this plan of uniformity is of great advantage to the people of the State. Technically it may be open to some objection, but it has been of great assistance in the development of the smaller suburban places whose prosperity is so interwoven with that of the larger cities.

"Furthermore, the problem of Public Service is unique. Most other companies of a similar character furnish one particular municipality, and perhaps its immediate environs, with one or more utility. We furnish 193 municipalities—large and small—with one or more classes of public utility service and most of them with all three.

CAPITAL INVESTMENT

"The capital invested in the business carried on by the Public Service Gas Company as of Dec. 31, 1911, will be approximately $74,000,000. The capital invested in the business carried on by the Public Service Electric Company, as of Dec. 31, 1911, will be approximately $67,250,000. These figures are arrived at respectively by taking the amount of underlying securities upon which each company pays a fixed charge and adding thereto the amount of cash capital of the Public Service Gas Company or electric company, as the case may be, as it will exist at the end of this fiscal year. Where there has been a combination or merger of gas or electric properties into one corporation the proportion of capitalization is generally arrived at by dividing the same in proportion to the gross receipts of that underlying company received from the gas and electric business respectively. This does not vary greatly from two-thirds gas and one-third electricity. As the capital of the gas company as of Dec. 31 next will be $7,950,000 and of the electric company $10,250,000, the underlying capitalization of the gas company is approximately $66,000,000 and of the electric company $57,000,000. The fixed charges of the gas company amount to $3,929,718, thus demonstrating that this underlying capitalization has been obtained at an annual cost of less than 6 per cent. The fixed charges of the electric company are $2,696,146. In this case the underlying capital has been obtained at 4.73 per cent—a most fortunate and reasonable circumstance in each case.

"The next question which presents itself is whether the actual capitalization is the capitalization that the board must recognize in this proceeding. I insist that it is. All these underlying companies, both gas and electric, upon which obligations of rental or otherwise have been assumed by the gas or electric company, as the case may be, were, with only one substantial exception, results of mergers or consolidations expressly authorized by and made in compliance with the so-called merger or consolidation act of New Jersey. The stocks of the old constituent companies were thus by direct authority converted into stocks and bonds of the new consolidated company, the practice generally followed being to provide sufficient bonds in the new consolidated company to take up the underlying bonds at maturity or before of the constituent companies, as well as to provide a quota of bonds for the future financial needs of the consolidated company. These values, thus long ago fixed, are in point of law at this late day immune from attack by the rate-making power or otherwise, and said values thus fixed must now be taken to have been the value of the properties, physical and franchise, tangible and intangible, entering into the respective agreements of merger and consolidation, and thus the State is now estopped from attacking this capitalization. This legal proposition is based on the decision of the Supreme Court of the United States in the New York Consolidated Gas case.

"The stocks of these underlying companies have been issued from twelve to twenty years. They have become scattered far and wide and, as in New York, have been

traded in freely and widely on the faith of their legality. The State through its rate-making power cannot be now heard to attack it. I regard this matter as settled for all time by the decision in the leading case which I have just quoted.

"If the conclusion that as a matter of law the validity of these securities cannot now be questioned is not controlling, then I insist with equal vigor that they should not be questioned by the board in the exercise of its discretion. I can conceive of no greater financial calamity that could happen to the people of this State than drastic action by this board, resulting in the destruction of the temple of Public Service over our heads. The securities to which I have referred are held broadcast over this State. They have passed from the hands of the promoter into the possession of the public. The blow would fall, in the first instance, upon those who have since put in large sums of money, and all—including radicals—agree that the investment of money in these enterprises should be encouraged, and those who make it should receive a fair return on their investment. Secondly, the blow would fall upon those who over a long period of years have invested in good faith in these various underlying stocks; but the end would not be here. I make bold to say that there is not a bank or trust company chartered by this State—except savings banks—that would not be seriously affected by any such unfortunate situation. In short, a state of financial panic would ensue.

VALUATION

"I now direct the attention of the board to the impracticability of making a complete physical valuation of the gas and electric properties connected with Public Service within any reasonable time; to the uselessness of any such appraisement when completed, and therefore to the advisability of arriving at some equitable solution of this problem quickly. I am frank to confess that I do not know what the physical value of these various properties is.

"The complications that would exist in valuing gas and electric properties located in some 193 municipalities, large and small, must be apparent. Assuming that the value as ascertained is less than the capitalized value, the knowledge thus acquired would be purely academic unless made the basis of action that would lead to financial ruin.

FAIR RATE OF RETURNS

"Then there is another aspect of the matter which must not be lost sight of. Having arrived at such a fair valuation of the property, gas and electric, devoted to the public use as would stand the test of review by the courts, the next duty of the board would be to determine the fair rate of return to be allowed thereon. My contention is, and I believe this board will go along with me in the proposition, that not less than 8 per cent on such valuation is just and reasonable. That was the deliberate judgment of the Wisconsin commission in the Madison case, and that, after years of reflection, is my judgment as to the minimum amount to be allowed on a well-established property, if it is to meet the requirements for betterments and extensions that will be put upon it by an increased public demand. If the rate of return is to be limited to a prevailing interest rate, sensible capital will not embark upon such enterprises, but will prefer a bond and mortgage, or a deposit in the savings bank.

EFFECT OF LOWER GAS AND ELECTRIC RATES

"In behalf of the interests which I represent I make the following proposition:

"That a schedule of rates be fixed by the board, effective for five years from Jan. 1, 1912, on a basis that will recognize the obligations of the gas and electric companies as to their respective underlying securities, and which will enable the gas and electric companies to pay annually a dividend of 8 per cent on their actual capital as it will exist from year to year, over the five-year period, after deducting proper reserves for maintenance, as hereinafter referred to, and after further providing a moderate fund for that portion of capital expenditure which business prudence demands should not be capitalized, and which must be made out of earnings to induce new capital to come forward for the balance of the large sum required annually for extensions to meet the growth of territory.

"I have caused to be made, subject to verification by the board, a careful estimate, based on the experience of the past, of the prospective business of both the gas and electric companies for the next five years, and have applied to this statement the foregoing proposition. It contemplates, in the case of the gas company, the putting into operation of a uniform flat rate of $1 as of Jan. 1, 1912, for the whole territory served by the gas company, and on Jan. 1, 1914, the reduction of this base rate to 95 cents and on Jan. 1, 1916, the further reduction of this base rate to 90 cents. On this basis an inspection of the table submitted will show that during this period there will have been accumulated by the gas company over and above dividends of 8 per cent and reserves a surplus of approximately $1,100,000, or an average of $220,000 a year. This sum is a less amount than should be accumulated for the purposes referred to above, as well as for protection against a business depression which seems only too imminent.

"In the case of the electric company it contemplates as of Jan. 1, 1912, the adoption of the same schedule of discounts from the base rate lately put into effect in New York by the Edison Company—which embraces a more liberal schedule of discounts than now in force in this territory. The present Public Service rate steps down 1 cent for every 500 kw-hours of monthly consumption for the first five steps; the New York rate steps down 1 cent for every 250 kw-hours of monthly consumption for the first four steps. In the fourth year of the period, or on Jan. 1, 1915, the base rate is further reduced from 10 cents to 9 cents, thus combining the first two steps of the theretofore existing schedule.

"There will be at the end of five years, if the prognostications as to business are reasonably accurate, a surplus over the 8 per cent dividend and reserves in the electric company of approximately $1,650,000, or an average of $330,000 a year—a sum quite inadequate.

"The subject of a proper reserve for purposes of depreciation, permanent renewals, obsolescence, unforeseen catastrophes and what-not is one that has been forcing itself to the front and engaging the attention of all thoughtful men conversant with public utilities. The fact is it has become a practical necessity for companies to consider the subject. All intelligent bankers now require it as a prerequisite to the purchase of securities. We have for years

PUBLIC SERVICE RAILWAY AND SUBSIDIARY COMPANIES' ESTIMATE OF OPERATIONS, YEARS 1912-1916 INCLUSIVE

Year	Earnings from Operation	Total, Including Miscellaneous Earnings of $25,000 Annually	Oper. Exp. and Taxes, 62 p.c.	Net Earnings	Bond Int., Rentals, etc.	Joint Facility Rent.	Int. on Capital Adv. by Pub. Ser. Corp., 6 p.c.	Total	Balance	Res. under Bankers' Agreement	Balance	†Dividend
1912....	$15,150,623	$15,175,623	$9,408,886	$5,766,737	$4,547,331	$94,313	$346,500	$4,988,144	$778,593	$200,000	$578,593	$566,820
1913....	*15,908,154	15,933,154	9,878,555	6,054,599	4,551,931	124,313	441,550	5,117,794	936,805	266,667	670,138	661,290
1914....	*16,703,562	16,728,562	10,371,708	6,356,854	4,548,531	154,313	541,000	5,243,844	1,113,010	333,334	779,676	755,760
1915....	*17,538,740	17,563,740	10,889,519	6,674,221	4,541,393	184,313	645,518	5,371,518	1,302,997	387,739	915,258	850,230
1916....	*18,415,677	18,440,677	11,433,220	7,007,457	4,534,343	214,313	753,736	5,502,392	1,505,065	500,000	1,005,064	1,039,170

*Annual increase, 5 per cent. †Rate of dividend: In 1912, 1½ per cent; in 1913, 1¾ per cent; in 1914, 2 per cent; in 1915, 2¼ per cent; in 1916, 2¾ per cent.

given this subject a most thorough consideration, and at the time of the first large sale of our general mortgage bonds to bankers the subject was thoroughly considered by the bankers, their experts, Stone & Webster, and by ourselves, and an agreement was reached providing for the gradual accumulation of such a reserve, starting in a small way, but with as large an amount as the company at that time was able to bear and still do its duty to the public and to its stockholders, but increasing annually at certain specific rates, until it reached a maximum of $1,500,000 a year. For the year 1912 the sum we are required to place in the reserve is $600,000, for 1913 it is $800,000, for 1914 it is $1,000,000, and it increases from there on, proportionately with the earnings, up to $1,500,000. In addition to this, commencing in 1913, the corporation is obliged to establish a sinking fund, amounting to $209,500 annually, for the retirement of its general mortgage bonds. This is simply additional reserve in another form.

"We should also feel justified in appealing to the board for protection by way of raise of rates against any action by any other arm of the State government, the effect of which was to make impossible the results herein outlined, such as, for example, any new form of taxation largely in excess of that now in force.

"The rates of the railway company are not here under discussion, but as the railway company is the third constituent member of the corporation family I have thought it wise to insert a prospective statement of the railway company's earnings and expenses for the next five years.

"The corporation is now paying dividends at the rate of 6 per cent per annum. It has been the frank hope of the management that the earnings for 1912 would justify placing the corporation upon a 7 per cent basis, and in 1913 upon an 8 per cent basis, there to remain at least for the early future. Using the results shown in the detailed tables of the three operating companies as a basis, it is apparent that if this plan be adopted these expectations will not be realized, and all that the corporation can hope to do is to continue its 6 per cent dividend in 1912 and the first half of 1913, and thereafter during the period probably pay a 7 per cent dividend, accumulating, in addition thereto, a surplus that in the later years might justify an 8 per cent dividend."

Mr. McCarter then presented a statement showing the prospective financial status of the corporation in the next five years. He added:

"The tables are founded upon the best predictions for the future that we can make, assuming that the country is normal. Financial panics which cause a cessation of increases, such as took place in 1907, are not provided against, nor are strikes nor untoward catastrophes such as in recent years have overtaken Galveston and San Francisco. Those conditions, should they arise, the company would have to meet as best it could, bearing its share of the burden of distress.

NEW CAPITAL REQUIRED

"A great opportunity is here presented for a just and honorable settlement of what otherwise might turn out to be the most dangerous and perplexing problem that has been injected into the public affairs of New Jersey since the days of the civil war. The Public Service Corporation has still left available for improvement some $20,000,000 of bonds. Its supply of bonds will then be exhausted. Future funds for the development of these great properties can come only from three sources—the expenditure of the reserve for construction purposes, the investment of further surplus earnings and additional issues of stock. As the municipalities served by the companies grow larger and larger the amount of money annually needed for improvements will increase. It has already averaged over $6,000,000 a year since the formation of the corporation. If these properties are to extend properly and do their share in the work of state development it must be practicable for the corporation to obtain its necessary funds. To make this reasonably secure, to insure a further investment of cash capital commensurate with the needs of the corporation, which must take the risk of its dividend behind all this mass of capitalization, we must be in the position to offer at least 8 per cent dividends, and in so doing we are only paying the minimum of what money is worth when devoted to these purposes under the circumstances which surround the case.

"This corporation is taking advanced ground upon all the great questions affecting public utilities. From having been unjustly regarded at its inception as a stock-jobbing operation, designed to enrich the few at the expense of many, it has taken its place, I am proud to say, as one of the foremost corporations of its character in the country. By successive raises in wages to the host of its employees it enjoys most cordial relations with its 10,000 workers. Allowing five persons to a family on the average—the usual average in such matters—one person out of every fifty of the total population of this State is dependent upon this corporation for his or her daily sustenance.

"But the corporation has gone further. It has jumped into the front rank of those companies which have inaugurated a system of welfare among their employees.

"The claim is made that we are active in politics. We have been to the extent of self-preservation. Just as long as approximately 10 per cent of the bills introduced into the Legislature at Trenton directly affect the business of this corporation, just so long will the corporation not only be justified but required to defend itself from such attacks by any legitimate means within its power. Two-thirds of the bills to which I have referred have no excuse for their existence other than an attempt on the part of the introducer to pamper to popular clamor or to blackmail the corporation. This board could perform no better work than helping to take the corporation out of politics, and in no way could that work be better started than by a permanent adjustment of the matters here under discussion. If such Utopian condition can be brought about no one will rejoice more than I. The few need to be protected from the clamorous many, as well as the many from the avaricious few."

PRELIMINARY CENSUS REPORT ON POLES PURCHASED IN 1910

The preliminary comparative report on poles purchased during 1910, as issued by the Census Bureau in co-operation with the Forest Service of the Department of Agriculture, shows that of the 3,870,694 poles purchased during 1910, 2,831,810, or 73.2 per cent, were reported by telephone and telegraph companies; 733,092, or 18.9 per cent, by electric railroad, light and power companies; and 305,792, or 7.9 per cent, by steam-railroad companies.

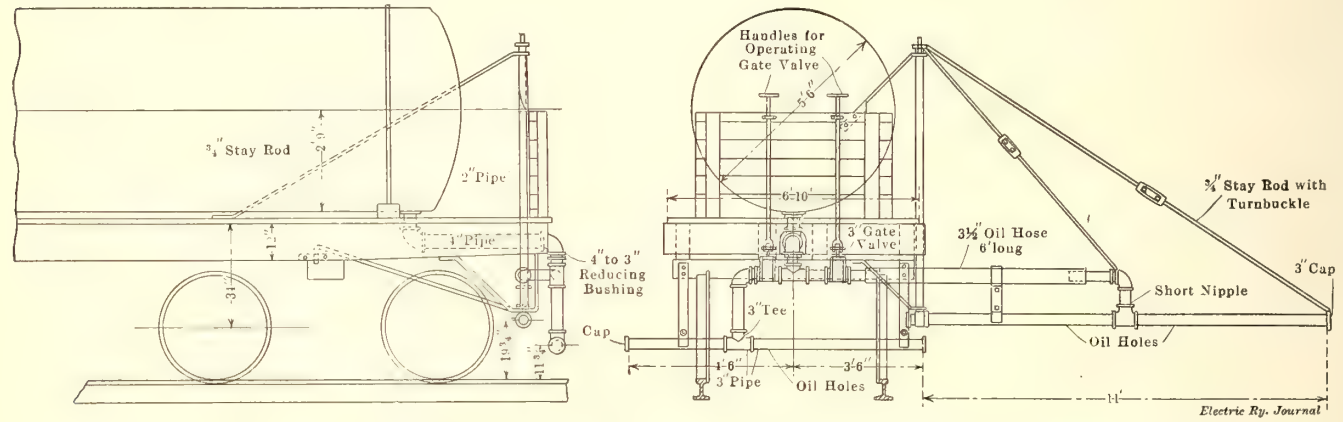
The total number of poles purchased in 1910 by all users of these materials, while greater than the number in 1909 by only 3.5 per cent, exceeded that of 1908 by 19.1 per cent, and of 1907 by 17.9 per cent. The electric railway, light and power companies increased their purchases by 105,678. In 1910, as in each of the three preceding years, more poles were cut from cedar than from all other woods combined. The proportion contributed by this species, however, has been steadily growing smaller, the percentage of cedar poles in the total of 1910 being 62.8, as against 65.3 in 1909, 67.7 in 1908 and 64.2 in 1907 While twenty-eight different woods were reported as drawn upon for pole material during 1910, four species—cedar, chestnut, oak and pine, ranking in the order given—contributed more than 90 per cent of the total during each of the four years covered by the report.

An interesting fact disclosed by the figures is the rapid growth of the practice of treating poles in order to prolong

their period of use. In 1910 824,673 poles, or more than 21 per cent of the total reported purchases for that year, were given some preservative treatment. This number was an increase of 248,042 poles, or 43 per cent over that of 1909; 480,285, or 139.5 per cent over that of 1908; and 428,474, or 108.1 per cent over that of 1907. In 1910 the class of pole users which applied preservatives most extensively was the electric railway, light and power companies.

CAR FOR OILING STREETS

The interurban lines of the Milwaukee Electric Railway & Light Company pass through the streets of a number of small towns and the company has inaugurated the plan of oiling the streets once or twice a year in preference to sprinkling them with water. To do this work a road-oiling car has been designed and built by the maintenance of way department of the company. This car, which is illustrated herewith, carries a 4000-gal. tank for holding road oil. It is equipped with oil-distributing pipes and regulating valves, and is designed so that it will spread the oil a width of 36 ft.

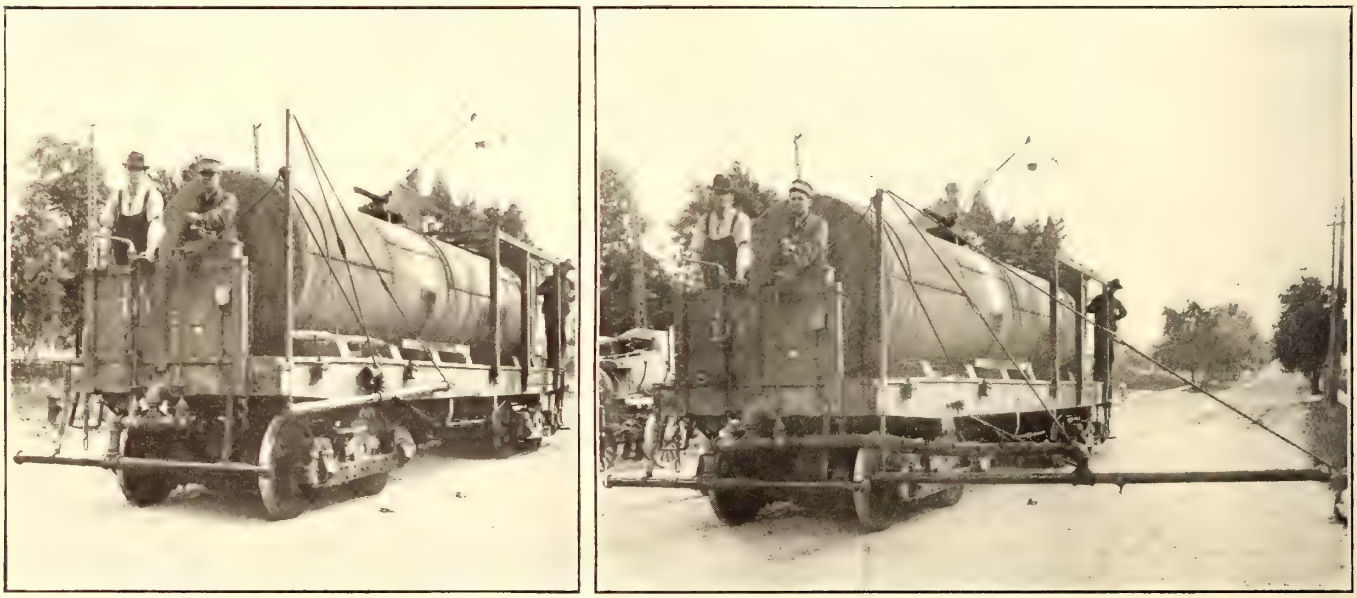


Side and End Elevations of Milwaukee Oil Tank Car

The crew of the oil car consists of a motorman, a trolley man and a valve man. The latter watches the speed of the car and the condition of the highway and regulates the supply valves according to the need of the street surface and speed of the car. Ordinarily the oil is spread with the car moving at about 3 m.p.h. A little over ½ gal. of road oil, at 3 cents a gallon, is used per square yard of street.

The distributing pipes permit the oil to escape through a series of small holes on the under side. These oil holes are graduated in size and spacing, according to the distance from the infeed, so that as the pressure is reduced near the end of the pipe the holes are larger and closer together. Thus an even distribution of oil is secured. The holes in the distributing pipes directly over the track rails are wound with tape. The long pipe supported at the side of the car is hung from a mast arm and is connected with the oil supply through a piece of hose. This pipe is so supported that it can be swung alongside of the car and raised above the truck level to permit operation around sharp curves.

F. G. Simmons, superintendent of construction and maintenance of way, states that no trouble has resulted from slippery rails following the oiling of the streets. As soon as the oil car has covered its streets a sand car follows and both rails are sanded. The line drawing shows the dimensions and piping arrangement at one end of the car.

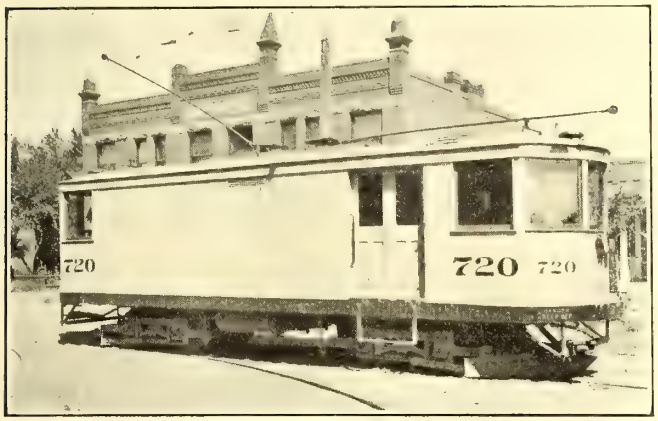


Tank Car with Boom Close to Car and Extended

Oil is taken from the bottom of the large tank through a tee-connection and two valves, one leading to a horizontal distributing pipe directly over the tracks and the other to a distributing pipe supported as a boom and designed to oil the roadway outside of the track space. One engraving shows the distributing pipes as arranged for oiling to the curb line and the other shows them as arranged for oiling only the track space.

NEW UTILITY CARS OF THE DENVER CITY TRAMWAY COMPANY

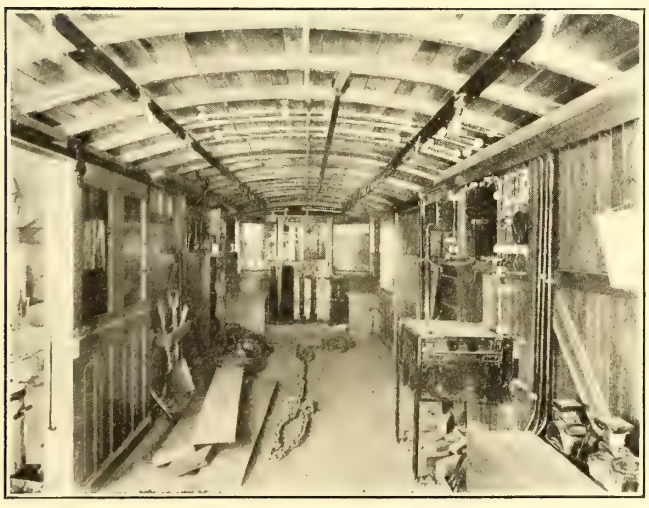
To facilitate the handling of trailers in its different division headquarters and carhouses the Denver City Tramway Company has recently completed the construction of five general utility cars, each of which is equipped with four motors and straight air brakes. The cars were built under the direction of W. H. McAloney, superintendent of rolling stock, and are designed for a maximum speed of about 17 m.p.h. on a level track. Each car is 34 ft. long over all, and the maximum width is 8 ft. 3 in. The underframing is of girder rails reinforced by Oregon pine. The superstructure is also of pine. Each car is provided with two Brill 27-G trucks with steel wheels to secure the maximum tractive effort. The wheel diameter is 30 in. and the axles are 4¼ in. in diameter. The distance between



Denver Utility Car

truck centers is 16 ft. The cars were made as short as was feasible for double-truck service on the Denver track gage, which is 3 ft. 6 in.

Each car is driven by four GE-58 motors, rated at 37½ hp and with gear ratio of 15 to 69. The control of four of the cars is of the General Electric K-6 type, with auxiliary contactor break in the main circuit, the fifth car being equipped with Westinghouse H L control. Plug connections are provided to enable any number of trailers to be supplied with light from each utility car. Each of the



Interior of Denver Utility Car

latter is provided with sixteen 16-cp incandescent lamps installed eight on each side of the interior in a row underneath the deck sill, the headlights being furnished with a 32-cp lamp in each case in series with the interior circuits. Westinghouse straight air-brake equipment with type D-1 EG compressors are used. The main power wiring is installed in conduit with condulet fittings. All the electrical switches with the exception of the circuit breakers and platform controllers are located at one side of the car, and are carried on the wall upon suitable insulating bases. All switches are carefully labeled, and the main switch, which is of 400 amp capacity, air compressor, governor, auxiliary contactor, an aluminum cell lightning arrester, lighting and heating circuit breakers are mounted on the interior of the car.

No vestibule bulkheads are provided, but each end of the utility car is equipped with platform controllers and air-brake valves for double-ended operation. Two US-13 trolley bases and poles are installed on the roof. The height of the trolley base from the rail is 10 ft. 9½ in., and the car floor is carried 40 in. above the rail. Steps 20 in. above the rail are provided on each side. The trolley wheels are 4⅝ in. in diameter, the standard dimension of the company for this service. Each end of the utility equipment is provided with two nose plows and attachments, permitting the use of fenders in case they become necessary. The car is fitted with sand boxes, electric heaters, two roof gongs and an air whistle. The weight of each car complete is 40,000 lb.

The interior equipment includes in each car a supply of jacks, rope, block and tackle, frogs, wedges, track tools, lanterns, torches, brooms, flags and dry-powder extinguishers. Racks are provided for smaller apparatus and supplies, and a locked cabinet is installed for the minor hand tools used. At opposite ends of the car near the vestibules are two side doors of the sliding type, 3 ft. 10 in. wide, and an extra trolley pole is carried below the roof in iron straps. Gay trolley catchers are in service. Ten trailers weighing 13,500 lb. each can easily be handled by each utility car.

TECHNICAL LIBRARIES

At the annual meeting of the Special Libraries Association, held in New York on Sept. 27 and 28, two papers relating to technical libraries were presented.

UNITED GAS IMPROVEMENT COMPANY'S LIBRARY

One, by F. N. Morton, was entitled "Technical Literature Abstracts and Information Bureau Work in the Library of the United Gas Improvement Company." Mr. Morton, before describing his work as librarian of this company, stated that some years ago the company, appreciating that the mass of information contained in the library was buried beyond hope of usefulness, employed an engineer to index the books and particularly the technical periodicals. At the same time a clerk was delegated to index the current periodicals as received.

This arrangement was continued until about eight and a half years ago, when Mr. Morton was transferred from the plant of which he was then superintendent to his present position. He is a graduate of a technical college and has spent seventeen years in serving in all departments of the gas and electric business, both technical and commercial. At first the principal work, it was supposed, would consist in keeping the various officials and heads of departments informed regarding current progress and development in the subjects in which the company is interested. This is done by a system of abstracts. Forty periodicals are read and abstracts are made of all articles of interest or value. The abstracts are mimeographed and are issued at intervals of about ten days. The work of indexing books and periodicals then came logically under the charge of the librarian. A good knowledge of applied science is an essential requirement for proper answers to some of the questions asked. The librarian is always on the lookout for new information, and makes a point of investigating any source that looks at all promising.

LIBRARY OF THE BUREAU OF RAILWAY ECONOMICS

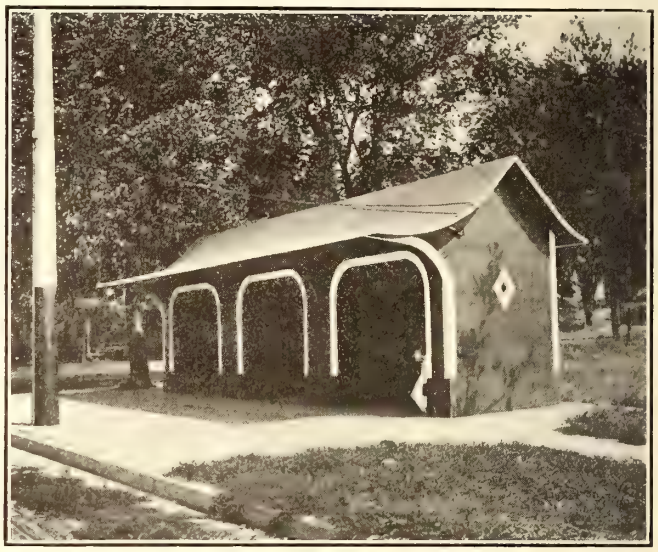
Richard H. Johnston, librarian of the Bureau of Railway Economics, Washington, D. C., read a paper describing this library. The bureau was established by a committee of presidents of steam railways, and represents all the steam railways of the country. It expects to serve as a clearing house of information upon matters of economic interest to the railways. As an adjunct to this work the bureau proposes to build up a complete railroad library, which is to be free of access to the general student of transportation. The necessity for such a library is demonstrated by an inspection of the various collections existing now. The library first obtained information as to the material available in the larger libraries in the United States. The check list now comprises about 20,000 entries, not including articles in periodicals or analytical references to the railway contents of works written primarily on other subjects.

The library keeps on file sets of the principal manuals and complete or partial sets of the most important economic journals. It is also interested in the reports of the various chambers of commerce and boards of trade, whose committees on transportation furnish valuable material relating to railways. The library also has works of general reference and many governmental documents relating to the subject. The bureau has a number of histories of individual railways and a fair collection of annual reports.

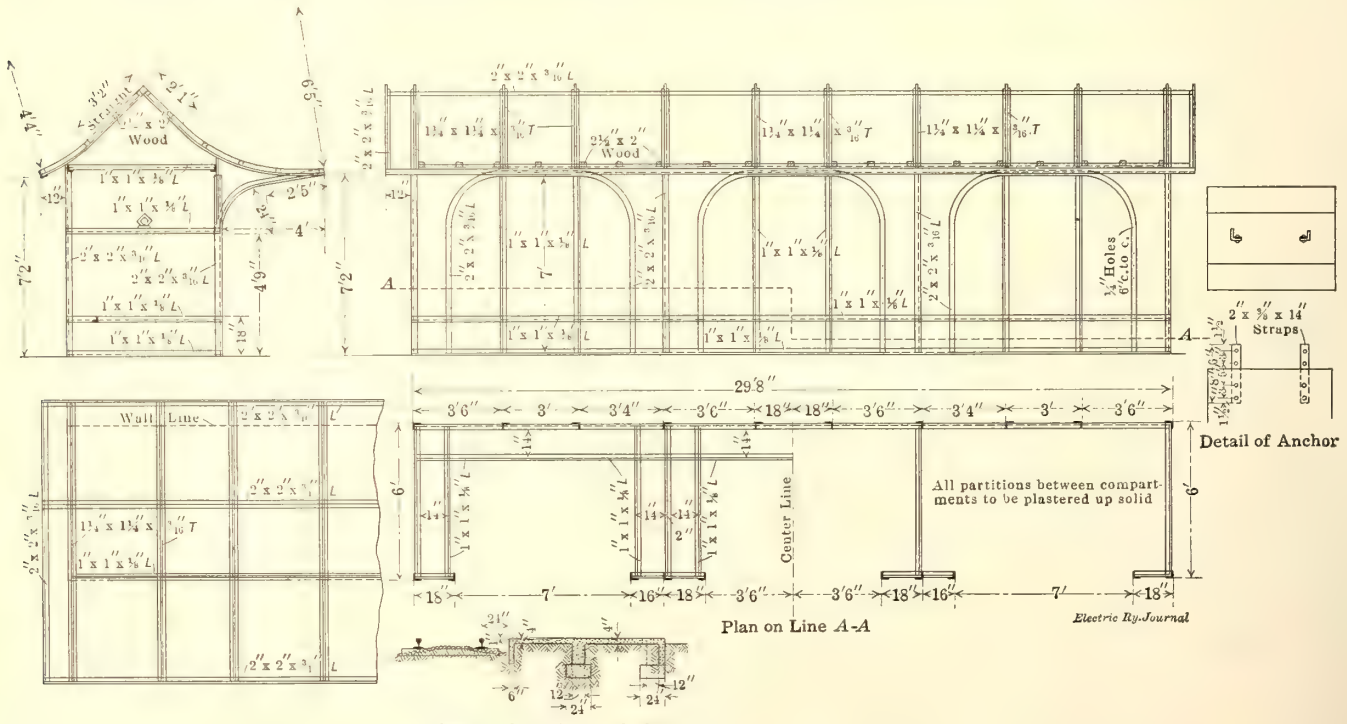
MILWAUKEE SHELTER STATIONS

The way department of the Milwaukee Electric Railway & Light Company, which is under the supervision of Fred G. Simmons, superintendent of construction and maintenance of way, has built along the interurban lines of the company a large number of substantial shelter stations of the design shown in the accompanying illustrations. The stations are made of fireproof materials, having a framework of steel covered with concrete placed on expanded metal lath. Such a station as the one shown in the half-tone engraving costs about $425. Stations of this type are used at points of considerable travel. At the various country road stops on the interurban line a square shelter with "X" walls in the center is erected.

The accompanying line engraving shows the structural-steel framework of the station presented in the half-tone illustration. This station is located at Delafield, on the 1200-volt Watertown interurban division. It consists of three unit sections, each 6 ft. x 10 ft. in floor area and 7 ft. 2 in. high to the eaves. The structural steel work is carried on a substantial concrete foundation with a platform having a smooth finish. All the steel work is covered with concrete except for a height of about 1 ft. around the outside, where the concrete wall has a protecting covering of sheet steel riveted to the structure. The building is painted drab with white trim. The seats along three sides of the interior of each of the three inclosures are 14 in. wide and these consist of concrete supported on expanded metal lath securely anchored to angle-iron framework. Mr. Simmons states that when a large number of these stations are built at one time the unit cost given above can be considerably reduced. This type of station, using only fireproof materials, even though it costs more than a frame structure, is thought to be warranted because it requires practically no maintenance and is not easily defaced.



Milwaukee Shelter Station



Steel Framework for Milwaukee Shelter Station

SIGNALING WITH TRACK TRIP CONTROL

BY W. H. ARKENBURGH

There has been some discussion recently of the desirability and advisability of using track trips in place of track circuits for signaling on interurban electric roads. Opposition to the scheme has come almost entirely from steam road men, as was to be expected. On steam roads there can be no doubt of the necessity for the track circuit. Theory and experience prove that there is no adequate substitute. The reasons for this are not far to seek. The track circuit protects every inch of the track. Any break in the circuit or any obstruction that will produce a shunt between the rails will be detected. Thus, if a train break in two, the portion remaining in the block will cause the signal at the entrance to that block to indicate stop. A broken rail will do the same thing in most cases, unless the break occur between the bond wires at a joint.

Now, a track circuit fed by primary battery is not a very expensive device. An alternating-current track circuit, on the other hand, especially if it includes impedance bonds for carrying the propulsion current around the insulated joints, is extremely expensive. Most steam road track circuits are of the primary battery type. It is true that some roads are using alternating current, but this is done on electrified lines or where foreign current interferes with the proper operation of direct-current circuits. With electric interurban roads the case is different. There is no escape from the alternating-current circuit with impedance bonds. The result is a very serious question of justifiable expense. On such roads, also, trains rarely consist of many cars and there is little danger of a break-in-two going undiscovered by the motorman unless he should be disabled, in which case no amount of signal protection, except automatic stops, would be of use. Aside from "break-in-two" protection the track circuit performs only one function better than a trip actuated by the wheels of a train can be made to do—that is, to warn against broken rails. Even here the track circuit is not infallible.

As already intimated, many cases of broken rails go undetected because either the break occurs at a joint and is bridged by the bond wires, or the ends of the rails make a contact sufficiently good to carry current to the relay. A track trip should be actuated by the wheels of a car and should follow closely the design of the standard instrument that has been on the market for many years; that was, in fact, the predecessor of the track circuit for the control of automatic block signals on steam roads. The most common form consists of a lever, pivoted in a frame which is fastened to one or more ties. The lever is so arranged that one end nearly touches one of the rails of the track, the upper edge being just high enough above the top of the rail to receive a smart blow from the wheels of a passing train. The other end of the lever projects within the frame and actuates a plunger which in turn moves contacts in an electrical circuit. Circuits can be so arranged that, as with track circuits, they will be normally closed. Thus any derangement of circuits will cause a stop signal to be displayed. One trip is placed at the entrance to the block and one an average train length beyond the end of the same block. The instrument at the entrance sets the signal at stop and the other restores the apparatus to normal. Other instruments may be placed at the fouling points of sidings and at other places demanding special protection. The only modification in design needed would be a provision for the display of a stop signal in case of breakage of any part of the instrument. There is no doubt that a trip might become inoperative through failure of the actuating mechanism or from being struck and knocked off its support. A reasonable amount of inspection should, however, detect anything of the kind in time to avert disaster. It should be possible so to design a trip that displacement or failure of any of its parts would cause a stop signal to be displayed. For example, the circuit being normally closed, its integrity might depend on the presence of mercury in a cup which would be overturned in case of damage to the instrument. Therefore, if the managers of interurban roads feel that they can afford to dispense with broken rail protection there is ready at hand a simple and cheap means of controlling automatic block signals. I do not wish to be understood as advocating trips actuated by trolley contacts; it is too easy to beat them.

PUBLIC UTILITIES DISCUSSED AT MUNICIPAL CONGRESS

On Sept. 25 the International Municipal Congress, which has been holding a two weeks' convention and exposition in the Coliseum, Chicago, devoted its afternoon session to the discussion of public utilities. Bion J. Arnold, of Chicago, acted as chairman.

Mr. Arnold opened the meeting with a brief review of the conditions leading up to the establishment of the public utilities commissions now found in many States. The last thirty years, he said, had been a period of rapid advance during which inventors and engineers produced many new ideas which the capitalists had financed and promoted. As a result, franchises had been granted easily and on liberal terms, often having been awarded to competing projects. Later these competing corporations, compelled to combine and absorb by economic conditions, had become monopolies, the privileges of which, as well as the financial management, were sometimes abused. Allowances had not been made for depreciation, and in some cases even maintenance had not been provided for, so that, as the original franchises lapsed, the corporations had found themselves without the means of rehabilitating their badly run-down plants and so heavily capitalized as to preclude their raising additional funds. At about this time public service commissions had been developed, and the problems of regulation have since been undergoing solution in many cities and States. In conclusion Mr. Arnold declared his belief that where a company has been judiciously managed the differences between property value and invested capital, represented by promoter's profit, fees, etc., should also be allowed to earn a fair rate of return for the investors, all over such a fair rate being turned back into an amortization fund to retire the burden of their early costs, so that finally the physical value shall equal the capitalized value of the plant.

E. L. Elliott, editor of the *Illuminating Engineer,* discussed "Public Lighting." A paper by H. M. Byllesby, Chicago, was next read. After reviewing the events of the last quarter century, the accomplishments of engineers and inventors and the undertakings of promoters and capitalists in carrying out these developments, Mr. Byllesby called attention to the decrease in price which the commodities made and sold by public utility corporations had undergone in late years. In many cases, he said, the companies had even extended their services into unproductive fields at a loss. The public and the corporations are fast approaching a common meeting ground and the day of fair dealing between corporations and the public and corporations and the government was at hand. In the public utility commissions the demand of the companies was only for able, experienced men, familiar with utility management and themselves men of some accomplishment. The public would then better realize that the utility corporations should be encouraged rather than strangled and their beneficent monopoly would be protected.

Mr. Arnold then called upon W. D. Norton, formerly assistant secretary for the New York Public Service Commission of the First District. Refuting the claim that commission regulation is expensive, Mr. Norton explained that the body under which he served and which has jurisdiction within the limits of New York City had, beside its other numerous duties, succeeded to the functions of the

former Rapid Transit Commission, an organization with an $800,000 yearly budget and employing an engineering staff of 500. The present budget of the Public Service Commission, little more than $1,000,000, was even less than the expected rate of growth of that of the old transit commission alone. Mr. Norton also spoke of the advantages of uniform accounts and reports.

W. H. Buist, Dundee, Scotland, said that in Great Britain it was a notable fact that the municipal plants were the best managed and most stable and furnish the best service. The Edinburgh railways, he said, under private management, with municipal division of profits, had given much trouble, while the municipally owned Glasgow roads were in a flourishing condition and last year earned $500,000 net profit. Municipally owned utilities in Great Britain, said Mr. Buist, were by their charter required to pay off their capital debts in a limited time.

Mr. Arnold said that thus far in America it was believed that better results could be obtained with private management under regulation. The talent required for efficient management, he said, required something more than merely the usual rate of interest or salary return.

HEARING ON ELEVATED RAILWAY IMPROVEMENTS IN NEW YORK

A hearing was held before Commissioner Eustis, of the Public Service Commission of the First District of New York, Sept. 27, 1911, on the question of improvements in the service of the Interborough Rapid Transit Company in respect to the operation of eight-car trains during the rush hours on the elevated lines of the Manhattan Railway.

H. H. Whitman, counsel for the commission, offered in evidence the order of the commission directing the hearing, with proof of service on the company. James L. Quackenbush, counsel for the company, said that he had no objection to the proceeding, but that he felt obliged to ask for an adjournment of the hearing. The Interborough Rapid Transit Company had been engaged in collecting data upon which to form a conclusion ever since the order had been served, and he had been advised that a conclusion had not been reached. It required time to determine how much work would have to be done in changing the structure and stations to accommodate the longer trains and to ascertain what financial plans would have to be made, as the expenditure of a considerable amount of money was involved.

E. G. Connette, transportation engineer of the commission, testified in regard to observations made on the various elevated lines of the company and to the probable increase in carrying capacity with eight-car trains. He qualified this, however, by stating that the company was running all the trains it could reasonably get over the road. Eight-car trains would not help with the same number of trains in operation, but the same number of cars divided into trains of eight car units would result in better service. To accommodate the longer trains changes would have to be made at terminals and the station platforms would have to be lengthened.

Mr. Quackenbush suggested that he defer asking the witness any questions until he had had an opportunity to look over the minutes. He said that at least a month would be required. Commissioner Eustis said that he would set the hearing for continuation on Sept. 29, 1911, and present the suggestion of an adjournment for a month to the commission. He said further: "This proceeding was brought for the purpose of arriving at a conclusion, and when we bring proceedings of this kind they are brought to carry them to as quick a conclusion as possible. It was time for you to prepare yourselves when you got this order."

Mr. Quackenbush in replying said: "This is not a thing which can be disposed of in the light way that you may think. It requires grave consideration and considerable study, and I had just as soon put all of these things in the form of an affidavit. I did not think that I would be required to do that."

The hearing was adjourned until Friday, Sept. 29, 1911, at 2:30 p. m.

PROGRAM OF THE AMERICAN ASSOCIATION

Secretary Donecker, of the American Electric Railway Association, has issued the following program for the Atlantic City Convention. All sessions will be held at the Greek Temple on the Convention Pier.

Tuesday, Oct. 10, 2 p. m. to 5 p. m. (Open session.)

Convention called to order.

Annual address of the president.

Annual report of the executive committee.

Annual report of the secretary-treasurer.

Announcements.

New business.

Reports of committees: (a) Subjects, (b) active membership, (c) associate membership, (d) public relations, (e) education.

Address—"The Hudson and Manhattan Tunnels," by William G. McAdoo, president Hudson & Manhattan Railroad, New York, N. Y.

Address—"The Effect of Electric Railway Operation on Taxable City Property," by Gen. George H. Harries, second vice-president Washington Railway & Electric Company, Washington, D. C.

Wednesday, Oct. 11, 2 p. m. to 5 p. m. (Executive session.)

Appointment of nominating committee.

Reports of committees: (a) Brill prize, (b) special committees, (c) insurance, (d) welfare of employees.

Address—"Measures for the Welfare of Employees," by D. T. Pierce, New York, N. Y.

Address—"Electric Railway Securities," by James G. Cannon, president Fourth National Bank, New York, N. Y.

Address—"The Interurban," by C. L. Henry, president Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.

Address—"The Toledo Street Railway Situation," by Albion E. Lang, president Toledo Railways & Light Company, Toledo, Ohio.

Thursday, Oct. 12, 2 p. m. to 5 p. m. (Executive session.)

Reports of committees: (a) McGraw Dictionary, (b) compensation for carrying United States mail, (c) taxation matters, (d) federal relations.

Address—"Physical Valuations," by O. T. Crosby, president Wilmington & Philadelphia Traction Company, Wilmington, Del.

Report of the committee on determining the proper basis for rates and fares.

Report of committee on nominations.

Election of officers.

Installation of officers.

Resolutions.

Unfinished business.

Adjournment.

THE INTERNATIONAL ELECTRICAL CONGRESS AT TURIN

The International Electrical Congress recently convened at Turin and completed its sessions Sept. 17. The program for the fifth section of the congress—that is, for the department of railways and electrical propulsion—contained eight papers as follows: "Single-Phase and Three-Phase Traction on Lines of Great Traffic," by Giorgio Calzolari; "Single-Phase Traction vs. High-Tension Direct-Current Traction for Interurban Lines," by F. J. Sprague; "Contract Systems for Electric Railways," by Gustave L'Hoest; "The Application of Electricity to Submarine Boats," by

Agostino Bezzi; "The Electrification of Steam Railroads," by Pietro Lanino; "Interurban Electric Railways with Special Reference to the Use of High-Tension Direct Current," by Guillaume Gyaros; "Distribution Systems for Single-Phase Trunk Lines," by Dr. W. Kummer, and "Electrification of Railways," by C. O. Mailloux. Mr. Mailloux was president of this section.

At one of the early meetings this section approved unanimously the proposition of Mr. Mailloux concerning the measure of the rate of acceleration of trains. The resolution reads as follows :

"WHEREAS, It is the universal practice on railways to express the speed of trains in kilometers per hour (or in miles or versts per hour) ; and,

"WHEREAS, It is logical to use this measure of speed in expressing the acceleration per second; and,

"WHEREAS, This definition of acceleration of trains is the one employed in America and its use is spreading in other countries; and,

"WHEREAS, This proposition has already received favorable action at the International Congress of Electricity held at Marseilles in 1908; now, therefore, be it

"Resolved, (1) That the acceleration of trains ought to be expressed in kilometers per hour per second (or in miles or in versts per hour per second) ; and,

"Resolved, (2) That a copy of this resolution be transmitted to the International Electrotechnical Commission."

TESTS WITH HAND AND AIR BRAKES IN NEW YORK CITY

At the request of the Public Service Commission, First District, New York, the Third Avenue Railroad, New York, made some interesting tests to determine the relative value of hand and air brakes under certain conditions. The experiments were made on Sept. 19 over a piece of practically level track on Bailey Avenue near 216th Street . Two cars were used, one weighing 28,000 lb. and equipped with hand brakes only, the other weighing 38,000 lb. and equipped with air brakes and Peacock hand brakes. Both the air-brake and the hand-brake applications on the second car were made by the same motorman. The results of the tests are shown in the accompanying table.

BRAKING TESTS ON P. A. Y. E. CARS.

Test No.	Speed—M.P.H.	Distance Traveled After Applying Brakes.
Car No. 610—Weight 28,000 Lb.—Hand Brakes.		
1	17.2	137.8 ft.
2	16.9	123.8 ft.
3	16.5	122.6 ft.
4	17.2	114.5 ft.
Average	16.95	124.7
Car No. 876—Weight 38,000 Lb.—Air Brakes.		
1 A	16.6	128.7 ft.
2 A	16.5	*117.4 ft.
3 A	16.4	*105.3 ft.
4 A	17.3	105.2 ft.
Average	16.7	114.2
Car No. 876—Weight 38,000 Lb.—Hand Brakes.		
1 B	17.0	144.1 ft.
2 B	17.6	134.3 ft.
3 B	17.0	128.3 ft.
4 B	17.6	159.8 ft.
Average	17.3	141.6

* Wheels skidded.

It will be noted in the case of the second car that with the hand brakes it was found possible to stop inside of 128.3 ft. when the initial speed was 17 miles per hour. With the use of the air brake the same car was stopped in 105.2 ft. from an initial speed of 17.3 miles per hour. In all cases the distances given in the table were measured from the point reached by the car at the instant that the stop signal was sounded.

Some comments on this test were made by E. G. Connette, transportation engineer of the commission, at a hearing held on Sept. 20 and reported on page 503 of the ELECTRIC RAILWAY JOURNAL for Sept. 23. Mr. Connette said that it was his belief that accidents with cars weighing as much as 38,000 lb. and not equipped with air brakes would be diminished materially if such cars were furnished with a hand brake as efficient as the one used by the Third Avenue Railroad. These braking experiments were conducted for representatives of the commission under the direction of Thomas F. Mullaney, chief engineer, and J. S. McWhirter, superintendent car equipment, Third Avenue Railroad.

SINGLE-END PAY-WITHIN CARS FOR CITY RAILWAY COMPANY, DAYTON

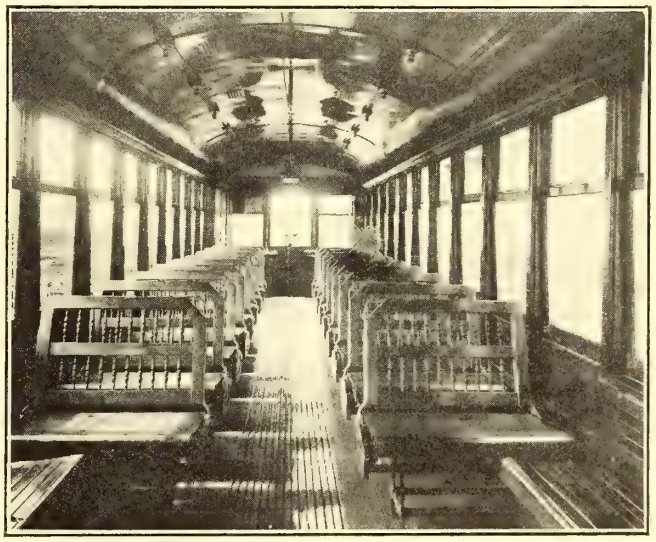
The City Railway Company, Dayton, Ohio, has recently placed in service ten double-truck, single-end, pay-within cars of the design shown in the accompanying exterior and interior views. The cars were built by the Cincinnati Car Company. Their principal dimensions are as follows: Length over the corner posts, 32 ft. ¼ in.; length over the



Arch-Roof Car for Dayton, Ohio

bumpers, 43 ft. 3 in.; length of the platforms, inside of vestibule, 5 ft.; width over the posts, 8 ft.; height from bottom of sill to top of roof, 8 ft. 6 in.; height from rail to underside of sill, 2 ft. 7⅞ in.; truck centers, 23 ft. 6¼ in.; wheel base of trucks, 4 ft. 9 in.; diameter of driver wheels, 34 in. and of pony wheels, 24 in.

The thirteen windows in each side of the car body are divided into two parts. The upper part is stationary and the lower part is arranged to rise straight up 25½ in. be-



Interior of Dayton Car Looking Toward Rear Platform

hind the letter panel. The lower sashes are equipped with Dayton Manufacturing Company's raise sash locks, racks and compression rollers. The sides of the car below the windows are of the concave and convex panel type of construction, with ½-in. yellow poplar panels steam bent to shape. The interior finish is of cherry throughout, with Agosote headlinings 3-16 in. thick.

The roof is of the arch pattern. Each car is ventilated by means of ten ventilators mounted on the roof. The

inside ventilation openings are equipped with Hart & Cooley pressed metal registers measuring 5 in. x 10 in., one under each ventilator. The vestibules at each end of the car are inclosed with three drop sashes in the end and one in the devil-strip side. The opposite side has a pneumatically operated sliding door and folding step of the pay-within type. This door slides into a side pocket. There are no bulkheads at either end of the car.

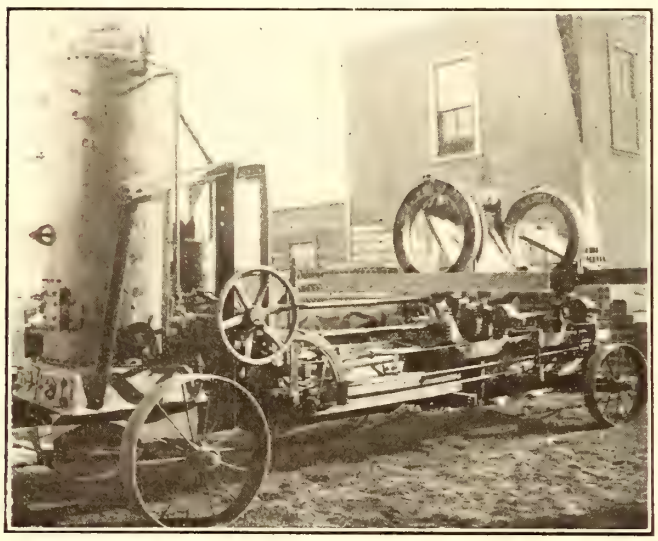
Each car has eighteen cross seats, nine on each side of the car, together with one longitudinal seat in each corner of the car which occupies the space of the two side windows. All seats are of cherry slat construction. The reversible seats are of Haywood Brothers & Wakefield manufacture.

The cars are mounted on two Standard No. O-45 maximum-traction-type trucks each equipped with a Westinghouse No. 306 motor wired for double-end control. The National Brake & Electric Company's straight air brakes are also installed. The weight of the car body, exclusive of body electric and air brake apparatus, is 12,360 lb., and complete, ready to run, 34,500 lb. The special equipment includes Consolidated buzzers, Ohio Brass Company's air sanders, Peacock hand brakes, Cincinnati Car Company's drawbars, National Lock Washer Company's curtains and illustrated herewith.

A POLE-PRESERVING MACHINE

Among the methods which have been tried for pole preservation are the effective but costly pressure treatment of the entire pole and the cheap but less efficient brush or non-pressure treatments. Since poles decay almost exclusively at the ground line, the problem of their preservation is confined practically to finding an inexpensive yet satisfactory method of treating that portion of the pole which is near the ground line. Working on this basis, George P. Benton and I. B. Eberhardt, of Chicago, have invented the "B. & E." pole-preserving machine, which is described herewith.

A demonstration of this machine was made on Sept. 20 in the pole yard of one of the largest public utility cor-



Pole-Preserving Machine

porations of Chicago. About a dozen representatives were present from the United States Forest Service and from several of the leading electric utility companies of Chicago and other cities. Three 35-ft. Michigan cedar poles cut last winter were treated seven, ten and fifteen minutes, respectively with heated creosote oil which was injected by an air pressure of about 5 lb. per square inch into a 3-ft. band corresponding to the ground belt of the pole. With the ten-minute treatment an initial penetration of 3/16 in. was obtained and this extended in a few days to a depth of over ½ in. In the ten-minute treatment the pole absorbed a full gallon of oil in the 3-ft. band that was subjected to the treatment.

The accompanying illustrations of the machine are from photographs taken during the tests. The machine is about 19 ft. long and 6 ft. wide. It is mounted on wheels so



Pole-Preserving Machine in Service

that it may be easily hauled about to various positions in the pole yard or taken from yard to yard. The main parts are as follows: Steam boiler, air compressor and storage tank, closed oil tank containing steam coils for heating the preserving oil, 3-ft. wide air-tight canvas band, which incases the pole at the zone to be treated, together with the necessary gearing and mechanism to pass this band about the pole and tighten it. If a large number of poles are to be treated, a platform is built on either side of the machine or the latter is placed in a trench so as to have the iron skids level with the ground; a simpler plan is to place inclined skids on each side of the machine and roll the poles up on them.

The operation of the machine is quite simple. The pole is rolled onto the iron skids. The two segmental rings called track rings are closed about the pole by turning a hand-wheel. The spool carrying the canvas band is then revolved about the pole by an opposite movement of the handle. A clamping bar is wedged against the band so that the latter forms a closed bag or cylinder around the pole. Air pressure is applied to the edges of the band to tighten it and the compressed air is allowed to enter above the oil in the tank, thus forcing the heated oil through a pipe connection into the bag and entirely around the pole for any desired length of time. Any oil which oozes out of the bag, as for instance through checks in the pole, drops into a basin on top of the tank, into which it is later drained by opening a drip valve. Thus no oil is wasted by spilling on the ground nor by treating more than that part of the pole that is subject to decay while in service. By means of the reverse operations the pole is released and then rolled off the other side of the machine. The entire operation takes only a few minutes beyond that required for actually subjecting the pole to the oil.

Any kind of coal-tar oil favored by the user may be employed for a preservative. The capacity of the machine is about fifty poles a day for poles from 7 in. to 24 in. in diameter. The cost of treatment, which includes labor, oil, fuel and fixed charges on the apparatus, is only a fraction of a dollar for a 7-in. top, 35-ft. pole. The machine is manufactured by the B. & E. Pole-Preserving Machine Company, Chicago. This company can also furnish treated poles from Chicago.

News of Electric Railways

Judge Grosscup Not to Resign

Judge Peter S. Grosscup, of the United States Circuit Court of Appeals at Chicago, announced on Sept. 21, 1911, that he would not send his resignation to President Taft early in October as he had planned. Judge Grosscup issued this statement:

"If any responsible magazine comes forward and says it has an article about me intended for publication, if any responsible government official comes forward and says that a government investigation of me is pending, or if any responsible man comes forward and says that he knows of anything that is pending, I will not resign. Full opportunity will be given any of these to come forward and present the matter so that I can meet it as a circuit court judge and not as an individual. I still am a circuit court judge and may hold on to the office. If any attempt is made to make the community believe that I am resigning under pressure or for any other reasons than the ones I have stated, I will not resign."

Judge Grosscup is also reported to have said:

"I shall ask that a committee, composed of reputable men, be appointed to make a thorough investigation of my career and business transactions. I want this committee particularly to investigate my connection with the Union Traction Company, Chicago, and the Chicago & Milwaukee Electric Railroad."

Laurence Ritchie, who is reported to have been engaged for more than a year in inquiring into the act of Judge Grosscup to obtain material for a magazine article, is quoted as follows:

"I wish to say that at no time while I was investigating Judge Grosscup was I connected with the United States government in any capacity, or with any federal department. I took up this work for an Eastern magazine and represented it throughout the investigation. What information and data I gathered are now the property of that publication. I resigned from the United States secret service about Aug. 22, 1909, when I became connected with that publication. My resignation was sent to the Secretary of the Treasury and no doubt can be found in the records of that department. I have at all times during my investigation of Judge Grosscup taken a neutral stand. I am in no way interested in his resignation and can take no part in the present controversy. My work on this matter was an open investigation; I made no secret of it."

New York Central Railroad to Put Its New York Waterfront Tracks Underground

The New York Central & Hudson River Railroad laid before the Board of Estimate in New York on Sept. 28, 1911, a comprehensive plan for its freight tracks along Riverside Drive and Eleventh and Tenth Avenues, New York. It provided for placing the tracks under ground from Spuyten Duyvil to its yards at the end of Riverside Drive, and their elevation from Sixtieth Street to Cortlandt Street and their operation by electricity. In addition development was suggested of its yards between Thirty-first and Thirty-seventh Streets and at St. John's Park. The entire cost of this improvement, it is reckoned by the company, would be $65,000,000, of which $43,000,000 would be spent at once. The company is asking in return for its outlay a perpetual franchise to such extensions and tracks as it does not now possess, a six instead of two or four-track line along Riverside Drive and a four-track line down the marginal way as far as Cortlandt Street instead of its present two-track surface road to St. John's Park, which can be operated only with great difficulty. The section of the New York Central's tracks involved begins at Spuyten Duyvil. There they cross the Harlem River at the present time on a two-track drawbridge. This is now quite sufficient for the needs of the traffic, but the new plans provide for the construction of a tunnel under the Harlem at some future time, if that should be found advantageous on account of the increase of the traffic.

Tax Value of Ohio Railways Fixed

The Ohio State Tax Commission completed its work of appraising the interurban and suburban railways on Sept. 19, 1911. On account of a request for further hearings the valuation of the property of the Toledo Railways & Light Company was omitted. The aggregate value of these properties, as fixed by the commission, is $115,482,227, as compared with $30,382,927 for 1910, an increase of $95,099,300. The commission has adopted a factor of computation to be used in the valuation of all properties under which the value of each road is fixed on the basis of its earning capacity. The commission argues that under this plan the results are in proportion to the total value of the properties. Many railway officials hold that the factor adopted is too high. The following table shows the valuations for 1910 and for 1911 of the principal companies in the State:

	1910	1911
Ashtabula Rapid Transit Company	$45,230	$225,208
Chillicothe Railroad, Light & Power Company	36,915	132,020
Cincinnati, Lawrenceburg & Aurora Street Railroad	121,930	379,050
Cincinnati, Newport & Covington	150,300	360,000
Cincinnati Traction Company	2,883,000	18,123,416
Cincinnati, Milford & Loveland Traction Company	162,509	404,060
Cincinnati & Columbus Traction Company	224,730	505,847
City Railway, Dayton	622,550	2,342,918
Cleveland, Painesville & Eastern	267,174	1,478,525
Cleveland & Eastern	263,090	577,573
Cleveland, Painesville & Ashtabula	137,853	469,635
Cleveland, Southwestern & Columbus	975,026	3,432,536
Cleveland Railway	7,964,800	18,465,140
Cleveland, Youngstown & Eastern	147,514	368,859
Columbus, Delaware & Marion	321,465	1,255,027
Columbus, Marion & Bucyrus	45,012	154,800
Columbus, New Albany & Johnstown Traction Company	74,896	113,729
Columbus Railway & Light Company	2,671,540	7,921,979
Dayton, Covington & Piqua Traction Company	128,759	418,310
Dayton & Troy Electric Railway Company	217,178	900,463
Dayton, Springfield & Xenia Southern Railway	121,032	375,000
Dayton Street Railway	97,890	329,830
Detroit, Monroe & Toledo Short Line	30,531	82,219
East Liverpool Traction & Light Company	209,110	1,585,679
Interurban Railway & Terminal Company	340,338	828,205
Lake Erie, Bowling Green & Napoleon	59,026	185,000
Lake Shore Electric Railway	972,504	3,890,867
Lorain Street Railroad	117,295	688,784
Mahoning Valley Railway	464,955	2,663,682
Mansfield Railway, Light & Power Company	105,768	787,227
Maumee Valley Railway & Light Company	74,375	308,080
Northern Ohio Traction & Light	1,496,782	9,617,701
Oakwood Street Railway	97,680	500,000
Ohio Electric Railway	2,899,375	12,570,022
Ohio Traction Company (operating Cincinnati-Hamilton Traction Company)	241,986	699,927
Ohio Valley Electric Railway	88,078	196,700
Parkersburg, Marietta & Interurban Railway	136,572	447,502
Pennsylvania & Ohio Railway	79,245	364,509
People's Railway Company, Dayton, Ohio	343,820	1,534,599
Portsmouth Street Railway & Light Company	262,746	841,683
Scioto Valley Traction Company	478,300	1,569,062
Springfield Railway	300,000	913,853
Stark Electric Railroad	232,053	1,142,356
Steubenville & East Liverpool Railroad & Light Company	206,000	1,126,589
Steubenville & Wheeling Traction Company	81,050	403,293
Springfield, Troy & Piqua Railway	115,770	328,260
Toledo, Fostoria & Findlay Railway	162,176	754,960
Toledo & Indiana Railway	304,575	876,609
Toledo, Port Clinton & Lakeside Railway	248,199	728,790
Toledo & Western Railroad	313,528	921,547
Toledo, Bowling Green & Southern	352,510	1,415,046
Western Ohio Railroad	59,663	2,219,144
Youngstown & Sharon Street Railway	90,933	574,853
Youngstown & Ohio River Railway, including Salem Street Railway	166,511	819,451
Youngstown & Southern Railway	113,300	625,856
Grand total	$30,382,927	$115,482,227

Chicago Subway Commission

At the first fall meeting of the Chicago City Council on Sept. 25, 1911, Mayor Harrison sent to the Council a proposed ordinance formally establishing the subway commission and defining its duties. The ordinance was referred to the committee on local transportation. The members of the present commission are City Engineer John Ericson, E. C. Shankland and James J. Reynolds. Mayor Harrison is expected to reappoint the present commissioners to the permanent body. The commission was appointed to make a preliminary study of the subway problem and to prepare plans for a system for Chicago. The members have just returned to Chicago from an inspection of subways in Eastern cities. The proposed ordinance provides:

Establishment of a subway commission of three members, one of whom is to be the city engineer.

Commission to have complete charge and control of designing, constructing and maintaining a subway system, subject only to supervision of the Mayor.

City Council to select routes.

No construction work to be undertaken until the routes have been prescribed.

Commission to have complete control of the location of water mains, gas mains, tunnels, conduits and all other underground work, which must be moved to make way for the subway.

The commission to maintain an office, employ engineers, architects, draftsmen and other assistants and buy such supplies and materials as are needed.

New Boston Power Plant Inspected.—By invitation of the Stone & Webster Engineering Corporation a party composed largely of Boston bankers inspected the new power house of the Boston Elevated Railway recently. At this station current will be generated at 13,200 volts, to be transmitted to a number of substations. The work is being done by the Stone & Webster Engineering Corporation.

Electrification at Montreal.—At the meeting of the Board of Control of Montreal, Que., recently, City Attorney Archambault submitted a statement that Chief Engineer Janin was studying plans to replace steam locomotives with electric locomotives on trains entering and leaving the city. As soon as the report of Mr. Janin is received the matter will be taken up with the Railroad Commission with a view to obtaining the opinion of that body.

Opportunity for American Manufacturers.—The representative of a foreign government, who is now in the United States, writes to the Bureau of Manufactures that a municipality in his home country, having with its suburbs a population of about 100,000, has decided to build electric tramways and to establish an electric lighting system. Further particulars can be obtained by interested American manufacturers by addressing the municipal officers and referring to the Daily Consular Reports, No. 7303, page 1104.

Opinion Divided over Municipal Ownership in Winnipeg.—Wide difference of opinion exists in the Council of Winnipeg, Man., over the terms of purchase of the property of the Winnipeg Electric Railway by the city for $24,000,000. At a meeting of the Council on Sept. 25, 1911, a motion to employ experts to go into earnings and valuations of the properties involved was adopted by the deciding vote of the Mayor. Two members of the special committee, appointed previously to conduct the negotiations, have resigned.

Petition of Groton & Stonington Street Railway Approved.—The Public Utility Commission of Connecticut has approved the petition of the Groton & Stonington Street Railroad, Mystic, Conn., in regard to methods of construction in Mystic. The commission says in its opinion: "We also order and direct that all trolley wires be suspended not less than 18 ft. above the surface of the highways, and that all double-truck cars used in transportation of passengers be equipped with some effective system of power brakes."

Joint Board to Consider Plans of Boston & Eastern Railroad.—The organization of the joint board to consider the plans of the Boston & Eastern Railroad for a tunnel between East Boston and its proposed terminal near Post Office Square in Boston has been perfected, with George G. Crocker as chairman and James B. Noyes as secretary. Both Mr. Crocker and Mr. Noyes are members of the Boston Transit Commission, which, together with the Railroad Commission and members of a board established in 1910 to investigate the whole subject of tunnels under Atlantic Avenue and the harbor, constitutes the joint board.

Terms of Detroit Settlement.—Under the new agreement between the Detroit (Mich.) United Railway and its employees the men will receive 23 cents an hour for the first six months, 27½ cents for the next twelve months and 29½ cents after eighteen months' service. The old scale provided for 23 cents an hour for the first six months, 26 cents for the next twelve months and 28 cents after eighteen months' service. The original request of the men was for 24 cents, 28 cents and 30 cents an hour respectively for the periods mentioned. For four months the men will be subject to call during thirteen hours for nine hours of work. At the end of the four months it will be decided whether the time can be reduced to twelve and one-half hours and maintain the schedule.

Proposal for Joint Use of Seattle, Renton & Southern Railway.—In the Electric Railway Journal of Sept. 23, 1911, page 508, mention was made of the ordinance introduced in the City Council of Seattle, Wash., which provides for the purchase under condemnation by the city of the property of the Seattle, Renton & Southern Railway in the city proper. Following the introduction of this measure W. H. Crawford, president and general manager of the company, submitted a proposition to the city for the joint use of the line by the city, ownership to remain in the company. The city has voted to issue bonds for the construction of a municipal railway from Renton to Salmon Bay, and it is proposed to make the Seattle, Renton & Southern Railway a part of the city's line.

Personnel of Pacific Electric Railway.—Under the consolidation of the Pacific Electric Railway, Los Angeles Inter-Urban Railway, Los Angeles Pacific Company, Los Angeles & Redondo Railway, San Bernardino Valley Traction Company, Redlands Central Railway, San Bernardino Inter-Urban Railway and Riverside & Arlington Railway, effective on Sept. 1, 1911, the operating organization of the new company, the Pacific Electric Railway, is as follows: Southern Division—W. T. Maddex, superintendent; O. P. Davis, assistant superintendent. Northern Division—J. C. McPherson, superintendent; F. L. Annabe, assistant superintendent. Western Division—W. C. White, superintendent; H. E. Rodenhouse, assistant superintendent. San Bernardino Division—A. B. Merrihew, superintendent; W. E. Erwin, assistant superintendent. Riverside Division—M. P. Groftholdt, superintendent. Other officers of the operating department of the former Pacific Electric Railway continue with like jurisdiction in like positions under the new company.

The Steinway Tunnel.—W. R. Willcox, chairman of the Public Service Commission of the First District of New York, at the meeting of the commission on Sept. 22, 1911, in replying to an inquiry by J. Sergeant Cram, of the commission, in regard to the Steinway tunnel to Long Island City stated that the board had always been in favor of the opening of the tunnel but that the Board of Estimate had not accepted the original terms arranged between the commission and the Interborough Rapid Transit Company. Mr. Willcox went on to explain that negotiations, which have been restarted, were progressing satisfactorily and that there was every prospect that at further conferences some agreement would be reached. Heretofore the Interborough Rapid Transit Company has refused to operate the tunnel except on the condition that the city buy it at its actual cost of construction, somewhere around $7,500,000. The commission was willing to agree to this proposition but the Board of Estimate refused to give its sanction.

Responsibility for Bridge Maintenance Defined.—The Board of Public Utility Commissioners has settled differences between the Trenton & Mercer County Traction Corporation and the Trenton Water Power Company regarding the maintenance of a bridge at Market Street, by deciding that the responsibility rests in a measure upon each corporation. It holds that the Trenton Water Power Company is obliged to maintain a safe structure and that the electric railway company must keep in good repair the space between its tracks and a distance of 3 ft. on either side of them. The attention of the board being called to the unsafe condition of the bridge, an investigation was made, as a result of which several recommendations were submitted to the Trenton & Mercer County Traction Corporation. One of these recommendations which was agreed to was that no car operated over the bridge should exceed a loaded weight of 20 tons. In respect to the other recommendation, the Trenton & Mercer County Traction Corporation alleged that it was the duty of the Trenton Water Power Company to maintain the bridge. The water power company denied the jurisdiction of the board upon the ground that it was not a public utility within the meaning of the act. The board decided otherwise and assumed jurisdiction.

Financial and Corporate

New York Stock and Money Markets

September 27.

Trading in Wall Street throughout the week was led by activity in the Steel shares. Strong rumors of either government suit against the Steel Corporation or its voluntary dissolution were followed by declines of both preferred and common shares to the lowest prices for the year. Trading on Tuesday was marked by general losses throughout the list. Total sales on Monday, Tuesday and Wednesday passed the million mark, the record for to-day being 1,683,729 shares. Rates in the money market are unchanged. Quotations to-day were: Call, 2⅛@2½ per cent; ninety days, 3½@3¾ per cent.

Other Markets

Boston issues opened at slight advances to-day, but declined early in the trading. Steel and Amalgamated Copper were the features of interest.

The Philadelphia market has been rather dull, and prices have not followed the trend of the New York market as closely as have those in other cities.

Chicago prices have dropped in the widespread decline, but a better tone was in evidence to-day and most of the active issues closed at higher prices than on Tuesday.

Quietness prevails on the Baltimore Exchange, and while a demand for investment securities is apparent, there is only very little business being done.

Quotations of traction and manufacturing securities as compared with last week follow:

	Sept. 20.	Sept. 26.
American Light & Traction Company (common)	a298	a290
American Light & Traction Company (preferred)	a107	a106
American Railways Company	a44	a44
Aurora, Elgin & Chicago Railroad (common)	a43½	a42½
Aurora, Elgin & Chicago Railroad (preferred)	a87	a87
Boston Elevated Railway	a127¾	a125
Boston Suburban Electric Companies (common)	a14	a14
Boston Suburban Electric Companies (preferred)	a75	a75
Boston & Worcester Electric Companies (common)	a12	a12
Boston & Worcester Electric Companies (preferred)	a51	a51
Brooklyn Rapid Transit Company	73¼	a72⅝
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	84	83
Capital Traction Company, Washington	a130	a130
Chicago City Railway	a190	a180
Chicago & Oak Park Elevated Railroad (common)	a3	a3
Chicago & Oak Park Elevated Railroad (preferred)	a6	a6
Chicago Railways, ptcptg., ctf. 1	a95	a95
Chicago Railways, ptcptg., ctf. 2	a30	a27
Chicago Railways, ptcptg., ctf. 3	a10½	a10
Chicago Railways, ptcptg., ctf. 4	a6	a6½
Cincinnati Street Railway	a132	*132
Cleveland Railway	a100	a99½
Columbus Railway (common)	a83	*83
Consolidated Traction of New Jersey	a75	a75
Consolidated Traction of N. J., 5 per cent bonds	a104	a104
Dayton Street Railway (common)	a25	a25
Dayton Street Railway (preferred)	a101	a101
Detroit United Railway	a70	a70
General Electric Company	149	146
Georgia Railway & Electric Company (common)	a158	a158
Georgia Railway & Electric Company (preferred)	a93½	a93
Interborough Metropolitan Company (common)	13¾	13⅝
Interborough Metropolitan Company (preferred)	41¼	40⅜
Interborough Metropolitan Company (4½s)	78½	77½
Kansas City Railway & Light Company (common)	a18	a19
Kansas City Railway & Light Company (preferred)	42	a42
Manhattan Railway	137	132
Massachusetts Electric Companies (common)	a17	a17
Massachusetts Electric Companies (preferred)	a88¼	a87¼
Metropolitan West Side, Chicago (common)	*27	*27
Metropolitan West Side, Chicago (preferred)	*75	*75
Metropolitan Street Railway, New York	15	*15
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	65½	65
Northern Ohio Light & Traction Company	a57	*57
Northwestern Elevated Railroad (common)	*30	*30
Northwestern Elevated Railroad (preferred)	*70	*70
Philadelphia Company, Pittsburgh (common)	a50	49
Philadelphia Company, Pittsburgh (preferred)	42½	42
Philadelphia Rapid Transit Company	a21¾	21
Philadelphia Traction Company	82	83
Public Service Corporation, 5% col. notes (1913)	*94	*94
Public Service Corporation, ctfs.	a104	a103
Seattle Electric Company (common)	a110	a110
Seattle Electric Company (preferred)	a101	a100
South Side Elevated Railroad (Chicago)	*95¼	a95½
Third Avenue Railroad, New York	8½	7⅝
Toledo Railways & Light Company	6½	6½
Twin City Rapid Transit, Minneapolis (common)	a106¾	*106¾
Union Traction Company, Philadelphia	a49½	48¾
United Ry. & Electric Company (Baltimore)	17¾	*17¾
United Rys. Inv. Co. (common)	29	29
United Rys. Inv. Co. (preferred)	56	53½
Washington Ry. & Electric Company (common)	a43½	a41
Washington Ry. & Electric Company (preferred)	a89	a89
West End Street Railway, Boston (common)	a87	a85½
West End Street Railway, Boston (preferred)	a101½	a100½
Westinghouse Elec. & Mfg. Co.	60⅝	60¾
Westinghouse Elec. & Mfg. Co. (1st pref.)	a118	a118

aAsked. *Last sale.

Alton, Jacksonville & Peoria Railway, Alton, Ill.—Judge W. E. Hadley, of the United States Circuit Court at Edwardsville, Ill., has appointed Frank L. Butler, Alton, Ill., receiver of the Alton, Jacksonville & Peoria Railway on the application of E. M. Davis and A. J. Davis, majority stockholders.

Berkshire Street Railway, Pittsfield, Mass.—The Berkshire Street Railway has petitioned the Railroad Commission of Massachusetts for authority to issue 49,000 shares of additional capital stock of the par value of $100 per share. The proceeds of the issue will be used to retire the company's floating indebtedness and for further additions and improvements to the company's property.

Boston (Mass.) Elevated Railway.—A meeting of the stockholders of the Boston Elevated Railway has been called for Sept. 29, 1911, to vote to authorize an issue of negotiable bonds not to exceed $5,000,000, the proceeds to be used for construction and equipment and to purchase such property as may be necessary and to pay any debts of the corporation.

Columbus Railway & Light Company, Columbus, Ohio.—The committee which is investigating the relations between the Columbus Railway & Light Company and the Columbus Railway did not have its report ready on Sept. 25, 1911, the date fixed for the adjourned meeting, and was expected to ask for thirty days more to finish its work. This investigation covers eight years and includes an examination of the physical property made by experts. The Columbus Railway owes the Columbus Railway & Light Company $115,000 for improvements, and it is to finance this debt and make other improvements that additional capital is asked.

Ft. Dodge, Des Moines & Southern Railroad, Boone, Ia.—Judge Smith McPherson, of the District Court of the United States for the Southern District of Iowa, has authorized the receivers of the Ft. Dodge, Des Moines & Southern Railroad to issue $720,000 of receivers' certificates. Of this amount $500,000 will be used to take up receivers' certificates issued on March 20, 1911, and the remaining $220,000 is to be spent for improvements.

Interborough Rapid Transit Company, New York, N. Y.—A hearing was held on Sept. 25, 1911, before the Public Service Commission of the First District of New York on the application of the Interborough Rapid Transit Company to issue bonds to the value of $11,400,000 under the mortgage of the company, dated Nov. 1, 1907, for $55,000,000. The company submitted evidence to show that it is desired to use the proceeds of $10,000,000 of the bonds to liquidate notes and $1,400,000 to install side doors on local trains, purchase additional machinery for the main power station and make other improvements. The hearing was adjourned until Oct. 4, 1911.

Montgomery County Rapid Transit Company, Norristown, Pa.—The property of the Montgomery County Rapid Transit Company was sold under foreclosure at Norristown on Sept. 21, 1911, for $75,000 to a representative of the committee of bondholders.

Montreal (Que.) Street Railway.—The Canadian Railway Commission is to be asked to recommend the Governor in Council to sanction an agreement for the sale of the entire property of the Montreal Park & Island Railway to the Montreal Street Railway.

Pacific Electric Railway, Los Angeles, Cal.—A meeting of the stockholders of the Pacific Electric Railway has been called for Nov. 16, 1911, to vote to authorize an issue of $100,000,000 of bonds to retire outstanding issues and provide funds to carry out the important extensions and developments which the company has in contemplation.

Porto Rico Railways, Ltd., San Juan, P. R.—The Porto Rico Railways, Ltd., has declared an initial quarterly dividend of 1 per cent on its common stock; also the regular quarterly dividend of 1¾ per cent on its preferred stock.

Portland & Brunswick Street Railway, Freeport, Me.—The property of the Portland & Brunswick Street Railway was sold under foreclosure on Sept. 25, 1911, for $225,000 to Harry B. Ivers, general manager of the Lewiston, Augusta & Waterville Street Railway, representing others.

Third Avenue Railroad, New York, N. Y.—The Court of Appeals at Albany has set Oct. 16, 1911, for hearing the appeal by the Public Service Commission from the decision of the Appellate Division of the Supreme Court in the reorganization case of the Third Avenue Railroad. The first plan of reorganization of the Third Avenue Railroad was disapproved by the Public Service Commission of the First District in 1909. The bondholders then devised a new plan, which was in turn disapproved by the commission. The company then applied for a rehearing before the commission. The rehearing was denied by the commission and appeal was taken by the company to the Appellate Division which decided against the commission.

Trenton (N. J.) Street Railway.—C. E. Mitchell & Company, New York, N. Y., are offering at 101 and interest the unsold portion of the present issue of $300,000 of 6 per cent general mortgage gold bonds of the Trenton Street Railway, dated June 1, 1911, and due June 1, 1941, but callable at 105 and interest on any interest date. The total authorized issue is $500,000. The trustee of the mortgage securing the bonds is the Bankers' Trust Company, New York, N. Y.

Twenty-eighth & Twenty-ninth Streets Crosstown Railroad, New York, N. Y.—Julius M. Mayer, counsel for Joseph B. Meyer, receiver for the Twenty-eighth and Twenty-ninth Streets Crosstown Railroad Company, outlined the terms for the reorganization of the company, which have been submitted to the Public Service Commission of the First District of New York, at a hearing on Sept. 22, 1911, before Commissioner Maltbie. The company is now operated under an arrangement with Frederick W. Whitridge, receiver of the Third Avenue Railroad, as explained in the Electric Railway Journal of Sept. 16, 1911, page 468. The plan of reorganization provides for turning over the control of the company to the Third Avenue Railroad, which would purchase securities to the amount of about $1,500,000 at 30 cents on the dollar. Mr. Mayer admitted that until the reorganization of the Third Avenue Railroad is effected his clients could not make their proposition definite. Mr. Maltbie said that the commission was willing to keep the proceedings alive, and if the company would submit data as to any property which it has, the commission may informally indicate the capitalization which it would be willing to consent to under the reorganization. The hearing was adjourned until Sept. 29, 1911.

Washington & Rockville Railway, Washington, D. C.—A hearing was held before the Public Service Commission of Maryland on Sept. 16, 1911, on the application of the Washington & Rockville Railway for permission to issue a mortgage to cover an issue of $100,000 of bonds and to increase the capital stock of the company from $50,000 to $300,000. The hearing will be continued on Oct. 5, 1911.

Waterville & Fairfield Railway & Light Company, Waterville, Maine.—Control of the Waterville & Fairfield Railway and the Union Gas & Electric Company has passed to the Central Maine Power Company, of which Harvey D. Eaton, Waterville, is president.

Yonkers (N. Y.) Railroad.—The Public Service Commission of the Second District of New York has authorized Leslie Sutherland as receiver of the Yonkers Railroad to issue $65,000 of receiver's certificates to refund a like amount which came due on Sept. 10, 1911. The proceeds of the original issue were used to improve the company's property in Yonkers.

Dividends Declared

Aurora, Elgin & Chicago Railway, Chicago, Ill., quarterly, 1½ per cent, preferred; quarterly, ¾ of 1 per cent, common.

Bangor Railway & Electric Company, Bangor, Maine, quarterly, 1¾ per cent.

Carolina Power & Light Company, Raleigh, N. C., quarterly, 1¾ per cent, preferred.

Chicago (Ill.) City Railway, quarterly, 2½ per cent.

Cincinnati, Hamilton & Dayton Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred; quarterly, ¾ of 1 per cent, common.

Cincinnati (Ohio) Street Railway, quarterly, 1½ per cent.

City Railway, Dayton, Ohio, quarterly, 1½ per cent, preferred; quarterly, 1¾ per cent, common.

Columbus, Newark & Zanesville Electric Railway, Newark, Ohio, quarterly, 1¼ per cent, preferred.

Dayton & Troy Electric Railway, Dayton, Ohio, quarterly, 1¼ per cent, preferred; quarterly, 1¼ per cent, common.

Illinois Traction System, Champaign, Ill., quarterly, 1½ per cent, preferred.

New Orleans Railway & Light Company, New Orleans, La., quarterly, 1¼ per cent, preferred.

Ohio Traction Company, Cincinnati, Ohio, quarterly, 1 per cent, common.

Oklahoma Railway, Oklahoma City, Okla., quarterly, 1¼ per cent, preferred.

Philadelphia Company, Pittsburgh, Pa., quarterly, 1½ per cent, common; extra, ½ of 1 per cent, common.

Porto Rico Railways, Ltd., San Juan, P. R., quarterly, 1¾ per cent, preferred; quarterly, 1 per cent, common.

Public Service Corporation, Newark, N. J., quarterly, 1½ per cent.

Scioto Valley Traction Company, Columbus, Ohio, quarterly, 1¼ per cent, first preferred; quarterly, 1¼ per cent, preferred.

Stark Electric Railway, Alliance, Ohio, quarterly, ¾ of 1 per cent.

Washington-Virginia Railway, Washington, D. C., 1½ per cent, preferred; 1½ per cent, common.

Winnipeg Electric Railway, Winnipeg, Man., quarterly, 3 per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

CAPE BRETON ELECTRIC COMPANY.

Period.			Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1 m.,	July,	'11.....	$31,215	$15,836	$15,379	$6,201	$9,178
1 "	"	'10.....	28,876	14,407	14,469	6,182	8,287
12 "	"	'11.....	332,935	171,736	161,199	73,759	87,440
12 "	"	'10.....	310,680	169,178	141,502	74,048	67,454

CLEVELAND SOUTHWESTERN & COLUMBUS RAILWAY.

1 m.,	Aug.	'11.....	$110,855	$58,850	$52,203	$29,921	$22,283
1 "	"	'10.....	107,755	56,605	51,150	29,794	21,356
8 "	"	'11.....	744,375	418,832	325,543	240,436	85,107
8 "	"	'10.....	688,272	401,535	286,737	238,351	48,386

DALLAS ELECTRIC CORPORATION.

1 m.,	July,	'11.....	$125,037	$81,610	$43,427	$25,992	$17,434
1 "	"	'10.....	117,270	85,473	31,797	26,842	4,955
12 "	"	'11.....	1,559,557	975,863	583,694	314,310	269,384
12 "	"	'10.....	1,403,744	923,843	484,901	322,218	162,683

EL PASO ELECTRIC COMPANY.

1m.,	Aug.	'11	$51,834	$30,776	$21,057	$8,319	$12,739
"	"	'10	49,351	29,557	19,794	8,215	11,579
12m.,	"	'11	667,937	387,394	280,544	98,389	182,154
"	"	'10	629,620	361,626	267,994	101,300	166,694

GRAND RAPIDS RAILWAY.

1m.,	Aug.	'11	$105,274	*$58,300	$46,974	$15,008	$31,966
"	"	'10	111,814	*54,424	57,390	15,278	42,112
8m.,	"	'11	765,706	*437,288	328,418	120,353	208 065
"	"	'10	755,642	*401,228	354,414	121,543	232,871

GALVESTON ELECTRIC COMPANY.

1 m.,	July,	'11.....	$44,763	$20.371	$24,392	$8,718	$15,674
1 "	"	'10.....	38,405	19,036	19,369	8,026	11,342
12 "	"	'11.....	414,212	221,791	192,420	100,197	92,224
12 "	"	'10.....	361,003	230,847	130,156	80,100	50,055

GALVESTON-HOUSTON ELECTRIC COMPANY.

1 m.,	July,	'11.....	$136,113	$76,069	$60,044	$25,105	$34,939
1 "	"	'10.....	122,097	65,989	56,108	26,608	29,499
12 "	"	'11.....	1,430,165	837,870	592,295	303,099	289.196
12 "	"	'10.....	1.255,297	766,376	488,921	273,858	215,063

HOUGHTON COUNTY TRACTION COMPANY.

1 m.,	July,	'11.....	$31,220	$13,639	$17,581	$7,773	$9,808
1 "	"	'10.....	30,036	14,380	15,656	6,640	9,017
12 "	"	'11.....	306,131	160,038	146,093	79,867	66,226
12 "	"	'10.....	320,231	169,837	150,393	76,556	73,837

JACKSONVILLE TRACTION COMPANY.

1 m.,	July,	'11.....	$43,920	$24,578	$19,342	$12,364	$6,979
1 "	"	'10.....	46,906	26,207	20,699	9,489	11,210
12 "	"	'11.....	578,831	320,563	258,263	123,449	134,819
12 "	"	'10.....	543,723	284,920	258,802	112,499	146,304

MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY.

1 m.,	Aug.	'11....	$424,701	$229,642	$195,059	$132,343	$62,716
1 "	"	'10....	412,339	213,079	199,259	188,739	80,521
8 "	"	'11....	3,297,882	1,755,726	1,542,155	991,165	550,990
8 "	"	'10....	3,096,477	1,658,360	1,438,117	901,818	536,299

MILWAUKEE LIGHT, HEAT & TRACTION COMPANY.

1 m.,	Aug.	'11....	$166,607	$46,886	$119,721	$77,510	$42,211
1 "	"	'10....	159,894	45,616	114,278	75,299	38,979
8 "	"	'11....	1,143,955	325,447	818,508	577,579	240,929
8 "	"	'10....	1,073,719	307,916	765,803	563,848	201,955

NORTHERN OHIO TRACTION & LIGHT COMPANY.

1 m.,	Aug.	'11....	$272,624	$143,666	$128,958	$44,321	$84,638
1 "	"	'10....	263,149	135,833	127,316	43,496	83,821
6 "	"	'11....	1,773,731	981,692	792,039	354,749	437,290
6 "	"	'10....	1,612,504	892,001	720,504	346,769	373,734

Traffic and Transportation

Test of Fenders and Wheel Guards in Massachusetts

The Railroad Commission of Massachusetts has issued the following notice in regard to the test of fenders and wheel guards which it proposes to conduct on the Middlesex & Boston Street Railway, commencing Oct. 10, 1911:

"Resolves of 1911, Chapter 74. Resolve to authorize the Board of Railroad Commissioners to investigate the matter of equipping street railway cars with fenders and wheel guards.

"Resolved, That the Board of Railroad Commissioners is hereby directed to investigate the matter of the compulsory equipping of the cars of street railways with fenders and wheel guards; to investigate the operation of such fenders and wheel guards in this commonwealth and elsewhere; to examine the comparative merits of different fenders and wheel guards, and to report to the General Court, not later than Jan. 15, 1912, the result of its investigation of the matters aforesaid and of any other matters relating to fenders and wheel guards for street railway cars, or to other means which the board may consider efficient and practicable for the prevention of accidents in the operation of the said cars. The board may expend for the purposes of this resolve a sum not exceeding $1,500. (Approved May 13, 1911.)

"In accordance with the above resolve the board will, commencing at 10 a. m. on Tuesday, Oct. 10, 1911, conduct a test of such fenders and wheel guards as persons interested may attach to cars provided for the purpose. The tests will take place at the Homer Street carhouse of the Middlesex & Boston Street Railway, near the junction of Commonwealth Avenue and Walnut Street, in Newton, where similar tests were held in 1906. Dummies and cars will be provided by the board.

"Persons having fenders or wheel guards to be tested at that time are requested to confer with the board at an early date, when the necessary details may be arranged."

Decision of Supreme Court of Washington in Seattle-Tacoma Fare Case

The Supreme Court of Washington has sustained and affirmed the order of the State Railroad Commission directing the Puget Sound Electric Railway operating between Seattle and Tacoma to reduce its passenger fares. The commission's order permitted the company to continue its advanced rates for through business and to points where patrons of the line could have steam railroad connection, but it refused to allow increases to the suburban towns in the Duwamish Valley.

The opinion recites that the road went into operation in 1902 and established rates under which many little towns grew up. In October, 1909, the company increased its rates to towns outside of Seattle. Similar advances were made to suburban towns near Tacoma. The commission ordered the company to restore the old round-trip rate between Seattle and Renton Junction and from Tacoma north to Algona and between Tacoma and points on the Puyallup line. The round-trip rate, Seattle to Renton, was reduced from 54 cents to 35 cents; from Seattle to Earlington from 50 cents to 30 cents. These are the rates that the company is required to restore by the decision of the Supreme Court.

In its decision the court says in part:

"The rate established is one the patrons can pay. It is one which we believe will give the company a profit over the cost of the particular service, and, when added to the charges remaining, will produce a revenue of 7 per cent, which, considering the character of the service and the rights of the public, we cannot say is either unreasonable or unjust. Our affirmance of the commission's order is based upon the broad ground that the company's new rate is unreasonable, that it is more than the service is worth to the patrons, that the old rate ordered by the commission is one which the patrons can afford to pay and is all that the service is reasonably worth to them, that it is one which the company can give and perform the service at a profit over the cost of the haul, and hence is a reasonable rate. Neither is the rate ordered by the commission in violation of the constitutional provision against discrimination between persons or places.

"Great consideration should be given the findings of that body to whom the State has primarily given the right and authority to determine questions of this character. Such findings should not be disturbed unless they bear evidence of having been arbitrarily reached and without a full and due consideration of all the controlling facts. Their determination calls for the exercise of economic as well as legal principles. Courts may well review the questions submitted in so far as they suggest the application of legal principles, but in so far as they suggest the enunciation of economic rules they must defer largely to those who by study, experience and calling are in better situation to determine what is and what is not a proper method of determination."

On the final question raised by the defense, that these rates are lower than the State permits the steam roads to charge, the decision says:

"It does not appear that these railroads are competing lines for passenger traffic nor that they have station facilities at any of the points affected by the order of the commission in the suburban zones except at Puyallup, Renton and Earlington. There being no discrimination, it is needless to determine the law upon a question which has no foundation in fact. It is therefore apparent that with the general increase in rates allowed by the commission, and with the patronage from through business approximately the same at the increased round-trip rate from $1 to $1.25, the company will have no difficulty in earning the 7 per cent fixed by the commission, in whose judgment as to a proper and sufficient rate we join."

Accident in Atlanta.—More than twenty persons are reported to have been injured on Sept. 24, 1911, by the overturning of a car of the Georgia Railway & Electric Company in Atlanta, Ga.

New Baggage Rules in Dayton.—The officers of the City Railway, Dayton Street Railway, Oakwood Street Railway and the People's Railway, Dayton, Ohio, have agreed to submit to the Public Service Commission of Ohio a new set of rules to govern the carrying of baggage on the cars of the companies. At the suggestion of the commission, the companies have agreed to keep the doors of their prepayment cars open at railroad crossings.

Safety Gates Reduce Accidents in Louisville.—The Louisville (Ky.) Railway has found, by a comparison of records of platform accidents, that a reduction of more than 50 per cent has been made following the use of safety gates on the cars of the Portland Avenue line. Thirty new cars for the Louisville Railway now under construction by the Cincinnati Car Company are to be equipped with gates for the entrances. The exits of these cars will be protected by sliding doors.

Owl Service Between Duluth and Superior Not Warranted.—Herbert Warren, general manager of the Duluth-Superior Traction Company, Duluth, Minn., is quoted as follows in regard to the subject of establishing an owl service between Duluth and Superior: "Both Duluth and Superior are too small to ask such accommodation. We are already running owl service in both towns, but the patronage does not justify the move, much less pay half the expense of operation."

Complaint Against Rochester, Syracuse & Eastern Railroad Closed.—The Public Service Commission of the Second District of New York has closed upon its records the complaint of residents of Port Gibson, Ontario County, against the Rochester, Syracuse & Eastern Railroad, Syracuse, N. Y., as to the stopping of cars at Port Gibson. Upon investigation by a representative of the commission an arrangement was made with the company which is satisfactory to the patrons of the road at that point.

Public Service Railway Answers Fare Complaint.—An answer to the complaint made some time ago by citizens of the boroughs of Wallington, Carlstadt and Woodridge regarding the fare zone question in that territory has been submitted to the Board of Public Utility Commissioners by the Public Service Railway, Newark, N. J. In its

answer the company insists that it has a legal right to fix fare zones and declares that it has not, as alleged, increased any fares in the territory from which the complaint is made.

Reduction in Fare Between Rock Island, Watertown, East Moline and Silvis.—The Tri-City Railway has informed the Mayor of Rock Island, Ill., that arrangements have been completed whereby residents of Rock Island will be conveyed to Watertown, East Moline and Silvis for a 5-cent fare. Heretofore anyone who boarded a car west of Forty-sixth Street, Rock Island, has been obliged to pay 10 cents to Watertown, East Moline and Silvis, while those boarding Third or Fourth Avenue cars east of First Street, Moline, have ridden for 5 cents.

Negotiations for Settlement of Chicago Suburban Fare Question.—The Township Board of Cicero has renewed negotiations with the County Traction Company, Chicago, Ill., operating the lines of the old Chicago Consolidated Traction Company outside of the city limits of Chicago, to settle the question of fare into Chicago over the County Traction Company's lines and the lines of the Chicago Railways, which operates the old Chicago Consolidated Traction Company's lines in the city, by a compromise of twelve rides for $1.

New Form of Transfer in Albany, N. Y.—The United Traction Company, Albany, N. Y., began on Sept. 25, 1911, to issue a new form of transfers which differs from the former one only in that the date is printed across the face in large red letters, thus doing away with the necessity of punching to indicate the date. A hearing was held before the Public Service Commission of the Second District of New York recently on the complaint of a resident of Rensselaer against the United Traction Company in relation to the issuing of transfers. The commission was asked to pass upon the right of conductors to refuse a transfer if not asked for by a passenger at the time of paying fare.

Accident Campaign of Louisville & Northern Railway & Lighting Company.—Reference was made in a recent issue of the Electric Railway Journal to the good results obtained by the advertising campaign of the Louisville & Northern Railway & Lighting Company, New Albany, Ind., to reduce the number of accidents on its lines. C. B. Scott, assistant to the general manager, who is in charge of the advertising campaign, states that especial attention is also given in instructing new motormen to impress upon them the importance of exercising extra care in operating cars so as to reduce the likelihood of accidents. Cards dealing with platform accidents, accidents to children and collisions with vehicles are posted respectively at transfer points and public places, in garages and stables and in schools.

Ticket Suit in Reading.—City Solicitor H. P. Keiser, of Reading, Pa., on behalf of the city, has instituted equity proceedings against the Reading Transit Company, United Traction Company and Front & Fifth Street Railway to compel the restoration of the six-for-a-quarter strip tickets on a portion of the Schuylkill Avenue loop. In the opinion handed down recently by the Supreme Court, deciding that the companies were not required to sell tickets on all of the lines of the city because such a mandatory clause was inserted in the ordinance to the Front & Fifth Street Railway to complete the loop, it was stated that such obligation might be imposed on that portion of the line controlled by this particular company, but that this question not having been raised, it could not be passed upon.

Des Moines City Railway Commended.—The Des Moines (Ia.) City Railway, of which J. R. Harrigan is vice-president and general manager, has been commended by the Des Moines Women's Club for prohibiting smoking on the new double-end pay-as-you-enter cars. The resolution thanking Mr. Harrigan is concluded with the statement that "the club would hale with delight the application of the same rule to all the city cars." The secretary of the Iowa State Fair Association has written Mr. Harrigan complimenting him on the manner in which the company transported visitors to the recent fair, stating that the board in charge of the fair was of the opinion that "the company gave better service than ever before and that the crowds were handled in the most satisfactory manner in the history of the Iowa State Fair."

Personal Mention

Mr. S. B. Thompson has resigned from the Third Avenue Railroad, New York, N. Y., to become master mechanic of the British Columbia Electric Railway, Vancouver, B. C. Mr. Thompson was formerly connected with Sanderson & Porter, New York, N. Y., and with the United Railways & Electric Company, Baltimore, Md.

Gen. George H. Harries, vice-president of the Washington Railway & Electric Company, Washington, D. C., has been elected president of the Association of Edison Illuminating Companies. General Harries is treasurer of the National Electric Light Association and was for two years vice-president of the Association of Edison Illuminating Companies. He is also second vice-president of the American Electric Railway Association, chairman of its federal relations committee and a member of the public relations committee of that association.

Mr. E. C. Carpenter, claim agent of the Indiana Union Traction Company, Anderson, Ind., has resigned to accept the position of general manager of the Pittsburgh & Butler Street Railway, Pittsburgh, Pa. Mr. Carpenter became connected with the local system in Anderson under Mr. Charles L. Henry twenty years ago and served under Mr. Henry during the construction of the first interurban electric railway in Indiana, between Anderson and Summitville. He has remained with the Anderson City Railway and its successor, the Indiana Union Traction Company, continuously since that time.

Mr. James Alfred Roosevelt has resigned as general superintendent of the Third Avenue Railroad to become superintendent of transportation of the British Columbia Electric Railway, Vancouver, B. C. Mr. Roosevelt was connected with Stone & Webster, Boston, Mass., for two years and for the past four years has been with the Third Avenue Railroad, first as assistant to the general manager and then as general superintendent. Mr. Roosevelt was tendered a farewell banquet at the Engineers' Club, New York, N. Y., on Sept. 26, 1911, by his associates in the company and his personal friends. Mr. W. O. Wood, president and general manager of the New York & Queens County Railway, Long [illegible] acted as toastmaster and presente[illegible] a token of esteem. [illegible] erick W. Whitridge, receive[illegible] Mr. Edward A. Ma[illegible] Avenue Railroad; Mr. Thom[illegible] engineer of the Third Avenue Railroad, [illegible]medley, vice-president and general manager of [illegible]nterborough Rapid Transit Company; Mr. L. H. Palmer, superintendent of transportation of the Metropolitan Street Railway; Mr. H. C. Donecker, secretary of the American Electric Railway Association; Mr. G. Haskell, Mr. Jack High, Mr. Charles Ellicott, Mr. W. L. Conwell and Mr. Samuel Trawick.

Mr. C. C. Elwell, whose resignation as engineer of maintenance of way of the Connecticut Company, New Haven, Conn., to become engineer of the Public Utility Commission of Connecticut was noted in the Electric Railway Journal of Sept. 23, 1911, was born in Maine in 1855, and was educated at the University of Maine as a civil engineer. For three years Mr. Elwell was employed by the United States government in the work of constructing lighthouses on the southern coast. Thirty years ago he began railroad work with the New England Railroad, entering the office of the civil engineer of the company in Boston. Three years later he entered the employ of the Wilmington & Northern Railroad of Delaware on construction and maintenance work, with headquarters in Wilmington. Mr. Elwell afterward became connected with the Baltimore & Ohio Railroad and remained with that company until 1893, when he entered the employ of the New York, New Haven & Hartford Railroad to complete the four-tracking of the company's New York division. He was roadmaster for two years. He was then promoted to the position of superintendent and worked as such for thirteen consecutive years. For the last three years he has been engineer of maintenance of way of the Connecticut Company and the New York & Stamford Railway. Mr. Elwell was one of eight delegates sent to Europe by the New York, New Haven & Hartford Railroad in 1895 to study railroad methods abroad.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Castro Point Railway, Martinez, Cal.**—Application for a charter has been made in California by this company to build an electric railway in Martinez. Capital stock, $11,000. Incorporators: Frank W. Bilger, T. Blake and H. E. Johnson, all of Oakland.

Etowah Valley Railroad, Dahlonega, Ga.—Chartered in Georgia to build an electric railway to extend from Atlanta through northeast Georgia to the Tennessee State line. Headquarters, Atlanta. Capital stock, $50,000. Incorporators: G. R. Glenn, H. D. Gurley, John H. Moore, T. J. Smith, J. M. Brooksher, J. E. Tate, H. Head, J. F. Sergeant, Craigh R. Arnold, W. H. Jones, B. F. Anderson and W. B. Townsend, all of Dahlonega. [E. R. J., Aug. 26, '11.]

***East Boston Marginal Freight Railroad, Boston, Mass.**—Application for a charter will be made in Massachusetts by this company to build an electric or steam railway in East Boston to connect many factories and warehouses along the water front with the Boston & Albany Railroad. Authority is given to arrange with the Boston Elevated Railway for the purchase of motive power from that company. A hearing is set for Oct. 6 before the Railroad Commissioners to determine the route of the proposed line.

***West Tennessee Traction Company, Memphis, Tenn.**—Application for a charter has been made in Tennessee by this company to build an electric railway between Memphis, Nashville and Jackson. Capital stock authorized, $100,000. Incorporators: E. Oppenheimer, A. G. Riley, Alfred Sohm, C. L. Winchester and W. W. Swift.

***Monongahela & Marion Railway, Morgantown, W. Va.**—Application for a charter has been made by this company in West Virginia to build an electric railway between Morgantown and Fairmont. Capital stock authorized, $50,000. Incorporators: John Madigan, M. E. Fetty, Parker S. Johnson, Sanford Barrickman and John E. Price, all of Morgantown, W. Va.

FRANCHISES

Jonesboro, Ark.—Preston Hatcher, Jonesboro, has received a six months' extension of his franchise in which to begin the construction of the 3-mile electric railway between Jonesboro and Nettleton. [E. R. J., Aug. 26, '11.]

Pasadena, Cal.—The Pacific Electric Railway, Los Angeles, has received a franchise from the County Supervisors to build the cut-off east of Schutzen Park, extending from the Pasadena short line to the South Pasadena line.

Chico, Cal.—The Northern Electric Railway, San Francisco, has received a franchise from the City Trustees to abandon its tracks on Fifth Street and use its Ninth Street tracks to connect with the Hamilton branch in Chico.

San Francisco, Cal.—A loop for the western end of the Geary Street Municipal Railway has been recommended to the Mayor and Supervisors by Patrick Broderick, the superintendent of construction of this railway, and Public Works Commissioner Charles S. Laumeister.

Fowler, Col.—The Pueblo & Suburban Traction & Lighting Company has accepted the franchise granted it by the City Council in Fowler.

Belvidere, Ill.—The Belvidere City Railway has received a 20-year franchise from the City Council in Belvidere.

Belvidere, Ill.—The Elgin & Belvidere Electric Company, Chicago, has received a 20-year franchise from the City Council in Belvidere, over the tracks of the city line from the terminus of the Rockford & Interurban Railway to the city limits.

Gary, Ind.—The Indianapolis, Chicago & Meridan Railway, Indianapolis, has asked the City Council for a franchise in Gary. This line will connect Indianapolis, Sheridan, Flora, Monticello, Francisville, Koutz, Valparaiso, Hobart, Gary, Wheeler, Hammond, Warsaw and Columbia City. M. J. Mooreland secretary. [E. R. J., July 15, '11.]

***Utica, Ind.**—Charles W. Kelly, Utica, Ind., has received a franchise from the Board of County Commissioners to construct an electric line over any road in the county.

Louisville, Ky.—The Board of Public Works of Louisville has sold to B. F. Avery & Sons a franchise for the construction of an electric railway on Sixth Street in Louisville. The company will build a subway at the intersection of Sixth Street with the tracks of the Louisville & Nashville Railway, and will then turn it over to the Louisville Railway, which will build and operate the line.

New Orleans, La.—The New Orleans Railway & Light Company, New Orleans, will ask the City Council for a franchise to double-track some of its lines in New Orleans.

Boston, Mass.—The Boston, Lowell & Lawrence Electric Railroad, Boston, will again ask the Railroad Commissioners for a certificate of public necessity to build an electric railway to connect Somerville, Medford, Winchester, Woburn, Lowell and Lawrence. Charles T. Remington, Boston, general manager. [E. R. J., June 19, '11.]

Lexington, Mass.—The Lexington & Boston Street Railway, Newtonville, has received a franchise from the Selectmen of Lexington to relay its tracks on Waltham Street from near Allen Street to the Concord Turnpike.

Liberty, Mo.—The Kansas City, Clay County & St. Joseph Railway, Kansas City, has received a 200-year franchise from Clay County to build its lines through the county to St. Joseph and Excelsior Springs. [E. R. J., Sept. 16, '11.]

Hackensack, N. J.—The Public Service Railway, Newark, has received a franchise from the Village Trustees of Ridgefield Park to extend its line on Hackensack Road to Queen Anne Road, in Hackensack.

Orange, N. J.—The Mountain Railway, West Orange, has asked the Common Council for a franchise to extend its line from the present terminus at West Christopher Street, in Orange, to the Lackawanna Railroad.

Summit, N. J.—The Morris County Traction Company, Morristown, has received a franchise from the City Council to double-track its line from the present terminus in Summit to the Chatham line.

Cleveland, Ohio.—The Cleveland, Alliance & Mahoning Valley Railway, Alliance, has received a franchise from the County Commissioners to build across public highways and roads in Clark County. This 22-mile electric railway will connect Cleveland, Alliance and Mahoning. [E. R. J., April 22, '11.]

Peniel, Tex.—The Greenville Traction Company has received a franchise from the City Council of Peniel. An extension will be built from Forest Park to Peniel.

Salt Lake City, Utah.—The Salt Lake & Ogden Electric Railway, Salt Lake City, has asked the City Council for a franchise to extend its line to Postoffice Place, in Salt Lake City.

Richmond, Va.—The Richmond & Henrico Railway, Richmond, has asked the Board of Aldermen for a franchise in Richmond. If the franchise is obtained the company will enlarge its power house in Richmond.

Aberdeen, Wash.—The Gray's Harbor Railway & Light Company, Aberdeen, has asked the City Council for a franchise to extend its North B Street line in Aberdeen to Sixth Avenue. It is said that the company is considering plans to extend its line up the Wishkah River.

Vancouver, Wash.—E. R. Ernsberger and Lawrence Harmon, Vancouver, have received a 50-year franchise from the City Council to build an electric railway in Vancouver. The line will be continued into Clark County. [E. R. J., Aug. 19, '11.]

Vancouver, Wash.—The Mount Hood Railway & Power Company has received a franchise from the City Council for several new lines in Vancouver.

TRACK AND ROADWAY

Birmingham, Ensley & Bessemer Street Railway, Birmingham, Ala.—It is reported that this company has ordered 3500 tons of open-hearth steel rails from the Tennessee Coal, Iron & Railroad Company.

Calgary (Alta.) Municipal Railway.—This company placed in operation on Sept. 16 its extension into Tuxedo Park.

*San Fernando, Cal.—It is report d that H. J. Whitley is considering plans for the construction of a 25-mile electric railway between Los Angeles and San Fernando.

San Jose Terminal Railway, San Jose, Cal.—The organization of this company, which proposes to build a 12-mile electric railway between San Jose and Alviso, has been completed by the election of the following officers: Hugh Center, San Jose, president; M. J. Gardner, Stockton, secretary and treasurer, and John A. Mehling, San Jose, vice-president and general manager. Offices of the company will be established in the Bank of San Jose Building. [E. R. J., Sept. 16, '11.]

New York, New Haven & Hartford Railroad, New Haven, Conn.—Joseph A. Lyons, 237 Lincoln Street, New Haven, has been given the contract for the electrification of this company's branch from Branford to New Haven, a distance of 12 miles.

People's Railway, Wilmington, Del.—This company has placed in operation its extension on King Street from Front Street to King Street wharf in Wilmington.

Freeport-Madison Electric Railway, Freeport, Ill.—A contract has been closed by this company with Hugh G. Palmer, Yorkville, for the construction and financing of the first section of the line from Freeport to Cedarville, a distance of 16 miles. The line will eventually extend from Freeport, Ill., to Madison, Wis., via Cedarville, Rock Grove, Oakley and Dixon. W. T. Raleigh, Freeport, is the promoter. [E. R. J., July 30, '11.]

***Hillsboro Electric Light & Power Company, Hillsboro, Ill.**—Plans are being made by this company for the construction of an electric railway between Greenville, Hillsboro and Collinsville. A franchise for an interurban line from Hillsboro to Taylor Springs, 3 miles south, has already been asked. The survey for this line has been made and the company agrees to build the line within a limited time after the franchise is granted. The line will extend through Coffeen or Donnellson and on south to Greenville through Pocahontas, Pierron, Highland, St. Jacob, Troy and Collinsville, connecting at Collinsville with the Illinois Traction System. J. J. Frey, Hillsboro, president.

***Macomb Southern Traction Company, Macomb, Ill.**—This company has been formed to purchase the old Chandler Railroad, which extends from Lacomb to Littleton, and electrify the line and extend it from Beardstown to Rushville. Capital stock, $750,000.

Davenport-Muscatine Railway, Davenport, Ia.—This company has ordered 3000 tons of Bessemer steel rails from the Illinois Steel Company.

Duluth (Minn.) Street Railway.—Plans are being considered by this company to build an extension from Seventy-first Avenue in Duluth to Prescott Street in New Duluth.

Peoples Railway, Dayton, Ohio.—This company will rebuild its line on Wayne Avenue between Fifth and Wyoming, in Dayton.

Steubenville & East Liverpool Railway & Light Company, Steubenville, Ohio.—It is reported that this company will extend its double track along Main Street beyond Allegheny Street, in Follansbee, when the new 60-ft. concrete bridge is completed over the creek at that point. The company will eventually double track its line from Follansbee to Steubenville.

***Oklahoma Northwestern Railway, Oklahoma City, Okla.**—This company has been organized to build a 150-mile electric or steam railway from Oklahoma City to Woodward, via El Reno, Watonga, Canton, Seiling and Mutual. Surveys are now being made from Watonga along the south side of the North Canadian River. Edward A. Wagener, Oklahoma City, president, and W. H. Wood, Watonga, chief engineer.

Ottawa & Kingston Electric Railway, Ottawa, Ont.—Surveys have been completed by this company between Manotick and Smith's Falls. It will be continued at once to Kingston. This is part of a plan to build an electric railway from Ottawa to Kingston and Smith's Falls via City View, Manotick, Kars, Burritt's Rapids and Merrickville. C. L. Rickenson, Manotick, is interested. [E. R. J., Nov. 26, '10.]

Oregon Electric Railway, Portland, Ore.—This company will soon build about 70 miles of new track. It has awarded a contract to the Colorado Fuel & Iron Company, Pueblo, Col., for the 75-lb. rails to be used for its extension from Salem to Albany.

***Elizabethtown, Pa.**—David Young, Jr., Newark, N. J.; F. H. Allaman, Elizabethtown, and others are considering plans for the construction of an electric railway between Maytown and Elizabethtown.

Lebanon & Campbelltown Street Railway, Lebanon, Pa.—Work has been begun by this company at Lebanon on its line between Campbelltown and Lebanon, via South Londonderry, South Annville and North Comwall. It will connect at Campbelltown with the Hummelstown & Campbelltown Street Railway, Hershey, M. S. Hershey, president. [E. R. J., Sept. 9, '11.]

Ephrata & Lebanon Street Railway, Lebanon, Pa.—Work on this company's line is progressing rapidly. The rails have been laid to a point beyond Lincoln and the bridge over Cocalico Creek will be placed in a few days. Bids will shortly be opened for the bridge over Middle Creek, near Hopeland.

Mahoning & Shenango Railway & Light Company, New Castle, Pa.—Plans are being considered by this company for an extension between Middlesex and New Castle.

Northumberland County Traction Company, Sunbury, Pa.—This company has increased its capital stock from $10,000 to $500,000, and issued $2,000,000 in bonds. The company will build an interurban railway to connect the lines in the counties of Northumberland, Union, Snyder, Montour, Columbia, Lycoming, Luzerne and Schuylkill. J. F. Schaffer, Sunbury, and John C. Johnson, Philadelphia, are the solicitors. [E. R. J., May 13, '11.]

Ft. Worth Southern Traction Company, Ft. Worth, Tex.—Stone & Webster have let the contract to the Texas Building Company to grade the right-of-way for this company. G. H. Clifford, Ft. Worth, is interested. [E. R. J., Aug. 12, '11.]

***Industry, Tex.**—Charles F. Knolle, Industry, and associates plan to build a 55-mile interurban line to connect Bellville, Nelsonville, Bleiblersville, Industry, Schoenan, Shelby, Round Top, Warrenton, Oldenburg, Ruthersville and La Grange. The proposed line will connect at Bellville, Tex., with the Gulf, Colorado & Santa Fé Railroad and at La Grange, Tex., with the Missouri, Kansas & Texas Railroad. Meetings are soon to be called at the different towns along the proposed line to appoint committees to secure the right-of-ways.

McKinney, Tex.—A company will be organized at once in McKinney with a capital of $50,000 to operate the new electric railway in McKinney, which will be completed and placed in operation on Oct. 1. The Commercial Club, McKinney, is interested. [E. R. J., July 1, '11.]

Waco (Tex.) Street Railway.—Material is being received by this company for the improvements of its lines in various sections of Waco. One of the betterments will be the double-tracking of the Cotton Palace line.

***Salt Lake City, Utah.**—George M. Cannon, of the real estate association, has appointed a committee of nine men to solicit a subscription of $3,000 to cover the expense of the preliminary survey of the proposed electric railway from Salt Lake City to Provo and Parpon. With the information obtained from this survey a report will be issued to investors in order to float bonds for construction of the line.

Brattleboro (Vt.) Street Railway.—An extension will be built by this company on its Main Street line in Brattleboro.

Washington & Old Dominion Railroad, Richmond, Va.—It is reported that this company has awarded the contract to the Messrs. A. and C. Wright for grading its line. Charles M. Henckley, president. [E. R. J., Sept. 23, '11.]

Morgantown & Dunkard Valley Railroad, Morgantown, W. Va.—Plans are being made by this company to extend its line from Cassville, W. Va., to Mount Morris, Pa., a distance of about 5 miles.

Vancouver, Wash.—Chicago capitalists have organized a company to construct an electric line from Vancouver, north to the South Fork of the Lewis River, thence northeast to Klickitat Pass, a distance of nearly 100 miles. Water power

sites on the South Fork of the Lewis River have been obtained for the development of electrical energy for the new company. Vancouver is to be the present terminus of the line and later direct connection will be made with Portland. H. L. Harmon, Vancouver, and E. R. Ernsberger, of the Mount Hood Railway & Power Company, are said to be promoting the project. [E. R. J., Aug. 19, '11.]

Wenatchee (Wash.) Traction Company.—It is reported that this company plans to build about 100 miles of new track, to include an extension from Cashmere to Beverly. Louis W. Pratt, president. [E. R. J., Sept. 23, '11.]

Chicago & Wisconsin Valley Railroad, Madison, Wis.—This company has filed its bond of $65,000 and begun work on the construction of its line between Janesville and Portage. It will connect Janesville, Friendship, Easton, Portage, Lodi, Middleton, Wausau, Stevens Point, Madison and Merrill. Allen T. Russell, Chicago, general manager. [E. R. J., July 15, '11.]

Milwaukee Western Electric Railway, Milwaukee, Wis.—Work will be begun at once by this company on its 7½-mile extension between Juneau and Hustisford.

***Eau Claire, Wis.**—Surveys are being made for an electric railway to extend from Eau Claire, via Downing, New Richmond and Hudson to St. Paul. The Chippewa Light & Power Company is reported to be interested.

SHOPS AND BUILDINGS

Central California Traction Company, Sacramento, Cal.—This company will establish a new freight depot in Oak Park, a suburb of Sacramento.

Geary Street Municipal Railroad, San Francisco, Cal.—Title has been secured for a carhouse property and plans and specifications are being completed.

Kentucky Traction & Terminal Company, Lexington, Ky.—A new passenger and freight station is being built by this company at Versailles.

Boston & Eastern Electric Railway, Boston, Mass.—It is reported that this company plans to have two stations in East Boston, one near Porter and Orleans Street and the other on Breeds Island near Post Office Square.

Boston & Worcester Street Railway, Boston, Mass.—This company will build two additional car pits, 350 ft. long, at the Wellesley carhouse, besides installing an electric hoist.

Worcester (Mass.) Consolidated Street Railway.—This company has awarded a contract to E. K. Watson & Company, Warren, for the construction of its new carhouse at Gates Lane. The building is to be of brick, with steel trusses, and will have a total length of 450 ft. It will be 114 ft. wide, and of one story, with a height of 20 ft. When completed it will furnish storage for 90 cars.

Ohio Electric Railway, Cincinnati, Ohio.—This company has awarded a contract to Nichol & Carr, Brunson Building, Columbus, for the construction of its new freight station and freight house to be built in East Town Street. The structure will be 150 ft. x 60 ft., of steel and concrete construction. The cost is estimated to be about $25,000.

Roanoke Railway & Electric Company, Roanoke, Va.—Plans are being made by this company for the construction of a new station at Mason's Creek, Roanoke.

POWER HOUSES AND SUBSTATIONS

Geary Street Municipal Railroad, San Francisco, Cal.—Plans and specifications for the building and equipment of the power house of this company are being prepared under the direction of A. M. Hunt, consulting engineer, San Francisco.

Des Moines (Ia.) City Railway.—Work has been begun by this company on the improvements to its power plant in Des Moines.

Ft. Dodge, Des Moines & Southern Railway, Ft. Dodge, Ia.—This company plans to enlarge its power station.

Oregon Electric Railway, Portland, Ore.—This company will build five new substations in the near future.

Roanoke Railway & Electric Company, Roanoke, Va.—A new one-story substation will be built by this company at Mason's Creek, on the Salem line. It will have a capacity of 500 hp to supply current to the line between the city limits of Roanoke and Salem.

Manufactures & Supplies

ROLLING STOCK

Oneida (N. Y.) Railway is said to be in the market for several cars.

Hattiesburg (Miss.) Traction Company is said to be considering the purchase of several cars.

Beaumont (Tex.) Traction Company expects to purchase two light double-truck cars in the near future.

Elmira, Corning & Waverly Railroad, Waverly, N. Y., is said to be figuring on the purchase of additional cars.

Long Island Railroad, New York, N. Y., has issued specifications for twenty-five steel suburban coaches and combination cars.

Davenport & Muscatine Railway, Davenport, Ia., will order six interurban cars through J. G. White & Company, Inc., New York, N. Y.

Topeka (Kan.) Railway has ordered four 20-ft. 8-in closed pay-as-you-enter cars mounted on Brill 21-E trucks from the American Car Company.

Boston (Mass.) Elevated Railway is reported to be in the market for twenty-five surface cars and twenty-five additional cars for the Cambridge subway.

Sheridan Railway & Light Company, Sheridan, Wyo., has ordered two 21-ft. closed pay-as-you-enter motor cars mounted on Brill 21-E trucks from the American Car Company.

Charles J. Jager Company, Boston, Mass., is in the market for a second-hand double truck car equipped with a 20 or 25-hp motor on each truck. A car of the old convertible type is preferred.

Richmond & Henrico Railway, Richmond, Va., has ordered one No. 310 motor and one type K-36-F controller from the Westinghouse Electric & Manufacturing Company.

Mason City & Clear Lake Railway, Mason City, Ia., has ordered one McGuire-Cummings steel-underframe long-broom snow sweeper and three snow plows from the McGuire-Cummings Manufacturing Company.

Lake Charles Railway, Light & Water Works Company, Lake Charles, La., has ordered two double equipments of No. 92-A motors and K-10-A control from the Westinghouse Electric & Manufacturing Company.

Augusta-Aiken Railway & Electric Company, Augusta, Ga., has ordered six 26-ft. motor car bodies mounted on Brill 39-E trucks from The J. G. Brill Company, through J. G. White & Company, Inc., New York, N. Y.

Gary (Ind.) Connecting Railway has ordered two double-truck combination passenger cars, three compartment cars and one double-truck combination express car and snow plow, mounted on McGuire-Cummings 70-A high-speed interurban trucks, from the McGuire-Cummings Manufacturing Company.

Gary & Interurban Railway, Gary, Ind., has ordered four double-truck city cars, mounted on McGuire-Cummings No. 10-A trucks, from the McGuire-Cummings Manufacturing Company. These cars are to be duplicates of the last eight cars built for the Gary & Interurban Railway by the McGuire-Cummings Manufacturing Company.

Illinois Traction System, Peoria, Ill., is now receiving twelve 57-ft. interurban trailer coaches with M.C.B. trailer trucks, from the St. Louis Car Company. These cars have been designed, built and delivered in about 100 days. They are of an especially substantial type, designed for high-speed, long-distance service.

Isthmian Canal Commission, Washington, D. C., has asked for bids for forty electric locomotives of novel design to tow ships through the locks of the Panama Canal. They will be operated with three-phase alternating current. Bids will be received until Nov. 30. Additional information is contained in Circular No. 650, which can be obtained from the general purchasing officer, Isthmian Canal Commission, Washington, D. C.

Detroit (Mich.) United Railway, reported in the ELECTRIC RAILWAY JOURNAL of Aug. 26, 1911, as having ordered fifty closed pay-as-you-enter motor car bodies from the G. C.

Kuhlman Car Company, has specified the following details for these cars:

Seating capacity 46	Fenders ..... Detroit
Weight (car body only) 17,900 lb.	Gears and pinions .....G.E.
	Heaters .....Peter Smith
Length of body...31 ft. 3 in.	Headlights ..... Dayton
Over vestibule ...43 ft. 10 in.	Journal boxes .....MCB
Width over all...8 ft. 6¾ in.	Motors.....2 G.E., 210-C
Roof ..... monitor	Seating material .....rattan
Underframe ..... wood	Trucks .....Standard O-50
Control .....G.E. K-35	Wheels ..... 33-in.

ADVERTISING LITERATURE

Arthur S. Partridge, St. Louis, Mo., has issued list No. 38 of second-hand electric and steam equipment for September, 1911.

Falk Company, Milwaukee, Wis., has issued a circular which illustrates its solid manganese, hardened center and regular special work.

Texas Company, New York, N. Y., has begun to publish a quarterly paper entitled *Lubrication,* which is devoted to the interests of the company. The first issue is dated August, 1911. The products of the Texas Company include Texaco cylinder oils, engine and machine oils, gas-engine oils, railway oils, special oils, black oils, greases, solid lubricants, etc.

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 4857, describing and illustrating its switchboard and high-tension relays, and containing general notes on the use of relays and their installation. Bulletin No. 4859 describes its line of synchronous condensers especially adapted for floating across the line for controlling the power factor. Bulletins Nos. 4871, 4876 and 4882 describe respectively mercury arc rectifiers, direct-current switchboards for small plants and enclosed flame arc lamps.

Richardson-Phenix Company, Milwaukee, Wis., has issued a 50-page illustrated book with the title "Scientific Lubrication of Machinery." This book contains a very comprehensive treatment of the theory and practice of lubrication, discussing all the existing systems and outlining tests and specifications for oils designed for different uses. The requirements of an efficient lubricating system as outlined in the pamphlet are, (1) a stream of clean, cool oil supplied continuously at just the points where it is needed, (2) an efficient collecting system for the oil used as it drains from the bearings, (3) a filter which will thoroughly remove all dirt, particles of metal and water from the oil and thoroughly cool it. (4) The system must be automatic in its operation and absolutely reliable. The products which the company manufactures to meet these requirements are illustrated and described and price lists and specifications are given.

De Laval Steam Turbine Company, Trenton, N. J., has issued a 32-page booklet entitled "Steam Turbine Centrifugal Pumps and Other Centrifugal Machinery." The booklet illustrates and describes briefly the several lines of machinery manufactured by the company. Another booklet contains an article by Francis Head, entitled "Comparative Tests of Large Engine and Turbine-Driven Centrifugal Pumps," which was reprinted from the *Engineering News* of May 11, 1911. The tests were made at the Torresdale filter plant, of Philadelphia, where there are installed seven compound engine-driven centrifugal pumps, each having a capacity of 45,000,000 gal. per day against a head of about 45 ft., and one steam turbine-driven centrifugal pump of a capacity of 50,000,000 gals. The pamphlet gives the detail results of the test, which show that the turbine-driven pump developed a duty over 21 per cent in excess of the duty shown by the compound engine-driven pump, and required less attention and seemed to be more easily maintained.

TRADE NOTES

Walpole Rubber Company, Walpole, Mass., has added to its present power plant equipment a 750-kw Westinghouse generator set and several boilers, necessitating the erection of a new brick stack 150 ft. high.

Electric Properties Company, New York, N. Y., has moved its offices from 165 Broadway to 10 Bridge Street, where Westinghouse, Church, Kerr & Company, of which it is the holding company, is located.

Rooke Automatic Register Company, Providence, R. I., reports the recent installation of its fare-collecting system by the street railway companies in Watertown, Fishkill, Catskill, Middletown and Port Jervis, N. Y.

Tool Steel Gear & Pinion Company, Cincinnati, Ohio, gave its employees their annual picnic on Sept. 23, at which eighty-one persons were present. Prizes were awarded to the winners of athletic events and games which were arranged for both men and women.

Hildreth-Jones Company, Chicago, Ill., inspecting and supervising engineers, has appointed James A. Lister manager of its bridge, structural steel and cement departments, with headquarters in the Monadnock Block, Chicago. Mr. Lister was formerly manager of the Chicago office of the Pittsburgh Testing Laboratory, Pittsburgh, Pa.

N. Curry, of the Canadian Car & Foundry Company, Montreal, Que., has been nominated as president of the Canadian Manufacturers' Association, and as he is the only candidate will be elected by acclamation. George H. Olney, of the E. F. Phillips Electrical Works, Ltd., and E. F. Sise, of the Wire & Cable Company, have been nominated from Montreal as members of committees. The annual meeting will take place on Oct. 10.

Frank Smallpiece has resigned as assistant manager of the Canadian General Electric Company at Montreal to become associated with J. W. Campbell, of Calgary, in the General Supplies Company of that city. Mr. Smallpiece has been connected with the Canadian General Electric Company for thirteen years, and was for some time engaged on steam turbine work. He was appointed assistant manager of the Montreal office about three years ago.

Western Electric Company, New York, N. Y., has received an order from the Great Northern Railway for thirty-two telephone selectors for use on its Cascade division. The company has received an additional order from the Chicago, Milwaukee & St. Paul Railway for seventy-five telephone selectors for use on its Hastings and Dakota divisions. The Atlantic Coast Line has also placed an order with the Western Electric Company for ninety station telephone train dispatching equipments, which will be used to equip 235 miles of track.

Westinghouse Air Brake Company, Pittsburgh, Pa., reports total net earnings for the year ended July 31, 1911, as $3,034,231, as compared with $4,653,102 for the previous year. The total surplus at the end of the fiscal year was $7,054,894, as compared with $6,931,760 at the end of the previous year. George Westinghouse, president of the company, in presenting the annual report, says in part: "All the plants in which the Westinghouse Air Brake Company is interested are now in excellent condition and well equipped for any probable expansion of trade. A dividend of 5 per cent on the company's holdings in the Russian Brake Company has been received during August, indicating a satisfactory revival of business in Russia. The condition of the other foreign brake companies in which the company holds stock has likewise improved since our last report. Current earnings continue at about the average rate for the year."

Union Switch & Signal Company, Swissvale, Pa., has received an order from the New York, Westchester & Boston Railway for block signal and interlocking apparatus, comprising thirty-two automatic signals to be installed on the 6-mile, four-track section between West Farms and New York City and Mount Vernon, N. Y.; eight automatic signals on the 2-mile, double-track section between Mount Vernon and New Rochelle, and twenty-four automatic signals on the 8½-mile, double-track section between Mount Vernon and White Plains. The signals will be installed to permit of a 2½-minute headway at the maximum speed of express trains. Energy for the operation of the system will be supplied at 110 volts, 60 cycles. The interlocking apparatus, consisting of six plants, is of the Union F style. The plants will be operated from 110-volt storage battery energy, derived from motor-generator sets placed in the lower floors of the tower buildings. The signal and telephone work will be installed according to plans and specifications prepared by the signal department of the New York, Westchester & Boston Railway under the direction of John Roberts, signal engineer.

Electric Railway Journal

Convention Number

PUBLIC SERVICE RAILWAY OF NEW JERSEY

THE lines of the Public Service Railway are divided into two main groups of properties. The larger group in mileage, earnings and density of population served is located chiefly in the part of New Jersey lying to the west, northwest and southwest of New York City. The smaller part of the system consists of the Southern division which centers at Camden, on the Delaware River, opposite Philadelphia.

Traffic on the extensive Northern divisions may be considered as of two main classes. These include, first, the large volume of distinctly urban business in the cities reached in New Jersey and the local travel between various points on the system, and, second, the traffic bound to and from New York by a combination route of street railway and ferry, tunnel or steam railway. It is noteworthy that a somewhat similar distribution of traffic prevails on the Southern division, where traffic consists in an important measure of passengers bound to or from the greater city of Philadelphia.

While northern New Jersey, in the districts served, is closely settled with attractive residential sections which have been developed largely by the homes of New York business men and is thus to a certain extent tributary to the greater city on Manhattan Island, the lines of the Public Service Railway serve manufacturing centers of importance in Newark, Jersey City, Hoboken, Bayonne, Paterson, Camden, Passaic, Elizabeth, Perth Amboy and New Brunswick. These are the chief cities reached by the railway lines, but there are large manufacturing plants in a number of other communities from which traffic is assured. Newark, the largest city on the system, has a number of suburbs and the extent and variety of its manufacturing industries is one of the most favorable considerations in the outlook for the future. The enormous volume of daily travel between New York and nearby points in New Jersey is, of course, divided between the steam railways and the electric lines, but much of the traffic that is of the commuter class and dependent principally on steam railway facilities for long-distance trips furnishes short hauls between stations and homes to the street railway. The unusual extent of this part of the traffic is due to the almost uniform settlement of the outlying districts between the boundaries of the incorporated communities reached as well as to the constantly increasing population of the cities, towns and villages.

POPULATION SERVED

The total number of communities served by the railway lines is 117 and the population thereof, according to the 1910 census, was 1,742,807. With its railway, gas or electric service the controlling Public Service Corporation reaches 193 organized communities, having a population in 1910 of 2,018,096. To show the proportion in large cities of the total population in the organized communities served by the railway it may be stated that Newark had, in the 1910 census, a population of 347,469; Jersey City, 267,779; Camden, 94,538; Elizabeth, 73,409; Paterson, 125,600; Hoboken, 70,324; Bayonne, 55,545; and Passaic, 54,773. Thus these eight cities had an aggregate of 1,089,437, or 62.5 per cent of the total given. These figures, however, do not indicate the closeness of settlement and full population in the most developed sections. The Essex division serves what is in reality a "Greater Newark," comprising the whole of the well-developed Essex County and several adjoining manufacturing places, with a total population of over 500,000. In this division only one fare is charged except on two lines reaching remote points. Similarly there is a "Greater Jersey City" district with a population of over 500,000. These two groups of closely settled communities, with the others named above that are not included in the compilation for "Greater Jersey City," have a combined population of over 1,300,000, or about three-quarters of the entire population reached by the railway lines in organized communities.

The lines are wholly urban and suburban in character and while the schedule speed on different lines varies materially, this is due principally to traffic conditions. No lines in the system correspond to the interurban properties operated in the Central West. The highways on which the lines are built generally

afford no stretch of territory of as much as 10 miles in any one place where high-speed interurban service could be introduced. The country is so closely developed that comparatively little of the mileage is situated in open, unsettled districts. Most of the lines are short in length and frequent stops are unavoidable.

While, therefore, short stretches of some lines might be adapted for interurban service, most of the mileage is on highways and the vehicular traffic and grades encountered, together with consideration for the closely settled districts through which most of the lines run, cause the restriction of operations to those of the urban and suburban class. At the last session of the Legislature a commission was appointed to study the situation confronting the Morris Canal, and if the bed of this canal should be made available for rapid transit it might permit the construction of a high-speed line between Newark and Paterson.

REVENUE AND TRANSFER PASSENGERS

As the company has extended its transfer system from year to year, the increase in transfer traffic has been greater than that in revenue traffic. The total numbers of passengers of both classes in each year from 1904 to 1910 and the percentage of increase each year as compared with the preceding twelve months are shown in Table I.

TABLE I.—PASSENGERS CARRIED AND PERCENTAGES OF INCREASE EACH YEAR.

	Revenue Passengers.		Transfer Passengers.	
	Total No.	Per Cent. of Increase Over Previous Year.	Total No.	Per Cent. of Increase Over Previous Year.
1910.....	258,746,130	8.6	82,652,558	1.4
1909.....	238,171,257	8.5	81,548,978	9.2
1908.....	219,421,974	4.	74,688,628	4.3
1907.....	211,025,386	6.4	71,638,588	13.7
1906.....	198,326,467	10.2	62,986,021	14.4
1905.....	180,000,197	8.8	55,079,789	10.2
1904.....	165,400,000	...	50,000,000	...
1904 to 1910.	.....	56 4	.....	65.3
Average	.....	9.4	Average	10.9

THE SIX OPERATING DIVISIONS

The lines of demarkation of the six divisions into which the system is divided should be explained. Five divisions, the Hudson, Essex, Passaic, Central and Bergen, are located in the northern group of properties. The railway company has no present physical connection between the group of properties in the northern part of New Jersey and the lines of the Southern division, which center in Camden.

Taking first the northern group of properties, the lines of the Hudson division include in the main the properties that reach the New Jersey shore of the Hudson River. The lines of the Bergen division, however, comprising the most northerly properties in the system, include the properties which terminate at Edgewater, N. J., opposite the ferry operated by the company from West 130th Street, New York City. The lines of the Passaic division include the properties in Paterson, Passaic and the contributory territory. The Essex division includes chiefly the closely settled territory in and near Newark, and districts which are partly suburbs of that city and have been developed partly by the inrush of New York commuters. The Central division includes the most southerly of the northern group of properties, reaching Elizabeth, Rahway, Plainfield, New Brunswick and Perth Amboy. The Southern division comprises all the lines centering in Camden, which receive their traffic from local industries and homes and accommodate passengers using the ferries operated between Camden and Philadelphia by the Pennsylvania Railroad.

Other operations of the railway company include a toll road between Union Hill and Hackensack in the Hudson division, a wagon elevator in Weehawken owned by the People's Elevating Company and the Jersey City wagon elevator. The two latter properties afford conveyance between the high bluffs overlooking the Hudson River and the shore. The two ferry lines owned and operated by the company carry passengers and vehicles across the Hudson River between West 130th Street, New York, and Edgewater, N. J., and between Bergen Point, N. J., and Port Richmond, Staten Island, across the Kill von Kull.

TOPOGRAPHICAL CONDITIONS

Owing to the peculiar topographical conditions in the section of New Jersey in which the greatest number of lines are operated there is a peculiar condition of competition with steam railroads. The New Jersey shore of the Hudson River in the districts reached rises abruptly within a short distance from the river to heights of 200 ft. or more. West of this ridge there are salt marshes, averaging about 2½ miles in width, which are traversed by the rights-of-way of steam railroads and by lines of the Public Service Railway running directly between Hoboken and Paterson and between Jersey City and Newark. On these salt marshes practically no traffic originates. The steam railroads maintain high rates of speed and make faster time than the street railway cars. On the other hand, the fares on the street railway are lower than those charged by the steam properties. For instance, the steam railways charge a single fare of 17 cents from Newark to New York, although the Pennsylvania Railroad adds 10 cents to this for each passenger who chooses to enter the new terminal on Manhattan Island. As the steam railway companies will not sell tickets from Newark to Jersey City or Hoboken, passengers are obliged to buy through tickets to New York at the rate mentioned. The street railway fare from Newark to Jersey City or Hoboken is 10 cents and, as this includes the right to transfer, much traffic is secured which otherwise would be diverted.

West of the salt marshes the land rises again and some parts of Newark reach an altitude of about 200 ft. above sea level. There are other high points on the system. The lines running in the residential community of Montclair reach the highest point. They go to the summit of the Orange Mountains in Montclair, 509 ft. above sea level. A line which passes the station of the Delaware, Lackawanna & Western

Railroad at Montclair extends to Caldwell, which is 418 ft. above sea level and reaches a district in which many people spend the summer. In this district a temporary summer population of about 7,000 people adds to the traffic of the company during the heated season.

MILEAGE IN LARGE CITIES

The extent to which the mileage is located in the principal cities of the territory may be explained by the following statement, giving the miles of track within the corporate limits of the places named: Newark, 102.251 miles; Jersey City, 64.417 miles; Paterson, 37.621 miles; Elizabeth, 29.666 miles; Camden, 42.193 miles; Hoboken, 13.464 miles. The total of 289.612 is about 40 per cent of the aggregate number of miles of track in the system, eliminating trackage at carhouses, crossovers, etc. "Greater Newark" and "Greater Jersey City," as mentioned on page 555 of this chapter, would have 174 and 127 miles of track respectively, or a total of 301 miles. Of the total of 525.19 miles of road located in all divisions, 302.18, or 57.5 per cent, is double track. All the single track mileage is protected by signals operated by trolley contact.

The extent to which the lines secure traffic bound between New Jersey points and New York or from points directly on the New Jersey shore of the Hudson River may be shown roughly by a statement of the number of lines which have terminals on the river and the cars operated thereon during the afternoon rush hours. This statement is Table II.

Table II.—Cars and Lines at Hudson River Terminals in Rush-Hour Period.

	No. of Lines.	No. of Cars During Rush-hour—5:30 to 6:30 P. M.
Jersey City terminal—P. R. R. ferries	9	149
*Hudson terminal, D., L. & W.	9	154
Fourteenth Street Ferry	6	50
Forty-second Street Ferry	3	42
Pavonia Ferry—Erie R. R.	3	24
Edgewater, 130th street	4	16
Total	34	435

*Also the terminal of the Hudson & Manhattan Railroad.

These figures compare with the total of 101 lines and 1,250 cars operated on the system.

As a whole, the territory served is a very prosperous one. It includes the homes of many men of wealth who transact business in New York. There are also congested districts with conspicuous foreign settlements, but without the same degree of congestion that is found in the larger cities of the country. As numbers of people go from New York to nearby towns in New Jersey for the heated season, the total traffic in the summer is greater on some lines reaching country districts than in the winter months. The exodus of permanent residents for the summer, or a vacation trip, causes a reduction in traffic on other lines. The total traffic, however, is larger in summer than in winter. June is the best traffic month of the year.

It will be understood from the reference to the small number of ferries owned and operated by the railway that this company has not attempted to compete with the established ferries doing business between Manhattan Island and New Jersey. In fact, with the exception of the short ferry connecting Bergen Point, N. J., and Port Richmond, Staten Island, no ferries whatever were operated across the Hudson River until the acquisition last year of control of the New Jersey & Hudson River Railway & Ferry Company.

The traffic was developed by a different policy, in accordance with which street railway service was furnished at the points where the traffic existed. This policy secures traffic carried on the ferries operated by the various railway companies connecting New York with different points in Jersey City, Hoboken and Weehawken. It also secures business carried by the Hudson & Manhattan Railroad between Hoboken and Jersey City and points on Manhattan Island.

The largest number of passengers secured at any one point on the Hudson River is recorded at the new Hoboken terminal, where it is estimated that 45,000 passengers a day are carried.

In this terminal one loop is installed in the surface part and one loop in the elevated structure. Four lines are accommodated in the surface part of the terminal and an equal number on the elevated part. The lines that terminate in the elevated part of the terminal, however, are those of the heaviest traffic. It is possible for passengers to pass under cover from this terminal to the Hudson River tunnels or to upper decks of ferry boats. This convenience of transfer is causing a steady increase of the traffic at this point.

A practical method for the collection of the initial fares on the lines leaving the elevated part of the Hoboken terminal has been established. Passengers pay the fare when they enter turnstiles through which they have to pass to enter the train platform. As each person boards the car he is registered by the conductor on a separate terminal register, and the total number of passengers shown by the car returns is checked against the total number indicated by the register returns.

Owing to topographical and business conditions prevailing, there are many picturesque sections in the districts reached. Among these may be mentioned the docks of foreign steamship lines at Hoboken. These furnish some traffic, partly of an immigrant nature. The dock district of Hoboken is also the terminus of the White line, one of the longest lines in the system, which extends from that city to Paterson, 17.6 miles. Hoboken is the site of Stevens Institute.

TRAFFIC DEVELOPMENT

The most remarkable development of territory from a traffic standpoint which is taking place on the lines of the system at the present time is found at West New York, N. J., which is located on the Hudson River, about opposite Fifty-ninth Street, Manhattan Island. This district, illustrations of which are presented on plate VI, has developed entirely in the last seven years and so far has been built up largely by the homes of working people. Some industries, such as silk mills, have also been established there. The section that is developed is a short distance west of the Hudson River. Now, however, the land lying

directly east on the Palisades facing Manhattan Island is undergoing development, and it is expected that people of more means will build in this territory. The district is easily accessible from Hoboken terminal or from New York by way of the Weehawken ferry, where two loops have been constructed in order to accommodate the rush-hour traffic.

The company reaches, by means of the ferry which it operates between 130th Street, Manhattan, and Edgewater, N. J., the crowded district of Harlem. The ferry affords a gateway for automobiles to reach the mountainous districts on the west shore of the Hudson River in northern New Jersey and southern New York. It connects with the cars of the Bergen division and thus affords a means of transportation to some of the finest residential districts and one of the famous golf clubs of the country.

As headways are short on nearly all the lines, little need for shelter stations exists, but several have been constructed. The most attractive type of shelter house is that which was built recently at Morsemere, on the line between Edgewater and Englewood. This is constructed almost entirely of glass. This unusual design was determined after a conference with the residents of the neighborhood, who thought that any other type would be objectionable, but recognized the advantage of an attractive shelter house. A view is shown on plate IX.

CONGESTED CORNERS

A map of the territory showing the lines of the company, which is reproduced on page 559, indicates to those experienced in street railway operation the nature of the traffic problems encountered constantly by the transportation department. About 100 per cent more cars are operated during the evening rush-hour traffic than in the middle of the day. Outside of the closely connected lines nearest the Hudson River there are three main centers of traffic in the Northern divisions, notably in Newark, Paterson and Elizabeth. In Newark the principal congestion arises in the afternoon rush hour from the traffic conditions at the intersection of Broad and Market Streets, which is the principal point in the business district and the busiest junction in the entire system. The number of cars scheduled to cross the intersection of these streets in fifteen-minute periods in the afternoon rush-hour is shown in Table III. This indicates that the largest number scheduled was 562 between the hours of 5:15 and 6:15 p. m. on a typical day, Jan. 23, 1911.

The conditions at this busy intersection are further complicated by the fact that several lines operated on Broad Street are looped around Bank Street, which is one block from Market Street. Realizing the importance of as speedy movement of cars as possible across the intersection of these streets, the city of Newark has co-operated with the company by the adoption of traffic rules which are enforced rigorously by policemen. Except at the corner of Broad and Market Streets, street intersections are not observed as stopping points within a few blocks of this crossing. Trolley stations are designated and are placed at such points as will impede in the smallest possible degree the progress of street railway traffic.

In order that relief at this point may be assured, it has been suggested that a subway be built with two separate levels, so that the Broad and the Market Street cars could be operated without loss of time for crossing. This would provide capacity for twice as much service as is now given at the intersection on the street level. An offer was made to the city by the company involving either construction and operation of such a subway by the railway or construction by the city and operation by the railway, but in the absence of prompt action it was withdrawn.

TABLE III.—CARS SCHEDULED TO CROSS BROAD AND MARKET STREETS, NEWARK, IN AFTERNOON RUSH PERIOD.

Time.	East.	West.	North.	South.	Total.
4:45 to 5:45	187	172	74	75	508
5:00 to 6:00	196	188	80	81	545
5:15 to 6:15	190	199	84	89	562
5:30 to 6:30	175	195	85	92	547
5:45 to 6:45	150	173	87	92	502
6:00 to 7:00	123	148	85	85	441
Cars leaving Bank Street Loop and entering Broad Street, one block from Market Street:					
4:45 to 5:45					52
5:00 to 6:00					57
5:15 to 6:15					61
5:30 to 6:30					53
5:45 to 6:45					45
6:00 to 7:00					39

Another traffic development of importance to Newark is promised in the new line between Newark and Manhattan Island to be operated jointly by the Pennsylvania Railroad and the Hudson & Manhattan Railroad. It has been announced that this line will be opened for operation this fall. The terminal for this line will be at Saybrook Place, and as it will probably cause some concentration of the commuter business, it will produce further congestion at the junction of Broad and Market Streets. The construction of another loop by the Public Service Railway would relieve conditions at the proposed terminal of this line, but while some talk on this subject has taken place, no definite proposition has been made by the company to the city. In order to meet the necessities of this case the city has tried to secure the passage of legislation which would enable the company to obtain the right to construct a loop without acquiring rights from the owners of abutting property.

PATERSON CONDITIONS

A similar condition of congestion, though involving a much smaller amount of traffic, is found in Paterson, where the situation at the intersection of Market and Main Streets involves the constant attention of the transportation department each afternoon. This city has a large foreign element in its population, due to the establishment of silk mills, which make it the leading city in the manufacture of that commodity in the country. The silk mill of the Doherty Mill Company, which is illustrated on plate IX, furnishes traffic for a number of extra cars each afternoon.

Extra cars are also provided to meet afternoon rush hour conditions at the plant of the Singer Sewing



Intersection of Broad and Market Streets, Newark, the Point of Greatest Congestion of Traffic on the System

Plate I



Exit Tracks on Upper Level of Hoboken Terminal



Entrance Tracks on Lower Level of Hoboken Terminal



Turnstiles at Entrance to Train Platform on Upper Level of Hoboken Terminal



Escalator Leading to the Upper Level of the Hoboken Terminal



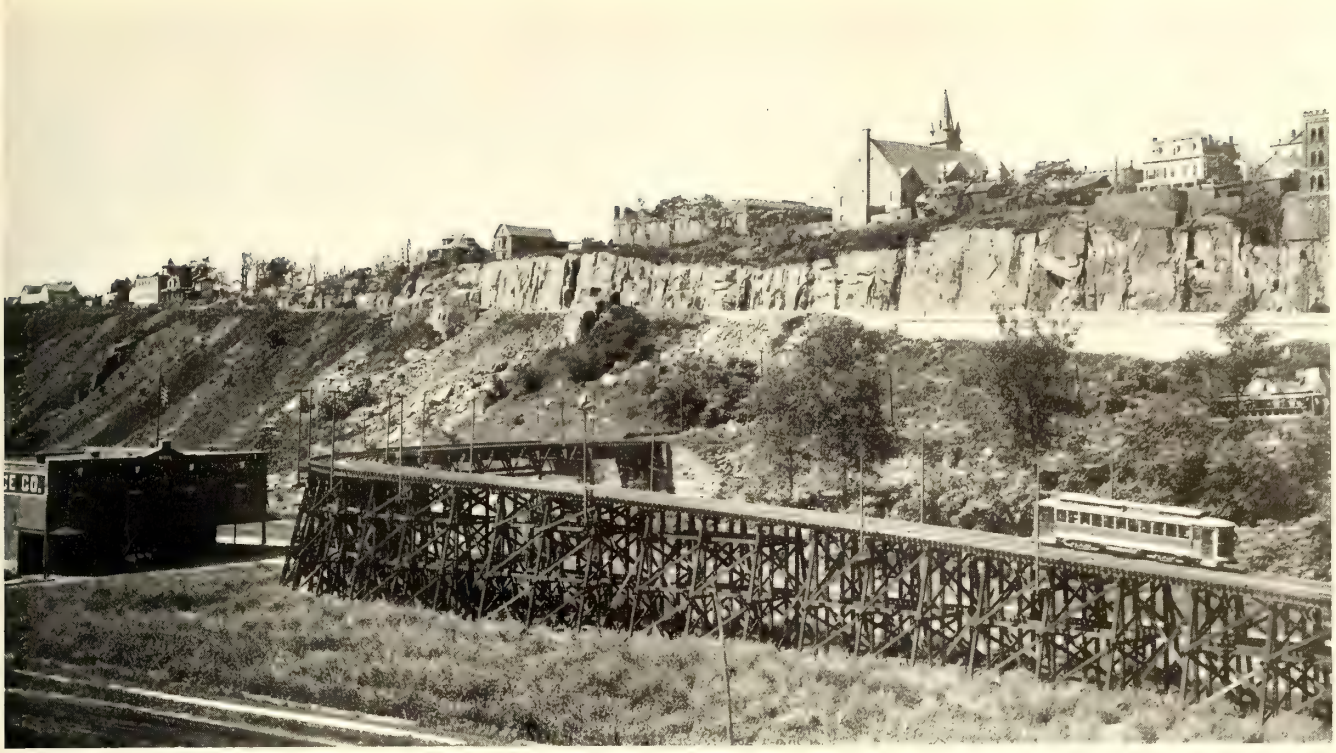
View at Intersection of Broad and Market Streets, Newark



Loop and Tracks at Principal Newark Station of the Pennsylvania Railroad, an Important Center of Street Railway Traffic



Loop at Weehawken Ferry Station of the West Shore Railroad, with Skyline of New York City from Forty-second Street to Seventy-second Street



Hillside Line at Hoboken



Edgewater Terminal Loop, Showing Station of the Ferry Operated by the Company Across the Hudson River Between Edgewater and West 130th Street, New York City



Development of Territory at West New York, N. J., Which Is Located on the Palisades of the Hudson River, Opposite About Fifty-ninth Street, New York City. These Buildings Have Been Constructed in the Last Seven Years



Loops at Camden Ferry Station, with Skyline of Part of Business District of Philadelphia



Scene in Branch Brook Park, Newark, One of the Many Attractive Public Places of Amusement Reached by the Lines of the System



Scene in Outlying District of Paterson, Showing Part of East Side Park—The Bridge Over the Passaic River Is at the Foot of the Hill



Lake in Woodlynne Park, Camden—This Park Is Owned by the Company



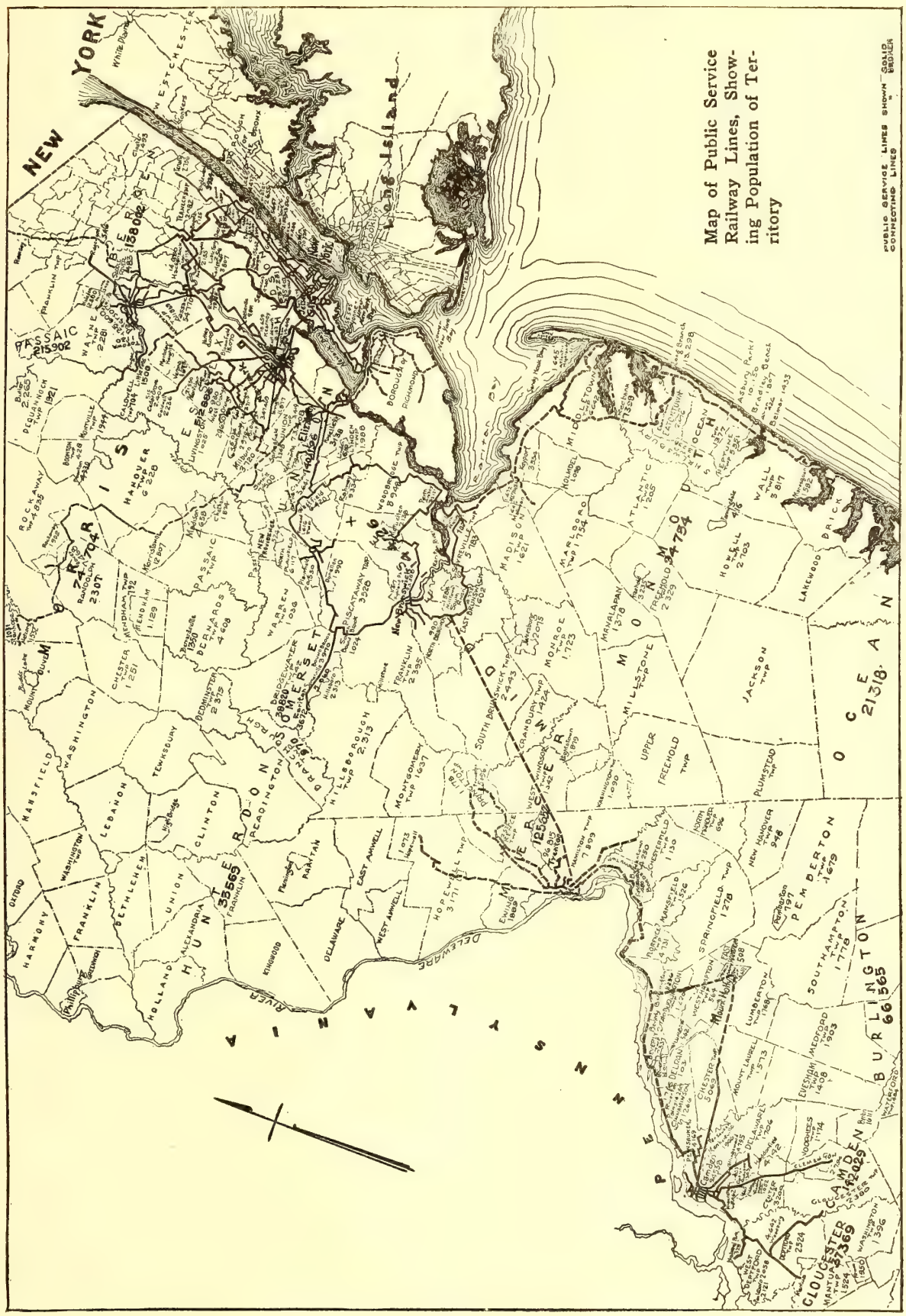
Wagon Elevator Owned by the Company and Located in Weehawken



Section of Track on Private Right-of-Way on the Fourteenth Street Line, Hoboken



Part of Central Business and Factory District of Newark


Map of Public Service Railway Lines, Showing Population of Territory
PUBLIC SERVICE LINES SHOWN SOLID
CONNECTING LINES
NEW YORK
Long Island
PASSAIC 215902
BERGEN 158002
ESSEX 322602
HUDSON 386401
MORRIS 124504
SUSSEX 24704
WARREN 36020
HUNTERDON 35565
MERCER 125067
MIDDLESEX 213184
MONMOUTH 234794
OCEAN 21318
BURLINGTON 66565
CAMDEN 146029
GLOUCESTER 57369
ATLANTIC 67944
CAPE MAY 17269
CUMBERLAND 57131
SALEM 33762
DELAWARE RIVER
DELAWARE BAY
ATLANTIC OCEAN

Machine Company at Elizabeth, at the Edison plant in West Orange and at the plant of the New York Ship Building Company in Camden.

A large part of the factory rush-hour traffic, however, is bound in the reverse direction from the large volume of business at this period, so that it is possible to load the cars both ways. For instance, the cotton and silk mills in Jersey City Heights, West Hoboken and Union Hill furnish traffic for cars bound to the ferries to meet the crowds arriving from New York. The hat factories in Orange and other plants in West Orange furnish passengers to Newark for the cars that carry the outward-bound crowds from that city. It is partly owing to these conditions, affording frequent opportunities for good loads on both trips of a run, that the company has been able to extend fare limits steadily. The uniform rate of fare for an adult passenger is five cents. Some lines of excessive mileage are divided into two or more fare zones.

RECAPITULATION OF_____DAY SCHEDULES

OFFICE OF SUPERINTENDENT OF TRANSPORTATION

PILOT NO.	LINE	SCH'D. NO.	IN EFFECT	NO. OF CARS 7 AM	10 AM	2 PM	6 PM	HEADWAY 7 AM	10 AM	2 PM	6 PM	TRIPS	HOURS	MILES	PLATFORM COST	TIME PER TRIP	SPEED PER TRIP	AVRG. SCHD. SPEED	MILES PER TRIP
	HUDSON DIVISION																		
1	NEWARK AVE.																		
2	PACIFIC AVE.																		
3	MONTGOMERY																		
	GRAND TOTAL																		

FERRIES	HEADWAY OF BOATS 6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 M	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	12 PM	TRIPS	COST	FIRST TRIP FROM N. J.	FIRST TRIP FROM N. Y.	LAST TRIP FROM N. J.	LAST TRIP FROM N. Y.
P. R. & B. P. FERRY CO.																									
THE RIV. & FT. LEE FERRY CO.																									
FERRY TOTALS																									

	FROM	TO	HOURS	COST
PEOPLES ELEVATING CO.				
JERSEY CITY WAGON "L"				

Week Ending _____ Signed _____

Traffic Conditions—Form for Recapitulation of Schedules

CAMDEN DEVELOPMENT

The city of Camden, while settled principally by persons in business in Philadelphia, has several industries which furnish street railway traffic. The principal plant from which any considerable amount of traffic is received is that of the New York Ship Building Company. The chief center of traffic, however, is at the Camden ferry station of the Pennsylvania Railroad, which operates ferry boats across the Delaware River to Philadelphia.

The Public Service Railway has two loops in this ferry station, and a stub track inside of each loop. The cars load and unload at the same points during the rush-hour periods in the morning and evening. These periods are longer at Camden than in the northerly divisions of the company. The morning rush period, so far as the operation of cars is concerned, lasts from 5 to 7 a. m. It begins unusually early, owing to the necessity for operation of all the cars from the one carhouse located in Camden to the most distant points. The evening rush period starts at 5 p. m. and lasts until 6.45 p. m.

During the principal hour of the evening congestion forty cars are scheduled to leave on the Market Street side of the terminal at the Camden ferry station, and fifty cars on the Federal Street side. The loops have accommodated traffic satisfactorily. The one on the Federal Street side was built in 1907 and two years later the construction of the loop on the Market Street side was completed.

In the last five years operation at Camden has been made safer by the fact that nearly all grade crossings have been eliminated. The schedule speed of cars is limited rigorously in one or two places, and in one village the ordinance requirements prohibit a speed of more than 6 m.p.h. There are a number of points of historic interest on the lines of the Southern division.

Much of the suburban development at Camden is of comparatively recent origin and the low prices of land and low rents are gradually attracting more people from Philadelphia. There are also some colonies of summer campers who add substantially to the revenue of suburban lines for several months during the year. Traffic has been diverted to the street railway lines on account of the increase in commutation rates by steam railroads. Sunday riding is restricted to some extent on some lines owing to the existence of several Quaker settlements in the district.

While a number of private amusement parks and attractive public parks are located along the system, the only parks owned by the company are Woodlynne Park, Camden, and Riverside Park, New Brunswick. The latter park is leased. Woodlynne Park is managed by the superintendent of the Southern division. It is in a tract of 13 acres of land. This park is closed on Sundays owing to the wishes of the authorities. Newark has three public parks, to which there is much travel. The Orange County Reservation, a large district on the top of Orange Mountain, which is preserved in its wild state, is near the lines of

the company. The Eagle Rock Reservation in West Orange, which is visited by thousands of people in the summer, is reached by one line.

No freight or express is carried at any point on the system. Newspapers are carried at a flat rate of 25 cents per 100 lbs. Extra cars are operated to carry the Sunday newspapers.

ADJUSTMENT OF SCHEDULES

Traffic conditions on the Public Service Railway are complex and are the subject of constant study on the part of the superintendent of transportation in order that schedules may be adjusted properly to the requirements of the many diverse districts served.

A statement of lines published in Table IV is taken from a recapitulation of week-day schedules compiled in the office of the superintendent of transportation.

TABLE IV.—RECAPITULATION OF WEEK-DAY SCHEDULES

Office of Superintendent of Transportation

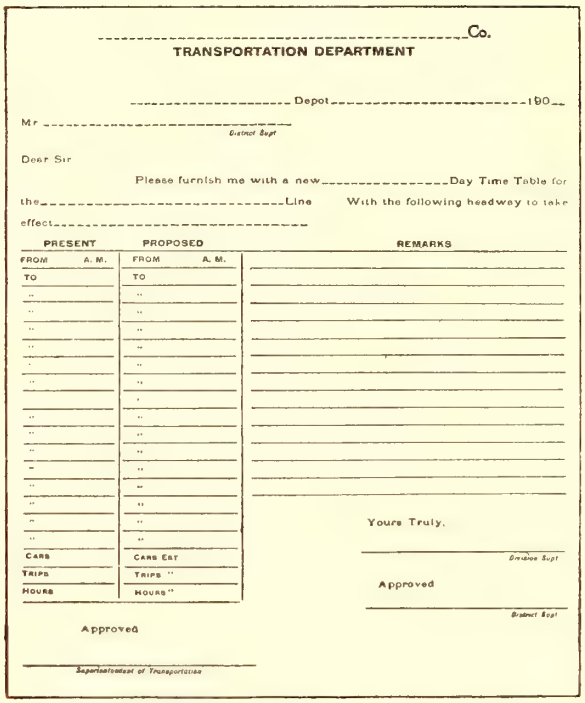
Pilot No.	Line	Average Scheduled Speed	Miles per Trip
	HUDSON DIVISION		
1	Newark Avenue	7.30	6.02
2	Pacific Avenue	7.36	6.08
3	Montgomery	8.40	11.64
4	Erie	6.62	4.05
5	Henderson	5.34	2.67
6	Lafayette	6.07	3.86
7	Greenville	8.85	16.49
8	Twenty-second Street	6.84	1.92
9	Fifth Street, Bayonne	3.73	1.00
10	Pavonia	7.58	7.60
11	Oakland	7.87	4.40
12	Newark and Summit Avenues	7.69	7.75
13	Washington	6.38	3.15
14	Willow	6.49	4.04
15	Grove	6.40	5.24
16	Jackson	8.35	10.55
17	Summit	8.32	8.22
18	Bergenline	8.22	11.57
19	Union Hill	8.10	13.79
20	Fourteenth	8.34	6.79
21	Palisade	11.59	15.14
22	White Line	10.22	35.33
23	Homestead	9.47	13.29
24	Bergen Pike	8.48	27.22
	ESSEX DIVISION		
26	Plank Road	8.01	20.11
27	Turnpike	9.17	17.46
28	Chapel	5.83	1.34
29	Hackensack	11.68	8.13
30	Fourth	5.45	1.44
31	Broad	9.38	18.63
32	Clinton	8.15	7.53
33	Paterson	10.43	31.53
34	Orange	8.00	12.91
35	Roseville	7.22	4.87
36	Central	8.35	8.48
37	Bergen	8.13	9.78
38	Clifton	7.30	7.18
39	Springfield	8.36	15.22
40	Kinney	7.59	9.33
41	Kearney	8.31	13.71
42	Mt. Prospect	9.03	13.01
43	Mulberry	7.56	6.78
44	Bloomfield	9.35	21.47
45	Valley Road	8.72	10.96
46	South Orange Avenue	8.40	18.90
47	South Orange-Maplewood	10.02	5.06
48	Crosstown	7.19	11.58
49	Eagle Rock	6.88	4.30
50	Clay Shuttle		
51	Clinton Hulby	8.57	11.28
	PASSAIC DIVISION		
52	Lakeview	7.07	8.99
53	Rutherford	2.67	.72
54	Singac	8.39	11.12
55	Monroe	6.78	2.34
56	Riverside	6.80	4.61
57	Totowa	7.87	5.41
58	Hudson River	12.40	4.84
59	Haledon	7.69	7.97
60	Main	9.15	16.74
61	Governor	7.66	7.66
62	Park	7.38	3.76
63	Broadway	7.73	6.28
	CENTRAL DIVISION		
67	First	7.78	8.17
68	Third	9.11	13.53
69	South Broad	7.12	3.75
70	Elizabeth	9.08	17.21
71	Main Line	11.01	57.70
72	Netherwood	8.54	4.24
73	Arlington	8.03	7.90
74	Kenilworth	7.11	3.54
75	Fourth	7.93	3.90
76	Fifth	6.40	2.08
77	Rahway	10.29	30.86
78	Easton	9.84	4.92
79	Burnet	8.94	4.36
80	South Amboy	10.54	31.52
81	Trenton Local	8.92	
82	Perth Amboy	10.65	32.02
83	Raritan	11.18	27.96
83	Raritan	11.18	27.96
84	Main Street Methuen	3.87	1.84
85	Codwise	9.15	4.85
86	Elmora	8.99	27.02
87	Amboys	8.86	8.90
	BERGEN DIVISION		
89	Hudson River	13.89	27.54
90	Englewood	12.99	17.75
91	Fort Lee	7.93	7.84
92	Hackensack	10.22	21.64
93	Lodi	11.64	5.82
94	Arlington	4.95	2.24
	SOUTHERN DIVISION		
1	Crosstown	7.10	6.17
2	Broadway	8.16	8.41
3	Haddonfield	10.47	13.82
4	Haddon Heights	11.63	27.20
5	Kaighn Avenue	7.45	2.99
6	North Cramer Hill	8.10	6.76
7	Merchantville	10.91	20.53
8	Pensauken	10.45	12.11
9	Gloucester	10.34	26.30
10	Sixth and Eighth Streets	9.10	7.09
11	Second and Fifth Streets	6.61	3.38
12	Riverton		
13	National Park	7.47	4.67

This shows the number of lines in each division, pilot number of each line, schedule number, the date on which the schedule went into effect, number of cars operated and headway respectively at 7 a. m., 10 a. m., 2 p. m. and 6 p. m., the total numbers of trips, hours and miles, platform costs, the time per trip, the speed per trip, the average schedule speed and the miles per trip. The totals for the principal items indicated are also given in the statement. Copies of this recapitulation are sent to the officials and district superintendents. The longest round trip run for a crew is 57.7 miles on the main line of the Central division.

The methods by which the service is adapted to the requirements of the various communities served constitute one of the most important features of the work of the company. The organization of the superintendent of transportation, who is in charge of these matters, includes a schedule department, whose work may be explained in some detail as the efficiency of its operation is well known. Before the present systematic study of schedules was made, it was customary to send inspectors into the various districts to count the new houses and other structures under construction in order that definite plans might be made to meet the increased traffic that would develop from the improvements found under way. This plan has been changed and now the service is adapted quickly to the transportation conditions that arise from time to time. The supervisors at the carhouses are in closer touch with the actual traffic conditions than any other officials of the company. Requests for changes in schedules, unless received from outside sources, therefore originate with supervisors. They are sent directly to the division superintendent and, if approved, are forwarded to the superintendent of transportation. Local supervisors, however, change schedules as

weather or other traffic considerations make advisable from day to day.

The form used for a request for a new schedule is published on this page. As indicated, it shows the present and proposed schedules with the different headways as they are changed from time to time



_____Co.

TRANSPORTATION DEPARTMENT

_____ Depot _____ 190__

Mr _____
District Supt

Dear Sir

Please furnish me with a new _____ Day Time Table for the _____ Line With the following headway to take effect _____

PRESENT		PROPOSED		REMARKS
FROM	A. M.	FROM	A. M.	
TO		TO		
"		"		
"		"		
"		"		
"		"		
"		"		
"		"		
"		"		
"		"		
"		"		
"		"		
"		"		
"		"		
"		"		
"		"		
"		"		
"		"		
"		"		
"		"		
"		"		
CARS		CARS EST		
TRIPS		TRIPS "		
HOURS		HOURS "		

Yours Truly,

_____
Division Supt

Approved

_____
District Supt

Approved

_____
Superintendent of Transportation

Traffic Conditions—Request for New Schedule

during the day. In this form the total number of cars, trips and hours required are shown under the present schedule, and the totals estimated for the same items under the proposed schedule. These requests are inspected by the schedule department, which reports directly to the superintendent of transportation. It is found that supervisors, in making requests for changes, frequently miscalculate the number of cars to be required. The analysis made by the schedule department develops such mistakes, if any have been made, and also permits the superintendent of transportation to compare the service requested with service given previously on the same line. In making the analysis of the effect of the proposed schedule, the schedule department prepares a headway sheet showing exactly all the trips suggested. It is not the practice to make out this sheet for a short line which may have only two terminals, but the information is necessary to permit judgment as to the effect of a change on most lines. The headway is computed for each trip of every train on the line. This information is used to make the runs into trains and to show all the runs made by each car. This is then divided so as to make runs of 10 hours for as many trains as possible.

For the purpose of keeping the superintendent of transportation informed at the earliest possible moment as to the revenue from passenger traffic on each day, the schedule department telephones the first thing each morning to every division superintendent and secures a statement of the receipts and the car hours run on the preceding day. This information is completed ordinarily by 9 or 9:30 o'clock every morning. In order that no time may be lost, the same information for the corresponding day of the preceding year is placed on the form the night before. This form also shows the average revenue per car hour, the percentage of increase in the total receipts, and the total of car hours. The company's telephone wire reaches all divisions, making it possible to get the information in a few minutes.

REGULAR RUNS

A recapitulation is placed at the bottom of every weekday timetable, showing the number of hours, cars and miles, and the main line headways. This also shows the time of train runs required by the timetable. Eight hours or more constitute a regular run. According to the figures compiled by the company, out of 1,395 total runs on the system, 1,145, or 82 per cent, aggregate 10 hours or over a day; 165, or 11.8 per cent of the total, are 8 to 9 hour runs; 85, or 6.2 per cent, are trip runs. It is found that these figures vary only slightly from time to time.

To show the full process by which graphical records of the number of passengers and seats supplied on the lines are made, the details of the methods employed may be described. Inspectors are sent to some point of compulsory stop, as, for instance, a railroad crossing. They count the number of passengers on each car as accurately as possible. They know the number

P.M. **PUBLIC SERVICE RY. CO.**
CAR TIMING REPORT

Line—North and South **Date, Aug. 11, 1911**
Location—East and West Streets **Direction—North**

Train.	Due.	Arrived.	Minutes Late.	Pass.	Remarks.
8102	4.34	4.37	−4	52	
8103	4.41	4.43	−2	45	
8104	4.49	4.52	−3	46	
8112	4.55	4.58	−3	36	
8105	5.01	5.02	−1	52	
8106	5.07	5.09	−2	40	
8107	5.10	5.15	−5	50	
8111	5.19	5.20	−1	52	
8113	5.25	5.27	−2	45	
8108	5.30	5.33	−3	56	
8114	5.34	5.37	−3	50	
8118	5.38	5.41	−3	65	
8115	5.42	5.43	−1	40	
8110	5.46	5.47	−1	63	
8101	5.50	5.50	0	40	
8109	5.54	5.57	−3	70	
8102	5.58	6.00	−2	68	
8116	6.02	6.06	−4	65	
8117	6.06	6.07	−1	51	
8119	6.10	6.13	−3	56	
8120	6.14	6.15	−1	65	
8112	6.20	6.23	−3	53	
8105	6.26	6.28	−2	62	
8106	6.32	6.32	0	30	

+ sign. AHEAD.
− sign. LATE.

SIGNED.....

Traffic Conditions—Form of Car Timing Report

of passengers each type of car will seat and are able to determine pretty accurately what the load condition is in each case. The reports made by these men show the train number; the time at which the car was due at the point stipulated; the time at which it arrived; the number of minutes, if any, it is ahead of or behind time, and the total number of passengers carried. Each

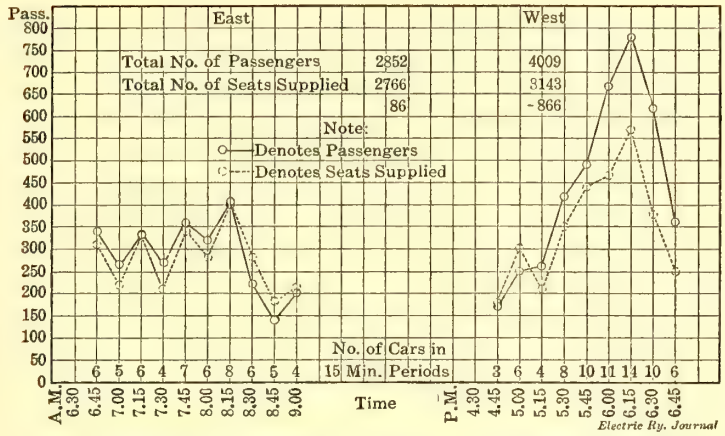


Chart Showing Passengers Carried and Seats Supplied in Morning and Evening Rush Periods

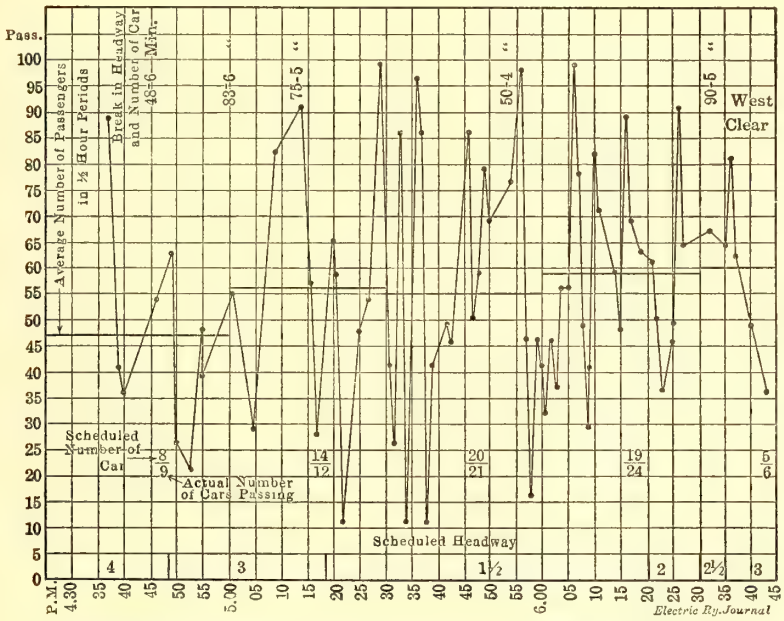


Chart Showing Passengers Carried in Cars in Evening Rush Period

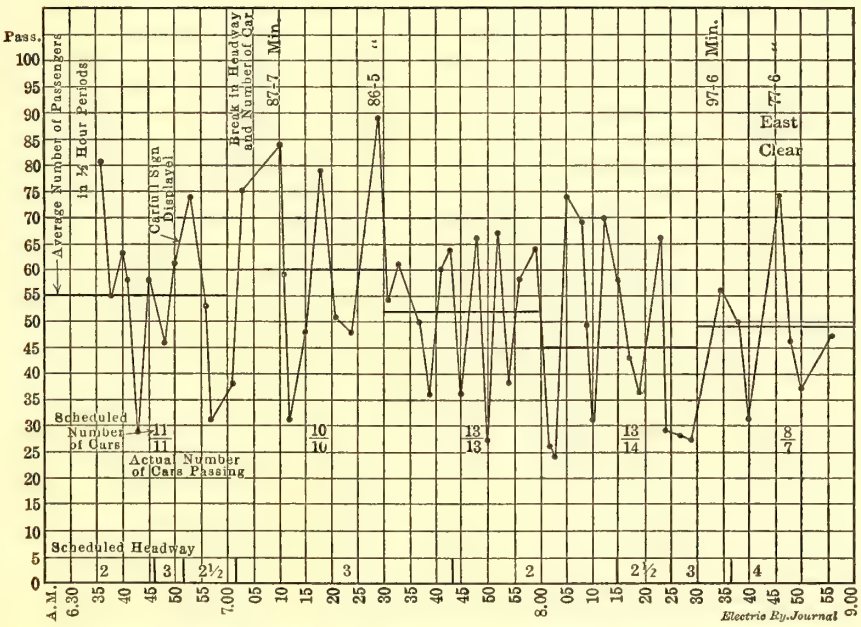


Chart Showing Passengers Carried in Cars in Morning Rush Period

day two men make a record of this nature at some point on a line in the system. As a rule the men take the record only at the time of the morning and evening rush. The division superintendents also place men at different points in their particular territory who sometimes happen to secure information regarding the same line at the same time.

CAR-LOADING RECORDS

Profile charts are made from this information, as published on this page, showing the condition of the weather and approximate number indicating the maximum load and a record of the number of passengers on each car. If the "Car Full" sign was displayed, that fact is indicated. This record shows the average number of passengers carried in half-hour periods, the schedule number of cars in such periods, and the actual number which passed the point designated. The schedule headway at all times during the interval under consideration is also indicated. Where there is a break in the headway scheduled, the number of the car responsible is indicated on the chart. Separate profile charts are made for the morning and evening rush records.

From these charts a third chart is made containing the principal information given on the first charts. This chart shows the total number of passengers and seats supplied on each line during both the morning and evening rush hours. It also indicates graphically a comparison of the passengers carried and the seats supplied in fifteen-minute periods.

The car-timing reports from which these charts are compiled are checked carefully by the schedule department and the charts are sent by the superintendent of transportation to the division superintendent affected, with recommendations as to changes or with instructions to discipline the men who were found by this method to be running ahead of time.

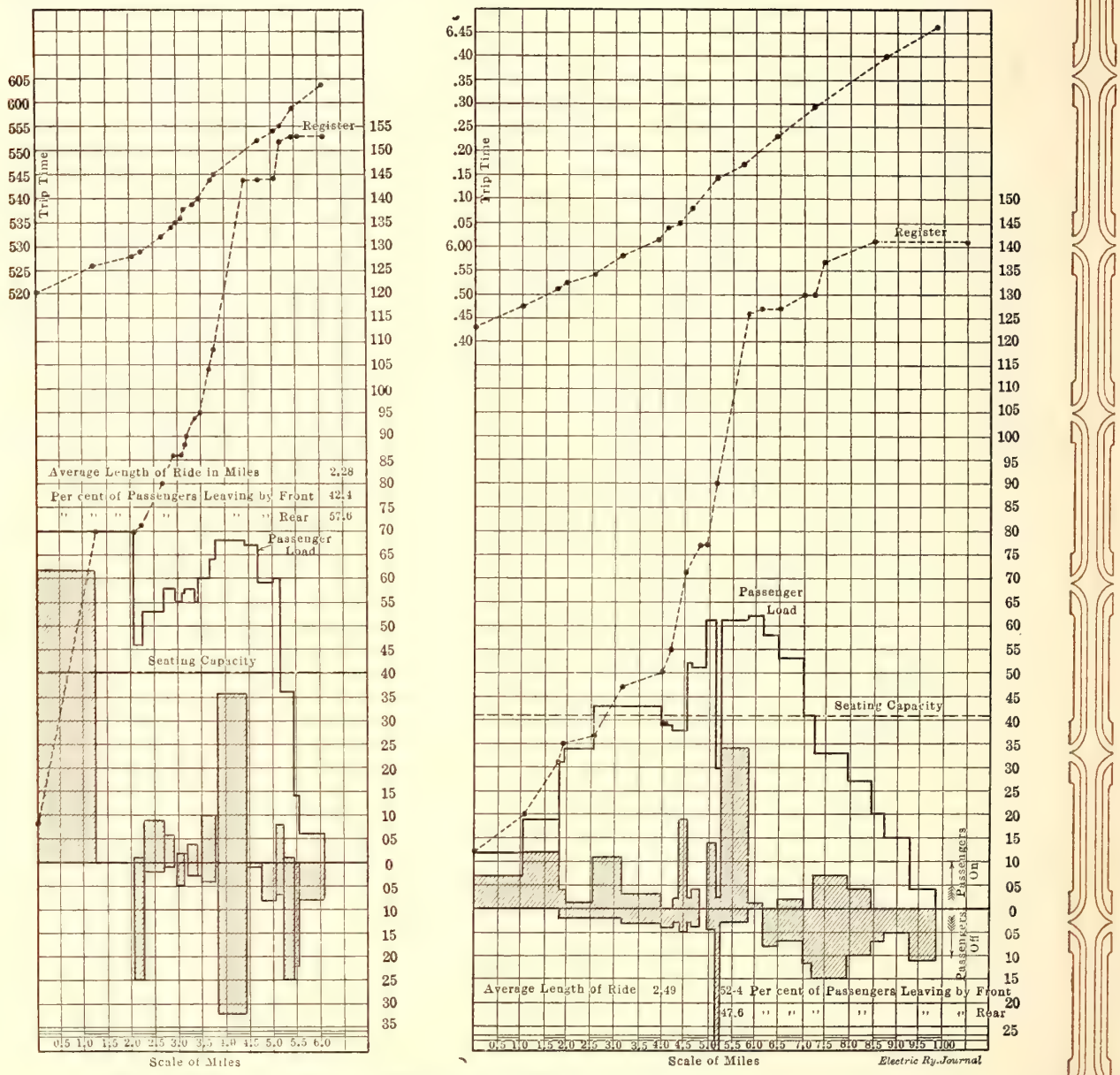
Of the 101 lines of the system, charts of this character are prepared for about 80. An effort is made to prepare a chart for each of these lines at least once a

month, and lines of heavy traffic are investigated at least twice a month. The lines that are not inspected in this way are small lines where traffic is light and changes are infrequent.

Besides the compilation of schedules, the schedule department checks the time of all chartered cars. As the rates for such cars are based on the number of minutes of use, charts have been made to show the running time from different points in the system to other points. One chart is made for each division, and a typical one is published on page 565. No cars are chartered for special use during the evening rush-hour service. The rate for special cars is figured on a basis of 10 cents per minute for actual running time from starting point to destination, and 5 cents per minute for run-off time from carhouse to the starting point. The minimum charge for one car is $8.

It is the practice to make new schedules whenever there is any warrant for their introduction. The object is to furnish the service where and when it is wanted. In addition to the regular week-day schedules, special schedules are made for Saturdays and Sundays, and for all holidays involving special traffic conditions, such as Labor Day. If special picnics or other events are to be held at any point, a special schedule is prepared for that day.

In August of each year a statement is prepared for the electrical department, showing the approximate number of cars by circuits that will be operated during the ensuing year. This enables the power department to make preparations for such increase in generating and distribution capacity as may be necessary.



Traffic Conditions—Diagrams Show Average Rides on Car, but Do Not Include Any Allowance for Subsequent Ride on Transfer

TESTS OF RIDES ON INDIVIDUAL CARS

Charts on this page show the results of tests to indicate the service on various lines. For these tests

two men are placed in a car. One man located at the front door has a stop watch and notes the time of each stop, the streets at which stops are made, the number of passengers leaving by the front door, and the condition of the register after each stop. The other man, located at the rear door, keeps a memorandum of the number of persons boarding and alighting at the rear end and the actual time and streets at which stops are made. The charts published indicate average lengths of rides of respectively 2.28 and 2.49 miles. They do not indicate the average length of ride per revenue passenger on these lines, as no attempt was made to distinguish between revenue and transfer passengers. No effort was made, either, to distinguish between passengers paying full fares of 5 cents each and those riding for half fare or on passes or reduced rate school tickets. As the data were gathered to indicate the average ride per total passenger these questions were not considered. It was found in one case that 42.4 per cent of the passengers left by the front door and 57.6 per cent by the rear door. In another case 52.4 per cent of the passengers left by the front door and 47.6 per cent of the passengers left by the rear door.

A test of another character has been made recently to show the loading and unloading at a busy point on one line. A typical summary showing the result of this experiment is published in Table V. This information is compiled only for cars of the prepayment type. Two men are used in the compilation of the data. One man watches the front door of each car that stops at the point designated and the other one gets the information desired regarding passengers who use the rear door. The object is to show the interchange of passengers and the average seconds per stop to effect the interchange.

Twice a year statements are prepared for each division showing the number of cars in the different sections of the division during the evening rush hour.

Table V.—Loading and Unloading Tests.
A Jersey City prepayment line.

	Aug. 28.	Aug. 29.
Number of trips	14	8
Total interchange	953	490
Total seconds stopped	1609.6	896.9
Average seconds per stop per passenger total interchange	1.89	1.83
Per cent of passengers leaving car, front platform	45.38	48.54
Per cent of passengers leaving car, rear platform	54.62	51.46

SCHEDULE.

LINE. NO.

IN EFFECT 19 SUPERSEDES NO.

RECAPITULATION

	Present	Previous	Increase	Decrease
CARS				
TRIPS				
HOURS				
MILES				
COST				
TIME PER TRIP				
SPEED PER TRIP				
SCHEDULE SPEED				
MILES PER TRIP				
RUNS				
RUNS AT 10 H'RS				
RUNS AT LESS				

HEADWAY		TIME POINTS
PRESENT	PREVIOUS	

Traffic Conditions—Recapitulation of Traffic Report

	P.R.R. Ferry	Car House	Vine St Ferry	Knight Av Fy.	Ship Yard	N. Creamer Hill	Mt. Ephriam Cem	Lee's Collingswood	Woodlynne Park	W. Collingswood	Gloucester Fy.	Merchantville	Delair	Audubon	Haddon Heights	Washington Park	Pensauken	Haddonfield	Lawnside	Moorestown	Riverton	National Park	Woodbury	Garden Lake	Clementon	Almonesson	Barton Landing	Mantua	Blackwood	Rancocas Park	Mt. Holly	Burlington
P.R.R. Ferry	0																														
Car House	12	0																													
Vine St Ferry	15	16	0																												
Knight Av Fy.	12	21	18	0																											
Ship Yard	22	34	31	13	0																										
N. Creamer Hill	22	28	16	36	43	0																									
Mt. Ephriam Cem	21	14	34	16	10	43	0																								
Lee's Collingswood	23	16	29	21	34	45	18	0																							
Woodlynne Park	24	17	30	15	10	46	3	21	0																						
W. Collingswood	28	21	34	19	14	50	7	24	4	0																					
Gloucester Fy.	29	30	38	20	6	51	17	41	20	24	0																				
Merchantville	30	21	44	45	52	52	51	53	54	58	59	0																			
Delair	31	22	45	46	53	53	52	54	55	59	60	27	0																		
Audubon	33	26	47	24	19	55	18	29	9	5	26	47	48	0																	
Haddon Heights	36	29	50	27	22	58	15	32	12	8	29	50	51	3	0																
Washington Park	37	38	51	28	15	59	25	49	28	32	8	64	65	36	39	0															
Pensauken	40	31	54	55	62	62	61	47	64	68	69	36	22	61	64	77	0														
Haddonfield	40	33	54	38	51	62	35	17	39	43	58	59	58	49	58	66	64	0													
Lawnside	41	34	55	32	27	63	20	37	17	13	34	55	56	8	5	42	63	45	0												
Moorestown	45	36	59	60	67	67	66	82	69	73	74	74	42	66	69	82	51	69	78	0											
Riverton	48	41	62	63	70	70	69	71	78	76	77	44	17	69	72	85	39	72	75	59	0										
National Park	50	51	64	41	28	72	38	62	41	45	21	77	78	49	52	13	87	79	57	92	55	0									
Woodbury	51	52	65	42	29	73	39	63	42	46	22	78	74	50	53	14	88	80	58	93	96	27	0								
Garden Lake	52	45	66	43	38	74	31	48	28	24	45	66	61	19	16	53	76	56	11	80	84	67	68	0							
Clementon	55	48	69	46	41	77	34	51	31	29	48	69	70	22	19	56	79	59	14	83	87	71	71	3	0						
Almonesson	59	60	73	50	37	81	47	71	50	54	30	86	87	39	61	22	96	86	66	101	104	35	16	77	78	0					
Barton Landing	60	51	74	75	82	82	81	67	84	88	89	15	57	81	84	97	66	84	87	15	54	110	111	152	155	159	0				
Mantua	63	64	77	54	41	85	51	75	54	58	54	90	91	63	65	26	100	92	70	105	108	39	16	81	82	25	66	0			
Blackwood	68	69	82	59	46	80	56	80	59	63	39	95	96	68	70	31	103	97	75	110	113	44	23	86	96	9	118	37	0		
Rancocas Park	77	68	92	98	99	99	82	84	87	90	96	47	77	96	99	114	85	101	104	32	94	127	128	115	118	136	17	140	145	0	
Mt. Holly	93	84	108	106	115	115	98	100	103	106	122	63	93	112	115	130	101	117	122	48	110	143	144	133	136	152	33	156	161	16	0
Burlington	130	121	145	145	152	158	135	137	140	143	159	100	130	149	152	167	138	154	167	85	147	180	181	178	181	189	70	193	198	53	37	0

Traffic Conditions—Form of Division Chart Used in Calculation of Chartered Car Time

THE CORPORATION AND ITS ORGANIZATION

WHILE the Public Service Railway is the operating company which furnishes the street railway facilities in the closely settled districts of northern New Jersey, it is not so well known publicly as the Public Service Corporation, by which it is controlled.

FORMATION OF THE CORPORATION

The corporation was formed in 1903 to overcome the severe financial straits into which electric railway and other public utility properties had fallen, and it has acquired extensive holdings of securities of the three principal classes of public utilities—electric railway, electric light and power, and gas.

Although the financial condition of the street railway properties had aroused concern for some time prior to the organization of the Public Service Corporation, it was not until a serious accident occurred in Newark that public attention was focused on the need for radical improvement. A car filled with school children was struck by a train of the Delaware, Lackawanna & Western Railroad at Clifton Avenue, Newark, and this had the effect of arousing an insistent public demand for radical rehabilitation of the properties. A number of conferences were held between holders of securities and bankers interested, and one proposition involving the organization of a new company was received and considered. The terms of this proposition, however, involved so large an increase in outstanding securities with so small a cash consideration therefor that, on recommendation of a sub-committee, it was rejected by a general committee.

The sub-commitee, composed of Randal Morgan, John I. Waterbury and Thomas N. McCarter, submitted a new plan in which provision was made for the advance of the necessary funds and the underwriting of the proposed new securities by the Fidelity Trust Company of Newark. The plan, in its general outline as well as details, was conceived by Mr. McCarter, who under the circumstances refrained from advising its acceptance. As Messrs. Morgan and Waterbury, however, recommended the adoption of the plan, and their advocacy of the arrangement was supported by the committee, steps were taken immediately to make the offer effective. Although it was not so stated at the time, it was understood that Mr. McCarter, as the author of the plan, had been asked to guide the affairs of the new corporation as its president and had consented to do so.

The sub-committee, in directing the proposal to stockholders of the several companies concerned, reported that in the calendar year 1902 the earnings from operation of the properties whose condition was primarily responsible for the movement were as follows: North Jersey Street Railway Company, $4,395,225; Jersey City, Hoboken & Paterson Railway Company, $1,951,365; Elizabeth, Plainfield & Central Jersey Railway Company, $250,711; Orange & Passaic Valley Railway Company, $88,134; total, $6,685,435.

After examination of the properties the committee concluded unanimously that no proposal should be considered in the interest of the companies which did not provide sufficient funds to meet the existing liabilities and immediate requirements and also money for betterments, extensions and improvements, and which did not provide further for a reduction of capital to a sum upon which, with the best management and liberal and judicious expenditure of money, fair dividends should not be earned and paid continuously.

The proposition submitted under the name of the Fidelity Trust Company of Newark, which was accepted and carried out, provided for the organization of a new corporation with an authorized capital stock of $25,000,000, of which $10,000,000 was to be issued at par for cash. It was provided that future issues of stock should be made only for cash and at not less than par. The new company, it was proposed, should purchase the stocks of the street railway properties named and issue in payment therefor perpetual interest-bearing certificates secured by a pledge of the stocks acquired. These certificates were to bear 2 per cent interest the first and second years, and rates increasing at one-half of 1 per cent annually until the tenth year. Then the rate was to become 6 per cent and dividends were to continue at that rate thereafter.

It was also proposed that the new company should take over additional properties immediately, offering similar certificates for the stock of the United Electric Company of New Jersey, and acquiring by lease the Essex & Hudson Gas Company, the Hudson County Gas Company, the Paterson & Passaic Gas & Electric Company and the South Jersey Gas, Electric & Traction Company.

The new company, as part of the plan, was to pay the floating debt of the street railway companies, which amounted at that time to about $4,300,000, and was also to provide the amounts necessary to cover the immediate requirements of the companies, aggregating approximately $1,750,000. For this total advance the new corporation was to receive so far as possible the bonds of underlying companies authorized by existing mortgages.

BROAD POWERS OF CHARTER

It was in pursuance of the plan outlined that the Public Service Corporation of New Jersey was organized with broad powers on May 6, 1903. The objects for which the corporation was formed are comprehensive. They include, in brief:

To purchase or otherwise acquire and own, sell, mortgage or otherwise dispose of the shares of the

capital stock of, or any bonds, securities or other evidences of indebtedness created by, any corporations of New Jersey or of any other State, or of the United States, and to exercise all the rights, powers and privileges of ownership of such stock, including the right to vote thereon.

To aid in any manner any corporation any of whose stock, bonds or other obligations are held or are in any manner guaranteed by the company, and to do any acts for the preservation and protection, improvement or enhancement of the value of any such shares of stock, bonds or other obligations, or the property represented thereby; to do any things tending to increase the value of any property at any time held or controlled; to further the organization of subsidiary companies; to issue bonds and to secure them by pledge, deed of trust, or mortgage of or upon the whole or any part of the property, real and personal, and to sell or pledge such bonds for proper corporate purposes; to construct, maintain, extend, enlarge and operate in New Jersey works for the supply and distribution of electricity; to acquire and hold such works with the franchises and rights under which the same are or may be operated by purchase, lease or otherwise; to operate such works and exercise such franchises and rights; to make, accept and transfer leases of works constructed and to be constructed for the purpose of supplying and distributing electricity; to operate such works under such leases and to use the public highways, streets and alleys for the purpose of erecting poles to sustain the necessary wires and fixtures and to lay pipes or conduits and to lay wires therein beneath the public highways and alleys as may be deemed necessary.

It is also provided that the company shall have power to issue obligations other than those mentioned, including perpetual interest-bearing certificates in payment for property, such property including shares of stock acquired by it, or for any other object in its business; to mortgage and pledge any stocks or other obligations or any property which may be acquired; to secure any bonds or other obligations issued or incurred by it; to guarantee any dividends or the principal and interest of bonds or other obligations and the performance of contracts and leases made by other corporations, and to issue its stock, bonds or other obligations in payment for any such guarantee when made by any other corporation, for the improvement or enhancement of the value of any shares of stock, securities, or other property owned by this company or any corporation in which it is interested.

As a primary object of the incorporation the company, it is provided, shall also have power to acquire by lease or other instrument the property and franchises of any corporation for such terms as may be agreed upon and to perform the obligations of any such lease with reference to the maintenance, operation, extension and improvement of the leased property, and to purchase or otherwise acquire and hold, mortgage and transfer or otherwise dispose of, trade, deal in and deal with property of every class and description.

It is further stipulated that the company shall have all the powers conferred by the laws of the State upon corporations formed under the corporation act, and it is expressly provided that the enumeration of specified items shall not be held to restrict in any manner the general powers of the company.

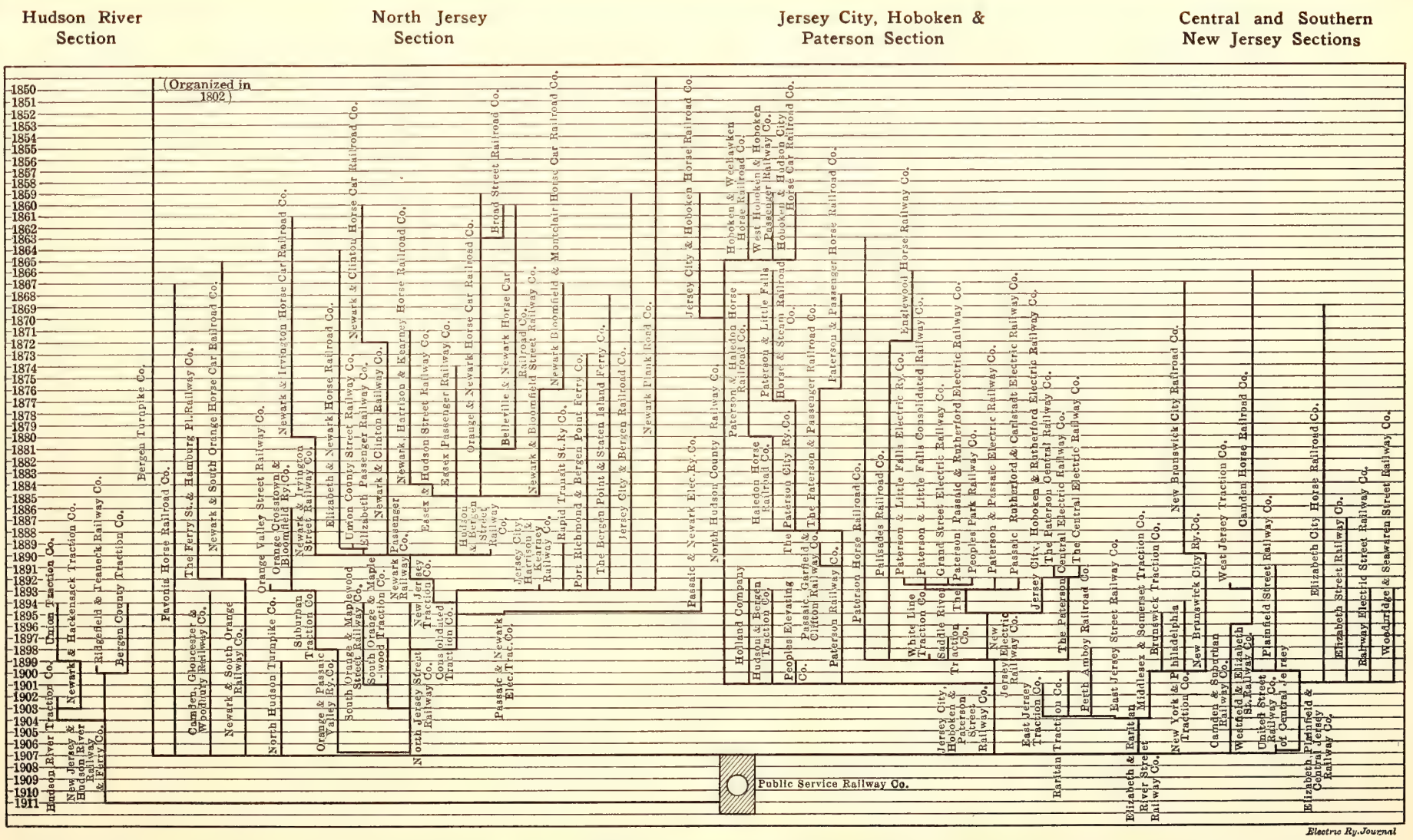
DEVELOPMENT OF THE SYSTEM

It was the intention at first, as may be inferred from the foregoing, that the corporation should control eventually most of the electric railway, electric and gas utilities of New Jersey. In furtherance of this plan, additional properties have been acquired from time to time and the corporation has continued to expand.

In one particular the plans formed originally have been amended. The corporation was designed at first to acquire and operate directly all the properties controlled. With the form of organization which was adopted later, it became mainly a security-holding company. Under this plan the Public Service Railway Company was formed on July 30, 1907, as a consolidation of the North Jersey Street Railway Company, the Jersey City, Hoboken & Paterson Street Railway Company, and the United Street Railway Company of Central Jersey. The Public Service Railway Company has absorbed or leased all the railway properties in the system. Similarly the Public Service Gas Company, a subsidiary, has acquired control by merger or lease of the gas properties. The Public Service Electric Company was formed on June 13, 1910, to carry out the same plan with respect to the electric lighting and power companies. The corporation owns 99.43 per cent of the $38,000,000 stock of the Public Service Railway Company, and, except directors' qualifying shares, all the stock of the Public Service Gas Company and the Public Service Electric Company.

The family tree illustrating the development of the present railway system of the Public Service Corporation is published on page 568. This gives the dates of organizations and names of the underlying properties which have been absorbed or leased by the Public Service Railway. In this diagram no account is taken of the fact that between 1903 and 1907 the properties were controlled directly by the Public Service Corporation. The control of all the properties was transferred later to the Public Service Railway. The family tree is given to indicate the large number of independent operating properties which were finally combined into the present extensive system.

The properties controlled by the Public Service Corporation or its subsidiaries are among the oldest in the country concerned in any way in the operation of public utilities. The earliest company organized which is now a part of the Public Service Railway system is the Bergen Turnpike Company, which was formed in 1802. This company still operates as a toll road, on which the railway company has a line. Other companies were operated originally as stage lines and some properties passed successively through the periods of horse power, cable and then electricity.



Family Tree of the Public Service Railway, Showing the Large Number of Companies Whose Properties Were Combined at Various Times in the Past to Form Systems That Were Merged Later Into One Extensive Organization.

The operation of horse cars was started in Newark and Jersey City in 1860. Three years later the operation of a steam dummy line was begun in Jersey City. This line was operated to the shore of the Hudson River first, but, as the city grew, operation was restricted more closely to outlying sections. The line, however, remained in operation until the eighties. The first electric car to be operated on the entire system, as now constituted, was started experimentally in 1889. It was operated by the Leo Daft system. Several cars were equipped with this system and operated. In the meanwhile the Newark Rapid Transit Railway Company, which had been organized as an electric railway, began construction and started the operation of its lines in Newark on Oct. 25, 1890. The Springfield Avenue line in Newark had been converted previously from horse to cable power, and this was converted for initial electrical operation on Oct. 4, 1890. The final work of conversion to electric operation of the principal properties located in Newark and Jersey City was finished a little later.

REHABILITATION, NOT EXTENSION

Although the corporation was formed with the broad objects stated, it has conducted its affairs along lines which naturally were not foreseen perfectly at the time of organization. For instance, the railway lines have been extended comparatively little. The principal increases in mileage have resulted from the acquisition of properties. The great development in the railway properties in the period following their acquisition by the corporation has been one of rehabilitation. Track and equipment have been reconstructed and modernized. Some of the properties had been extended freely into outlying districts by the earlier companies, and as they reached some lightly settled territory development has been awaited.

A further check upon railway development has been furnished by the new policy of the State regarding franchises. Most of the street railway franchises held by the subsidiary companies of the corporation are perpetual. Several years ago agitation was started in New Jersey for limitation of the life of new franchises and an act on this subject was passed by the Legislature in 1906. This measure limited franchises, except in some localities, to twenty years. The term could be made forty years by a majority vote. The act was afterward amended so that in communities not exceeding 12,000 population franchises could be granted for not to exceed fifty years.

The corporation, notwithstanding the comparatively limited extension of street railway track, has benefited in other ways by the development of territory which resulted from the street railway facilities furnished. It regards the street railway properties in one sense as agencies which insure the settlement of territory, and hence an inevitable increase in the consumption of gas and electricity.

Table VI shows the miles of track operated at the end of each fiscal year.

Table VI.—Miles of Track Operated.

Dec. 31.	
1903	495
1904	646
1905	646
1906	646
1907	648
1908	657
1909	657
1910	713

Table VII shows the proportion of the revenue contributed by the three principal departments into which the corporation's activities are divided. This shows that the railway properties as classified furnished 47.3 per cent of the total gross revenue from all sources for the seven months of operation in 1903. This proportion decreased to 45.6 per cent in 1910. On the other hand the electric properties increased from 18.8 per cent of the total in 1903 to 20.1 per cent in 1910. The gas properties decreased from 32 per cent in 1903 to 29.1 per cent in 1910. Miscellaneous income aggregated 1.9 per cent of the total in 1903 and 5.2 per cent in 1910.

Presumably there have been occasional adjustments, owing to the transition period through which the properties have been passing, that would affect to some extent any deductions that might be drawn from the figures. Some properties of each class have been acquired in various years, so that the figures are not based on ownership of the same properties from year to year. However, they show that the railway system contributed pretty close to one-half of the gross revenue, the electric properties one-fifth, and the gas properties a little under one-third.

Table VIII shows the percentage of increase each year, as compared with the preceding year, in the

Table VII.—Percentages of Gross Revenue Contributed by the Various Properties.

	Electric Properties.	Per Cent of Total.	Gas Properties.	Per Cent of Total.	Railway Properties.	Per Cent of Total.	Miscellaneous Income.	Per Cent of Total.	Total.
*1903	$1,776,557.65	18.8	$3,026,993.50	32.	$4,471,244.37	47.3	$187,403.74	1.9	$9,462,199.26
1904	3,502,811.92	19.7	5,378,440.63	30.3	8,415,278.79	47.4	463,249.75	2.6	17,759,781.09
1905	3,721,631.68	18.7	6,059,446.56	30.4	9,488,358.45	47.7	640,405.91	3.2	19,909,842.60
1906	4,161,917.81	19.4	6,526,316.01	30.4	10,086,933.92	46.9	723,658.34	3.3	21,498,826.08
1907	4,647,219.18	19.7	7,251,480.50	30.7	10,705,392.77	45.3	1,023,951.44	4.3	23,628,043.89
1908	4,584,682.27	18.9	7,349,930.23	30.3	11,086,353.43	45.7	1,246,721.36	5.1	24,267,687.29
1909	5,117,728.04	19.3	7,870,878.58	29.6	12,114,412.19	45.6	1,457,432.29	5.5	26,560,451.10
1910	5,872,237.86	20.1	8,491,882.46	29.1	13,308,725.26	45.6	1,532,347.57	5.2	29,205,194.15

*Operations for seven months only.

Table VIII.—Percentages of Increase in Gross Revenue, as Compared with the Preceding Year.

	Electric Properties.	Gas Properties.	Railway Properties.	Total, Including Miscellaneous.
1905	6.25	12.66	12.75	12.11
1906	11.83	7.70	6.31	7.98
1907	11.66	11.11	6.13	9.90
1908	*1.35	1.36	3.56	2.71
1909	11.63	7.09	9.27	9.45
1910	14.74	7.89	9.86	9.96

*Decrease

gross revenue reported by the three classes of utilities and by the corporation as a whole. It will be noted that the electric properties increased at a higher average rate than the railway and gas properties.

There appears to be no reason to doubt that further expansion of the activities of the corporation will take place in some way in the future, although the lines of development are not as clearly to be foreseen as was believed a few years ago. For instance, tentative arrangements have been made on behalf of the corporation for the acquisition of the Elizabeth & Trenton Railroad, which extends from a connection with the Public Service Railway at New Brunswick to Trenton. Similar tentative arrangements have been made for the acquisition of the Riverside Traction Company, which extends from Trenton westward to a connection with the lines of the Southern division of the Public Service Railway at Camden. These tentative arrangements will be carried to completion if certain desired franchises are granted.

CORPORATE AFFAIRS

The publication of annual reports was begun with a statement for the year ended Dec. 31, 1909, and the organization of the properties on definite lines. Two annual reports therefore have been issued and the main figures in each and the percentages of increase in 1910, compared with 1909, follow in Table IX.

TABLE IX.—COMPARATIVE EARNINGS FOR TWO YEARS, WITH PERCENTAGES OF INCREASE.

	1909.	1910.	Percentage of Increase.
Gross earnings of leased and controlled companies	$25,103,019	$27,672,847	10.2
Public Service Corporation of New Jersey, miscellaneous income	1,457,432	1,532,347	5.1
Total income	$26,560,451	$29,205,194	10.
Operating expenses and taxes	13,331,228	14,611,300	9.6
Net income	$13,229,223	$14,593,894	10.3
Bond interest and rentals of leased and controlled companies	10,111,403	10,558,243	4.4
Balance	$3,117,820	$4,035,651	29.4
Fixed charges of Public Service Corporation of New Jersey	1,689,372	1,835,356	8.6
Surplus	$1,428,448	$2,200,295	54.
Less amounts set aside as reserves by Public Service Corporation of New Jersey	.....	$125,000	...
By the Riverside & Fort Lee Ferry Company	.....	5,000	...
		$130,000	
Net divisible income	$1,428,448	$2,070,295	44.9

Payment of dividends on the stock of the Public Service Corporation was begun on June 29, 1907, when 1 per cent was disbursed. A rate of 4 per cent per annum was maintained from that time to Sept. 30, 1909, when a quarterly dividend at the rate of 1¼ per cent was paid. That rate was continued until March, 1911, when the rate of 1½ per cent quarterly was established, placing the stock on a 6 per cent annual basis.

The corporation has, in addition to its $25,000,000 capital stock, all of which is now outstanding, $20,200,000 authorized perpetual interest-bearing certificates, issued in exchange for the stock of underlying companies in accordance with the plan of 1903, of which $19,970,440 are outstanding; $19,183,285 are in the hands of the public and the remainder are owned by the corporation. The corporation also had an issue of $4,000,000 of 5 per cent three-year collateral notes which were called for payment on Oct. 1, 1911.

Of an issue of $50,000,000 of 5 per cent general mortgage bonds, due on Oct. 1, 1959, $30,000,000 are now outstanding.

In connection with the sale recently of a block of the general mortgage bonds a contract was made with the purchasing bankers by which the corporation agreed to provide out of earnings each year for rehabilitation, renewals and depreciation, other than customary and proper maintenance charges, or for construction, extensions or acquisition of properties, the following sums annually: In 1910, $250,000; in 1911, $400,000; in 1912, $600,000; in 1913, $800,000; in 1914, $1,000,000; in 1915 and thereafter annually during the life of the bonds, from $1,000,000 to $1,500,000, the exact sum to be determined by the earnings.

The annual report for 1910 shows total outstanding debt of the Public Service Railway and subsidiary companies of $67,256,000, of which $9,239,000 was owned by the corporation, leaving $58,017,000 in the hands of the public. These figures did not include the outstanding funded debt of the New Jersey & Hudson River Railway & Ferry Company and subsidiaries, a total of $4,542,000, of which $67,000 bonds were held by a subsidiary and $4,475,000 were in the hands of the public.

The total outstanding funded debt of the corporation and subsidiary companies, according to the 1910 statement, was $178,967,217, of which $14,525,135 was owned by the corporation and $164,375,082 was in the hands of the public.

In addition to this the railway system had outstanding $1,016,000 equipment trust notes and $165,185 real estate mortgages. Other miscellaneous obligations of subsidiary gas and electric companies brought the total of miscellaneous obligations outstanding to $1,538,935, all in the hands of the public. The subsidiary companies, whose dividends were guaranteed through leases by either the railway, electric or gas companies, had $78,308,950 capital stock outstanding, of which $21,926,650 was owned by the company and $56,382,300 was in the hands of the public.

Of the subsidiary companies of the corporation which are not leased, the capital stock outstanding was $54,657,550 and the amount thereof owned by the corporation was $53,548,850, leaving $1,101,500 in the hands of the public.

From June 1, 1903, to Dec. 31, 1910, the total expenditures charged to capital account on the systems operated by the corporation and subsidiary companies were as follows: Railway, $22,474,714; electric, $9,184,984; gas, $10,848,303; total, $42,508,001. Of the total amount, 52.9 per cent was expended on the railway properties, 21.6 per cent on the electric system and 25.5 per cent on the gas properties.

PERSONNEL OF THE CORPORATION

The officials of the Public Service Corporation are as follows:

Thomas N. McCarter, president.
George J. Roberts, first vice-president.
John J. Burleigh, second vice-president.
Randal Morgan, third vice-president.
Anthony R. Kuser, fourth vice-president.
Edwin W. Hine, secretary.
H. C. Stevenson, assistant secretary.
James P. Dusenberry, treasurer.
R. D. Miller, assistant treasurer.
T. W. Van Middlesworth, assistant treasurer.
Frank Bergen, general counsel.
L. D. H. Gilmour, assistant general counsel.
E. A. Armstrong, assistant general counsel.
L. S. Hoffman, general solicitor.
P. S. Young, comptroller.
H. V. Drown, general claim agent.
Percy Ingalls, general agent.
George Barker, real estate agent.
John L. O'Toole, publicity agent.

The board of directors is composed of the following: Frank Bergen, Anthony R. Kuser, Samuel T. Bodine, Lewis Lillie, John J. Burleigh, Horatio G. Lloyd, Walton Clark, Thomas N. McCarter, Thomas Dolan, Uzal H. McCarter, John F. Dryden, Randal Morgan, James P. Dusenberry, F. W. Roebling, J. Horace Harding, George J. Roberts, Wm. C. Heppenheimer, John F. Shanley, Edwin W. Hine, P. F. Wanser and Edgar B. Ward.

The members of the executive committee of the board of directors are: John J. Burleigh, Thomas N. McCarter, Walton Clark, Uzal H. McCarter, Edwin W. Hine, Randal Morgan, Anthony R. Kuser, George J. Roberts and Lewis Lillie.

The operating officials of the subsidiary Public Service Railway are given below:

R. E. Danforth, general manager.
P. S. Young, comptroller.
M. R. Boylan, general auditor.
C. B. McCourt, assistant to the general auditor.
L. D. H. Gilmour, assistant general counsel.
N. W. Bolen, superintendent of transportation.
J. W. Brown, assistant superintendent of transportation.
J. A. Pearson, purchasing agent.
R. S. Inglehart, general storekeeper.
H. V. Drown, general claim agent.
H. D. Briggs, assistant general claim agent.
E. J. Dunne, superintendent distribution.
H. A. Benedict, mechanical engineer.
D. G. Knight, superintendent buildings.
D. Beatty, superintendent trucking.
Martin Schreiber, engineer maintenance of way.
M. White, superintendent of maintenance of way.

Operating affairs of the companies are considered by executive committees formed of officials of the various properties, which meet on Monday afternoon of each week. The committees are composed of the president, the first vice-president, the second vice-president, Walton Clark, a director; an assistant general counsel, the comptroller, the general managers of the railway, gas and electric companies, the secretary and the general agent. The committees pass on all questions relating to the operating companies before they are submitted for the consideration of the board of directors of the corporation.

THE PUBLICITY DEPARTMENT

The publicity agent is directly responsible for all matters of publicity relating to the railway, gas and electric properties. The work of this official has been developed along somewhat unusual lines. He gives talks on practical operating questions before civic, religious and social organizations.

So far as the street railways are concerned, these talks relate to such topics as the problem of congestion in rush hours. For instance, it is shown that 65 per cent of the total passenger traffic of the company is handled in five hours. In talks before various Newark organizations emphasis is laid on the fact that nineteen out of the twenty-one lines in that city are affected by the congestion at Broad and Market Streets. Reference is also made to other matters of service, to the detrimental results of unregulated vehicular traffic, the effect of franchise taxes, and the benefits to the community arising from the development of outlying property. During the coming winter the attention of the public will be specifically directed to means for the prevention of accidents.

The point of view of the corporation on various questions of interest to the public has been explained in newspaper advertisements. No regular advertisements of railway schedules are placed in the newspapers, but the commercial departments of the gas and electric companies are advertised largely.

The publicity department also prepares folders and attends to the printing of such timetables as are issued for the public. If some unusual event is to occur advertisements are placed in the newspapers directing attention to the service that will be furnished. The publicity agent also writes articles describing different features of the property or improvements which are of interest and sends these to newspapers which it is believed will publish the material because of its news value. As the publicity agent is a practical newspaper man, he is able to judge the value of the articles he distributes. No article is sent to any newspaper unless it is believed that the information is well worth publication as a matter of general interest. In the event of accidents accurate information is given to newspapers upon request.

A complaint department has been opened on the first floor of the Public Service Building, where it is readily accessible to the public, and verbal or written complaints are solicited by the company. These are received by the publicity agent and the complaints are referred to the departments affected for investigation and action. A prompt report is secured and a letter is written to the person who made the complaint. A card record of all complaints is kept.

OFFICE BUILDING

AT the time that the gas, electric and railway properties now constituting the Public Service Corporation were consolidated the executive and the departmental offices of the company were widely scattered and their equipment also left much to be desired. Hence one of the first steps taken after the details of the new organization were decided upon was , concentrate the headquarters of the several departments under one roof. The location chosen was in a building about to be erected by the Prudential Life Insurance Company at the corner of Bank and Broad Streets. This place is in the heart of Newark's business section and the building is adjacent to others owned by the Prudential Life Insurance Company and harmonizes with them in exterior design. The interior, however, was laid out for the special purposes of the Public Service Corporation, which leased it for a term of years. Furthermore, no efforts and expense were spared to install those conveniences which would make it possible for the employees of the company to work under the most agreeable conditions. Although the office building is eleven stories high, it was found necessary to place some of the offices in an extension which is part of an adjoinng building also owned by the Prudential Insurance Company.

GENERAL BUILDING EQUIPMENT FEATURES

The construction and equipment of the building are of almost palatial character. The exterior is of granite; the main corridors, halls and assembly rooms are wainscoted in marble and the general and executive offices are finished in plaster, with oak trimmings. A fireproof construction is used, but the building also has hose connections and fire extinguishers on every floor. The porters of the building have been trained by the chief janitor to answer all fire calls on whistle signal. Under the fire drills which have been instituted each man understands the work which he is expected to do. Surprise tests have shown that calls in the main building can be answered in 1 minute and calls in the extension in 1½ minutes.

There are four high-speed passenger elevators and one freight elevator in the main building and two slow-speed passenger elevators in the extension, where only a three-floor service is required. Three of the four elevators in the main building have a rated carrying capacity of 2500 lb. each. The fourth elevator is of extra heavy type so that it may be used for carrying up safes, parts of vaults and other bulky articles. During the luncheon period from 11:30 to 1 these four elevators carry about 700 persons each way. The freight elevator is used for carrying conductors' cash boxes from the basement to the cashier's counting room on the third floor. Other vertical transportation facilities include two dumbwaiters, one between the kitchen mezzanine and the pantry on the eleventh floor and the other between the kitchen and the larger pantry on the tenth floor.

A great variety of electric lighting systems and fixtures has been installed to make the company's home in itself an excellent advertisement of its lighting business. Among the lighting systems in regular use are carbon lamps, tungsten lamps, concealed lighting, Moore vacuum tubes and Cooper Hewitt mercury-vapor lamps. The showrooms, of course, contain additional methods of electric lighting. The entire building is also furnished with emergency gas connections with many varieties of fixtures. Steam heat is used throughout and fans are provided for summer.

Fresh air is secured through ventilators which are open to the outside of the building during the summer. These ventilators are supplied from a blower-driven air-purifying equipment in cooler weather. Every floor is also equipped with vacuum outlets for cleaning. High-class toilet rooms are installed on all floors except the sixth, where a comfortable retiring parlor is provided for women employees who may be taken ill. One significant item in connection with the toilet room feature is the fact that some 600 individual towels and 85 to 100 roller towels are used every day. This means that every employee receives at least one towel a day. An artesian well furnishes excellent drinking water through faucets and marble basins in the hallways on every floor. A refrigerator system is installed partly for the restaurant service and partly for demonstrations in the showrooms. The refrigerating and vacuum plant machines are in the basement.

ELEVENTH FLOOR AND MAIN RESTAURANT

In describing the purposes of the building it is desirable to begin with the eleventh and tenth floors because they contain the restaurant and certain other features which are of common interest to all of the employees in the building. The manner of conducting this restaurant represents such a radical step in welfare work by a public service company that it deserves a detailed description. Originally the corporation planned to grant the restaurant an annual subsidy of $25,000 to enable it to supply the employees with a midday meal at cost price. On further consideration, however, the corporation decided to furnish meals absolutely free of charge. This decision has evidently met with ardent approbation from the employees, as is shown by the excellent attendance records. The luncheon time of 45 minutes has been found ample because little time is required to go to and from the dining rooms and there is no delay whatever at the tables. The restaurant serves about 650 lunches a day and of this number about 550 are required for the main dining room on the eleventh floor. The rank and file are divided into three shifts or messes so that individuals dine at the same time and the same tables every day. The first group stays from 11:30 to 12, the second from 12:15 to 12:45 and the third from 1 to 1:30. This leaves

15 minutes between the messes for resetting the tables, changing linen, washing dishes, etc. The cool and quiet location of the restaurant on the top floor of the building is in striking contrast to the average restaurant on the sidewalk level. Even the warmest summer days are made comfortable by the use of ceiling fans.

The dining room for the heads of departments and junior officers and the private dining room for the president, directors and other executives are on the tenth floor. These rooms have parquet floors and in

Date 191
(Leave the above line blank)

I, an employee of PUBLIC SERVICE, hereby apply for library privileges. I agree to observe all the rules of the Library, and to give immediate notice to the Librarian of any change of address or business.

Name .....

Occupation .....

..... Department

..... Company

..... City

The within applicant is an employee as stated, and the Library will be immediately notified if he be transferred or leave the employ of the company.

.....
(Head of Dept.)

Date, ... 191

Office Building—Front and Back of Library Application

other ways are somewhat more elaborately furnished than the main dining room. The dining room of the department heads and junior officers is furnished with small round or rectangular tables so that parties of officials can confer during their luncheon. No distinction, however, is made in the character of the meals served in all of the different rooms. The food is of the highest quality and its preparation compares favorably with the average high-priced restaurant. The accompanying specimen menus will give a clear idea of the high standard of these meals. As no one must give tips or other gratuities, it is no exaggeration to say that the restaurant feature means a saving of $1 to $3 per week per employee. The large number of diners makes it feasible to offer great variety in the vegetables, meats, desserts, drinks and other constituents of the bill of fare. Cold meals are served when the heat is unusually oppressive. The restaurant is open for midday meals every working day except Saturday half holidays during July and August. It employs twenty-three waiters, nine cooks and assistants and eight pantrymen, including dish-washers. The labor charge is not excessive since these men are at liberty to work elsewhere in the late afternoon and evening.

Cold Consommé in Cup	Mock Turtle à l'Anglaise
Fried Chicken, Maryland	Stuffed Philadelphia Chicken,
Spinach à l'Anglaise	Giblet Sauce
Boiled Potatoes	New Carrots & Peas Persillade
Cold Lamb, String Bean Salad	Fried Sweet Potatoes
Cantaloupe	Assorted Cold Cuts,
Buttermilk Iced Tea	Lettuce Salad
Milk Tea	Fresh Pineapple Ice Cream
Coffee	Buttermilk Iced Tea
July 25, 1911	Milk Tea
	Coffee
	Aug. 3, 1911.

Office Building—Two Menus of Employees' Restaurant

The description of the restaurant would be incomplete if some reference was not made to the splendid culinary outfit and general kitchen facilities, which are of the most modern character. The system of preparing food here is a revelation in modern cookery when contrasted with the unskilful and unsanitary practices of many pretentious restaurants. Cooking, frying and similar operations are carried out on the mezzanine of the eleventh floor under the direction of an excellent chef. This kitchen contains ranges operated by live steam and gas, a mechanical potato peeler, double-bottomed soup pots, a motor-driven meat chopper and a steam cooker. The latter has separate air-tight compartments so that the odors of the various foods cannot intermingle. A pipe line from the basement leads to six refrigerators, one of which is used exclusively for fish on Fridays and for fruit on other days. The principal ice-boxes for meat storage are in the basement. A special dumbwaiter and an iron stairway serve for conveying material between the kitchen and the main pantry.

The pantry for the main dining room is at the rear of the eleventh floor. This section contains motor-driven dish-washing machinery, metal closets for dishes, large urns for cold and hot tea, coffee, etc., and a table on which sandwiches are prepared and other preliminary table work done. Owing to the length of the main dining room, four side pantries are used for extra dishes, tableware and napkins to facilitate the work of the waiters.

The eleventh floor also contains the elevator machinery, and a winding stairway leads to the tower, from which a fine outlook can be had over Newark and vicinity.

TENTH FLOOR—DINING ROOMS, ASSEMBLY HALL, LIBRARY, ETC.

The tenth floor contains the dining room of the junior officers and also a dining room for the executive officers. Lunch is served from 12.30 to 2 o'clock.

This floor also has an assembly room which seats 235 persons. It serves as a smoking room for the employees during their luncheon period, but its principal use is as a meeting center for various employees' associations. A bulletin board is installed to post notices of meetings, to give a list of technical magazines which are on file in the library and for miscellaneous matters of interest to the men. Several valet facilities, such as a barber shop and shoeblack stand,

adjoin the assembly room. This service is given at low prices because the concessionaires are not required to pay rent. A clothes-checking room, principally for winter and stormy weather, is also provided.

The company's free technical library is also on the tenth floor. In these days anyone can enjoy the use of vast collections of popular books and periodicals. It is much more difficult, however, for ambitious workers to obtain ready access to any large number of the purely technical books and periodicals of which they are in real need. This library is therefore proving of great value to the best men in the service. It is conducted along much the same lines as the average public circulating library. The reference room is open from 9 a. m. to 5 p. m. on week days and from 9 a. m. to noon on Saturdays, but it is closed on all holidays. The contents are available for circulation among all properly registered employees who have obtained application cards from the librarian or their local superintendent. Books are issued for home use if the application is approved by the head of the department. Circulating books may be kept for two weeks with the privilege of renewal for the same period. Unbound periodicals, except the current issue, may be kept for seven days without renewal. A fine of 2 cents a day is imposed for each volume kept beyond these limits. Should a borrower keep a book or paper for ten days beyond the allotted time, a messenger is sent for it at the cost of the user. The books loaned relate principally to gas, electric railway, electric lighting and other engineering subjects, although there are some standard textbooks of more general character. The librarian is always prepared to secure on request special data on any technical topic. Under certain conditions books are delivered upon written or telephone application free of cost.

NINTH FLOOR—EXECUTIVE OFFICES

The executive headquarters of the Public Service Corporation are on the ninth floor. They comprise the rooms of the president, vice-president, board of directors and other executive officials of the company. The directors' room has an annex containing tub and shower baths. A notable feature is the luxurious reception room which has been provided for callers. The same floor contains the offices of the general agent of the gas and electric interests of the Public Service Corporation and of the subsidiary Camden Coke Company. There is also an auxiliary office of the publicity department for use when its representative desires to be free from the large number of visitors who call at the regular quarters, which are located near the main entrance on the ground floor.

EIGHTH FLOOR—OFFICES OF THE LAW AND ELECTRICAL DEPARTMENTS

The eighth floor contains the offices of the general counsel of the corporation and of the real estate department, the principal law library and the drafting room of the electrical department. The latter is illuminated by Cooper Hewitt mercury-vapor lamps. It has a private winding stairway to the blueprinting room below.

SEVENTH FLOOR—ELECTRICAL AND MISCELLANEOUS OFFICES AND TELEPHONE

The general manager, general superintendent, illuminating engineer, plant engineer and purchasing agent of the Public Service Electric Company have rooms on the seventh floor. The treasurer and stock transfer clerk of the Public Service Corporation and the superintendent of the building are also on this floor, which contains in addition the telephone exchange. In the telephone department a chief, four girls and three men are employed to handle the wires which connect all parts of the Public Service system throughout the State. About 300 lines are now operated from this board.

SIXTH FLOOR—MISCELLANEOUS OFFICES

The sixth floor contains the offices of the general manager of the Public Service Gas Company and of the paymaster of the Public Service Railway, the drafting room of the gas company and the women's retiring room.

FIFTH FLOOR—ACCOUNTING OFFICES

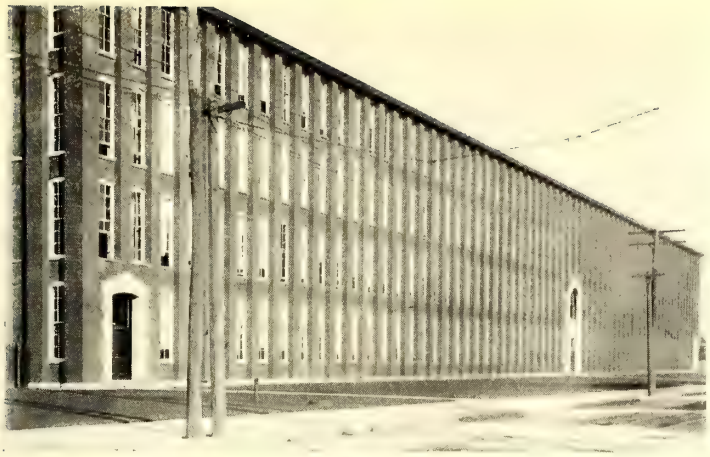
The fifth floor is used almost entirely for accounting purposes. It accommodates the comptroller of the Public Service Corporation and the general auditors of the gas and electric companies. It is also the headquarters of the "New-Business Department" of the gas and electric companies.

FOURTH FLOOR—GENERAL CLAIM DEPARTMENT

The fourth floor is devoted entirely to the general offices of the claim department, which is organized to handle the claim business of the gas, electric and railway companies. These offices include those of the general claim agent and assistant, the general solicitor, trial attorneys, etc. An auxiliary law library is provided for the special use of the railway department so that it is unnecessary for any of the claim attorneys in charge of railway business to go to the main law library on the eighth floor except in special cases.

THIRD FLOOR—RAILWAY OFFICES

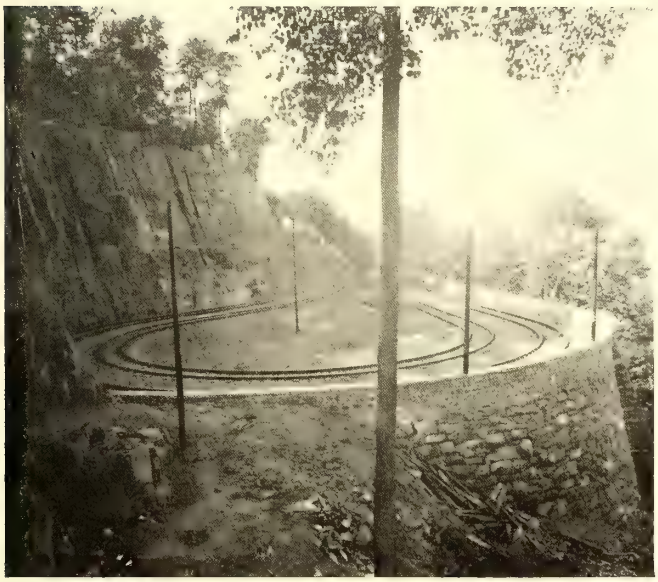
As shown in the accompanying plan, the third floor of the main building and the L extension are used exclusively by the Public Service Railway Company. A common waiting room leads to the offices of the general manager, the superintendent of transportation, the mechanical engineer, the traffic agent and the general office staff. The offices of the superintendent of distribution, the superintendent of timetables and the railway cashier open directly on the corridor of the main building. In the extension, as indicated, are the offices of the superintendent of the Essex division of the employment department, the way department and the purchasing department. The rooms for the Essex division of the claim department are located on this floor in the extension, as indicated.



Industrial Plant at Paterson, Which Furnishes Evening Rush-Hour Traffic for Extra Cars



Shelter Station at Morsemere—The Sides Are Constructed Principally of Glass



Loop at Edgewater, Showing Line Which Connects Hudson River Ferry and the Palisades



Scene on Market Street, Newark, Near the Most Congested District



One of the Hudson River Ferry Boats Operated by the Company



Scene on Maplewood Line, Showing Orange Mountain in the Distance

Plate X



Street Scene in Residential Community of Hackensack



Intersection of Through and Crosstown Lines in Bloomfield, One of the Districts Reached by the Lines Radiating from Newark



Part of the Central Business District of Paterson, Showing Intersection of Market and Main Streets, the Point of Heaviest Traffic Movement in That City



Headquarters of the Public Service Railway and Allied Companies



Entrance to Main Floor on Broad Street Side of Public Service Building



Part of Showroom on Main Floor of Public Service Building



Employees' Auditorium and Smoking Room in Public Service Building



Main Dining Room for Office Employees in Public Service Building



Dining Room in Public Service Building for the President and Directors



Dining Room in Public Service Building for the Heads of Departments and Junior Officers



Part View of the Kitchen of the Public Service Employees' Restaurant



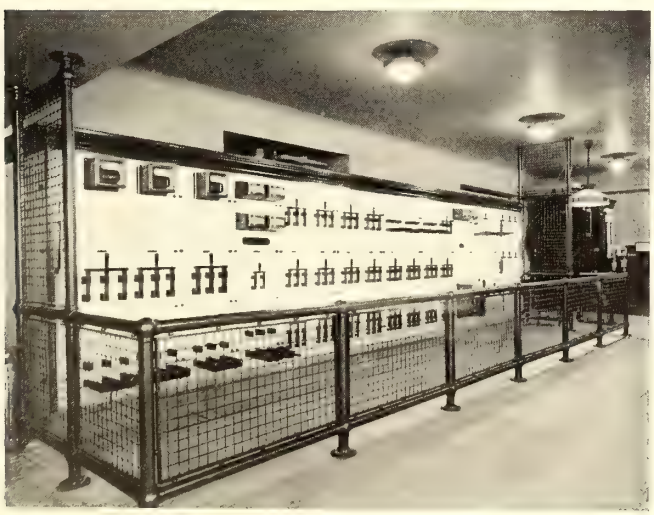
Part of the Pantry on the Tenth Floor for the Employees' Main Dining Room



Working Exhibit of the Complete Electric Kitchen, Located in the Basement



Compartments in the Basement for Testing the Absorption of Light by Wall Papers of Different Colors



Main Switchboard in the Basement of the Public Service Building



Offices of the Publicity Department Near the Broad Street Entrance



Over-Crossing at Little Ferry



Plank Road Bridge Over the Hackensack River



A Portion of the Jersey City Viaduct for Surface Cars

There is also a space on this floor marked "Storage" which is used for valet service and for locker rooms where the building employees change their uniforms.

SECOND FLOOR—CLERICAL FORCES OF THE RAILWAY, GAS AND ELECTRICAL DEPARTMENTS

The rear part of the second floor of the main building consists of one large room for the bill clerks and bookkeepers of the electric and gas companies. Each man has a private locker for his set of ledgers so that there may be no dispute about whether one clerk has tampered with another's books. The complaint bureau and the credit department of the gas and electric companies adjoin this room. The second floor, including the extension, also houses the clerical force of the general auditor of the Public Service Railway Company; the new business promotion staff for gas, electric, power, lighting, automobile and other service, and the mailing room of the gas and electric companies.

FIRST FLOOR—PUBLICITY DEPARTMENT, SHOWROOMS, ETC.

The regular offices of the publicity department are at the Broad Street entrance on the first floor near those of the general cashier and of the consumers' meter department. This office receives and investigates general complaints, answers inquiries and gives information to press representatives on the different phases of the company's activities. The greater part of this floor is devoted to beautiful showrooms, where may be seen an enormous variety of gas and electrical fixtures, especially for lighting. In one of these showrooms each electrical fixture is separately wired so that its illuminating effect in actual service can be demonstrated. A handsomely furnished reception and waiting room is available for prospective customers or for other visitors who may wish to keep appointments with friends in order to go on shopping tours, etc.

THE BASEMENT—SHOWROOMS, BUILDING CONTROL APPARATUS, ETC.

The basement contains the machinery for the heating, lighting, ventilation, cleaning and plumbing of the building. There is also a Howard master clock for synchronizing all clocks throughout the building and a white marble switchboard for all of the power and lighting circuits. The basement gas and electric showroom differs from that on the main floor in having a large variety of heavy exhibits. Two of the most striking features are the all-gas and all-electric kitchens which are installed side by side. Each kitchen is operated on alternate weeks by a skilful housekeeper who shows how baking, cooking and other home food manufacture can be done with either of these modern powers. Other exhibits are household washing machines, refrigerators and complete automobile electric charging outfits. An ingenious scheme for demonstrating the fidelity with which the different kinds of artificial illumination approach the quality of sunlight is afforded by a darkened showroom which has a number of ground-glass compartments. Each cell contains some prominent type of gas or electric illuminant, with the exception of one compartment which has a passage for receiving daylight. Other features of the showroom are vacuum cleaners and an electric player-piano.

The basement also contains the mailing department of the corporation, where about 45,000 pieces of United States mail are handled every month. Two boys distribute and collect mail throughout the building all day long. The company also maintains a delivery system for private mail to all offices throughout the system. The rest of the basement floor is used by the collectors of the gas and electric companies.

WAY DEPARTMENT

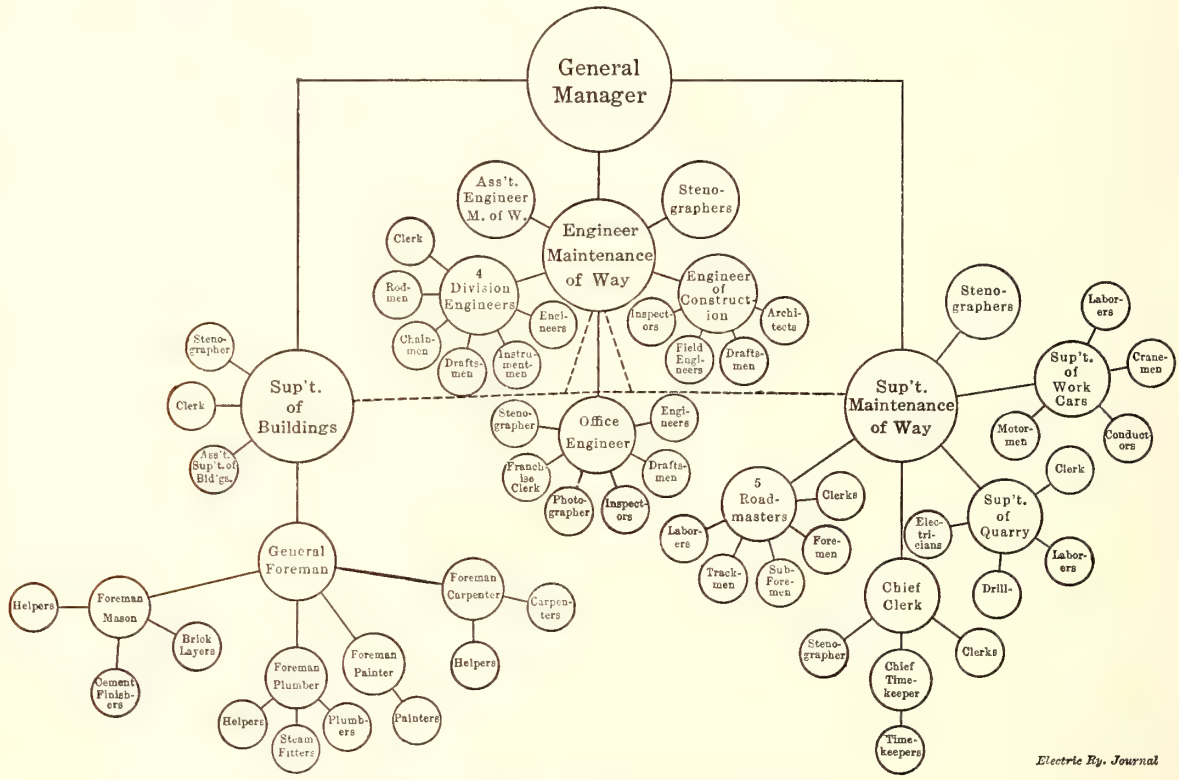
THE way department of the Public Service Railway not only has charge of all of the track work of the system, but it is also responsible for all stationary structures on the property except those used for the generation, transmission and distribution of electrical energy. The work of the way department may be summarized as embracing the construction and maintenance of tracks, bridges, viaducts, culverts, toll roads, wagon elevators, docks, ferry houses, boats, way department yards and buildings, service cars, carhouses, car shops, office buildings, passenger terminals and stations, and the residences of caretakers of the company's property.

A peculiarity of the organization of this department is the absence of one superior officer. As shown in the accompanying chart, the department has three co-ordinate officers, all of whom report directly to the general manager. These officers are the following: Superintendent of way, engineer of maintenance of way and superintendent of buildings. The forces under these officials, however, are always available for work in any other branch of this department. This relationship is indicated by the broken lines between the three co-ordinate officers. All authorizations are issued directly by the general manager in accordance with the requisitions which are made upon him by the officer who is responsible for the specified work.

DUTIES OF CO-ORDINATE OFFICERS

The superintendent of way executes and maintains the work for which designs and specifications are made by the engineer of maintenance of way, subject to the approval of the general manager. In addition to the regular maintenance of track and bonding, this officer has charge of the storage yards, the stockrooms, the supply trains, the quarry and other facilities for carrying on the business of the department. The activities of this branch and of the engineering forces are carried out according to the following divisions: Essex, 199.95 miles; Hudson, 152.05 miles; Central, 158.88 miles; Southern, 118.70 miles; Bergen and Passaic combined, 49.33 miles and 80.672 miles respectively. The central division also has charge of the 25 miles of single track which the Public Service Railway is now operating for the Elizabeth & Trenton Railway. Each division has a roadmaster, who reports to the superintendent of maintenance of way. The roadmaster has a clerk and foremen of the different subdivisions. The number of subforemen and of the track men and helpers in their charge depends, of course, upon the amount of work in hand, but the general form of the organization is the same under all conditions.

The engineer of maintenance of way prepares the plans and specifications for carhouses, terminals, bridges, track layouts and extensions, etc., and employs inspectors to insure compliance with the terms



Way Department—Organization Diagram

of all such specifications and contracts. He also has charge of the photographic facilities which are maintained for the use of all departments of the railway service. This officer has an assistant engineer of maintenance of way, an office engineer to take care of the clerical forces of the department, the drafting room and records, an engineer of construction and five division engineers, who follow up the work in the field, such as track and building work.

The superintendent of buildings is responsible for the maintenance of carhouses, terminals, stations, bridges, viaducts, trestles, wagon elevators, docks, ferry boats and residences. He has one general foreman for each of the principal building trades, such as carpentry, masonry, painting and plumbing. Each general foreman is responsible for his class of labor in the entire territory, with the exception of the distant isolated Southern division at Camden, where one foreman has direct charge of all the different classes of building work mentioned. Every general foreman has one assistant foreman.

OTHER ORGANIZATION DETAILS

The number of men employed by the way department fluctuates greatly throughout the year. The superintendent of maintenance of way employs from 150 to 3000 men; the engineer of maintenance of way employs from 40 to 75 men, and the superintendent of buildings from 30 to 135 men.

One of the most important features in the operation of the department is the weekly report which is prepared for the general manager to keep him in close touch with every detail of its work. This report briefly describes all projects in hand, whether pending or completed. It will be observed from the accompanying abstract of one of these reports that subjects of general interest, claim department matters, franchise operations and the work of the separate divisions are treated in the order named. Furthermore, these items are accompanied by references to the party or parties who are responsible for any delays in the work. Thus, the reference, under general pending matters, to the sprinkler system at the Market Street carhouse shows that the work was being held up because the real estate department had not yet secured extra land needed for a tank.

A few words under the sub-head "Work Done During the Week" serve to show the general progress which is being made on each task in hand. For instance, it is reported that one contractor is driving the pile foundation for the Passaic Wharf carhouse and that another is installing a heating plant at the Plank Road storeroom. The report on the Hoboken terminal shows that the work has been completed on the first floor but that the sash for the second floor is still missing. The exact progress of a job is presented in such cases as the making of drawings and the inspection of material. The general matters are concluded under the sub-head of "Work to Be Done." This explains what jobs are in hand and why they are being delayed.

ABSTRACT OF ENGINEERING REPORT TO THE GENERAL MANAGER.

Newark, N. J., July 1, 1911.

Dear Sir:—Below please find report of Office of Engineer of Maintenance of Way as of July 1, 1911:

GENERAL

PENDING	NO WORK DONE DURING THE WEEK
Sprinkler system, Market Street carhouse.	Waiting on Real Estate Dept. to get extra land for tank.
Crows Mill Bridge.	Making repairs to temporary bridge.
Ferry property, N. Y. and Edgewater.	Submitted estimate. Instructed to include in annual estimate—1912.
Shelter Palisade and Hillside Avenue.	Property owners' consent obtained.
WORK DONE DURING THE WEEK	
Hackensack River Bridge, Hudson River Road.	Work has been started.
Passaic Wharf carhouse.	Contractor driving pile foundation.
Bergen Point ferry slip.	Preparing material for erection.
Plank Road storeroom.	Contractor installing heating plant.
Sip Avenue terminal.	Revised formal contract signed.
Hilton carhouse.	Two bays completed, ready for trusses. Foundation completed and laying brick on other bays.
Hoboken terminal inclosure.	Waiting for sash for second floor. Iron work completed on first floor.
Curbing Monroe Street, Ridgewood.	Cement curb laid on west side. Curb will be completed this week.
Special work for Summit and Pavonia Avenues, Jersey City.	New special work drawing completed and work ordered.
Wye for Greenville carhouse.	New special work drawing 50 per cent completed.
Inspection of lumber from the Trexler Lumber Company.	Seventy-five per cent completed.
WORK TO BE DONE	
Photographs of sections between Milltown and Trenton.	Maps completed, negative made and received June 30.
Carhouse layout book of capacities.	Delayed on account of other rush work.

CLAIM DEPARTMENT

SURVEY FINISHED AND MAP TO BE MADE

Jas. Van Auken, Broad Street, Lackawanna Avenue, Newark.
Frederick Huth, Bergen Street and Winans Avenue, Newark.

SURVEY AND MAP TO BE MADE

George Weiss, Tenth Street and Fourteenth Street, Newark.
Jacob Bab, Belmont Avenue and Montgomery Street, Newark.

FRANCHISE REPORT

PETITIONS WRITTEN AND SENT TO MR. GILMOUR SINCE LAST REPORT

JERSEY CITY

8949-C—Warren Street Extension with auxiliary connections.
8951-C—Relocation of single track with auxiliary connections in Jersey Avenue.

NUTLEY

8937-C—Revised relocation of existing Nutley carhouse connections.

CERTIFICATES OF STATE FORWARDED TO MR. GILMOUR

JERSEY CITY

8949-C—Warren Street Extension with auxiliary connections.

HUDSON DIVISION

PENDING	NO WORK DONE DURING THE WEEK
Hudson division map	About 50 per cent completed.
WORK DONE DURING THE WEEK	
List of bridges.	Preparing report.
Bergen pike tracings.	About 75 per cent completed.
Elias cut-off.	Grades being taken.

PHOTOGRAPHIC DEPARTMENT

WORK DONE DURING THE WEEK

Little ferry.	One negative at the site of viaduct.
Hudson claim.	One negative Montgomery car No. 1318.
Bridges and culverts.	Four negatives on Bergen Pike.
System maps.	Printing.

ESSEX DIVISION

PENDING	NO WORK DONE DURING THE WEEK
Erie siding, Passaic.	Awaiting decision of Erie officials.
WORK DONE DURING THE WEEK	
S. O. & M. T. Company.	Survey under way.
D., L. & W. loop, Montclair.	Sketch to Mr. Hand, of the D., L. & W., for his information.

CENTRAL DIVISION

PENDING	NO WORK DONE DURING THE WEEK.
Line and grade on Raritan Avenue, Highland Park.	Held by orders from Mr. White.
Measurement of pavement, George Street, East Bound Brook.	Will be measured when job is finished, 20 per cent is measured.
Line and grade elimination of curves, Roselle.	Waiting for house to be moved.

WORK TO BE DONE

List of bridges.	Thirty-seven per cent completed. Will start to have list typewritten about the end of next week.
List of electric welds.	Note of work being taken as work progresses. Welder returned yesterday.

SOUTHERN DIVISION

PENDING	NO WORK DONE DURING THE WEEK
Request of Camden Water Department for permission to connect into our 18-in. drain from carhouse.	Agreement presented to Mr. Hertline, of the Water Department. No action taken, pending consultation with Mr. Bailey.
Compilation of bridge data.	Seventy per cent completed. Held up by more urgent work.

WORK DONE DURING THE WEEK

Railroad crossing at Pennsylvania Railroad at Westfield Avenue.	Met representative from Mr. Snowden's office in reference to repairing joints and surfacing crossing. Trouble thought to be due to leak in pipe of Stockton Water Company. Railroad representative to consult with the water company.
Grading track East Atlantic Avenue, Haddon Heights.	Arrangements being made to consult with Mr. Benj. Lippincott, a former resident of Haddon Heights, who was influential in having the road constructed, with the idea of securing additional information.
Haddon Avenue and Newton Avenue special work, Camden.	Fifty per cent completed.
Electric welds Broadway, Kaighn Avenue, Fifth Street, Second Street and State Street, Camden.	Measurements made with representative of Barber Asphalt Company and completed.

NORTH PATERSON EXTENSION

PATERSON STATE LINE

PENDING	NO WORK DONE DURING THE WEEK
Connections on Wagaraw Road to Arnold silk mill.	Work held up pending action of County Freeholders.

WORK DONE DURING THE WEEK

Third Street reversed curve, North Paterson.	New property map received from real estate department. Curves and poles located. Road bed graded and ties in place.
Ballasting and surfacing.	Eighty-three per cent complete.
Monuments.	Ninety per cent in place.

Yours very truly,

Engineer Maintenance of Way.

The next main heading in the weekly report mentions the survey and map work done for the claim department. Following this are reports relating to franchises for extensions, relocations, connections, etc. The report on the separate divisions is followed by notes on the photographic department and on the construction of new sections, such as the Paterson line.

These weekly reports refer to several hundred subjects each, but despite this their concise arrangement makes it easy for the general manager or other executive officers to follow at will any job, from the largest to the smallest. This weekly log also tends to eliminate friction between subordinate officials, because all know that anyone's delinquencies will be brought to the attention of the general manager in short order.

OFFICE FACILITIES

The executive headquarters of the way department are on the third floor of the Public Service Building, Newark, in proximity to the offices of the general manager. These headquarters include the printing, filing and drafting rooms and the offices of the following way department officials: Superintendent maintenance of way; engineer maintenance of way; assistant engineer maintenance of way; superintendent of buildings; office engineer; construction engineer and engineer of the Essex division, which includes the city of Newark. The offices of this department are uniformly 15 ft. square. They are finished in oak, equipped with Derby office furniture to match. The drafting room, which is 30 x 60 ft. in size, is located along the entire rear of the building, to obtain the benefit of natural light on three sides. As shown in the illustration of the interior on plate XXII, this room is provided with office desks, filing cabinets and drafting tables (including four of the Keuffel & Esser adjustable type), and all field engineers' supplies, except stakes. The extent of the field work may be judged by the circumstance that there are now in use eight transits and six levels. The blueprinting for all the railway departments is done on the Federal arc-lamp machine shown on plate XXII, which in one minute can print a strip up to 3½ ft. wide and 3 ft. long. The blueprinter and the vats for washing and drying prints are placed in a compartment which adjoins the drafting room. A dark room is also provided for photographic work.

All of the drawings of the way department are made to the following standard sizes for economy and convenience in filing: Class A, 7 in. long and 11 in. wide; class C, 15 in. long and 26 in. wide; class E, 22 in. long and 39 in. wide; class H, 42 in. long and 39 in. wide; classes K, L and J are roll length, respectively 11 in., 22 in. and 33 in. wide. There are now on file about 8000 drawings, which are indexed geographically in the following convenient way: The files are first divided according to the names of the operating divisions, then subdivided by townships and then further subdivided alphabetically, according to the name of the street, road or highway. Photographs and negatives are stored in the same manner.

JOB ORDERS, CONTRACT FORMS, ETC.

A chief clerk has charge of all correspondence, authorizations, job orders and similar papers. The job-order system is used to account for all labor done by all departments and is described in detail in the chapter relating to the accounting department.

Copies of the approved job order are made for the issuing office, the auditor, the assistant storekeeper in charge of way supplies, the chief timekeeper and the subordinate officer who was responsible for the original requisition. The purpose of giving the storekeeper a copy of the order is to enable him to have the material ready before it is requested. Since the storekeeper knows where the material is required, he is able to save considerable mileage by co-operating with the superintendents of the supply trains. A copy of the job order is given to the timekeeper to enable him to allocate the proper labor charges without asking any questions of the man in charge of the job.

At the end of the month the auditor sends to the

chief clerk of the way department a list of the actual cost of the individual job orders. The comparison of these costs with the original estimates offers a sure method of finding the calculating ability of those who were responsible for the original requisition. It also serves as a check against gross mistakes in future estimates. It is easy to discover those sections which are costing too much for maintenance, because every section of track has a permanent job order number, against which the expenditures are charged. Analyses of the latter kind are usually made by the engineers once a year.

The weekly report to the general manager, previously described, is based in part on the daily construction-work report, the headings of which are reproduced in the engravings on this page. This report gives the authorization number of each job, the amount of track and paving completed to date and on the one day preceding the date of the report, the number of subforemen, laborers, teams, cars and the time estimated for the completion of the job.

STANDARD FORM OF AGREEMENT

One of the most important documents used by the way department is the accompanying agreement form, which is used in connection with all contracts. This document is the result of the careful collaboration of the engineers of the Public Service Railway Company, put into legal phraseology by the chief attorneys of the corporation. It is so drawn that it could readily be used by other railways for the same purpose. The agreement embraces a preamble and seventeen articles and is published below:

THIS AGREEMENT made this.....day of..... in the year of our Lord one thousand nine hundred and .....(191..,) between

(hereinafter called Contractor), party of the first part, and Public Service Railway Company, a corporation of the State of New Jersey (hereinafter called Owner), party of the second part:

Witnesseth: That the said parties hereto have mutually bargained and agreed, and by these presents do mutually bargain and agree, to keep, observe and perform all and singular the stipulations, undertakings and agreements hereinafter specified, each party agreeing as to the matters and things said party is to do.

First.—Owner proposes to have built and constructed for its use and purposes
situated at
in the State of New Jersey.

Second.—The Contractor is to furnish all the material and do all the labor required for said work in the erection and completion of the
in all respects according to the drawings and specifications hereto annexed and made a part hereof, which said drawings and specifications are to be read, considered and deemed as if they were herein particularly set out.

Third.—Said Contractor is to commence work herein required
and complete the same on or before the

Fourth.—Contractor shall immediately take away and remove any material furnished for use in the performance of said work deemed defective by the Owner; either before or after it is put in place, and furnish in the place and stead thereof suitable material; and shall in like manner do over in a proper and satisfactory manner any work imperfectly done in the opinion of the Owner in and about said work. Notice as to such material or such work from the Engineer of the said Owner specifying wherein the defect, improper or unsatisfactory material or work consists shall be deemed sufficient notice to said Contractor.

Fifth.—All work to be done and material furnished under this agreement shall be subject to inspection and performed to the entire satisfaction of the Engineer of the Owner, and no money shall at any time become payable in pursuance of this agreement until a certificate shall have been given by said Engineer to the effect that said Contractor is entitled to such payment under the provisions of this agreement. It is understood that the said Engineer may act herein by his duly appointed Assistant or Inspector.

Sixth.—Said Owner is to pay said Contractor for the said work, in the instalments and manner hereinafter specified, the sum of

Seventh.—In case the said Owner shall desire any changes in either the work or material, it shall be at liberty to have the same made, and said Contractor does hereby agree to make such changes. The same shall only be on the written order of the Engineer of the said Owner; and if the same involve any additional material or labor, such order shall so state the same, and the amount of cost to be paid therefor, in addition to the aforesaid contract price; and should the same require any less material or labor, the same shall in like manner be specified in said order; and the amount of payment to be abated therefor from the said contract price shall be likewise therein specified.

Eighth.—The Owner will pay to the said Contractor the said sum so specified in manner following, that is to say: Within five days after the close of any calendar month an estimate shall be made by the Engineer of the said Owner of all the work performed and the material furnished for said month, and the amount thereof based upon the said contract price less
per cent, to be forthwith paid to the said Contractor; and within after the final completion of all the work to the entire satisfaction of the said Owner, the balance owing to said Contractor shall be paid to said Contractor in cash.

Ninth.—The time for the full performance and completion of this contract is a matter of essential importance to the said Owner and required by it in its business, and upon which various enterprises and transactions are dependent, and it has been bargained and agreed by and between it and the said Contractor that any delay beyond the time herein specified for the completion of the work herein contracted to be done by the said Contractor will cost the said Owner a sum of
per day; and it is therefore expressly agreed in consideration thereof, that from the balance of the sum owing said Contractor upon the completion of this contract, there shall be retained by said Owner as and for compensation for such delay a sum of
dollars for each day in excess and beyond the time herein limited; provided, however, that if said Contractor shall finish and complete said work on or before the day of next, said Owner shall and will pay said Contractor an additional sum to said contract price equal to
dollars for each day before said limited time the same is finished as aforesaid.

Tenth.—It is further agreed and understood by and between the parties hereto that in case delay be occasioned the said Contractor from strikes of workmen, lock-outs in the shops where the material is produced, or strikes upon the railroads interfering with the transportation of materials, or delay occasioned by flood, fire or disaster, then and in every such case the delay incident to said strikes, lock-outs, fire, flood or disaster shall be allowed the said Contractor and not included as a part of the time in which said Contractor is to finish and complete said contract as herein specified.

Eleventh.—In case the Owner shall fail to furnish any material or thing on its part to be furnished or supplied the said Contractor for the finishing and completing of the said contract, and such failure shall continue after five days' written notice from said Contractor to said Owner of such failure, that then and in such case the number of days said failure shall continue after the expiration of five days after said notice shall be allowed to the said Contractor as additional time for the completion of said contract.

Twelfth.—This Agreement and the drawings and specifications are intended to fully co-operate and complement each other; and in case of any dispute as to the meanings of said drawings or said specifications, the same shall be referred to the Engineer of the Owner for decision, whose decision shall be final and binding, and it is hereby accepted by said Contractor.

Thirteenth.—Said Contractor shall and will discharge the said work, material and land whereon the same are erected from any and all lien, claim or demand from any person or persons whomsoever, so that the said Owner shall and may have, possess and enjoy the same free from any and all liens, claims or demands of any other person or persons whomsoever claiming by, through or under said Contractor.

Fourteenth.—Said Contractor shall and will indemnify, protect and save harmless the said Owner from any and all claims, costs, suits, demands, damages or proceedings whatsoever for or on account of any accident to any person or persons, whether working for the said Contractor or otherwise however; and for any like claim, suit, demand or damages for or by reason of

PUBLIC SERVICE RAILWAY COMPANY—MAINTENANCE OF WAY DEPARTMENT

DAILY CONSTRUCTION WORK REPORT FOR_____

LOCATION	AUTH. NO.	TO BE DONE		DONE TO DATE		YESTERDAY'S WORK DONE		WORKING FORCE TODAY					DAYS TO COMPLETE	REMARKS
		FT. TRACK	FT. PAVING	FT. TRACK	FT. PAVING	FT. TRACK	FT. PAVING	NO. FOREMEN	NO. SUB-FOREMEN	NO. MEN	NO. TEAMS	NO. CARS		

Way Department—Heading of Daily Construction Work Report

any injury to any property caused or occasioned by any act or omission of said Contractor or persons acting for him.

Fifteenth.—Said Contractor further agrees before any payment may be required to be made by said Owner under these Presents, that the said Contractor will cause to be made, executed and delivered to the said Owner his bond or bonds in the sum of dollars with sufficient surety satisfactory to said Owner conditioned for the faithful performance and carrying out to the perfect satisfaction of said Owner of all the stipulations, undertakings, contracts and agreements herein contained, and to indemnify, protect and save harmless the Owner from any and all damages, demands, costs or expenses incurred for or on account of or by reason of any liens, claims or demands whatsoever, either for material or from laborers, mechanics or others, or from any suit, action, claim, demand or damage arising from accident to any person or persons whether employed upon said work or not; or from any injury or damage to any property occasioned by said Contractor or person acting for or under said Contractor; so that the said Owner shall and will be saved and forever held harmless from, by reason or on account of anything done or permitted to be done by said Contractor, or any person or persons acting for said Contractor, or any matter or thing which may be improperly omitted to be done under said Contractor, by any person or persons acting for said Contractor

Sixteenth.—This contract on the part of said Contractor shall not be assigned or transferred to any other person or persons whomsoever.

Seventeenth.—Should the Contractor fail or neglect to furnish either sufficient workmen or material, or both, for the efficient and reasonable performance in due time of the work herein provided, and such failure and neglect shall continue for a space of three days after the service by the Owner on the Contractor of a written notice, specifying wherein such failure or neglect consists, that then and in such case said Owner may supply such workmen or said materials, or both, and the cost and expense incurred by said Owner therefor may be deducted from any sum due or owing or which there may thereafter become due or owing under this contract, and no money shall be payable to said Contractor until all of said cost and expense is paid and satisfied to said Owner. In case such cost and expense exceeds the sum due or to become due under this contract, said Contractor will pay said Owner such cost in cash.

Instead of supplying such workmen or material, or both, said Owner may at its option at the end of said three days give notice in writing to Contractor that the Contractor's right to continue said work on this contract has ended, and said Owner may engage some other person or persons to do the same at the cost and expense of said Contractor, using for that purpose any of said contract price remaining; any cost in excess thereof the said Contractor is to pay said Owner. If there should remain any of said contract price after paying said Owner such cost and expense, it shall be paid to said Contractor. The remedies and provisions herein reserved by the said Owner are in addition to any legal remedies possessed by it, and are to be deemed and taken as cumulative remedies, and not to exclude any other lawful remedies not herein specified.

And to the faithful performance and fulfilment of all and singular the above mentioned stipulations, undertakings and agreements, said parties hereto do hereby bind and oblige themselves and their legal representatives each to the other and the legal representatives of such other

In witness whereof, the said parties have caused these Presents to be properly executed on behalf of each; dated the day and year first above written.

PUBLIC SERVICE RAILWAY COMPANY,

By

Approved: Vice-President

Attest:

Gen. Mgr.

As to form:

Ass't Counsel.

Secretary.

YARDS, STORAGE AND SERVICE CARS

The storage and supply train headquarters of the way department are at the Passaic Wharf, which is located on the Passaic River, Newark. This yard has recently been enlarged from 12 acres to 35 acres. In fact, the last addition was purchased on Aug. 24 of this year. The property consists of reclaimed meadow land, which has navigable water on one side and a siding to the Pennsylvania Railroad on the other. Water shipments are brought alongside a 400-ft. dock, which is equipped with unloading machinery for cars and boats.

Among the structures at this installation are an electric sand-dryer equipment and storage warehouse, shops and tie-preservation plant. Sand is brought to the sand dryer by means of scows, carrying from 300 cu. yd. to 600 cu. yd. each. The total capacity of the dryer is about 200 cu. yd., which is sufficient to supply all sand required for traction as well as for all construction throughout the system, with the exception of the Southern division. The wet sand is placed on a belt conveyor which delivers it to the rotating shell of the sand dryer, where it comes into direct contact with the flames of a furnace. The hot air from the furnace is forced through the shell by means of a blower, and the hot gases are carried up the flue. A bucket conveyor delivers the dried sand to storage bins. The entire sand-drying equipment as described was furnished by the American Process Company, New York.

The shops at Passaic Wharf have rip-saws, borers and other woodworking tools for cutting and trimming lumber before it is delivered at the place of installation. This advance preparation insures good supervision, eliminates much waste and permits more accurate work than could be obtained with hand tools in the field. All other work for the track department, except minor blacksmith operations, plate drilling and rail bonding, is carried on at the nearby Plank Road shops of the rolling-stock department. The company does not believe in the home manufacture of special work, because it finds that lower prices can be secured in competition, especially when the cost of maintaining a plant and storage room is considered.

The Passaic Wharf tie-preservation plant, which shown in one of the illustrations on plate XXIV, may be used for either creosoting or the carbolineum superficial methods. The illustration shows the conveyor carrying ties into an immersion tank. When the superficial treatment is employed this plant takes care of 1000 ties a day. Large timbers employed for trestle and bridge service are brush-treated at the locality where used.

The Passaic Wharf property is well supplied with stationary and movable hoisting machinery and service cars. Some of this equipment is shown on plates XXI and XXIII. One view on plate XXIII shows an electrically controlled stationary crane and clam-shell buckets loading sand on a standard motor-equipped supply car. This stationary crane is also used for discharging boats. Another view presents a derrick car in action, and incidentally a part of the outside special-work storage. A third view illustrates a Brownhoist 10-ton crane at work at Passaic Wharf.

Plate XXI, of the storage yards at Plank Road, shows how neatly the rail may be piled with the use of power cranes.

A very interesting addition to the service-car equipment is embraced in two special-work crane cars which have recently been furnished by the Brown Hoisting Machinery Company, as illustrated on plate XXI. The body framing is of steel with a wood floor containing steel plates or ribs to minimize wear. When the 23-ft. 6-in. boom of these cars is extended each crane will lift 3000 lb., and when it is raised 6000 lb. The cranes can work with their grab buckets without interfering with any load on the car due to the condition that the crane is elevated about 2 ft. above the floor. Hence there is no longer required an extra car for carrying rails. The boom heel is also ele-

vated, thus permitting material to be placed under the boom when the car is in transit. Another special feature is the addition of a 22-cu. ft. grab bucket for loading excavated material from the track onto the work cars. At present, in excavating for new track work, the earth is thrown to one side, and the work cars haul the dirt away at night, the dirt being loaded by hand. It is intended to handle the dirt with the grab buckets of the new cranes, from the use of which a considerable saving in money and time is expected. These cars are carried on Peckham No. 100 trucks.

Among the portable equipment used in track construction is a Ransome concrete mixer for making concrete in the fields; Champion portable stone crushers, made by the American Roads Machinery Company, for crushing old stone for use as ballast or in concrete mixtures; Universal 4 ft.-gage road rollers for rolling the subgrade between rails; Buffalo wide-gage rollers for subgrade-pavement work; three bonding cars for applying the brazed bond of the Electric Railway Improvement Company; one Kerwin corrugation grinder, owned by the company, and one Gherky corrugation machine, which is operated under contract. Illustrations are presented also of a Watson-Stillman portable hydraulic rail bender, which can bend rails weighing as much as 130 lb. per yard, and a Long & Allstatter stationary rail bender. Until recently it was the company's practice to use the portable rail bender for curving rails in the field at the place of use. It is now customary, however, to make exact measurements on the job, after which the rails are bent with the stationary machine at Passaic Wharf. The stationary bender is driven by a G. E. 550-volt, 15-hp motor through bevel gearing and a silent chain. The accompanying table shows in detail the number and class of every service car in use.

TABLE X.—SHOWING THE NUMBER OF WORK CARS OF THE PUBLIC SERVICE RAILWAY, EXCLUSIVE OF TWO NEW CRANE CARS

NORTHERN DIVISION WORK CARS

No.	End	Motors	Control	Trucks	Assignment or Type
5602	D	4–80	2-K-6	2 McCord	M. of W. Open Box.
5603	"	4–68	2-K-6	2-P-14-B-3	M. of W. Box.
5604	"	4–68	2-K-6	2-P-14-B-3	M. of W. Semi-Box.
5605	"	4–68	2-K-6	2-B-27-G	"
5606	"	4–68	2-K-6	2-P-14-B-3	"
5607	"	4–68	2-K-6	2-P-14-B-3	"
5610	"	2–1000	2-K-10	1-B-21-E	M. of W. Flat.
5620	"	4–80	2-K-6	2-P-100	M. of W. Rail Car.
5621	"	4–80	2-K-6	2-P-100	"
5622	"	4–80	2-K-6	2-P-100	"
5623	"	4–80	2-K-6	2-P-100	"
5624	"	4–80	2-K-6	2-P-100	"
*5625	S	4–80	1-K-6	2-P-100	M. of W. Crane.
5626	D	4–56	2-K-6	2 Baldwin	M. of W. Semi-Box.
5628	"	Trailer	...	2 Hewitt	M. of W. Dump.
5629	"	"	...	"	"
5630	"	"	...	"	"
5631	"	"	...	"	"
5632	"	"	...	"	"
5633	"	"	...	"	"
5634	"	"	...	"	"
5635	"	"	...	"	"
5636	"	"	...	"	"
5637	"	"	...	"	"
5638	"	4–101	2-K-6	"	M. of W. Open Box.
5639	"	Trailer		"	M. of W. Dump.
5640	"	"		"	"
5641	"	"		"	"
5643	"	4–101	2-K-6	2-P-100	M. of W. Rail Car.
5644	"	4–101	2-K-6	2-P-100	"
5645	"	4–101	2-K-6	2-P-100	"
5646	"	4–101	2-K-6	2-P-100	"
5647	"	2–800	2-K-10	1-B-21-E	M. of W. Flat.
5652	"	Trailer		1-P-6	"
5653	"	"		1-P-6	"
5655	"	"		2-P-14-B-3	"
5657	"	2–52	2-K-2	1-P-9	M. of W. Battleship.
5660	"	2-W-3	2-K-10	1-B-21-E	M. of W. Semi-Box.
5661	"	Trailer		1-P-6	M. of W. Flat.
5662	"	"		"	"
5663	"	4–57	2-K-35	2 Taylor	M. of W. Rail Car.
5664	"	4–57	2-K-35	"	"
5665	"	4–57	2-K-35	"	"
5666	"	4–57	2-K-35	"	"
6003	D	Trailer		1 McGuire	M. of W. Tank.
6006	"	4–67	2-K-6	2-P	M. of W. Loco.
6009	"	Trailer		2-P-8	M. of W. Flat.
6011	"	"		1 White	"
6012	"	"		1-P-8-9	M. of W. Crusher.
6013	"	"		1-P-6	"
*6014	"	"			M. of W. Crane.

*Brown, 3-ton Hoist.

SOUTHERN DIVISION WORK CARS

No.	End	Motors	Control	Trucks	Type
5913	D	2–49	2-K-10	1-B-21-E	M. of W. Dept.
5921	"	Trailer		1 L+F	M. of W. Flat.
5922	"	"		1 Robinson	"
5923	"	"		1-B-21-C	"
5924	"	"		1-B-21-C	
5925	"	"		1-B-21-E	
5926	"	"		1 St. Louis	"
5927	"	"		2-B-27-G	"
5930	"	4–56	2-K-14	2 Baldwin	M. of W. Dept.
5931	"			1-P-6	M. of W. Crusher.

THE QUARRY

For several years past the company has operated a quarry at Fairview, which is located on the Bergen Turnpike, between West Hoboken and Hackensack. This quarry has recently been enlarged from 10 acres to 25 acres, giving a visible supply of 1,500,000 cu. yd. of trap rock. The crushing equipment consists of one No. 4 and two No. 6 Allis-Chalmers crushing plants, which have a combined capacity of 600 cu. yd. a day, which is practically equal to that of the storage bins. The blasted rock is brought to the crusher in narrow-gage railway cars instead of by teams, as was the former practice. One of the interesting features of the plant is that all apparatus, except the air drills, is electrically operated, the combined motor capacity of the crushers and air compressors being about 500 hp. Another interesting feature is the use of manganese steel for the conveyor buckets and for the inner shelves of the screens. This type of reinforcement has proved very effective in reducing the frequency and total cost of renewals.

The cost of delivering crushed stone from the Fairview quarry alongside of any job within a radius of 20 miles averaged 47 cents per cubic yard, but was lowered to 38 cents per cubic yard by changing to trail-car haulage. Both figures include labor, power, maintenance of line and track equipment and general expenses. Another economy was effected by making use of returning empty cars for the distribution of supplies from Passaic Wharf.

The operation of this quarry has proved satisfactory to the company from two important standpoints. It has produced a considerable saving over the cost

per cubic yard, but more important still, it has eliminated all dependence upon outside quarries. It follows that track work has no longer to be delayed because of the failure of contractors to make deliveries. It is now planned to operate the quarry through the winter months, so that plenty of crushed rock will be available for spring operations, and even for sale to outside parties. The quarry is in charge of a superintendent, who reports to the superintendent of maintenance of way. He is assisted by a clerk, a general electrician, a machinist, a dynamo man and a boss driller. About eighty-five men are employed during the busy season.

SOUTHERN DIVISION HEADQUARTERS

The Southern division headquarters, which is at Camden, is not only a considerable distance from the rest of the Public Service System, but it is also operated on a 5-ft. instead of a 4-ft. 8½-in. gage. The general supply center of all departments of the Southern division is at Camden, in charge of the local division engineer and roadmaster.

BRIDGES, TRESTLES AND CULVERTS

The lines of the Public Service Railway are operated over 282 bridges, trestles and culverts, distributed according to the operating divisions as follows: Southern, 30; Hudson, 31; Passaic, 34; Essex, 65, and Central, 122. These structures embrace almost every possible type, many of them having been built long before they were taken over by the present management. The illustrations and descriptions will therefore be limited to a few modern designs which are typical of each class.

Among the most interesting structures are the drawbridges over the Hackensack and Passaic Rivers between Jersey City and Newark. All of these bridges are of the combination railway and highway type, but those over the Hackensack River are longer. The two cities named are joined by three lines, known as the Plank Road, Turnpike and White. The longest bridge is on the Plank Road crossing of the Hackensack River. It is 1675 ft. in length, and is made up of eight Pratt truss spans carried on concrete piers, and one draw span 300 ft. long carried on concrete center piers. The width of 60 ft. affords room for a 10-ft. sidewalk on each side and a 40-ft. double-track roadway. The pavement is wood block. The cost of this bridge was about $1,500,000. The Plank Road bridge now being built over the Passaic River will be 1000 ft. long and 60 ft. wide. The Turnpike and White Line routes also have pairs of bridges approaching in size those operated over the Plank Road line.

Two different schemes are used for maintaining the connection of the rails on these and other drawbridges. One method is to use Lorain funnel rails, in which design the rail ends in an exaggerated throat. This permits the operation of cars even if the movable rail does not mesh exactly with the stationary rail. The second method is to employ lift rails, as in steam-railroad practice. The application of lift rails is shown on plate XVII.

In place of derailing switches near bridges, a secondary overhead wire and circuit breaker are placed 1000 ft. away from each side of the draw span, so that when a car reaches this auxiliary overhead wire the opening of the breaker cuts out the main trolley wire. The second wire is provided partly for car lighting and partly to give the conductor the option of running his car slowly to within a few feet of the draw. Further details of this scheme are given in the article on the distribution department.

One illustration on plate XVI shows the largest viaduct on the Public Service system, as seen from the Palisades looking toward the Hoboken terminal. The viaduct is a double-track structure which runs for 2.04 miles from the Hoboken terminal to Pavonia Avenue, Jersey City. It is 30 ft. wide and has been furnished with iron railings and walkways on each side for use by passengers in blockades or other emergencies. That portion of the viaduct near the Palisades is 90 ft. high and is of the open-truss type, with floor beams, as constructed originally for cable operation. The modern section from the Palisades to Jersey City is a plate-girder design, each of the four rails being supported by one girder.

The company's longest double-track trestle and drawbridge crosses Timber Creek, Gloucester County, on the Southern division. This trestle is 1700 ft. long. It has been entirely rebuilt by the present management with untreated white-oak piles and creosoted-pine deck. The reconstructed trestle is 3 ft. higher than the original structure, to give greater security from the high tides common in this location.

The illustrated over-crossing at Little Ferry on the Bergen turnpike is typical of the structures now erected for this purpose. Originally this line was discontinued, being broken up by railroad crossings at five places. At present it has two viaducts and two permissible grade crossings. The only break is at Little Ferry, and this, too, will soon be eliminated. The standard over-crossings are of the plate-girder and concrete abutment type, figured for the following railway loads regardless of speed: 20,000 lb. per axle when the axles are spaced as follows: 4 ft. 6 in., 14 ft. 6 in., 4 ft. 6 in., 14 ft. 6 in., etc., or 20 ft. 6 in. between the rear and front axles of cars in a train.

For bridges of spans up to 75 ft. the company uses either reinforced concrete or steel incased in concrete, because such designs conduce to lower maintenance. For long spans, plate-girder bridges are preferred to open-girder designs, particularly on account of greater ease in painting. Open girders have been found rather annoying at some railroad crossings owing to corrosion from locomotive gases. The small truss members, especially, are rapidly weakened by the gases if they are not carefully watched and frequently painted.

Some bridges are entirely maintained by the company, some are jointly maintained with municipalities, and others by a municipality alone. Monthly inspection reports are rendered by the roadmasters on all bridges, viaducts, trestles, etc. The roadmasters'



Lift Rails at Draw of Plank Road Bridge Over the Hackensack River



Manganese Curve on the Hudson River Line at Edgewater, Opposite New York City



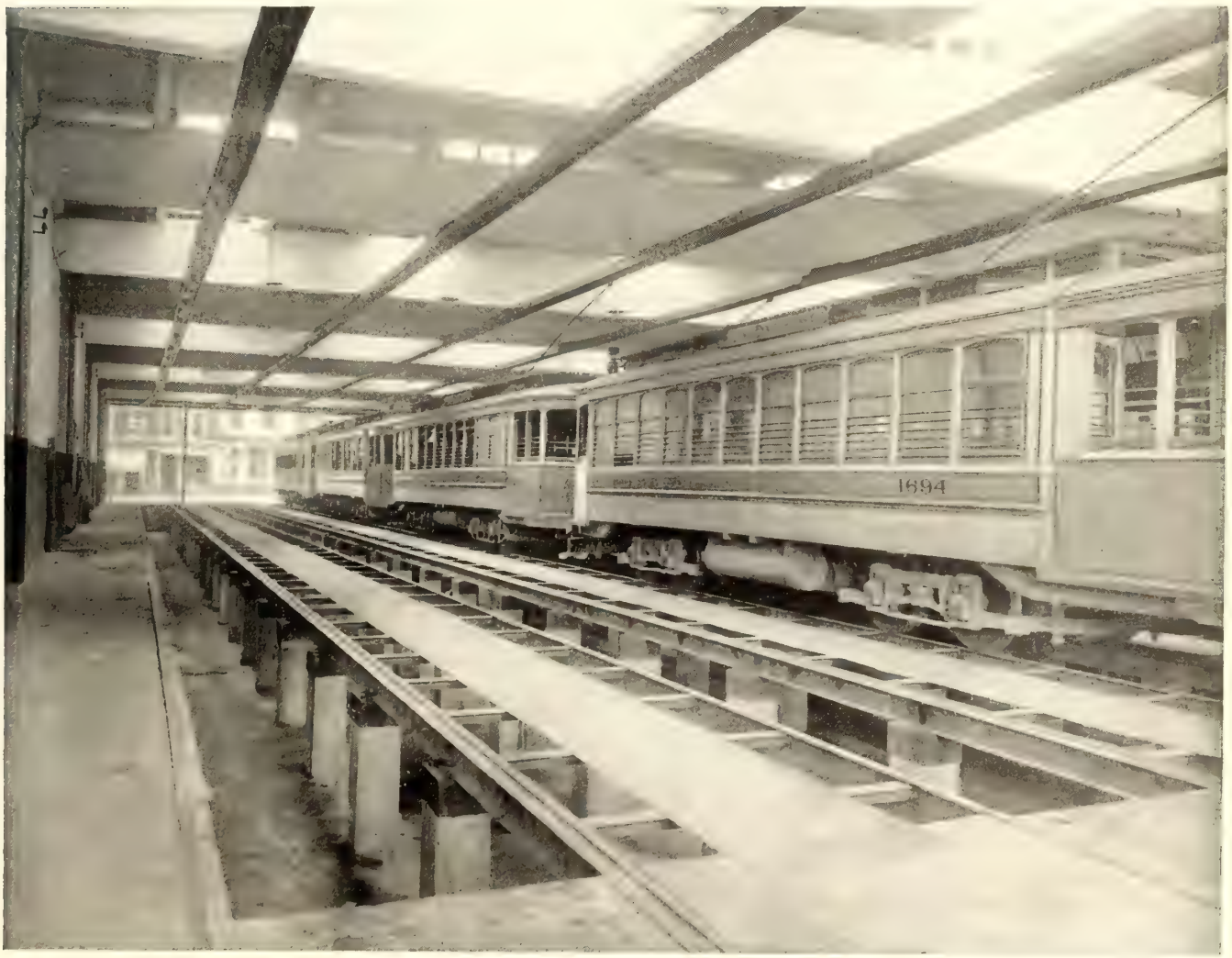
An Example of Paving in Newark, Where the Railway Company Was Permitted to Use Granite Along the Rails, the Rest of the Street Being Paved with Asphalt



View Taken During Construction of Hudson River Line, Along the Palisades of the Hudson River, Opposite West 130th Street, New York City



Exterior of the West Hoboken Carhouse, Showing the Standard Type of Construction Employed by the Company for an Operating Carhouse



Interior of the West Hoboken Carhouse, Showing the Style of Open Pits with Metal Devil Strips, Roof Construction and Lighting, Etc.



General View of the Quarry at Fairview



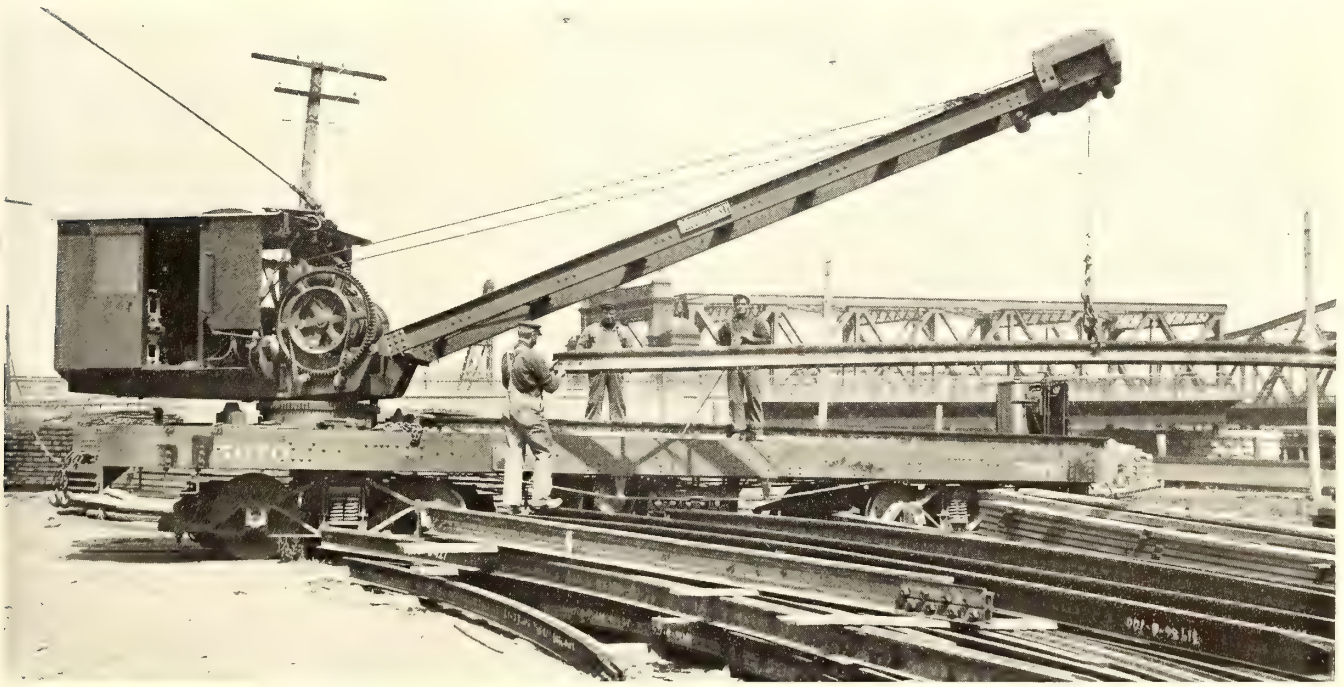
Industrial Railway and Side-Dump Cars for Transporting Rock to Breaker at Fairview Quarry



Rails Piled Into Position by Means of a Crane Car



Handling Special Work with Old-Type Crane Car



Storing Special Work with New-Type Crane Car



Drafting Room of Way Department



Blue-Printing Room of Way Department





Side View and Sectional View of Old Cast-Welded Rail Joints



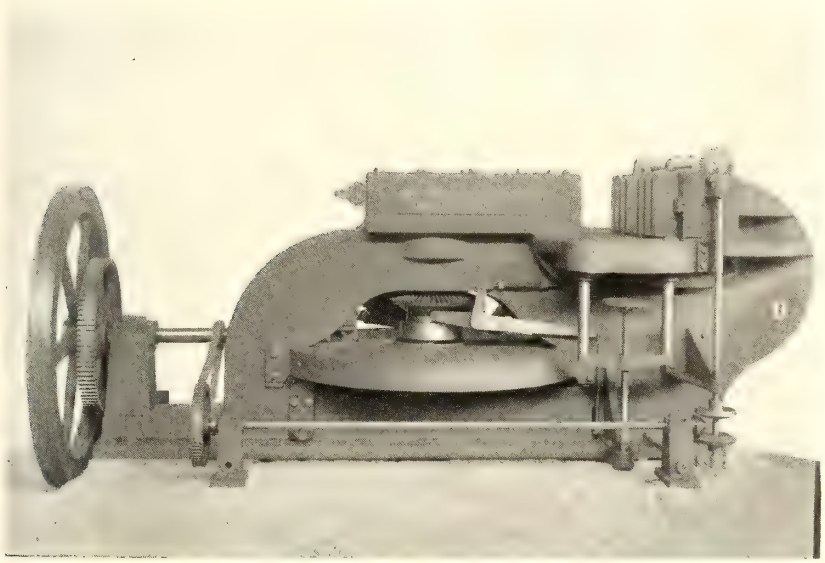
View of Old Cast-Welded Rail as Rehabilitated by Means of Insert Piece and Electrically-Welded Joint



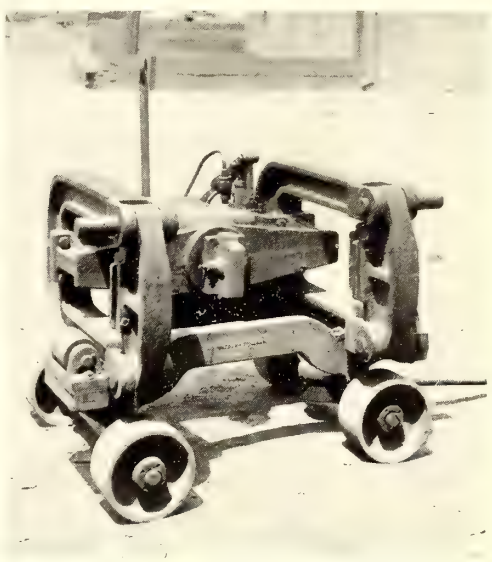
Derrick Car and Shovel at Passaic Wharf



Rail Grinder in Service



Stationary Rail Bender



Portable Rail Bender





Views of Stationary Derrick Delivering Ballast to Work Car at Passaic Wharf



Tie-Preserving Plant at Passaic Wharf



Rock-Crushing Plant at Fairview



Dump Car, Rock Crusher and Conveyor at Fairview Quarry

reports are checked by the engineer maintenance of way and by the local transportation superintendents. Extensive changes in these way structures are left for the annual statement of the engineer maintenance of way. All recent culverts are of concrete.

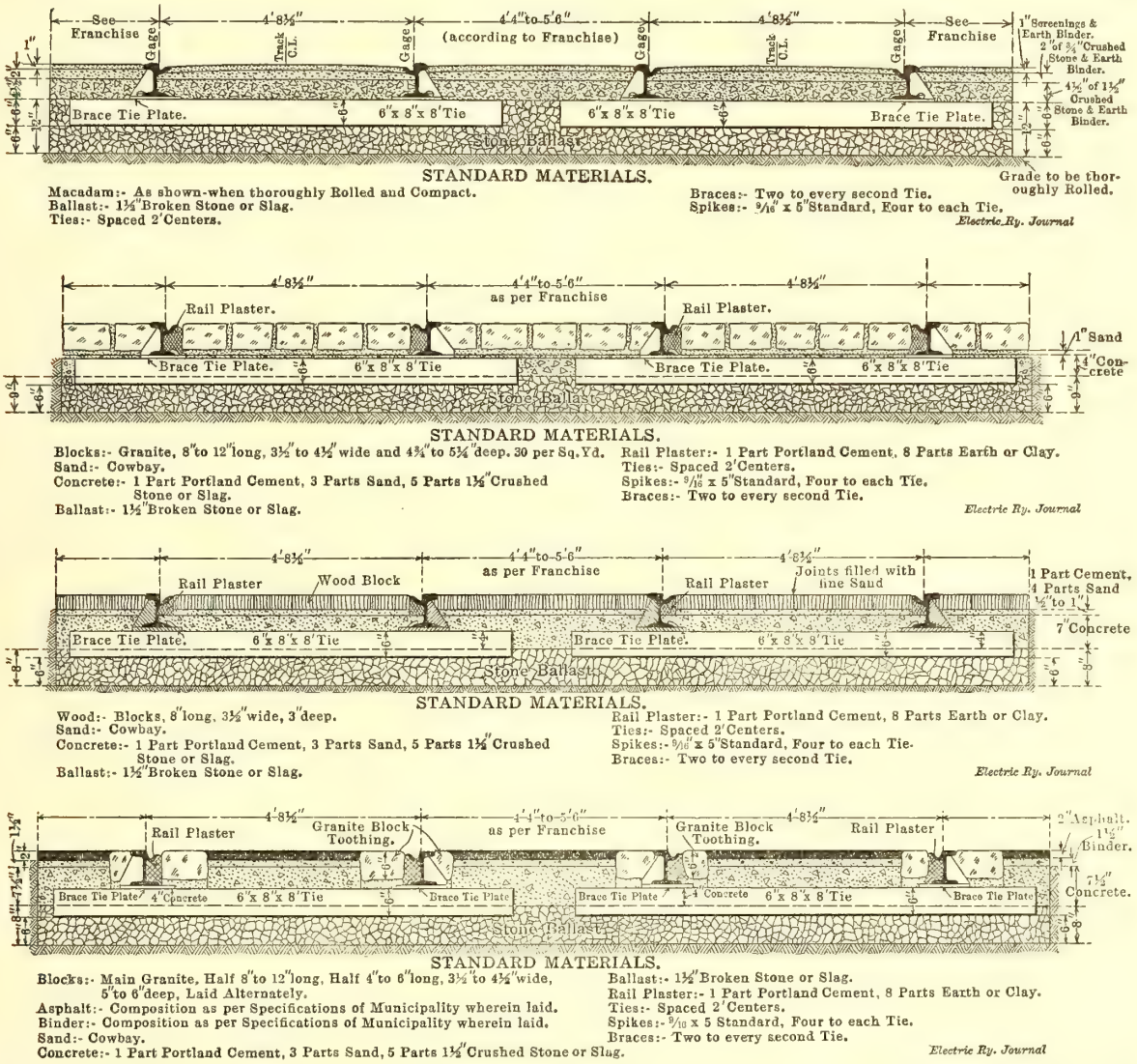
Wagon elevators form an unusual feature of an electric-railway system. They have been found useful in Jersey City and Hoboken, however, owing to the steep grade between the Hudson River shore and the cliffs of the Palisades directly beyond it. The roads between the two levels are so steep that many wagon and automobile drivers prefer to pay elevator tolls instead of making the wearisome climb. Both the Jersey City and Hoboken elevators have a vertical travel of about 90 ft., and are operated by cables driven by electric motors. The elevator tolls are as follows: Upward trip, 10 cents for a single horse and wagon or small automobile, and 15 cents for a two-horse wagon or a large automobile; downward trip, 5 cents and 10 cents, respectively, for the two groups of vehicles.

TRACK CONSTRUCTION STANDARDS

The present trackage of the Public Service Railway amounts to 760.98 miles, 125 miles of which is unpaved. There are 227.92 miles of T-rail, 287.81 miles of tram rail, 211.15 miles of grooved rail and 34.10 miles of carhouse and yard trackage.

The paved track is divided as follows: 460 miles of stone block, 120 miles macadam and 55 miles of wood block, brick, asphalt, etc. It is interesting to note that since the properties were consolidated under the Public Service interests in the fall of 1903 there have been reconstructed or otherwise modernized some 225 miles of track, equivalent to 30 per cent of the entire system or running track. The weight of rail throughout the entire system varies from a 60-lb. running rail to a 127-lb. guard rail.

The standard rail for city service is the Lorain section No. 116-434, weighing 116 lb. per yard. It is 7 in. high, has a ½-in. web and a groove 1½ in. deep. The Public Service Railway's extensive experience with both 9-in. and 7-in. rails has led it



Way Department—Cross-Sections of Girder Rail Construction with Macadam, Granite Blocks, Wood Blocks and Asphalt with Granite Strips

strongly to advocate the lower rail. A 7-in. rail is cheaper because less excavation is required, while the use of electrically welded joints gives as good gage-holding qualities as the higher rail.

All classes of track construction, whether open or paved, have a rolled subgrade. The ties, which are laid 2 ft. centers, are 6 in x 8 in. x 8 ft. in size, and are impregnated with 10 lb. of creosote per cubic foot. Joints are always staggered, and two combination brace tie-plates and rail braces are used for every other tie. There are four 9/16 in. x 5 in. spikes per tie. In open track, the ballast consists of 1½-in. trap rock or slag, and in paved track of 4-in. concrete, which is placed between the ties and flush with their tops. This concrete consists of one part Portland cement, three parts sand and five parts 1½-in. stone or slag.

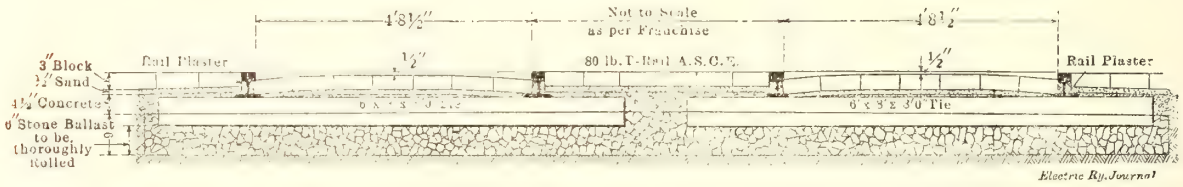
The kind of paving depends largely upon the franchise obligations and upon the practice of the municipality. The preference of the company is for granite block, as this is ultimately the most economical material. In no case would it recommend laying along the rail such materials as asphalt, bitulithic or amisite. Generally these sheet pavements are used only in combination with granite or trap-rock paving blocks. If stone block is objectionable on account of roughness, wood block is installed between and outside the rails, as shown in one of the cross-sections on page 583. Other cross-sections show the track standards on streets paved with granite, macadam and asphalt respectively. The brick construction is practically the same as that shown for wood block.

An example of high-class stone paving block is that applied on some streets in Newark, which was done in 1910 under what is known as the Newark specification. This provides for a 4¾-in. to 5¼-in. deep granite block, 8 in. to 12 in. long and 3½ to 4½ in. wide, quarried to lay up with a ⅜-in. joint. This paving rivals brick for smoothness and appearance and is superior to it in life. Plate XVIII includes a view of this paving as laid on Bloomfield Avenue, Newark.

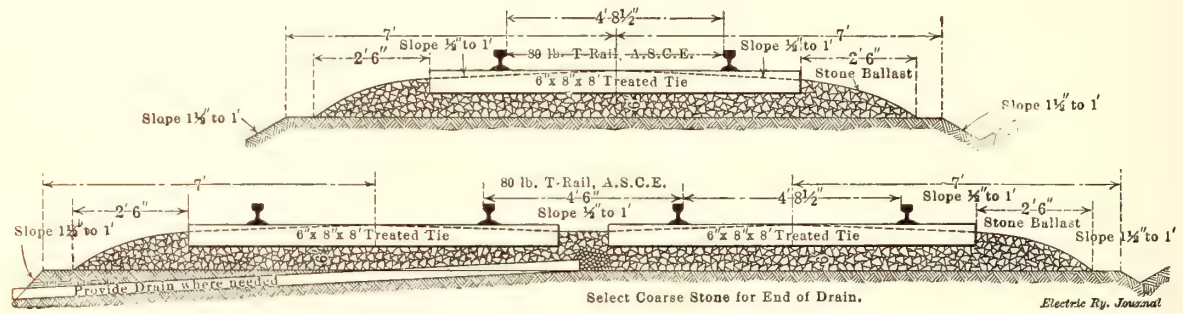
An interesting example of wood-block paving is afforded in Bayonne, where the railway company substituted wood block between the rails on an asphalt street. This construction has now been in use for six years with entire satisfaction, whereas paving renewals would have been required long ago if asphalt had been used throughout.

Since 1908 the standard rail joint for paved streets has been the Lorain electrically welded joint. It is expected that 45,000 of these joints will have been installed by the end of 1911. There is still in use a considerable amount of track which was cast-welded previous to 1903 with the joints so cupped that urgent repairs were often necessary, requiring the cutting in of short pieces of rail. Recently, however, a very successful method has been employed to reclaim this old rail. First, the cast-welded joints are cut out, as shown in plate XXII. Then a new piece of rail is installed, the joint being electric-welded with a single steel bar and four welds, as shown in plate XXII. After the electric weld is made, the head of the rail is ground off to a smooth surface. Where the cast-welded joints are not so badly cupped as to require renewal, they are ground down with a Kerwin-Detroit or a Nichols grinder. It is surprising how much some of the cast-welded track has been improved by renewing and repairing the joints in the manner described, and by regaging and resurfacing the track. With these methods, the track, in many cases, is given a probable further life of four to five years, while otherwise it would be absolutely necessary to lay out money for new construction immediately in order to permit safe car operation.

The standard rail section for T-rail in paved streets is the 7-in., 80-lb. rail recommended by the American Electric Railway Association. The standard T-rail for open construction is the 80-lb. A. S. C. E. section. With the latter construction the company uses No.



Way Department—Standard T-Rail Construction for Paved Streets



Way Department—Standard T-Rail Construction for Single and Double Track on Private Right-of-Way

0000 Continuous joints and the Electric Railway Improvement Company's brazed bonds. Cross-sections are presented on this page of open single and double-track construction as carried out on the North Paterson extension, and of T-rail construction in a paved street.

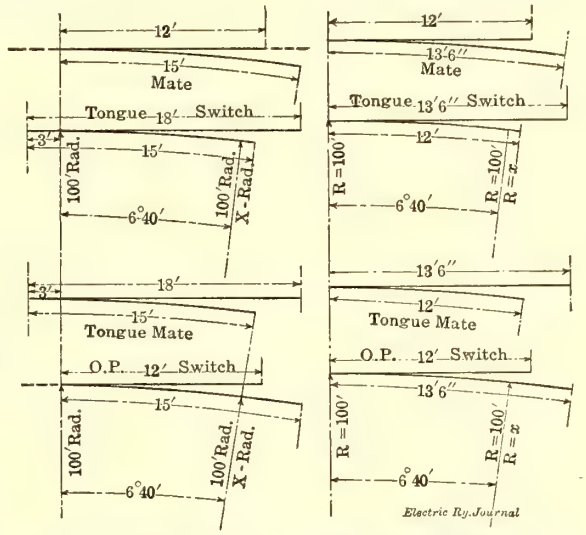
SPECIAL-WORK

It is obvious that a company operating through such an extended territory as the Public Service Railway must have a great variety of special-work. There are 102 grade crossings of steam railroads alone, and each crossing requires from one to twelve sets of crossing frogs. A typical grade crossing is shown in an accompanying drawing. These crossings are equipped with derailing switches, which are operated by the conductor by means of a lever and rods. The rods run through buried ducts. The cars are stopped at these crossings until the conductor has crossed the track and pulled the lever. These derails are made by the U. S. Switch & Signal Company. The steam-railroad crossings are of the built-up type, with rolled manganese steel on the foreign track, the other crossing rails being of open-hearth steel.

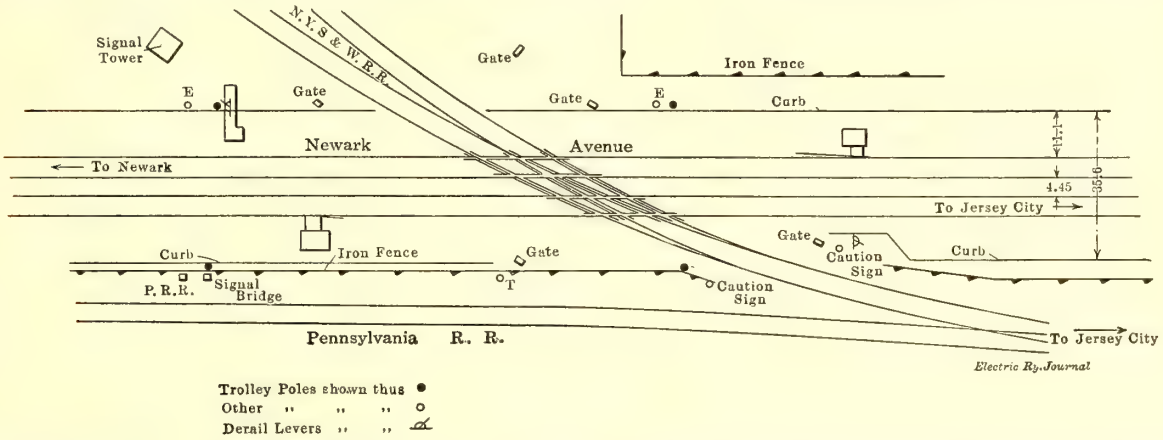
Formerly a great variety of switches was used in making up special-work layouts, but standard designs are now employed to great advantage. It has been found possible to install the straight 100-ft. radius switch in many cases, thereby leading to important economies in permitting the interchange of switch pieces and in minimizing storage room. The accompanying drawings show layouts for a 100-ft.-radius switch and mate, one for regular hardened center and the other for manganese work. As a rule hardened center special-work with some solid manganese-steel curved rail has been used, but now many 7-in. solid manganese switches and mates are being installed.

In recent years electrically controlled switches of the Cheatham and American Automatic Switch Company's types have been placed at important junctions in Newark and at the Jersey City terminal. At the latter place they are under the control of a tower man. The company expects largely to increase the number of automatic switches at an early date.

At the most important street intersection on the Public Service Railway, namely Broad and Market Streets, Newark, the special-work is subjected to a rush-hour traffic of 500 cars an hour, so that it is one of the most congested street railway crossings in the world. The ordinary hardened-center type crossing became useless after six months at this location. The solid manganese crossing now installed has been in place for more than two years and still appears good for some time. One of the views on plate XVII shows a manganese section of running and guard rails on the horse-shoe curve of the Hudson River line which descends the Palisades directly opposite 129th Street, New York. The minimum radius of these curves is 60 ft. and the maximum grade on which they are located 6 per cent.



Way Department—100-ft. Radius Switch Pieces for Hardened Center and Solid Manganese Construction Respectively



Way Department—Derail Positions at Grade Crossing with New York, Susquehanna & Western Railroad, Newark Avenue, Jersey City, N. J.

In recent years electrically controlled switches of the Cheatham and American Automatic Switch Company's types have been placed at important junctions in Newark and at the Jersey City terminal. At the latter place they are under the control of a tower man. The company expects largely to increase the number of automatic switches at an early date.

The special-work installation at Five Corners, Jersey City, is notable as an important transfer point, since it is the intersection of the Turnpike, Belt, Oakland Avenue, Pavonia and Summit Avenue lines. The wood-block paving at this important intersection has borne the brunt of exceptionally heavy team traffic

for the past four years with excellent results. These blocks are laid on a concrete base 6 in. deep.

BOATS AND FERRY HOUSES

The way department maintains five ferryboats under the superintendent of buildings. Details of these boats are presented in Table XI.

TABLE XI.—DATA ON FERRYBOATS.

Name.	Gross Tons.	Length. Ft.	In.	Engine Equipment.	Passenger Capacity.
Edgewater	709	146	6	850-h.p. compound, 22x30 in., 24-in. stroke.....	2,000
Leonia	643	145		2 engines = 500 hp, 16x30 in. cylinders, 12-in. stroke.	1,800
Englewood ...	484	135		420-hp beam engine, 36-in cylinder, 9-ft. stroke.....	1,000
Bayonne City..	414	125		328-hp beam engine, 30-in. cylinder, 9-ft. stroke.....	900
Public Service.	305	102		382-hp beam engine, 32-in. cylinder, 8-ft. stroke.....	900

The first three boats operate between the terminal at Edgewater, and the terminal at West 130th Street, New York City. The last two boats operate between the terminal at Bergen Point, Bayonne, N. J., and the terminal at Port Richmond, Staten Island.

TERMINALS AND CARHOUSES

The Public Service Railway now has twenty-eight operating terminals in addition to eighteen carhouses which are used only for storage. These operating structures do not include the River Street (Hoboken), Exchange Place (Jersey City), and Market Street (Camden) ferry terminals. The Jersey City and Camden terminals are old structures, but those in Hoboken are of comparatively recent date.

The Fourteenth Street terminal consists of three loading tracks, which are built over plank-covered piling beyond the curb line at the Hudson River, and one unloading track with a concrete platform. There is no terminal building, but all tracks are under shelter. The interesting features of this installation are the solid manganese curves which have been in service for some four years and still show little wear, in striking contrast to ordinary open-hearth steeel, which had but two years' life under the same conditions.

The second Hoboken terminal merits particular attention, as it is one of the finest street-railway stations in service. This building adjoins the passenger terminal and ferry house of the Delaware, Lackawanna & Western Railroad, and it is also directly over the station of the Hudson & Manhattan Railroad. From this junction point the traveler is able to take a ferry boat or tunnel train to New York City or along the New Jersey shore, board the Delaware, Lackawanna & Western trains, use the viaduct cars of the Public Service Railway to Jersey City Heights and West Hoboken, or board the local surface trolleys. Thus, in all, five distinct services are provided from one location. The eight incoming trolley lines now bring about 70,000 passengers a day to this terminal. About 180 cars per hour are operated during the morning and evening rush hours, but it is possible to care for 400 cars per hour daily.

A complete preliminary description of this structure was printed in the ELECTRIC RAILWAY JOURNAL of Aug. 7, 1909, but it may be of interest to summarize the principal features of the completed installation.

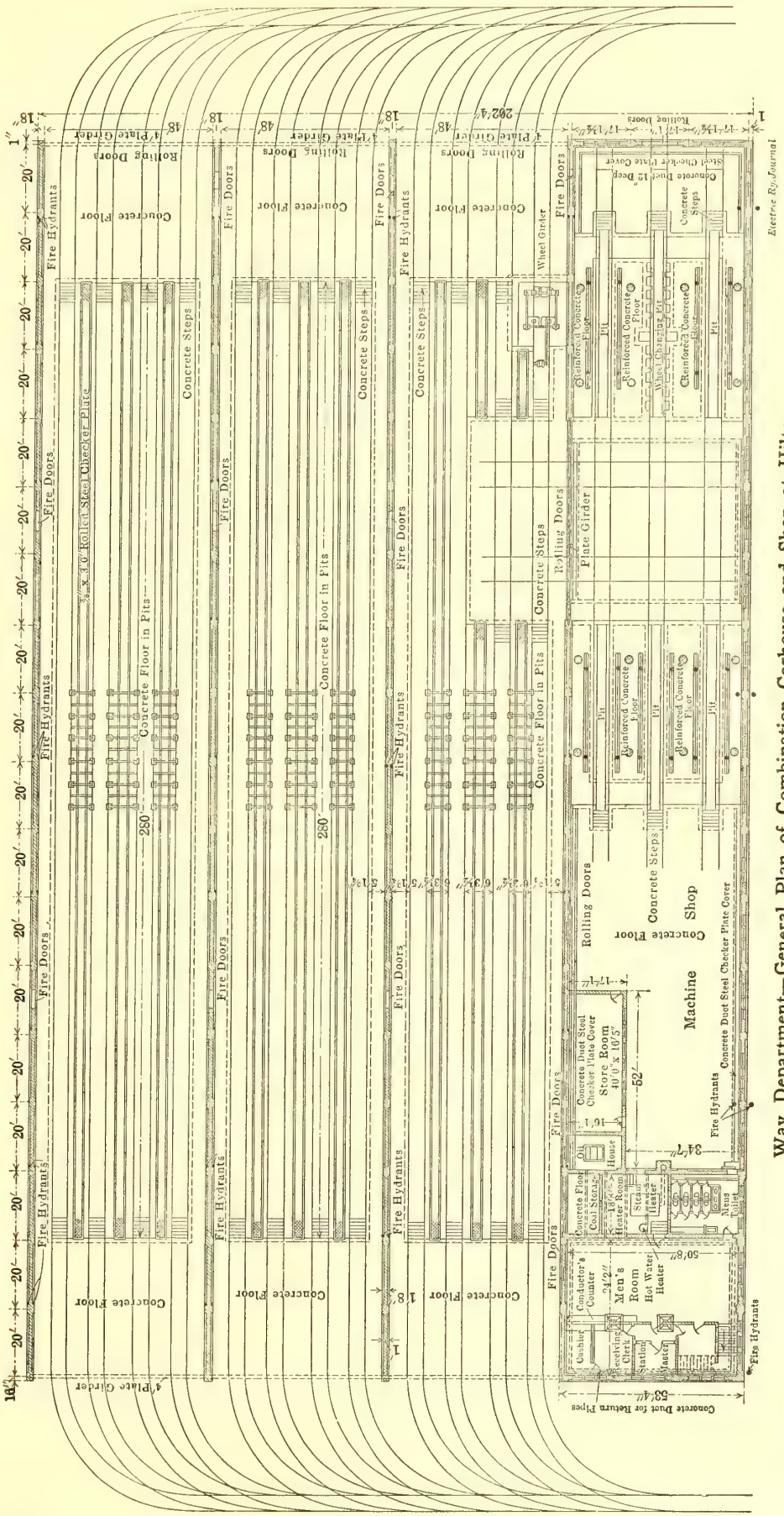
The terminal is a two-story structure with stairways to the street and to the tunnel station, and an escalator for passengers from the underground lines. The ground floor has one unloading and four loading tracks, all of which pass over a common loop. The upper floor track arrangement for the viaduct cars is similar, except that there is one unloading track less. The unloading tracks on both floors are isolated from the loading track by a fence to prevent alighting passengers from riding back. All boarding passengers must enter through ticket choppers' gates, as the terminal is operated on the pay-as-you-enter system.

The station is a structural-steel frame with irregular sides 397 ft. x 373 ft. x 145 ft. x 53 ft. The area of the first floor is 43,767 sq. ft. and of the second floor 46,053 sq. ft. Both the floors and roof are of concrete, reinforced with metal fabric. Heavy copper ornamental cornices extend on three sides of the building. The bottom ironwork of the second floor is entirely incased in concrete. Part of the structure is incased with wired glass and copper. The stairways are of ornamental cast iron. The skylights in the roof and marquise are of copper Anti-pluvius puttyless type, with wired glass. The lower floor is open, but has an ornamental steel fence with folding and sliding gates. The inside treatment is of tile and plaster, with copper trimmings and metal sash. This floor has facilities rooms, offices, toilets, etc., for the employees. The principal conveniences for passengers are on the upper floor, which has a waiting room of 2000 sq. ft. area, toilets, retiring room, news-stand and operating offices.

The track work is of Lorain 9-in. standard hardened-center construction, except that at the west end, including the loops, solid cast-manganese steel is used.

Another important traffic connection with the Hudson & Manhattan Railroad will be established by the Sip Avenue, Jersey City, terminal, which is now under way. The company expects to handle 6000 passengers an hour here during the rush periods. As shown in the plan, on page 585, passengers from the underground line will reach the street level by means of an escalator or stairway, thence proceeding to the waiting room and prepayment-loading tracks of the trolley cars. As in the Hoboken terminal, the unloading track will be isolated from the other tracks by a high fence. The track work will consist of solid manganese switches and mates with open-hearth curves.

As shown on the plan mentioned, the open parts of the property will be inclosed by an iron fence. The waiting room will be of brick, steel and glass. Brick utilities rooms for the employees of the transportation department will also be erected near the exit from the terminal. A marquise for the protection of alighting passengers will be attached to the commercial building which is to be erected opposite the unloading track for the gas and electric subsidiaries of the Public Service Corporation. The cost of this building will be about $125,000, and of the whole improvement, including the terminal, about $175,000.



Way Department—General Plan of Combination Carhouse and Shop at Hilton

CARHOUSE AND SHOP DESIGN

The operating and storage carhouses embrace both open and closed types of construction, varying greatly in accordance with the ideas of the old underlying companies. The present management, however, favors the closed carhouse. Buildings of this type have been approved for construction at Hilton, South Orange and at Washington Avenue, Nutley. The last-named installation is the only one on which work has not yet been started. The characteristics common to all these buildings are the use of brick walls and mill-type roofs, the provision for sprinkler fire protection, the unusually high percentage of pit room, the two-way exits, the reservation of one bay for offices and a self-contained maintenance plant and of an employees' club room on the second floor.

HILTON INSTALLATION

The Hilton carhouse is on a 12-acre property, only part of which will be used at present. The present installation is 362 ft. long by 202 ft. wide, made up of three storage and inspection bays and one shop bay. The storage bays hold

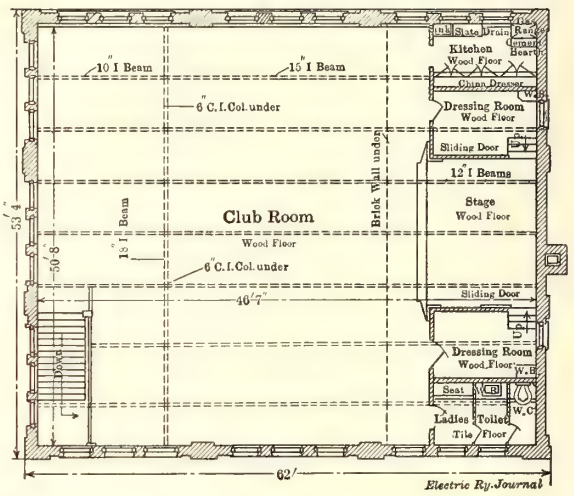
100 45-ft. cars and the shop bay 12 45-ft cars. Cars are always operated in one direction, entering at one end of a bay and leaving at the other. Fully 80 per cent pit room has been provided in the three storage bays by building pits in every track except for 40 ft. from each end. The concrete floors of the pits and devil strips have ample drainage to permit cars to be washed in any position. Cars can be shifted easily into the shop from the adjoining bay by means of a transfer table.

All of the shop tracks have car hoists except the track over the wheel-changing pit. The machine shop, storeroom and heating plant are located between these overhauling tracks and the facilities rooms, which include the men's waiting room, the cashier's, receiver's and superintendent's offices, toilets and lockers. This arrangement places all shop and transportation business on the first floor. The upper story contains a 60-ft. x 50-ft. employees' assembly room for social purposes, a stage with dressing rooms, lunch room, reading room, etc.

The Hilton carhouse is built up of brick walls 12 in. thick with 20-in. pilasters every 20 ft. The division walls are of the same construction, with approved fire-door openings. The track entrances and transfer-table section between the first car bay and the shop are protected by Kinnear rolling steel shutters. The roof is of mill construction, in which steel trusses support 6-in. x 12-in. purlins, over which 3-in. spline planking is laid. The roof proper is of five-ply Barrett specification tar and gravel with copper flashings. Antipluvius wired-glass skylights are installed, two for every other panel of each car-storage bay and three for every other panel of the shop section. The outside wall of the shop also has large windows.

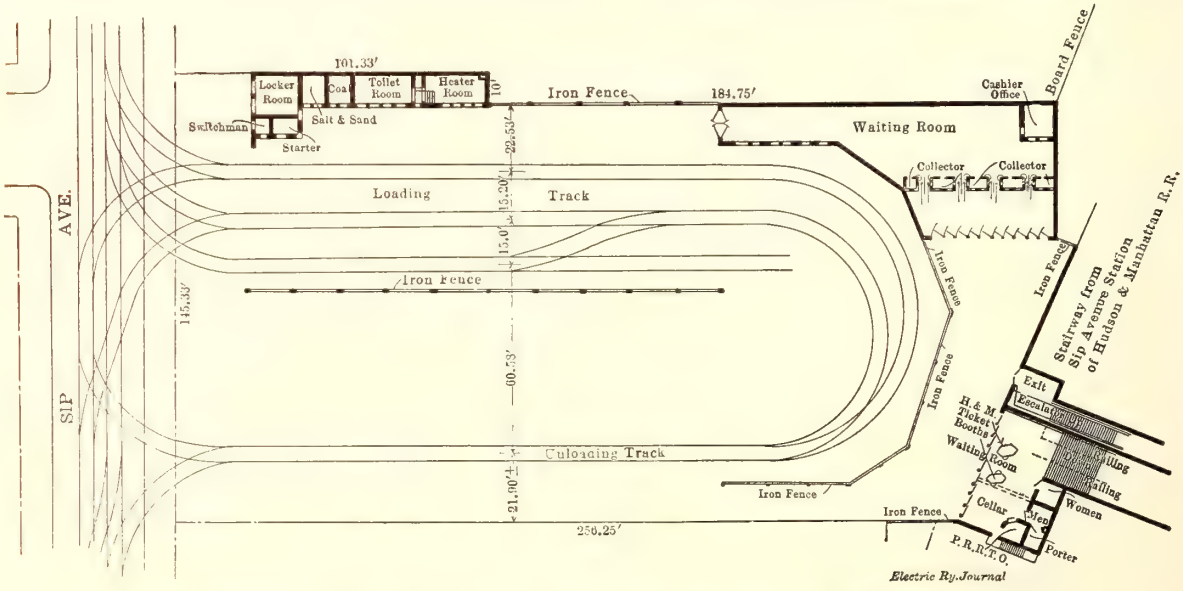
There are four tracks in each storage bay. The pits, which are not heated, consist of a concrete floor and piers with creosoted wood-block caps for anchoring the rails. The walks between the tracks are of 5/16-in. checker plates 3 ft. wide. These are supported on angle irons which are riveted to the running rails at intervals of 3 ft.

The fire protection at the Hilton installation consists of roof and aisle sprinklers; a 50,000-gal. steel gravity tank set on a 100-ft. tower, and a 1000 gal. per hour capacity underwriters' centrifugal fire pump. The yard has fire hydrants in hose houses of approved type. The property is also equipped with an auxiliary fire alarm in circuit with the city system. Other fire-protection appliances include fire extinguishers and fire pails. Numerous hose connections are provided for car washing.



Way Department—Employees' Social Rooms on Second Floor, Hilton Carhouse and Shop

The selection of mill construction instead of reinforced concrete was dictated by the important condition that mill construction was some 25 per cent to 30 per cent lower in first cost and also by the fact that the underwriters refused to give a lower insurance rate for cars stored in a reinforced concrete building than for storage in a mill structure of the type described.


101.33'
Locker Room
Coal
Toilet Room
Heater Room
10'
Iron Fence
184.75'
Cashier Office
Board Fence
Switchman
Salt & Sand
Starter
Waiting Room
Collector
Collector
Loading
Track
AVE.
SIP
Iron Fence
145.33'
Iron Fence
Iron Fence
Iron Fence
Stairway from Sip Avenue Station of Hudson & Manhattan R.R.
Exit
Escalator
H. & M. Ticket Booths
Waiting Room
Cellar
Men
Women
Porter
P.R.R.T.O.
Culvert
Culvert
Culvert

POWER GENERATION

THE Public Service Railway Company buys all the electrical energy required for the operation of its cars from the Public Service Electric Company, which operates all of the generating stations and substations for both railway and lighting service. As explained in the chapter on overhead construction, the Public Service Railway has jurisdiction over the distributing system from the point where the low-tension, direct-current feeders leave the substations. All energy supplied to the railway company is metered at the low-tension busbars in the substations.

GENERAL SCHEME OF POWER GENERATION AND DISTRIBUTION

The power generation and distributing system of the Public Service Electric Company is divided into the Northern, Central and Southern divisions. The Northern division includes Essex, Hudson, Bergen and Passaic Counties, in which are situated the large cities of Newark, Jersey City, Hoboken, Paterson and the Oranges. The Central division includes the cities of Elizabeth, Perth Amboy, Rahway, Cranford, New Brunswick and Plainfield. The Southern division includes Trenton, where lighting service only is given, and the territory around Camden, where energy for both lighting and railway operation is supplied. The largest part of the load of the entire system is carried by the power stations of the Northern division. All of the generating stations in the Northern division are tied together by 13,000-volt transmission lines, as are all the stations in the Central division, and the Central and Northern divisions in turn are tied together by a transmission line connecting Newark and Elizabeth. The Camden territory of the Southern division is operated independently of the Northern and Central divisions.

When the Public Service Corporation was formed in 1903 it acquired a total of twenty central stations and twenty-four substations. The central stations had a mixed equipment of 60-cycle alternating-current machines for lighting distribution, 25-cycle alternating-current machines for railway distribution, and a number of 500-600-volt direct-current generators for supplying energy directly to the railway feeders. The problem which confronted the engineers of the Public Service Corporation was to re-design the entire power generation and distribution system so as to attain economical and reliable operation and to provide ample reserve in case of failures of any class of apparatus in any of the separate stations. Inasmuch as a large amount of 25-cycle and 60-cycle generating machinery had been acquired at the time of the consolidation, it was decided to retain both the 60-cycle and 25-cycle generating apparatus and distribution systems in Essex and Hudson Counties, where by far the largest proportion of the total load is carried. In Bergen and Passaic Counties 60-cycle alternating current is used for both the railway and lighting systems, and all of the distribution in the Central and Southern divisions is also 60-cycle alternating current.

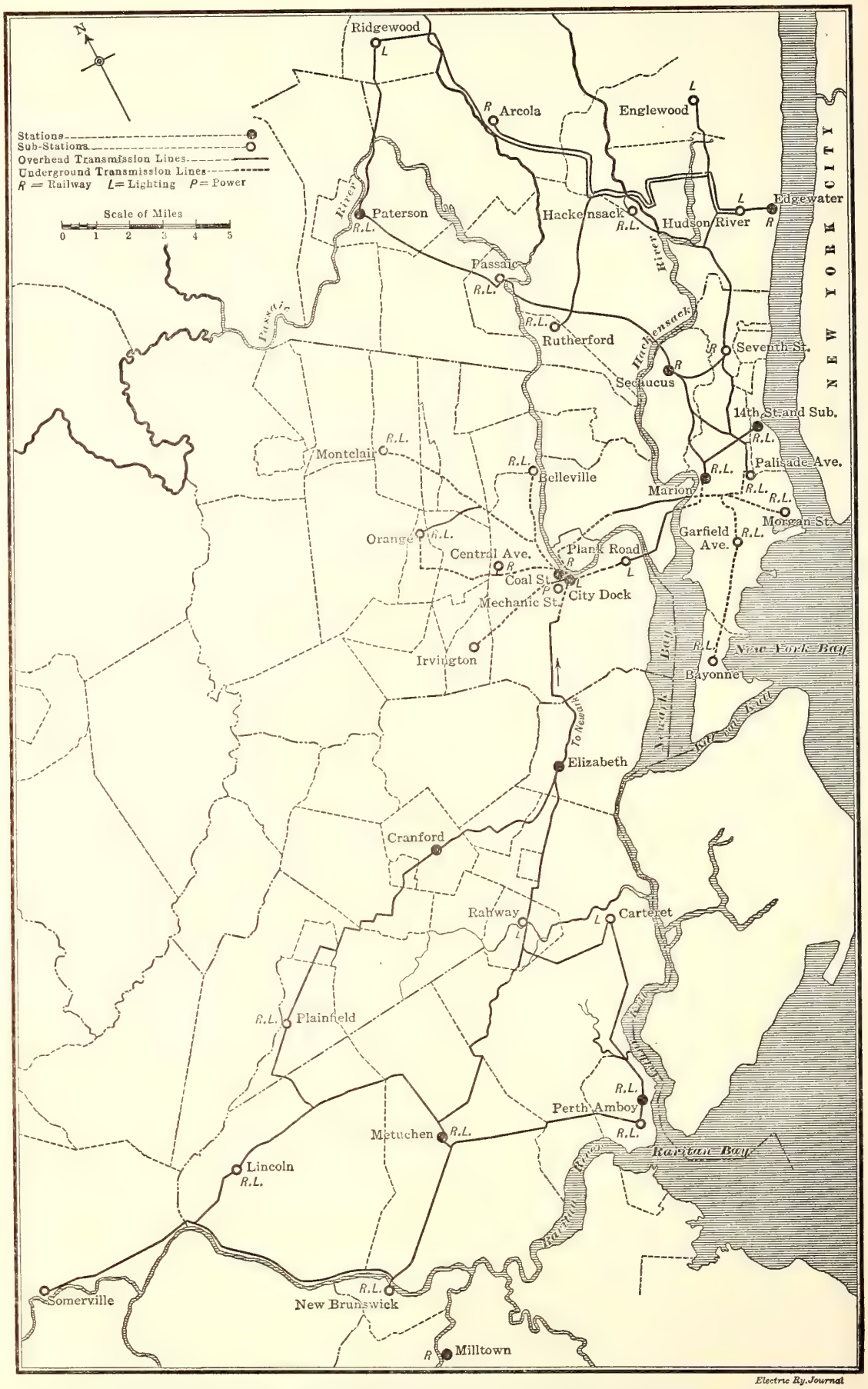
As the transmission system in Essex and Hudson Counties is almost entirely underground, there is but little complication in maintaining separate distribution systems for the two frequencies.

The railway loads in Newark, Jersey City and Hoboken are so heavy that it would not be feasible to operate rotaries of 2000-kw, which is the company's standard size for 25-cycle machines, from the same transmission lines which supply the lighting circuits on account of voltage fluctuations. Where the transmission lines are carried entirely overhead, as in the Central division and in Bergen and Passaic Counties in the Northern division, the use of two frequencies would involve excessive complication of circuits and pole lines. In such territory, however, the railway loads are comparatively light and do not interfere with proper regulation of the lighting units which are supplied from the same 60-cycle transmission lines. To provide spare capacity for either the 25-cycle or 60-cycle systems a 3000-kw frequency changer was installed in the Newark station three years ago. This machine has proved very valuable in cases of sudden and unexpected failures in the generating apparatus or transmission lines of either frequency.

It will be noted from a study of the maps showing the distribution systems of the three divisions that a large number of substations are operated and that apparently they are too close together for the highest total economy. This has come about very naturally, however, on account of combining the lighting and railway service in the same company. These substations are all located in the centers of lighting distribution, where it has been necessary to establish substations of quite small capacity in some cases in order to give the best regulation and to keep down the amount of feeder circuits. With these centers established and with the operators necessary for the lighting substations it has required only the construction of larger buildings and the installation of railway rotaries with an additional transmission line back to the generating station. The result from an operating standpoint is very satisfactory, as a large number of feeding points are provided and it is possible to maintain high voltage over the whole length of the suburban lines with a minimum amount of copper.

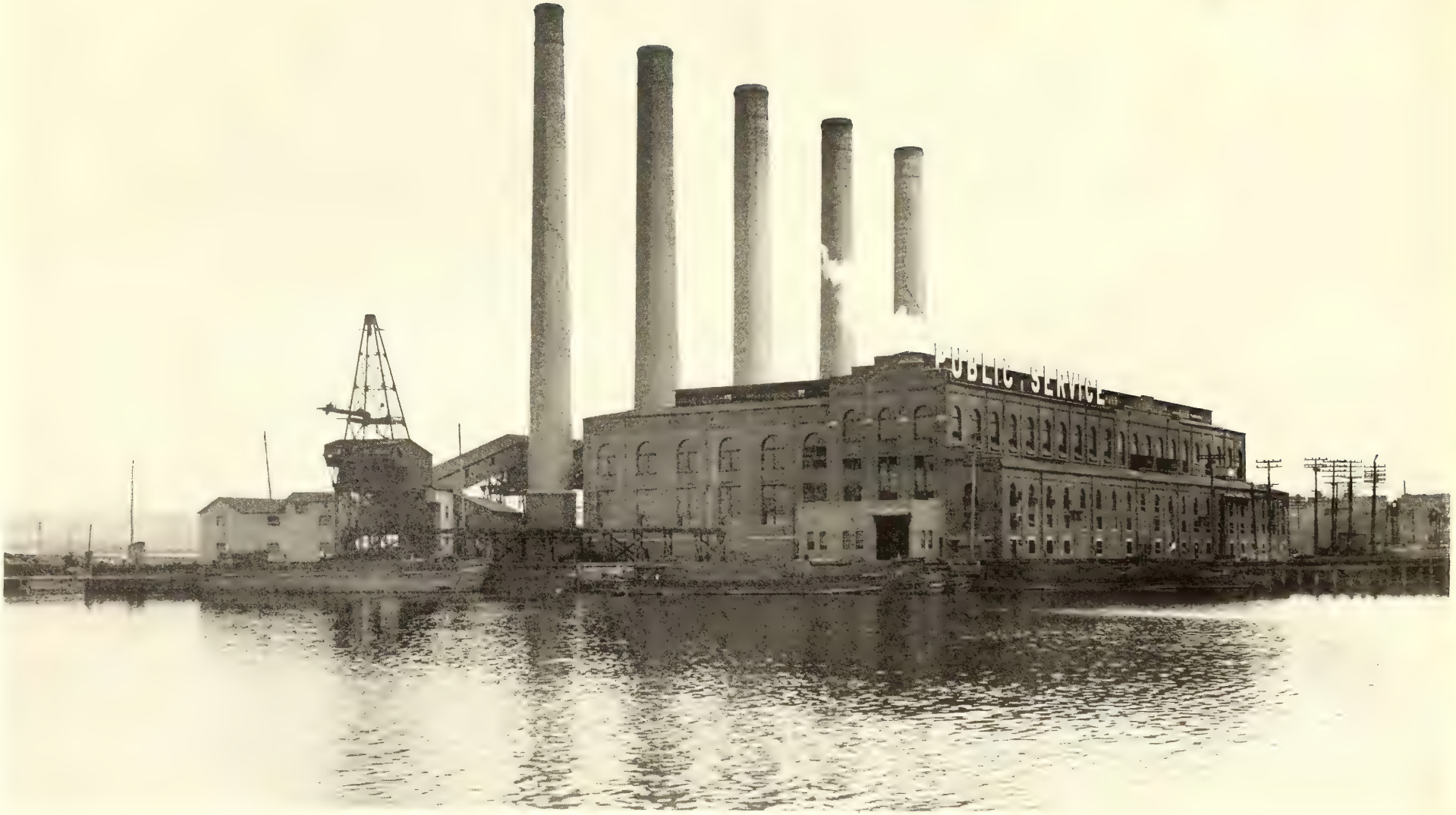
NORTHERN DIVISION POWER STATIONS

The power stations supplying the Northern division are located at Marion, Newark, Secaucus, Fourteenth Street (Hoboken), Paterson and Edgewater. The Secaucus and Edgewater stations generate current for railway operation only, but the other four stations have a combined railway and lighting load. Alternating current at 25 cycles for distribution to the railway substations is generated at the Marion, Newark,



Electric Ry. Journal

Power Generation—Map of Northern and Central Division Transmission Lines

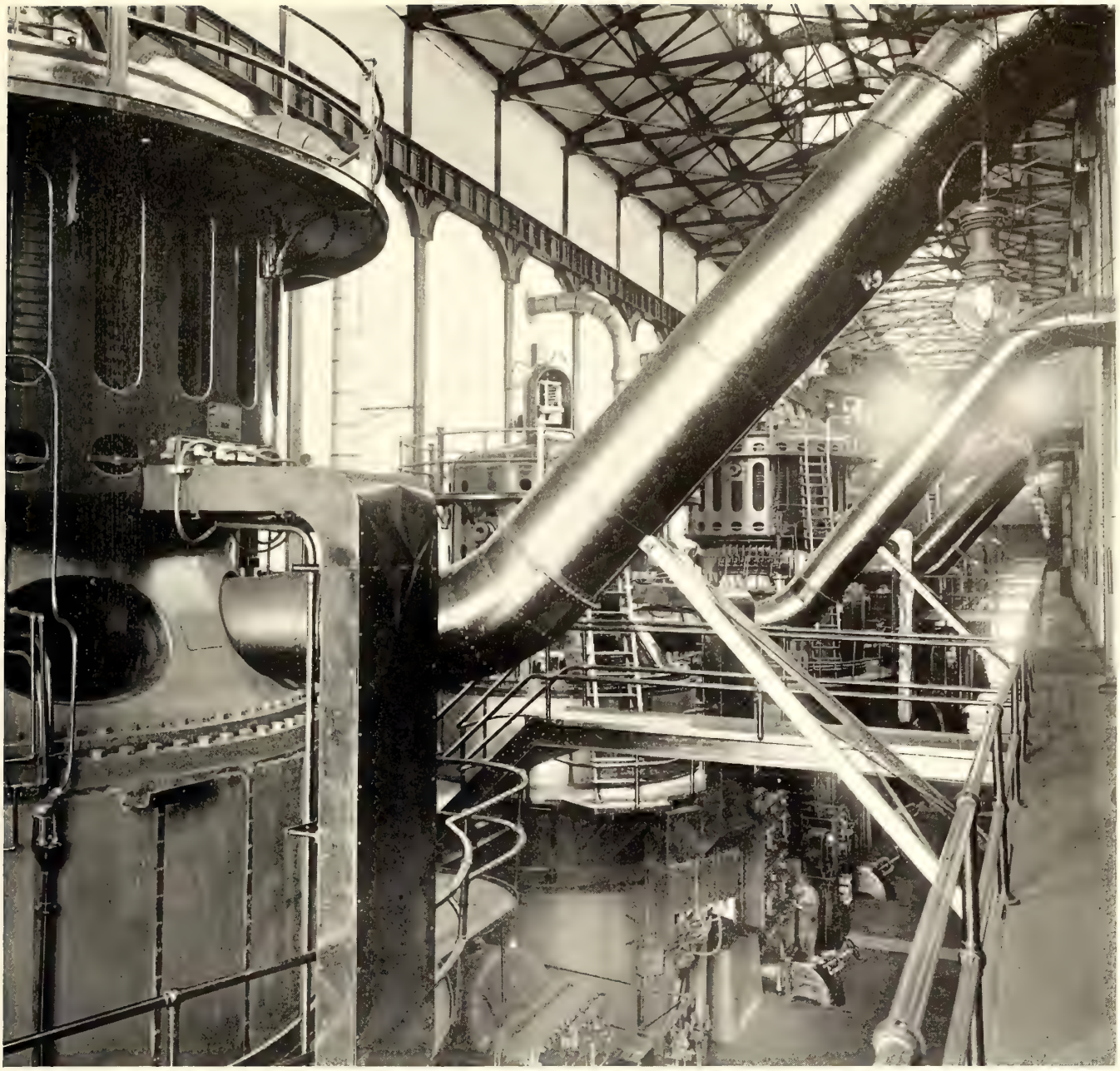


View of Marion Power Station from West Bank of Hackensack River

Plate XXV

Plate XXVI

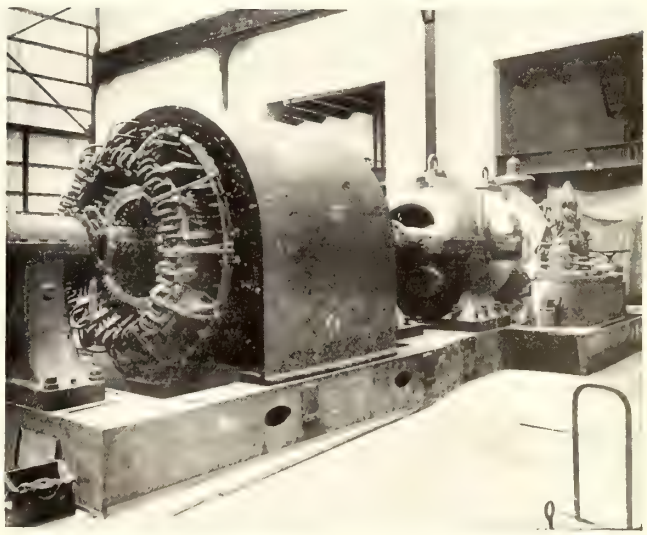
Coal-Handling Machinery at Marion Power Station



Turbine Room in Marion Power Station



Hackensack River Cable House of Meadows Transmission Line



5000-kw Turbo-Generator Unit in Perth Amboy Power Station

Plate XXVIII



Coal Conveyor Trestle at Perth Amboy Power Station



Exterior of Perth Amboy Power Station



Crossing of Meadows Transmission Line Over Pennsylvania Railroad Electric Division



Crossing of Meadows Transmission Line Over Delaware, Lackawanna & Western Railroad

Plate XXX



Exterior of Substation at Washington Avenue, Newark



Interior of Substation at Washington Avenue, Newark



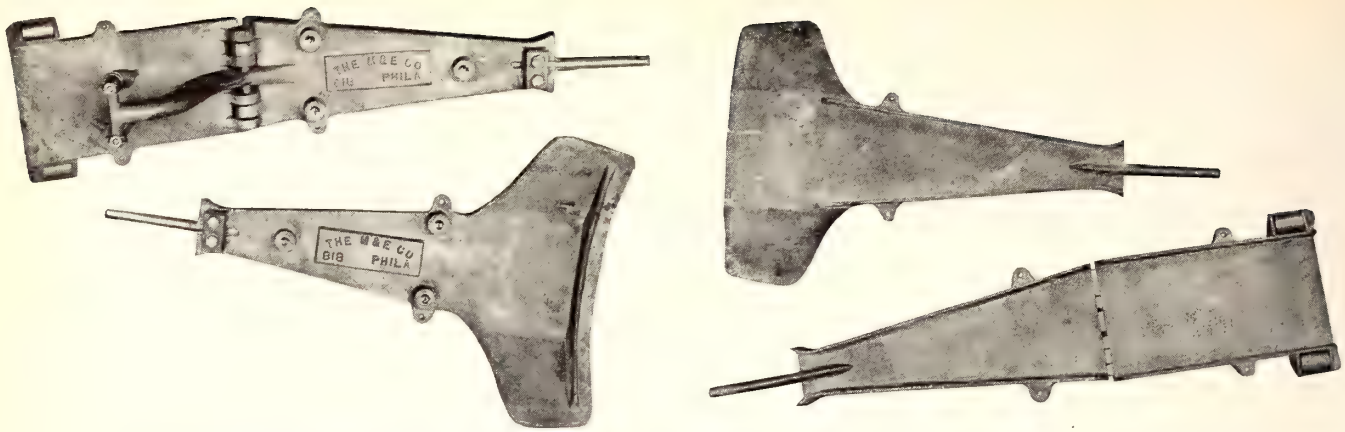
Overhead Construction with Numbered Switches in Front of West Hoboken Carhouse



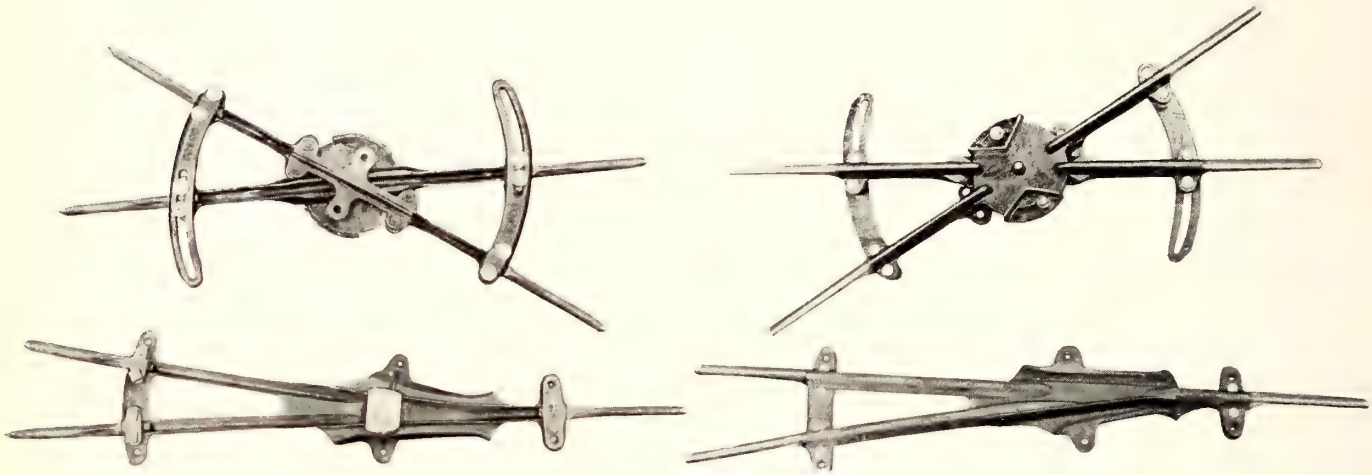
Overhead Switch Layout on Broad Street, Newark, to Accommodate Different Car Pole Locations



Fixed-Angle Overhead Construction in Place at Fourth Street, Union Hill, at the End of a Span-Construction, Right-of-Way Line



Top and Bottom Views of the Hinged Overhead Contact Pans Which Are Installed at Drawbridges



Top and Bottom Views of the Adjustable Crossing with Bridging Piece to Prevent the Trolley Wheel from Entering the Angle



Two Adjustable Crossings in Place on Market Street, Newark

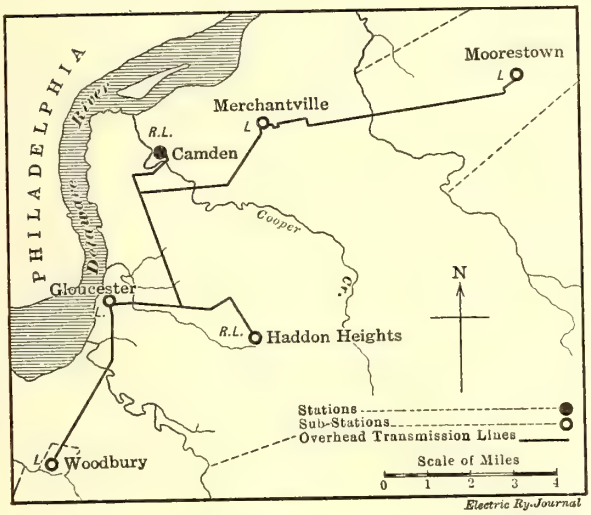


Trolley Troughs Under Low Railroad Bridge, Broad Street, Elizabeth

Secaucus and Edgewater stations. Direct current at 500 volts is generated at the Newark station, Fourteenth Street (Hoboken) station and at Paterson. The Marion station, which is the largest generating plant of the entire system, has a capacity of 23,000 kw at 25 cycles for railway purposes and 26,000 kw at 60 cycles for lighting and power, making a total capacity for this station of 49,000 kw. An additional 9,000-kw, 25-cycle generator will be added within a year. The Newark station, which consists of two separate plants operated as a single station, contains a total of 14,800 kw of direct-current and 25-cycle alternating current generators. The 60-cycle light and power equipment of this station has a total capacity of 9450 kw. The Paterson station contains 2800 kw of direct-current generators for railway purposes and 7800 kw of light and power a.c. generators. The Secaucus station has a total generating capacity of 3550 kw, all of which is used for railway operation.

MARION POWER STATION

The Marion power station, which is the largest generating plant operated by the Public Service Electric Company, is located on the east bank of the Hackensack River west of Jersey City. It was built in



Power Generation—Map of Southern Division Transmission Lines

1905 and has been enlarged from time to time until it now contains 26,000 kw of 60-cycle Curtis turbo-generators and 23,000 kw of 25-cycle generators of the same type. A cross-section of this station is shown in the engraving on page 592. The turbine room is 43 ft. 5 in. wide and 60 ft. 6 in. high from floor to bottom of roof trusses. The boiler room is 109 ft. wide and contains forty water-tube boilers arranged in banks of five boilers each on opposite sides of the four firing aisles. The boiler room is divided by brick partition walls into four separate sections and the ten boilers in each of the last three sections built are connected to brick stacks 14 ft. in diameter inside and 225 ft. high. The boilers in the first section are connected to two brick stacks, one of which is 9 ft. in diameter and 225 ft. high, and the other 14 ft. in diameter and 225 ft. high. Reinforced concrete coal-storage bins are built above the boilers under the roof and discharge the coal through spouts to the hoppers of the stokers.

Coal is delivered on barges to the dock on the Hackensack River. It is unloaded by clamshell buckets operated from a hoisting tower which deliver it to a belt conveyor running parallel to the boiler house on the north side. The conveyor delivers to cross conveyors running into the boiler house over each storage bin. For storing an emergency supply of coal during the season of closed navigation a large open space on the north side of the building is used. This storage yard is spanned by a traveling gantry crane carrying a clamshell bucket. The coal is picked up from the stock pile by this bucket and dumped into a hopper on one end of the crane. From here it is elevated by a bucket conveyor and dropped on the distributing belt conveyor running parallel to the building.

NORTHERN DIVISION SUBSTATIONS

There are nineteen outlying substations on the Northern division, in addition to which substation apparatus is placed in five of the six power stations. Fourteen of the outlying stations contain rotary converters for the railway distribution system and 600-volt railway converters are also installed at the Newark, Secaucus, Fourteenth Street (Hoboken) and Edgewater power stations. The following is a list of the railway substations and the total capacity of rotary converters installed in each: Washington Avenue, Newark, 2000 kw; Irvington Avenue, Newark, 2500 kw; Central Avenue, Newark, 3000 kw; Montclair, 1500 kw; Orange, 1000 kw; Morgan Street, Jersey City, 2000; Garfield Avenue, Jersey City, 4500 kw; Bayonne, 1500 kw; Palisade Avenue, Jersey City, 3000 kw; Seventh Street, West New York, 3500 kw; Rutherford, 300 kw; Arcola, 600 kw; Passaic, 2300 kw. The substation equipment in the power stations includes the following: Newark, 7000 kw, including a 3000-kw frequency changer which may be used for either 25-cycle or 60-cycle supply; Secaucus, 600 kw; Fourteenth Street, Hoboken, 3000 kw; Edgewater, 850 kw. All of the railway substations, with the exception of those at Central Avenue, Newark, and Arcola, also contain lighting equipment of varying capacities. The total capacity of the generating equipment of the Northern division is 48,750 kw for railways and 46,260 kw for lighting and power. The total capacity of the railway substation equipment on the Northern division, including that in power stations, is 39,510 kw.

TRANSMISSION LINES

The transmission system of the Northern division has two centers, one at Newark and one at the Marion power station west of Jersey City. As will be seen from the map on page 590, the transmission

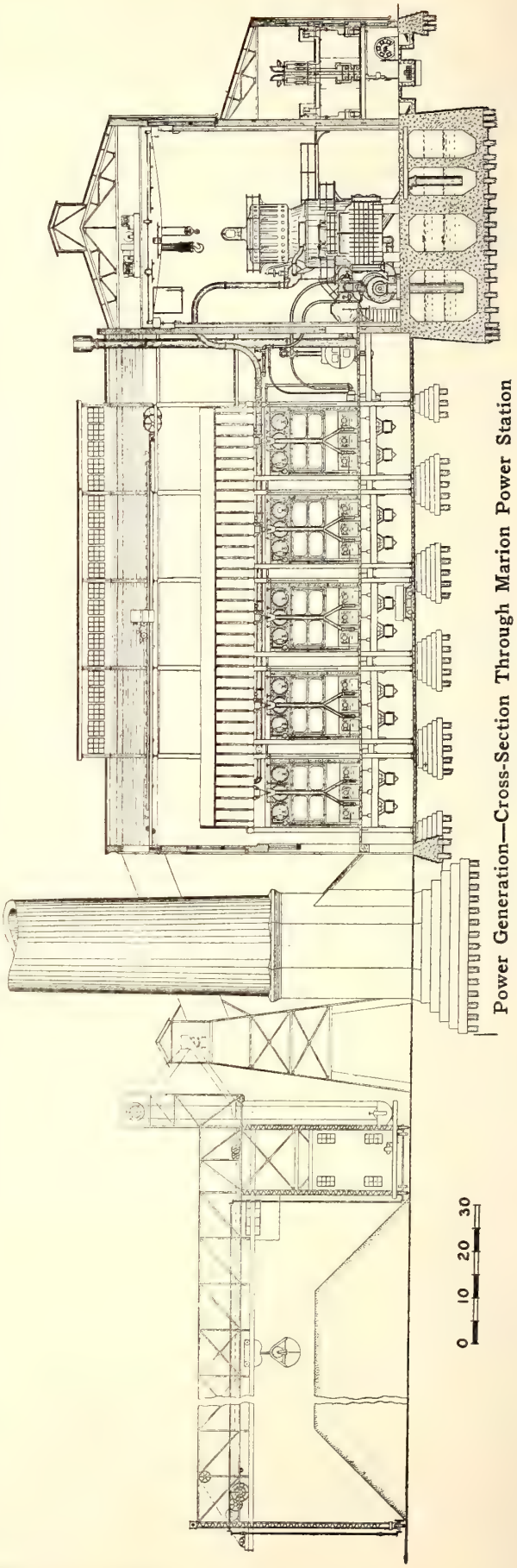
lines from the Marion station form a large loop connecting the substations at Palisade Avenue, Seventh Street, Hudson River, Englewood, Hackensack, Ridgewood, Passaic and Rutherford. They also tie together the Fourteenth Street generating and substation and the Paterson and Secaucus power stations. The Bayonne, Garfield Avenue and Morgan Street substations in Jersey City are also fed by underground transmission lines connecting with the Marion station. The Marion and Newark stations are tied together by two separate transmission lines, one of which crosses the Hackensack meadows along the Turnpike, and the other entering Newark by way of the Plank Road. The 25-cycle generators at Edgewater are tied in to Marion station by a 25-cycle transmission line from Seventh Street substation which follows the 60-cycle line to Hudson River substation. From the latter substation the line runs to Edgewater without entering the Hudson River substation and is connected to the station busbars.

The transmission line connecting the Marion power station with Newark and paralleling the line consists of fourteen No. 00 copper wires carried on two cross-arms supported by a double line of poles. The illustrations on plate XXIX show the crossings of this transmission line over the Delaware, Lackawanna & Western Railroad and over the electrified New York extension of the Pennsylvania Railroad. At the latter crossing the line is carried by two latticed steel poles and no protecting cradle is used. This transmission line terminates on the west bank of the Hackensack River in a cable house, from which it is carried under the river to the Marion power station by submarine cables.

CENTRAL DIVISION POWER STATIONS

The power stations of the Central division are all of comparatively small size. They are located at Elizabeth, Cranford, Metuchen, Perth Amboy and Milltown. The Elizabeth station contains 1275 kw of railway generating apparatus and 800 kw of light and power generating apparatus. The Cranford station contains 3150 kw of railway units and 2850 kw of lighting units. The equipment of the Metuchen station contains 1500 kw of railway machines and 1500 kw of lighting machines. The Perth Amboy station, which is new, contains at the present time two 5000-kw turbo-generators, either of which may be used for the railway load or for the lighting load. The Milltown station contains 1200 kw of railway generating equipment. The stations at Elizabeth and Milltown will be shut down within a few years and the new station at Perth Amboy will become the main station for this territory.

The Perth Amboy station is located on the Raritan River at tidewater and is close to the coal shipping docks of the Pennsylvania, Lehigh Valley and Philadelphia & Reading Railroads, so that a continuous and cheap supply of condensing water and fuel is available. The station is a brick and steel frame building 112 ft. deep and 181 ft. wide. It will



Power Generation—Cross-Section Through Marion Power Station

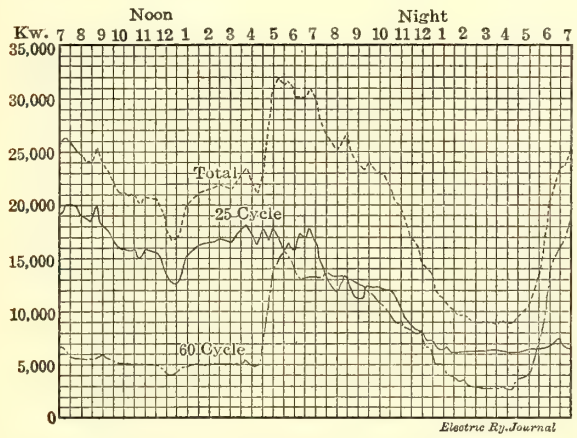
contain three 5000-kw Westinghouse horizontal turbo-generators and when entirely completed will contain five such units. Property is available for doubling this capacity in the future. Coal is delivered in barges and is unloaded with clam-shell buckets operated from a hoisting tower on the end of the dock which extends out 300 ft. into the river. An inclined steel trestle supports the belt conveyor which runs from the hoisting tower into the monitor over the boiler room, where it discharges into the storage bins above the boilers. Views of the Perth Amboy station are shown on plates XXVII and XXVIII.

CENTRAL DIVISION SUBSTATIONS

Only two of the outlying substations on the central division contain railway units. The Lincoln station contains a 400-kw rotary converter and the New Brunswick station contains a 300-kw rotary converter. With the exception of the Cranford station, however, all of the generating stations in this division contain some substation equipment. Elizabeth has 800 kw; Plainfield, 900 kw; Metuchen, 300 kw; Perth Amboy, 1100 kw, and Milltown, 250 kw. All of the generating stations and substations on the Central division, with the exception of Milltown, are tied together by transmission lines, as shown on the map, in such a way that the failure of any one transmission line would not affect the continuous operation of any of the stations.

SOUTHERN DIVISION

The Southern division has only one power station in which current for railway operation is generated. This is located at Camden and contains 4400 kw of railway generators and 3000 kw of light and power generators. The railway load in Camden is carried chiefly by 500-volt direct-current engine generators in the Camden station, but two 500-kw, 60-cycle,

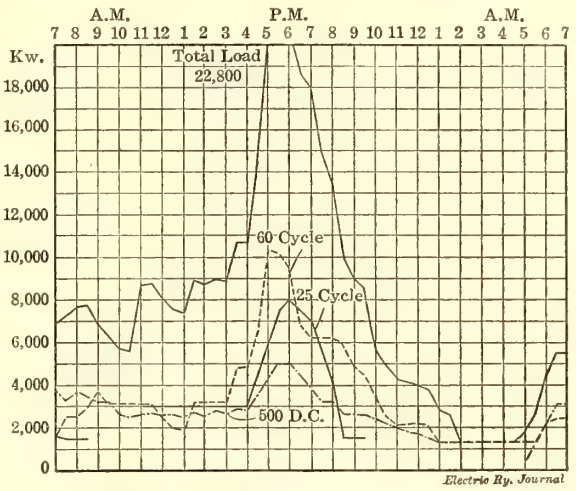


Power Generation—Maximum Load Diagram of Marion Station

11,000-volt rotary converters are also installed in the station to supply the railway lines. Only one substation in the Southern division contains railway-converting apparatus. This is located at Haddon Heights, where two 500-kw, 60-cycle rotaries are fed from a transmission line carrying current at 11,000 volts. As the traffic in the Camden territory grows other substations will be built in the suburbs.

LOAD CONDITIONS

During the year 1910 the total output of the generating stations of the Public Service Electric Company was 288,740,147 kw-hours, of which the rail-



Power Generation—Maximum Load Diagram of Newark Station

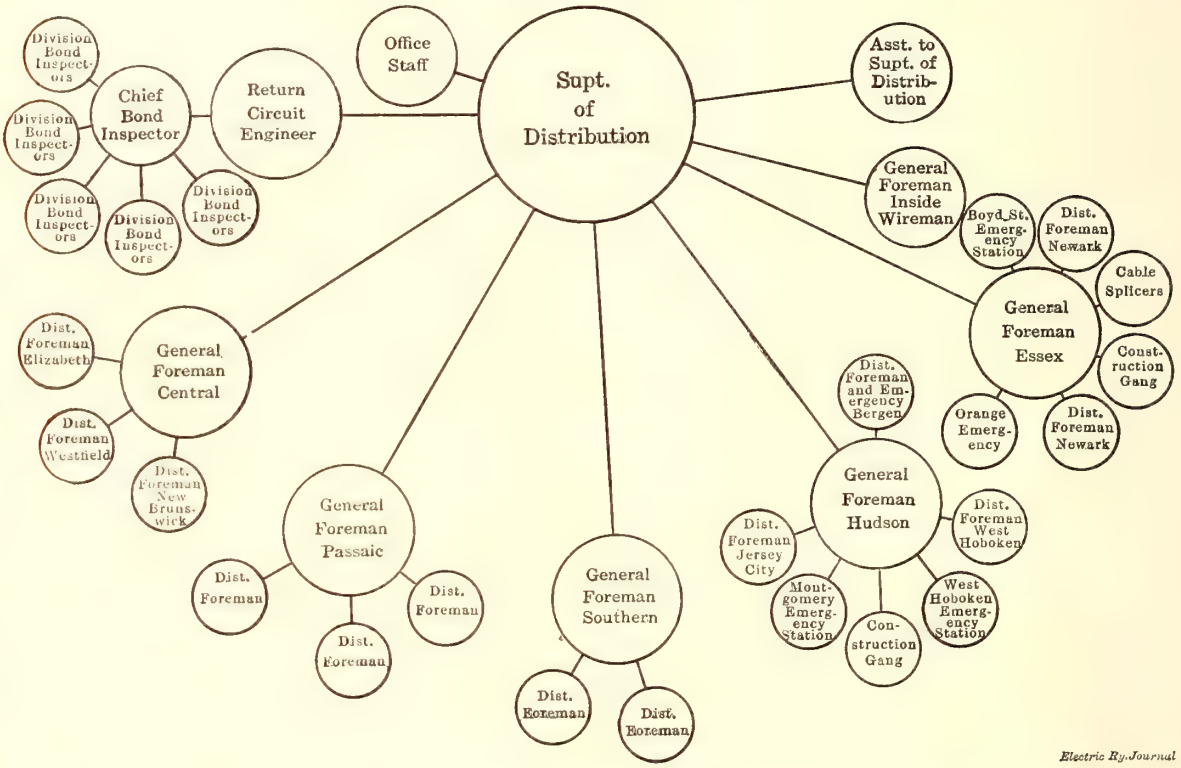
way company used 150,108,893 kw-hours and the remainder, or 138,631,254 kw-hours, was used for lighting and power supply. The maximum total loads occur during December and typical maximum load curves of the Marion, Newark and Camden stations are reproduced. The evening peaks between 5 and 7 o'clock are much larger than the morning peak, due to the combination of railway and lighting loads, which reach their maximum values at about the same time. Notwithstanding these peak-load conditions the Marion station had a load factor of 66.29 on the maximum day last year.

LOAD DISPATCHING

All of the alternating-current generating stations on the Northern division are operated in multiple so that the load can be thrown from one to another as may be desired. The system of station dispatching is under the direct charge of a chief operator at the Marion station, who is assisted by three load dispatchers, one of whom is on duty on each eight-hour shift. These dispatchers give all orders to stations for starting up and shutting down generators and throwing feeders in and out at the various substations and between the generating stations. This method of tying together the power stations by transmission lines and operating them all from a central point makes it possible to lay out a program in advance for running each of the stations so as to give the best load-factor possible and the lowest average total cost of current at the busbar. The program is changed occasionally as conditions change to keep down the total cost to a minimum. Some very interesting results reducing the operating costs of the generating stations are being obtained by this method of operating.

OVERHEAD CONSTRUCTION

THE distribution or line department has charge of all low-tension direct-current distribution, including lighting, railway and industrial motor circuits. It also has charge of all bonding and return circuits, telephone and block signals. As shown in the accompanying organization diagram, the chief of this department has the title of superintendent of distribution. Among the subordinate officers who report directly to him are the general foremen of the five operating divisions as named in the article on the way department. Each general foreman has charge of the construction and maintenance of the low-tension direct-current distribution lines in his district, and he is also jointly responsible with the return-circuit engineer for the maintenance of return circuits. divisions have certain special facilities, as indicated. Thus, the Essex division has a construction gang, cable splicers and two emergency stations. The Hudson division has a construction gang and three emergency stations, whereas the Central, Passaic and Southern divisions have only regular maintenance gangs. These differences in organization are due to the fact that the dense traffic conditions on the Essex and Hudson divisions require greater specialization. The average maintenance gang on all divisions consists either of a district foreman, lineman, helper and driver, or of a foreman, two linemen and driver. The feeder and pole-construction gang on the Essex division varies from ten to fifty men, according to the amount of work in hand. Construction work on the Southern, Central



Overhead Construction—Organization Diagram of the Distribution or Line Department

The general foreman of inside wiring takes care of lighting and motor circuits in the company's buildings. The return-circuit engineer is directly responsible for the construction and maintenance of all bonding and other return-circuit work as hereinafter described. The total number of men employed under the several heads shown in the diagram varies from 100 in winter to 150 in summer. The headquarters of the department are in two rooms on the third floor of the Public Service Building.

DIVISION ORGANIZATION

The organization diagram shows that the district foremen subject to each general foreman vary in number on the different divisions, and also that some and Passaic divisions is handled by the maintenance gangs, except where the job is large enough to justify the employment of a temporary gang. The cable splicers employed by the general foreman of the Essex division usually consist merely of one cable man and helper. It is the duty of these men to keep all cables in good condition, to see that manholes are clean, to determine all faults in cables and to submit monthly reports on tests of cable sheaths with relation to stray currents. These reports give the voltage of cable to track and to ground. These men are generally employed in Newark, but they are subject to call on other parts of the system. Large cable installations are made by the cable manufacturers, but smaller jobs are handled by the railway company's construction

gangs. Conduit lines are built by the construction department of the Public Service Electric Company.

EMERGENCY SERVICE

As previously observed, emergency gangs are employed on the Essex and Hudson divisions. There are two to four men in a gang. The company gives these men free lodging at the emergency station and pays for their laundry service. The men are subject to call at any hour of the day, but they receive one day off with pay every seventh day. On the other divisions two men in each gang take turns in staying at headquarters during the night to take care of any calls. These stations are provided with bedding for the use of those who are willing to stay there all night; otherwise, the men are summoned by telephones established in their homes by the company. The demands on their time for emergency service, however, are very rare, as the traffic conditions are not severe on the divisions named.

The department is supplied with Trenton tower wagons, wrecking wagons, feeder wagons and trolley wagons and hose-jumper wagons, all of which are drawn by horses. There has just been received, also, for use in Newark, an electric emergency wagon from the Electric Vehicle Company, Long Island City, N. Y. The cars and wagons used on outlying divisions have telephone equipments.

The great area served by this company and the variety of operating conditions have made it impracticable to establish a central bureau at which the work of maintenance and emergency gangs may be assigned. This eliminates the loss of time which would ensue if they returned to the office without telephoning for instructions. The emergency crew reports the work done on a form of the type reproduced on this page. This mentions the place where the trouble occurred, the time of the call, the time of arrival, the time the line was cleared and the cause of the trouble. These reports are compared with the detention reports up to midnight of the preceding day, as furnished by the transportation department through the night telephone operator, and also with the daily report of interruptions in power circuits, as prepared by the power department. Consequently, interruptions to traffic are reported from three independent sources, so that the general manager and other executives can see whether defects are being promptly corrected by the responsible department.

Public Service Railway Company.

Overhead Department—Trouble Reports.

_____ N. J., _____ 191...

Place.....

Trouble.....

Time of Call..... M. *Time of Break*..... M.

Time of Repairs..... M. *Cars Delayed*.....

Reported by..... *Lineman*.....

Place.....

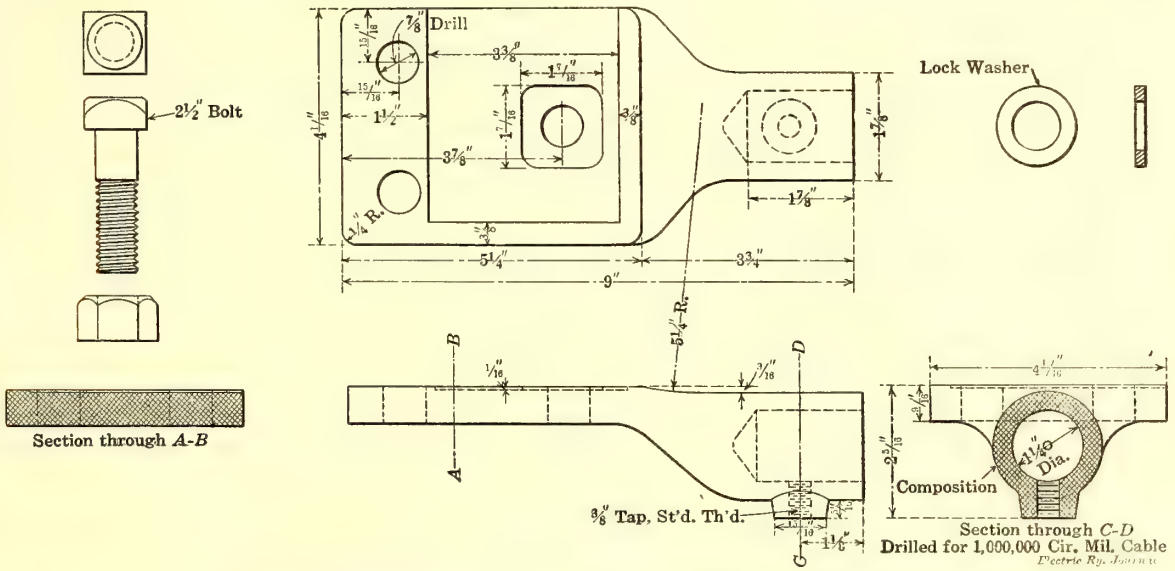
Trouble.....

Time of Call..... M. *Time of Break*..... M.

Time of Repairs..... M. *Cars Delayed*.....

Reported by..... *Lineman*.....

Overhead Construction—Part of Line Crew's Daily Report

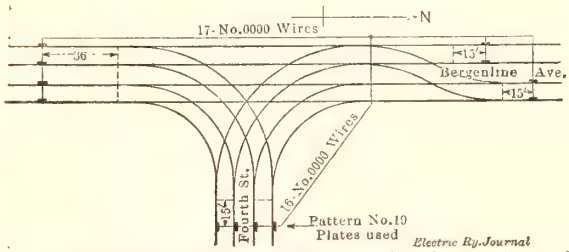


Overhead Construction—Details of Terminal Plate for Negative Circuits

It should be noted in this connection that every division of the transportation department is provided with a wrecking car. This outfit is used by the transportation department for handling car and track blockades.

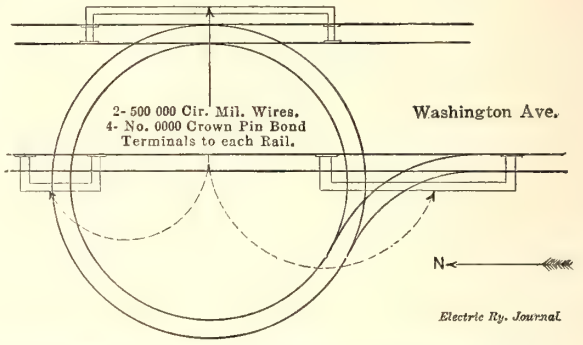
DUTIES OF THE RETURN-CIRCUIT ENGINEER

The return-circuit engineer has charge of all return circuits from the rail to the power house, such as bonds, negative return wires and supplementary wires around special work. He is assisted by the chief bond inspector and by division bond inspectors. The return circuit engineer makes surveys at least once a year of every part of the system to



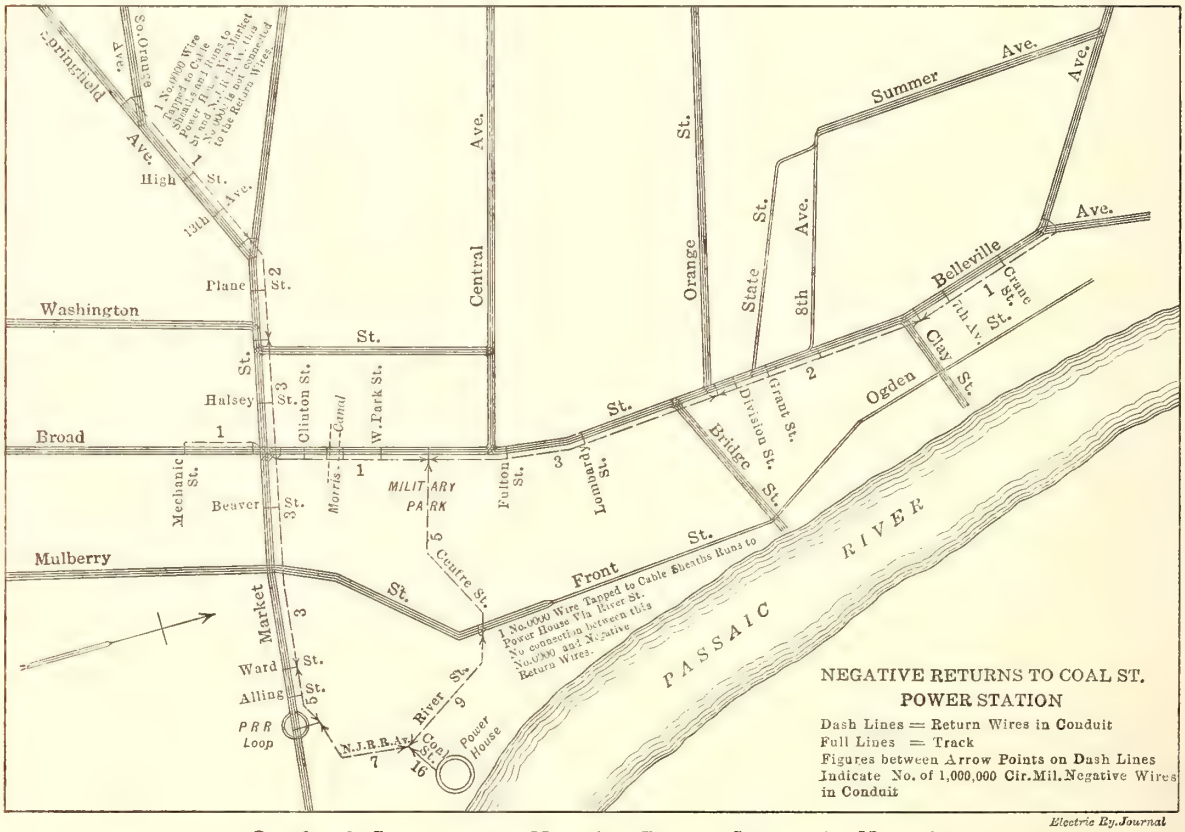
Overhead Construction—Return Circuits at Fourth Street and Bergenline Avenue, Union Hill

study the effect of stray currents. For this work he is provided with a Herrick car, which is used for bond testing and for determining transmission-line losses, with portable bond testers for individual cases, electrical measuring instruments, etc. The chief bond inspector uses the Herrick car for locating defective bonds. The memoranda of these locations are turned over to the proper division bond inspectors. Defective bonds are repaired directly by the distribution department with the brazed-bond system of the Electric Railway Improvement Company, three of whose bonding cars are now in service. Construction and extensive rehabilitation of bonding are done by the way department under the supervision of the distribution department. Crown-pin bonds are standard for new work and reconstruction. The Lorain electric-welded joint has been adopted for city track work.



Overhead Construction—Return Circuits at Big Tree Loop, Washington Avenue, Belleville

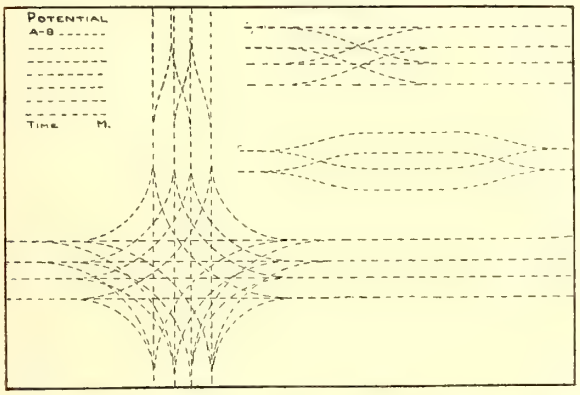
One of the most interesting features of the return-circuit construction is the method of wiring around all special work, no dependence being placed upon the bonding. For this purpose the company uses soldered terminal plates, which are applied and installed as explained in the drawing on page 595 and in the following description: Before applying the terminal plate for negative or supplementary wires the rail is ground off by means of an electrically driven grinder and tinned. Then the plate is tinned and bolted up with three 2½-in x ⅞-in. bolts, which have lock washers on either side. Upon this the rail is heated with a



Overhead Construction—Negative Return System in Newark

gasoline torch and solder is poured into its 1/16-in. recess. The wire or cable is attached by means of a set screw and is also soldered into the terminal. The supplementary wires are placed along the ends of the ties at about 6 ft. from the rail joints to avoid interference by track-repair gangs. This method has been found to give the highest mechanical and electrical efficiency for return-circuit work.

The return-circuit wiring of all special work is kept in an indexed file of individual drawings 8 in. x 13 in. in size. Examples of such arrangements are the drawings on page 596 of Big Tree Loop on Washington Avenue, Belleville, and Fourth Street and Bergenline Avenue, Union Hill, which show re-



Overhead Construction—Front of Bonding Inspector's Report Used for Special Work

spectively the application of crown-pin bond terminals and of terminal plates. Terminal plates, however, are standard. A drawing on page 596 shows the system of parallel negative return wires which has been installed in Newark to tap return current from underground-cable sheaths. These wires are run in conduit from various points to the Coal Street power station, as indicated on the diagram.

Bonding reports on special work are made by the division bond inspectors on forms of the type shown on this page, on which every possible combination of special track work is indicated by dotted lines. The bond inspectors are instructed to fill in solidly the exact layout which they have bonded or tested. If a test is made, letters are used to indicate the points of contact and the results are tabulated in the upper left-hand corner of the report. If a continuous wire has been installed, the inspector indicates its position and locates the point of attachment as being so many feet from the switch point. He notes also the number and style of the terminals and the size of wire. These reports are used to make the finished indexed drawings of the class previously referred to and shown on page 596.

REPORTS, JOB ORDERS AND REQUISITIONS

The state of every job for which the distribution department is responsible is detailed on a monthly report for the general manager. The general style of this report is similar to that described in the article on the way department, and so requires no reproduction. The table opposite is an abstract of a form made at

PART OF SCHEDULE FOR AUTHORIZATIONS—DISTRIBUTION DEPARTMENT May 20, 1911

Auth. No.	Division.	Description.	Date Started.	Date Will Start.	Per Cent Completed. April.	May.	June.	July.	August.	September.	October.	November.	December.	1912 January.	Total.	Will Complete.	Completed.	Remarks.
292	Essex	Automatic signals—Mt. Prospect Avenue, Newark	....	May 22	..	100	..	..	..	..	..	..	..	..	..	June 1	.....	.....
472	Essex	Return circuit	.....	.....	..	..	..	..	..	..	..	..	..	..	..	.....	.....	Pending advice from the legal department.
473	Central	Trolley guards	.....	July 24	..	..	..	25	75	..	..	..	..	..	..	Sept. 1	.....	.....
494	Passaic	Negative to Paterson Station	....	June 1	..	..	100	..	..	..	..	..	..	..	..	June 15	.....	.....
505	Southern	Telephone system—Blackwood Line	.....	July 1	..	..	..	100	..	..	..	..	..	..	..	Aug. 1	....	.....
506	Southern	Negative—River Road and State Street to Federal Street	.....	.....	..	..	..	..	..	..	..	..	..	..	..	.....	Apr. 30	.....

the beginning of the year to follow the progress of authorized jobs. This schedule gives the authorization number, the division, character and locality of the work, when it was begun or when it will be begun, the percentage completed from month to month, the estimated date of completion and the actual date of completion. A final column, headed "Remarks," is reserved for notes regarding responsibility for delays, etc.

The main storeroom of the distribution department is at Plank Road and Passaic Wharf, Newark, and is a part of the supply center in charge of the general storekeeper. Each division has a substoreroom, supplies for which are secured through a stores order which is sent by the general division foreman to the storekeeper, via the superintendent of distribution, by whom it must be approved before it can be filled.

FEEDER-DISTRIBUTION SYSTEM

The feeder system of the Public Service Railway is divided into sections, some of which are fed jointly; that is, in parallel, by certain stations. This method of connection has the same advantage as a tie-wire system for taking care of overloading and otherwise for equalizing the loads in a large territory. A typical example of this feeder equalization is presented in the sketch on this page, which shows an installation at Miller Street and Frelinghuysen Avenue, Newark, where three automatic circuit breakers have been installed to equalize sections Nos. 25, 52, 44 and 22. It should be added here that the section insulators are usually installed at cross-overs, wyes, loops and turning points generally for the convenience of the transportation department, so that cars may be turned at the nearest point in case of trouble.

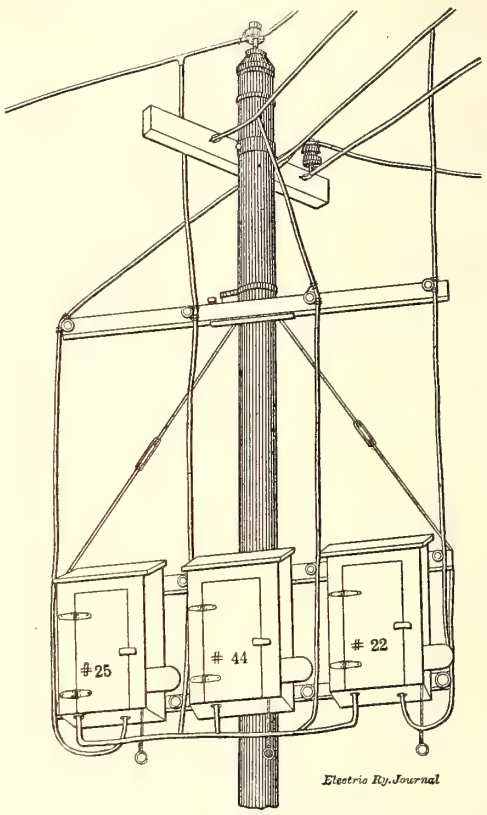
In the illustration of the Miller Street pole, sections Nos. 25, 44 and 22 are indicated on separate equalizer boxes. Section No. 52 is equalized through the other three sections. The breakers are closed, except in case of trouble. These breakers are in circuit with four telltale wires which are connected to a four-point switch and a lamp circuit in the station master's office at the Miller Street carhouse. Each telltale is marked and connected to a corresponding section. When one of the automatic circuit breakers is open and before it is closed there is placed on the proper telltale wire that switch in the station master's office which corresponds to the open breaker. The lighting of the lamps will indicate that the section is O. K., so that the circuit breaker should be closed. If the lamps do not light it is an indication that there is a ground on the line, so that the circuit breaker should not be closed. In this event the emergency crew must be notified at once to find the trouble on the given section.

When the circuit breaker is open a red semaphore shows alongside the box. When the circuit breaker is closed this semaphore is concealed behind the shields of the box. A piece of rope about 18 in. long with a ring at the lower end extends from the bottom of each box. The circuit breaker can be closed by pulling down this rope with a hooked pole which is kept in the station master's office.

ANALYSIS OF POWER REQUIREMENTS

An important feature in connection with the power-distribution system is the annual study made by the superintendent of distribution of the energy requirements of each feeder section in relation to changes in power and substation equipment, feeder arrangement, bonding betterments, etc. This study includes an analysis of the changes in power and substation apparatus suggested by the chief engineer of the Public Service Electric Company, which supplies the energy requirements of the Public Service Railway Company.

The recommendations of the superintendent of distribution are based on the proposed maximum service schedules over the specified section, as worked out



Overhead Construction—Feeder Equalizer Boxes

by the transportation department for the ensuing years, and upon the known average requirements of cars operated in the territories under consideration. As shown on the next page, the transportation department lists the approximate car requirements according to the number of the sections or circuits.

All calculated loads are based on records which were procured during the heaviest traffic months of the current year. The second table on the next page is a typical example of the relation between the electrical and transportation conditions in a given territory.

In the foregoing instance 30-kw substation capacity was allowed per car, which gave a station rating of 2160 kw, or an overload demand of 160 kw. As a rule, the substation machinery allowance per car in these estimates varies from 30 kw to 40 kw, according to the average weight and type of the equipment used on given sections.

Table XII.—Estimated Service on Passaic Division for the Year 1910.

Number of Circuit.	Route.	Number of Cars.	Number of Circuit.	Route.	Number of Cars
1	City Hall Loop	22	14	Main St., Michigan	12
4	Haledon	2	17	Main St., Passaic	10
5	Totowa	2	18	Singac River Road	4
6	Governor	3	19	Singac	3
7	Broadway	11	20	Grand Street	3
8	Cedar Lawn	8	21	Clay Street	4
9	North Main Street	4	36	Berry's Creek	2
10	Riverside	7	37	Rutherford	5
11	Lakeview, Clifton	4		Lodi	3
13	White Line, Passaic	6		Total cars	115

Table XIII.—Load on Stations in Hudson Division.

Palisades or West New York Substation, Capacity 2000 kw feeds.

	Section.	Jointly with Station.	Number of Cars in 1910.
1	Ft. Lee	....	7
2	Bergen Line	....	10
4	Summit Avenue	R	6
5	Union Line	R	9
7	Boulevard	R	4
8	Hudson Heights	....	10
9	Forty-second Street Ferry	R	10
10	West Hoboken	R	2
12	Shop	R	5
13	New Durham	....	2
14	Fairview	....	4
34	Homestead	R	3
	Total		72

Note:—R means that the section is jointly fed with Hoboken.

FEATURES OF LINE CONSTRUCTION

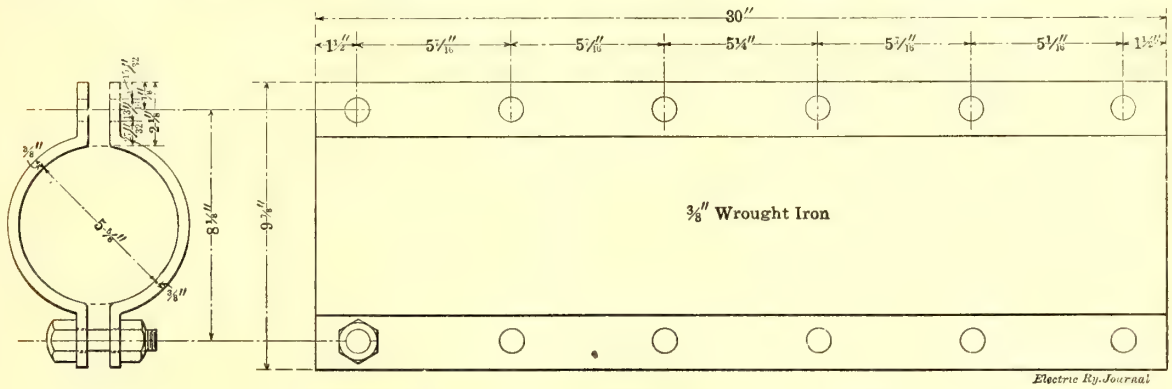
The consolidation late in 1903 of the properties now constituting the Public Service Railway brought under one management an almost infinite variety of overhead work, much of which was in urgent need of improvement. Since this time over 80 per cent of the trolley wire has been replaced, No. 00 wire being usually substituted for No. 0, and 500,000 lb. to 750,000 lb. of copper have been added to the distribution system every year in feeders, cables, etc. Advantage was taken of this reconstruction to standardize the pole and line material so far as practicable. The standard poles are 30-ft. chestnut or tubular steel, with a rake of about 8 in., and set 6 ft. in the ground in a 6-in. concrete shell. The pole spacing for both double and single-tangent track is 110 ft. The steel poles are 5-6-7-in. sections, with a 30-in. space at the ground line. The span wires are 5/16-in. double-galvanized steel and are hung with a minimum sag of 12 in., to insure flexibility. The spans are fitted with porcelain interlocking insulators, while caps and cones are used for primary insulation. The trolley wire is No. 00, suspended by means of 14-in. clinch ears at a height of 18 ft. 6 in. above the top of the rails. The trolley wire is hung with a 3-in. sag in 110 ft., to give a tight wire.

Corroded steel poles are usually renewed by the application of a 30-in. split clamp, which is made of ⅜-in. wrought iron and bent to shape in the company's shops. Details of this clamp are shown in a drawing on this page. The pole and clamp are given a heavy coat of graphite paint. In some cases the space between the clamp jaws is filled with cement. All steel poles now bought are reinforced at the butt with a 30-in. tubular sleeve, swedged near the ground line, as indicated on page 600. In the downtown section of Newark several hundred steel poles have been rehabilitated by the use of the Gherky sleeve.

An instruction print with table of radii is furnished to every foreman to insure uniform placing of wire on curves. This print, which is reproduced on page 600, shows the distance off center of the wire on all common radii of curves, and states that 4 in. offset must be added for each inch of elevation of the outer rail. The overhead switches are located entirely by the track frog, the position of which is determined by the radius of the curve. This reduces the location of the trolley frog to one standard distance in all cases. Only one degree of frog is used for all curves. The linemen are instructed simply to place the switch so many feet back from the track frog along the tangent.

SPECIAL INSTALLATIONS

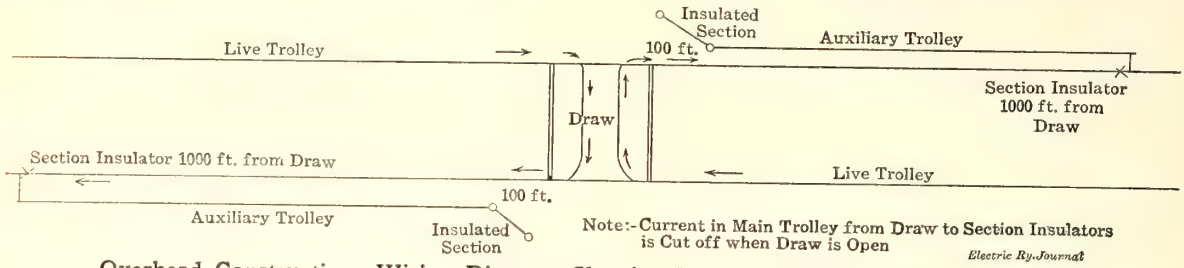
A view on plate XXXI shows the overhead frog construction applied on a curve near the Lackawanna Railroad station, where it was necessary to take care of variations due to the different location of trolley bases on single-end and double-end cars. One frog is installed in the ordinary position, but the second frog is placed on the straight wire about 6 ft. in front of the other. This extra frog is connected by another wire to a third frog placed on the curve wire at the point of tangency.



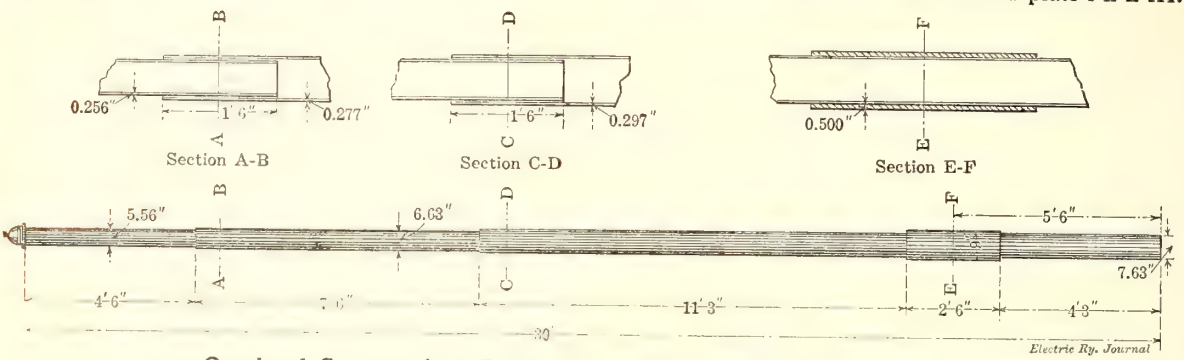
Overhead Construction—Details of Standard Clamp

Owing to the fact that the greater part of the Public Service system is arranged for single-end operation, it was found impracticable to back cars safely into a wye without turning the trolley pole. To meet this difficulty the standard trolley switch or frog was equipped with a flat bronze spring, as shown in plate XXXII. This gives it the action of a spring track switch. The conductor has no trouble now, as he is required merely to see that the trolley rope is free when the pole reaches the frog.

All trolley frogs and fixed angle crossings are made with a bootjack or bridging piece to prevent the trolley from catching in the V of the frog and tearing down the line. This construction is shown in plate XXXII for individual switches. A similar installation on Market Street, Newark, in front of the Pennsylvania Railroad Station is also shown in plate XXXII.



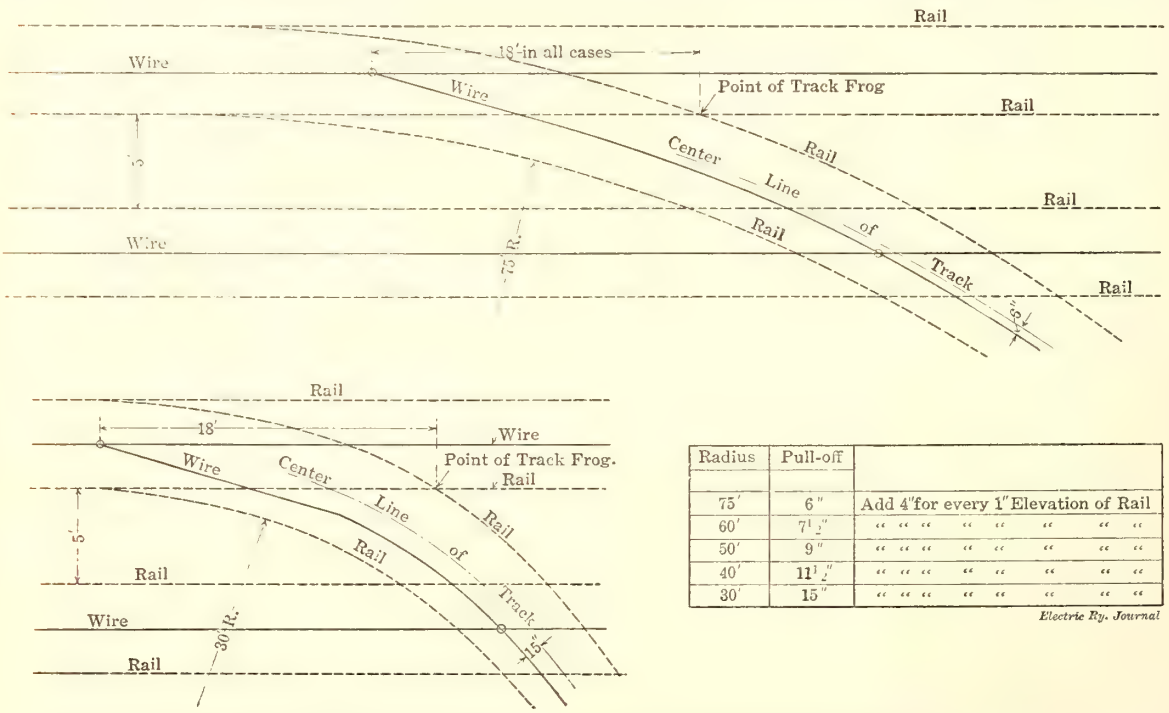
Overhead Construction—Wiring Diagram Showing Power Cut-Off Scheme at Drawbridge



Overhead Construction—Details of Standard Steel Pole and Sleeve

All frogs, crossings, section insulators, etc., have flexible approach ears to prevent the crystallization of the trolley wire at the end of the ear and to obviate the necessity of preventer ears. Plate XXXIII shows an example of this construction.

Two drawings on page 602 show the special cast-steel chairs which support wooden cross-arms on iron



Radius	Pull-off	
75'	6"	Add 4" for every 1" Elevation of Rail
60'	7½"	" " " " " " " "
50'	9"	" " " " " " " "
40'	11½"	" " " " " " " "
30'	15"	" " " " " " " "

Electric Ry. Journal

Overhead Construction—Standard Instruction Pr int for Erecting Overhead Work at Branch-Offs

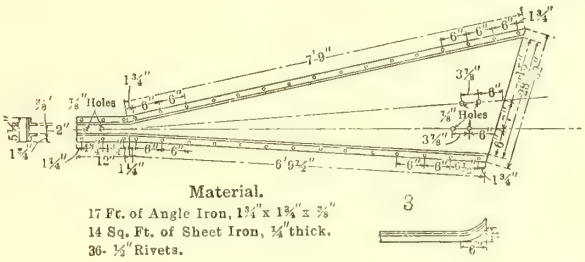
Two drawings on page 602 show the special cast-steel chairs which support wooden cross-arms on iron

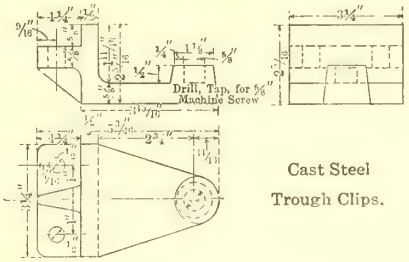
poles without using cross-arm braces. Each chair is made of two halves bolted around the pole. Two supporting members are used for double-arm chairs and one supporting member and a strap for single-arm chairs. The bolts which fasten the cross-arms to the chair are independent of those that fasten the chair to the pole. Separate sets of bolts were found necessary to prevent the slipping of the chair under heavy loads. Both chairs have a supporting surface of 2⅝ in. x 15⅝ in.

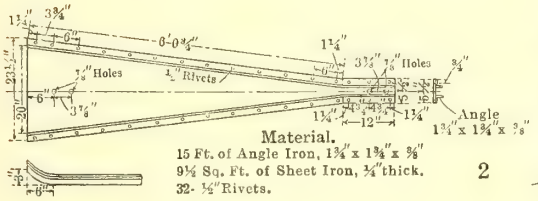
The feeder pole at Front and Ogden Streets, Newark, which has been fitted with these chairs, is also interesting in another way, inasmuch as it has to carry very heavy loads, the weight of which must be distributed over a limited area. The pole consists of three extra heavy tubes of 10 in., 9 in. and 8 in. diameter respectively. It is stiffened inside by a steel rail which extends into the lower part of the top section. The interior of the pole is grouted. A channel beam 10 ft. long is placed at right angles to the pole just below the ground along the curb line, and a second 10-ft. channel is placed at right angles to the pole on the opposite side, 8 ft. below the ground line. The second channel serves as a deadman for the anchor rods which are attached to a pole band installed just below the ground line.

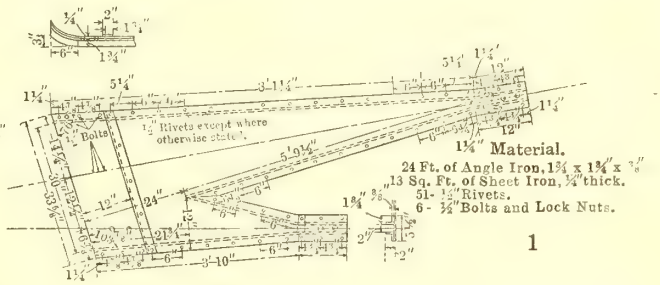
An example of the overhead construction adopted for locations with very restricted clearance is presented by a half-tone on plate XXXII and by the drawing on this page, which shows the overhead trough and pan construction under the Jersey Central Railroad in Elizabeth. At this place the trolley wheel would not stay on the wire because of a 5 per cent grade on the approaches. The pans are insulated from the metal structure of the railroad approach by 2 in. of wood and mine hangers, each with a 1-in. petticoat. The insulation required exceptional care to avoid interference with the signal circuits of the steam railroad.

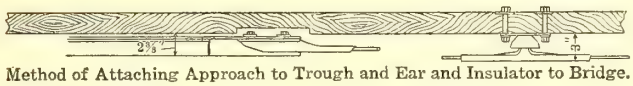
A wiring diagram on page 600 shows the overhead construction used on the approaches to drawbridges. At a point 1000 ft. from the draw a section insulator is installed in the regular trolley wire to deprive the car of current when the draw is open. A parallel wire is provided, however, for lighting the car and for moving it cautiously to within a shorter distance from the draw. The auxiliary trolley is deadended at a point 100 ft. from the draw. The overhead line connections between the roadway and the draw consist of pans, either of the automatic drawbridge type of the Electric Service Supplies Company or of home-made construction. Top and bottom views of the former pans are shown in plate XXXII. Both the overlapping and underrunning parts are made of cast bronze. The underrunning half is attached to



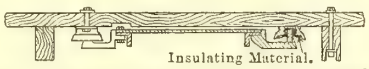




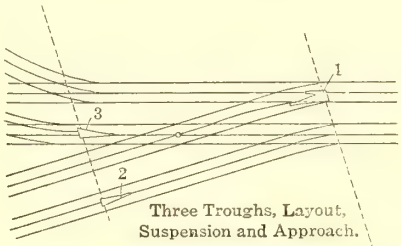




Method of Attaching Approach to Trough and Ear and Insulator to Bridge.



Method of Suspending, Insulating and Protecting Troughs to Bridge.



Three Troughs, Layout, Suspension and Approach.

Material.

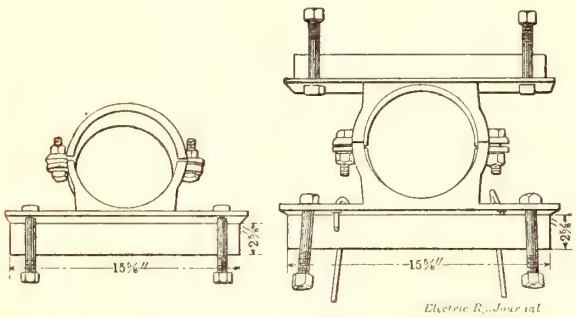
3 Troughs.
70-80 Mine Hangers and Bolts.
20 Trough Clips.
50-60 Ears.
1 Adjustable Crossing.
280 Ft. of 2-0 Phono-Electric Wire.
2 Switches.
500 Ft. of 2" x 4" Timber.

Electric Ry. Journal

Overhead Construction—Details of Pan Work Under Railroad Bridge at Broad Street, Elizabeth

the draw and the overlapping half to the end of the structure. The underrunning half has a hinged outer portion, which passes under the other pan and makes positive contact by means of springs. The wings of the solid half are inclined to provide for variations in the height of the pans, due to oscillations of the draw for the expansion and contraction of the bridge structure. The outer ends of the hinged portion have rollers to minimize friction.

Plate XXXIII shows some two-way and three-way overhead crossings without the flexible approaches; a



Overhead Construction—Cast-Steel Chairs for Supporting Wooden Cross-Arms on Iron Poles

standard section breaker; overhead construction at Fourth Street, and private right-of-way, Union Hill, showing four pull-off wires attached to a fixed angle or crossing; line construction in front of the West New York carhouse, showing some catenary suspension; line construction at Plank Road storage carhouse, and overhead switches in front of the West Hoboken carhouse, numbered to correspond to the numbers of the carhouse tracks.

MANUFACTURE OF OVERHEAD EQUIPMENT

The company is now manufacturing circuit breakers, switches, adjustable crossings and other line material at the Plank Road car maintenance shops. Until very recently frogs and crossings were made of a bronze composition containing eighty-seven parts of copper, six parts of tin and seven parts of zinc. This is being superseded by malleable iron, which is more flexible and cheaper, even when due allowance is made for the scrap value of the old composition. Ears and approaches, however, will continue to be made of another bronze composition consisting of 90 per cent copper, seven parts zinc and three parts tin. Phono-electric wire is installed in the downtown sections of Newark and Jersey City. This wire gives about two-thirds more wear than the ordinary hand-drawn copper.

SIGNAL SYSTEM

The line department is installing United States non-recording signals on 166 miles of single-track sections, comprising practically all single-track mileage. According to the plans of the company all of the single-track routes will be equipped with this system. The apparatus is of the manufacturer's standard type, except that a different contact switch is used wherever cars are turned to the right. The advantages of this switch, a view of which is shown in plate XXXIII, are that there are no complicated parts to maintain and that the wheel can travel on its groove all the way without interruption in a horizontal plane. This switch is being patented by the superintendent of distribution.

ROLLING STOCK

THE car equipment of the Public Service Railway comprises 1381 double-truck closed cars, 177 single-truck closed cars, 276 double-truck open cars, 254 single-truck open cars, 96 plows and sweepers, 62 sprinklers and sand cars, and 134 work, line and miscellaneous service cars, a total of 2380 cars of all kinds. When the Public Service Corporation was organized in 1903 a varied assortment of rolling stock equipment was acquired with the street railway properties which were taken over. Many of these cars were replaced at once by more modern equipment, but those which were in good condition were retained in service. During the last eight years the company has purchased or built in its own shops 811 large double-truck closed cars and 137 double-truck open cars to replace old cars withdrawn from service and to provide for increased traffic.

The older cars built prior to 1903 have series numbers beginning with 1 and continuing up to 1300. The 12-bench, double-end open cars built in 1904 have serial numbers beginning with 1400. Closed cars with serial numbers from 1522 up to 2319 have all been built since 1904. The cars used on the Southern Division in Camden have serial numbers beginning with 2900, 3000 and 3100, while service cars of all divisions are numbered beginning with 5000.

The following is a brief description of the principal types of closed cars purchased since 1904:

1500 class: Double-end; 30-ft. 8-in. bodies; longitudinal seats; seating capacity 33; converted to pay-as-you-enter type at Plank Road shop in 1908.

1600 class: Single-end; 30-ft. 8-in. bodies; cross seats; seating capacity 40; converted to pay-as-you-enter type at works of John Stephenson Company, 1908.

1700 class: Part single-end and part double-end; 28-ft. 8-in. bodies; longitudinal seats; seating capacity, double-end cars 31, single-end cars 33; converted to pay-as-you-enter type at the Plank Road shop and at the works of John Stephenson Company in 1908.

1800 class: (Nos. from 1800 to 1846) Single-end; 30-ft. 8-in. bodies; cross-seats; seating capacity 40; converted to pay-as-you-enter type at works of John Stephenson Company in 1908.

1900 class: (Nos. from 1900 to 1949) Part single-end and part double-end; 30-ft. 8-in. bodies; cross seats; seating capacity 42.

1900 class: (Nos. from 1950 to 1981) Single-end; 28-ft. 8-in. bodies; longitudinal seats; seating capacity 33; converted to pay-as-you-enter type in 1908 at works of John Stephenson Company.

2000 class: (Nos. from 2000 to 2049) Single-end; 30-ft. 8-in. bodies; cross seats; seating capacity 39. Built in 1907.

2000 class: (Nos. 2050 to 2099) Single-end; pay-as-you-enter; 30-ft. 8-in. bodies; cross seats; seating capacity 39. Built in 1908.

2100 class: Same as Nos. 2050 to 2099. Built in 1908.

2200 class: Single-end; pay-on-platform type; 32-ft. bodies; longitudinal seats; seating capacity 41. Built in 1910.

2300 class: Double-end; pay-on-platform type; 32-ft. bodies; longitudinal seats; seating capacity 41. Built at Plank Road shop, 1911.

Exterior views of these later types of cars as converted are shown on plates XXXV to XXXVII.

The newer cars used on the Southern Division are of the following types:

3100 class: (Nos. from 3154 to 3186) Double-end, 33-ft. 4-in. bodies; cross seats; seating capacity 46. Built in 1906.

1800 class: (Nos. from 1857 to 1876) Double-end; 29-ft. 4-in. and 32-ft. bodies; cross seats; seating capacity 40 to 44. Built in 1904 and 1906.

1900 class: (Nos. 1991 to 1999) Same as 2200 class. Built in 1910.

The following table summarizes the lengths of the closed cars operated by the Public Service Railway:

Car bodies over 33 ft.	54
Car bodies from 30 ft. to 32 ft.	867
Car bodies from 28 ft. to 30 ft.	162
Car bodies from 22 ft. to 28 ft.	334
Car bodies under 22 ft.	141
Total	1558

TYPES OF PREPAYMENT CARS

In 1907 the Public Service Railway ordered 150 prepayment cars built under license from the Pay-As-You-Enter Car Company. These cars, which are numbered from 2050 to 2199, were the first prepayment type cars put in operation on this road. The results of operation of these cars were so successful that 733 of the old style double-truck cars have since been converted to the prepayment type. The prepayment feature has been adopted as standard for all new cars. The only exceptions are for cars operated on some of the long lines where fare zones are established and the conductor is required to pass through the car to collect second fares.

Three types of prepayment platforms have been used on the new and rebuilt cars. These are distinguished as "pay-as-you-enter," "pay-within" and "pay-on-platform." The "pay-as-you-enter" type has separate exit and entrance door openings in the rear-end bulkhead. The "pay-within" type has the bulkhead entirely removed and the conductor stands within the car facing to the rear. The "pay-on-platform" type has a double sliding end-bulkhead door without a central doorpost to divide the opening into entrance and exit, but has the usual curved platform railing inside of which the conductor stands. The "pay-on-platform" arrangement has been adopted for all future construction of new cars and the "pay-within" arrangement is being used in rebuilding some

of the old cars which have short platforms. The following table summarizes the prepayment cars operated by the company:

	Single-End	Double-End	Total
Pay-as-you-enter	334	132	466
Pay-on-platform	212	246	458
Pay-within	81	22	103
Total prepayment	627	400	1027
Old style	89	442	531

The platforms of all prepayment type cars are inclosed with folding gates or doors mechanically operated by the conductors and motormen. Doors are used on both platforms of all double-end prepayment cars and on the front platforms of single-end cars. Wire mesh gates are used on the rear platforms of single-end cars. On the first cars which were converted the gates over both the entrance and exit steps on the rear platform were dropped down to the step tread outside of the platform sills and were arranged to open outwardly. All of the entrance gates are now being set up on the platform and arranged to swing inward.

SINGLE-END AND DOUBLE-END CARS

Most of the lines operated by the Public Service Railway have wye or loop terminals for turning single-end cars and a majority of the cars purchased during the last five years have been of the single-end type. The company now has 716 single-end closed cars and 842 double-end closed cars. The increased seating capacity and lower weight of a single-end car as compared with a double-end car of the same type is shown by the 1700 class cars of this company. Of the 100 cars of this type forty-six are single-end and fifty-four are double-end. All have longitudinal seats and 28-ft. 8-in. bodies. The double-end cars seat thirty-one passengers and weigh 44,000 lb., while the single-end cars seat thirty-three passengers and weigh only 41,500 lb.

SEATING ARRANGEMENT

Longitudinal seats are favored by the management for cars operated on all but the longest lines. The 2200 and 2300 class cars built during 1910 and 1911 have longitudinal seats. Nearly all of the cars on the Southern Division are used on long runs into suburban territory and such cars are equipped with cross seats. Combination seating has been placed in some of the original narrow longitudinal seat cars where the latter are being used for suburban work.

WHEELS

The standard wheels of the Public Service Railway are chilled cast iron of the reinforced spoke pattern. They are 33 in. in diameter, with 2½ in. treads and 11/16 in. flanges. Several thousand solid steel wheels have been purchased and put in service on interurban and viaduct lines, but at present prices of iron and steel wheels, cast-iron wheels are considered more economical for city service. A trial lot of 100 light-weight, one-wear steel wheels have recently been put in service to determine their life and cost per 1000 car miles as compared with cast-iron wheels. The practice of grinding cast-iron wheels to remove flat spots is described in the chapter on maintenance of car equipment.

MOTORS

Of the 1381 double-truck closed cars 1186 have four-motor equipments. The two-motor equipments under double-truck cars are confined to the old light cars. A few two-motor equipments with a total capacity of 120 hp are being tried under large cars as an experiment, but the grades and the rail conditions on many of the streets are so bad at times that it is difficult to obtain sufficient adhesion on two pairs of driving wheels to accelerate the large cars at the rate required to attain the present schedule speeds.

Table XIV shows in detail the types of motors used on closed, open and service cars. The Westinghouse No. 307 and General Electric No. 216 motors are

TABLE XIV.—TYPES OF MOTORS USED BY THE PUBLIC SERVICE RAILWAY.

	Closed Cars.		Open Cars.		Service Cars.		
	Two-Motor	Four-Motor	Two-Motor	Four-Motor	Two-Motor	Four-Motor	Total
West. 307	...	8	...	...	...	...	8
West. 101	32	468	...	...	4	5	509
West. 68	29	288	...	...	...	6	323
West. 93-A	...	33	...	...	...	...	33
West. 92-A	...	28	...	...	...	...	28
G. E. 216	...	10	...	...	...	...	10
G. E. 80-C	55	175	...	...	...	7	237
G. E. 67	25	110	...	17	...	4	156
G. E. 57	112	19	41	...	86	11	269
G. E. 90-A	...	8	...	...	...	...	8
Older types	111	39	128	3	109	11	401
	364	1186	169	20	199	44	1982

of the interpole type, which has been adopted as standard for all new motor equipments.

TRUCKS

Short-wheel-base trucks with outside-hung motors were for a long time the standard equipment for closed double-truck cars, but recently the company has adopted as standard the M. C. B. equalized type, with 6-ft. wheel base and inside-hung motors. Nearly all of the cars now operated on the longer routes where high speed is attained have been equipped with trucks of this type, and the short-wheel-base trucks are being used under cars operated at slow speed.

AIR BRAKES

All of the large double-truck cars are equipped with air brakes in addition to hand brakes. In 1904 the storage air-brake system was adopted for the cars running on the principal lines and compressor stations were installed at the important carhouses. During the past two years, however, independent compressors on the cars have been applied in large numbers. Out of a total of 1303 air-brake cars, 681 have storage tank equipment and 622 have independent compressors. The storage air-brake cars have two storage tanks 18 in. x 78 in. with a combined capacity of 439 cu. ft. of free air at 300 lb. pressure. They discharge through a reducing valve set at 50 lb. into a service reservoir 12 in. x 42 in., from which the air is admitted through the brake valve to the brake cylinder. An average of 1.2 cu. ft. of free air is required for each full application of the brakes so

that the storage capacity on the car is sufficient for at least 300 brake applications.

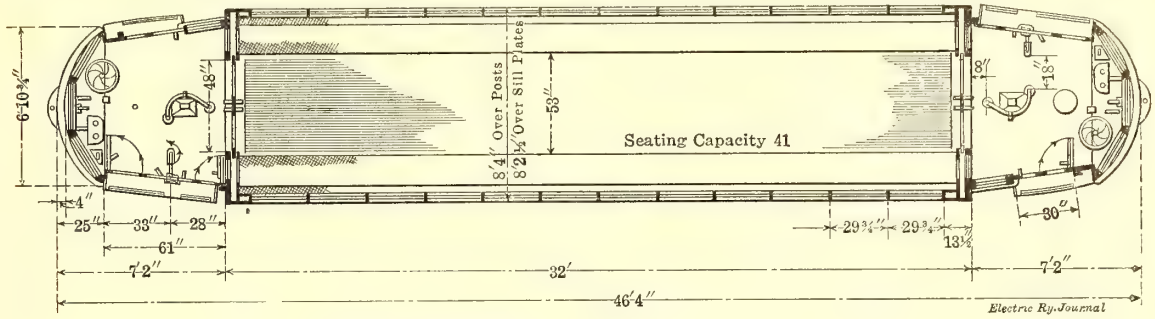
CAR HEATING

Closed cars are heated by coal stoves set in the center of the car on one side or by hot-air coal heaters mounted on the front platform and discharging through a register in the forward bulkhead. Hot-water heaters burning coke are used on the Southern division cars.

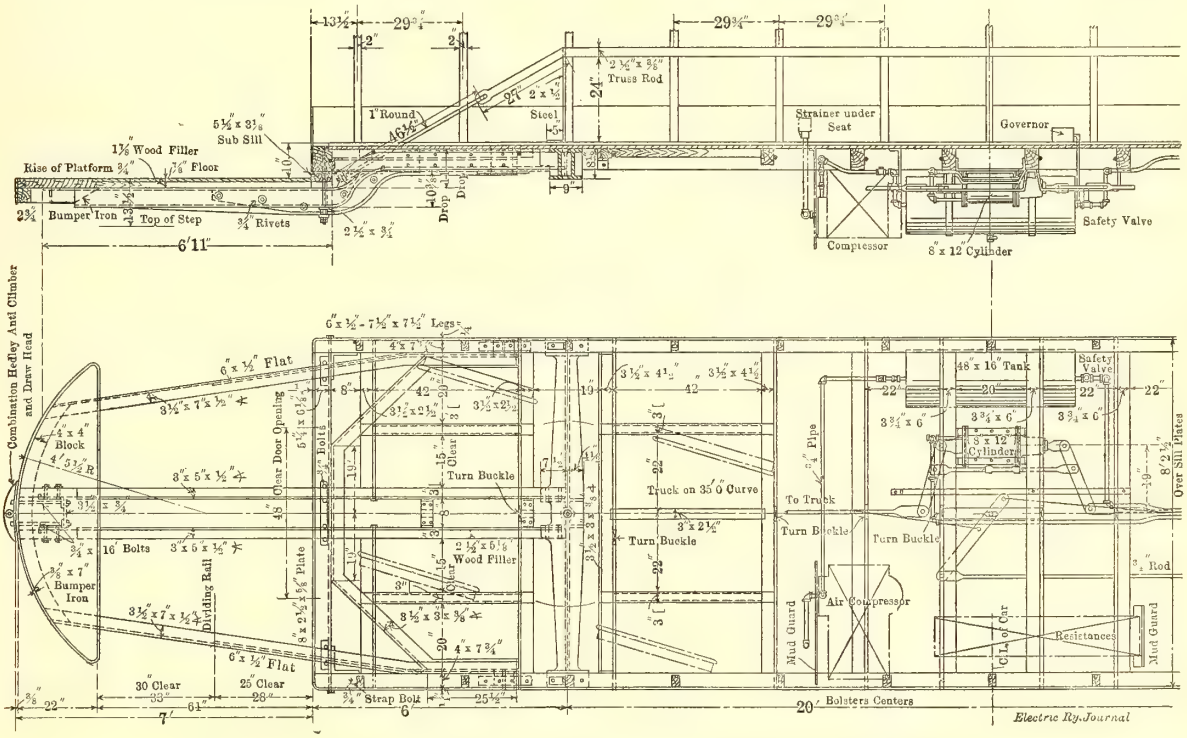
LATEST TYPE OF CAR

The latest type of car of the Public Service Railway is designated as the 2300 class. Twenty cars of this type have been built this year at the Plank Road shop. These cars are designed for double-end prepayment operation and have 32-ft. bodies. The platforms at each end are 7 ft. 2 in. long and are completely inclosed with folding doors above the steps. The seating capacity is 42 passengers, and the total weight with equipment is 45,600 lb.

No center sills are used in the underframing. The side sills consist of 7¾-in. x 4-in. yellow-pine timbers, reinforced with a ¼-in. x 18-in. sill plate, which forms the bottom side panel and is continued around the ends of the car body to the bulkhead-door posts. The bolsters are of cast steel with shouldered ends, on which the side sills rest. In the center of the underframing are four cross timbers 3¾ in. x 6 in., which support the air-brake apparatus and the resistance grids hung under the car. Along the face of each cross timber is a ¾-in. sill tie rod, which has riveted ends countersunk in the sill plates and a turnbuckle inserted in the center to draw it up tight. The end sills are 5¼-in. x 6⅞-in. white-oak timbers, mortised into the side sills and stiffened with ½-in. x 6-in. knee plates.



Rolling Stock—Floor Plan of 2300 Class Car



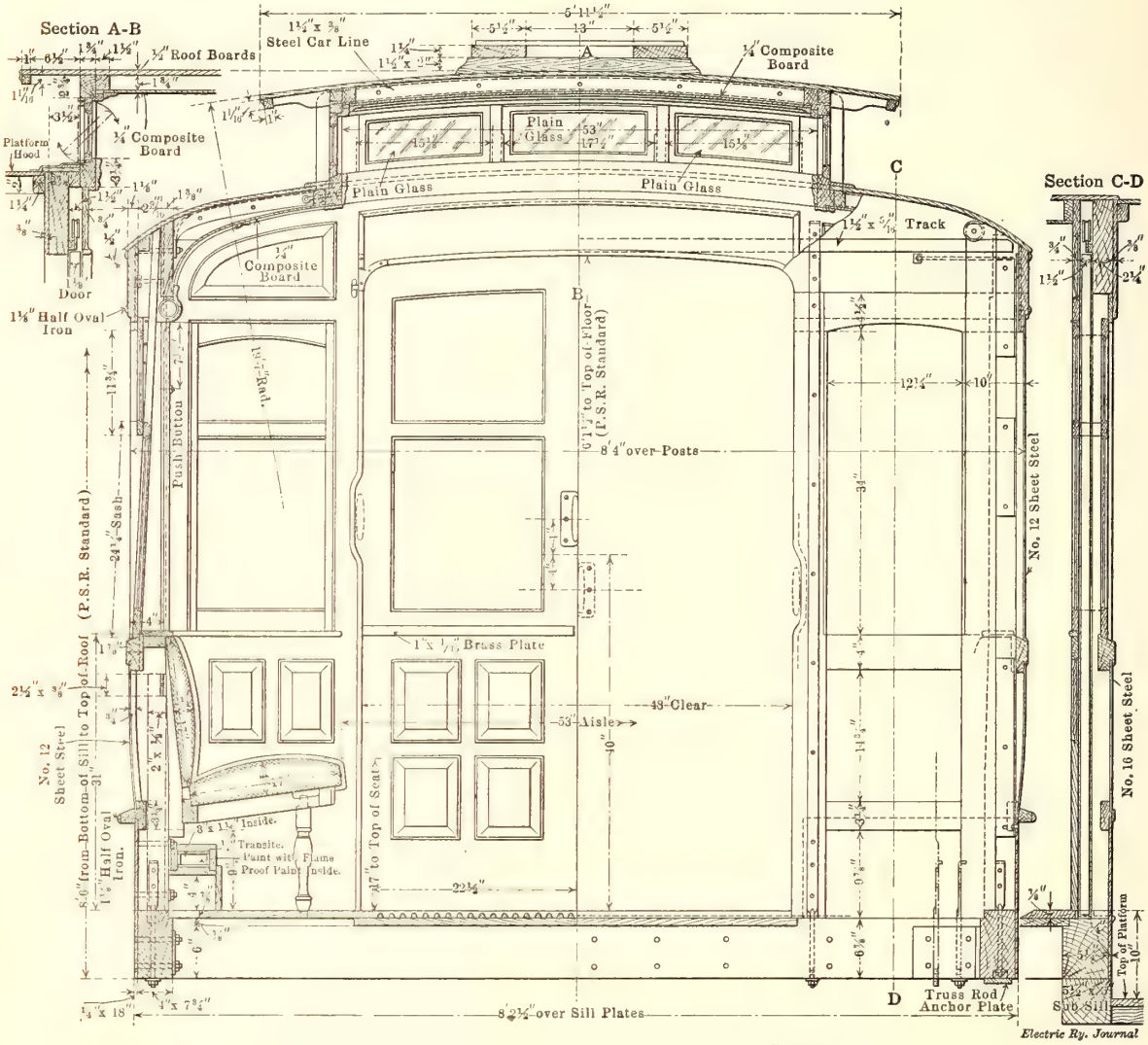
Rolling Stock—Part Plan and Elevation of Framing of 2300 Class Car

Each end of the underframing is further reinforced by a continuous steel angle 3 in. x 3½ in. x ⅜ in., which is bolted to the side sills just outside the bolster for a distance of 25½ in., and is then bent inward at an angle of 45 deg. to the inside face of the end sill, against which it has a bearing of 38 in. No other diagonal bracing is used.

The platform framing consists of two 3-in x 5-in. x ½-in. angle center sills and two 3½-in. x 7-in. x ½-in. angle side sills. The center platform sills are carried back to the bolster, to which they are bolted. They are reinforced with 2½-in x 5⅛-in. oak fillers, which extend out under the crown piece and back up the anti-climber drawhead casting. The bumper beam is 4 in. x 4 in., cut on a radius of 4 ft. 5½ in. and sheathed with a ⅜-in. x 7-in. face plate. The platform side sills are bolted inside of the body side sills and are reinforced at the bend under the end sill with 6-in. x ½-in flat plates riveted to the vertical webs of the angles. A 5½-in. x 3⅛-in. subsill is attached under the body end sill, and the platform sills are clamped up against this subsill with ¾-in. stirrup clamps.

The body posts are ash, 2 in. x 3½ in. They are mortised into the top of the side sills and bolted to the ¼-in. sill plates. A steel plate 2 in. x ½ in. is attached on the side of each of the posts over the bolsters to take the downward thrust of the overhang truss rod. This truss rod is 2½-in. x ⅜-in. section, and is gained into the posts just below the windows. It terminates at each end in an eye, into which is inserted a 1-in. round hook bolt which passes down through the side sill to the truss-rod anchorage. The top side panels under the windows are formed of No. 12-gage sheet steel, which is screwed to the blocking back of the fender rail and is notched into the window rail. The panels are slightly convex and are supported on the inside by ¾-in. ash ribs.

The roof is of the monitor-deck pattern with compound carlines over each post. The roof boards are ½ in. thick, covered with canvas. Agasote is used for the headlining of both the upper and lower deck.

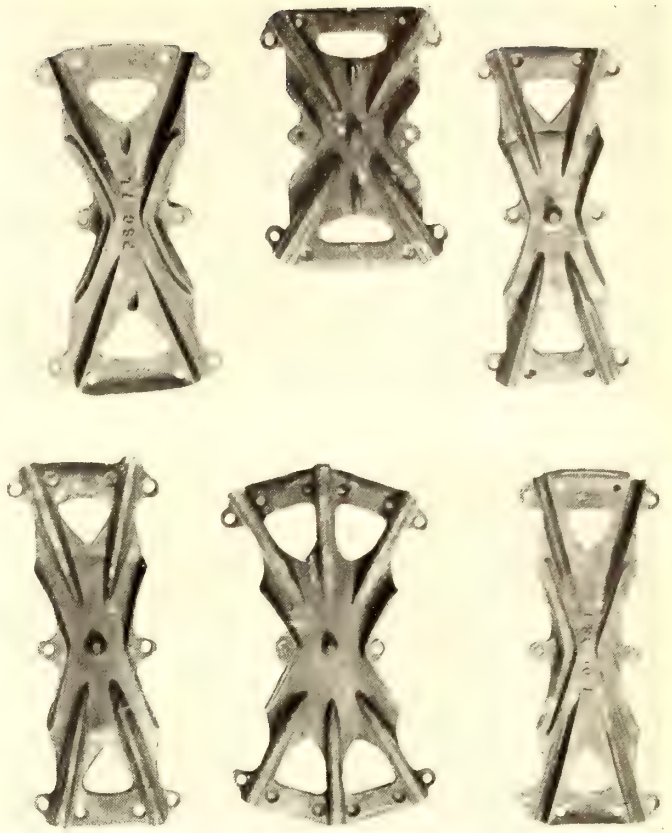


Rolling Stock—Cross-Section Through 2300 Class Car

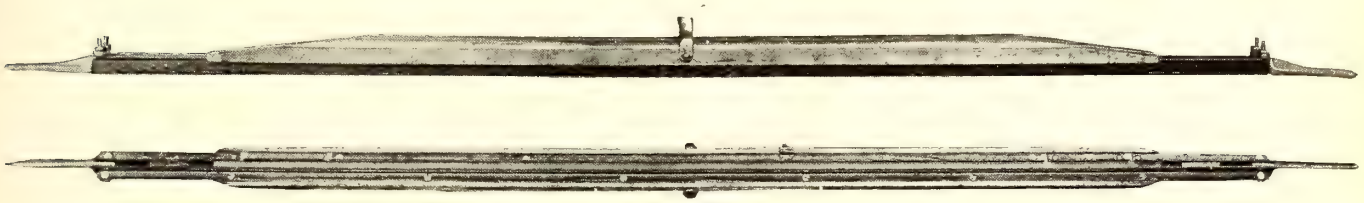
The end bulkhead doors slide back into pockets in the bulkhead and have a clear opening of 48 in., which is divided into entrance and exit passageways by the platform railing which partially surrounds the fare box. This railing terminates 8 in. away from the step into the car and is bent around slightly more than 90 deg., to come in line with the post on which the door-operating handles are mounted. The opening over the right-hand step is 61 in. wide, and is divided by a pipe railing into an entrance 32 in. wide



Equalizing Feeder Boxes, Miller Street and Frelinghuysen Avenue, Newark



Two-Way and Three-Way Fixed Angles—Flexible Approaches Not Shown



Overhead Switch for Signal System



Standard Form of Section Insulator



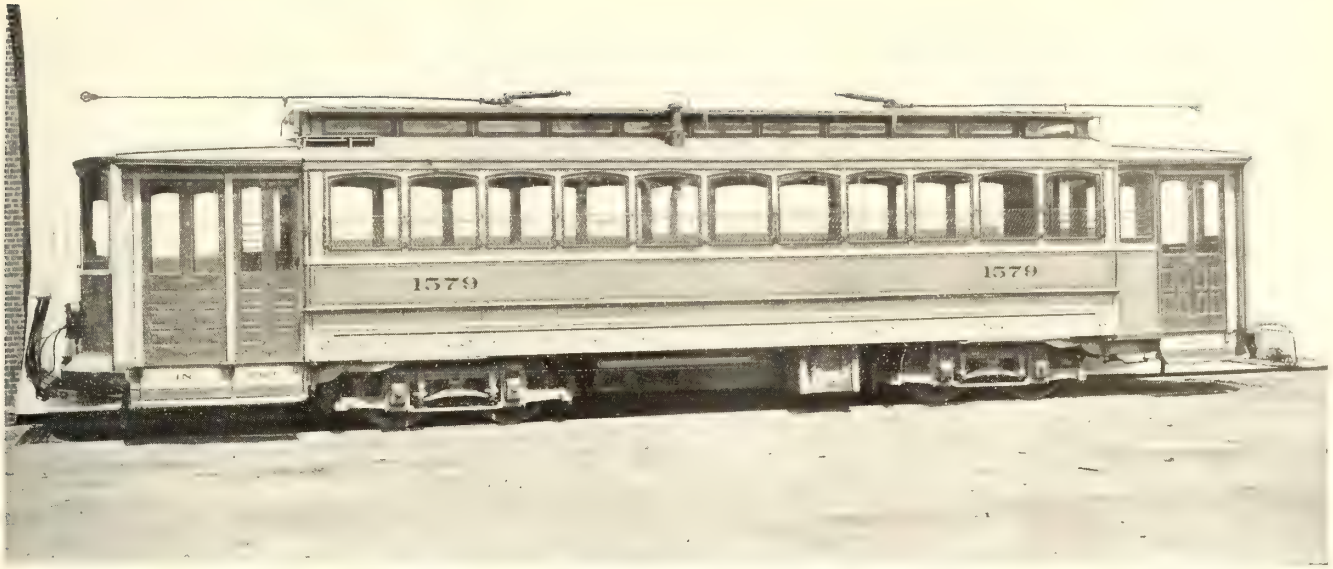
Standard Overhead Line Hanger with Flexible Approaches



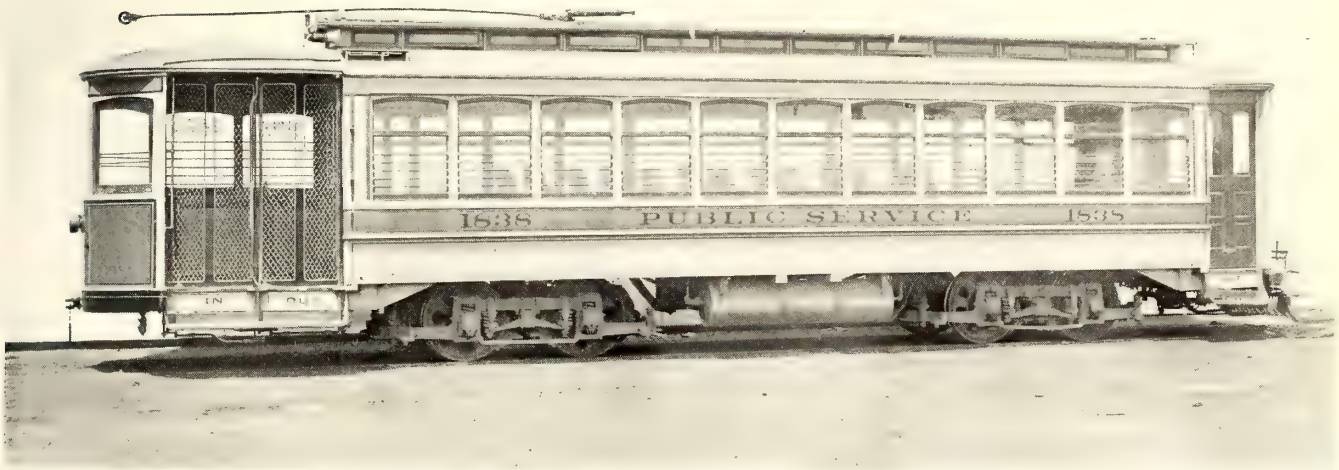
Example of Overhead Construction, Including a Few Catenary Hangers (Shown at the Right), in Front of the West New York Carhouse



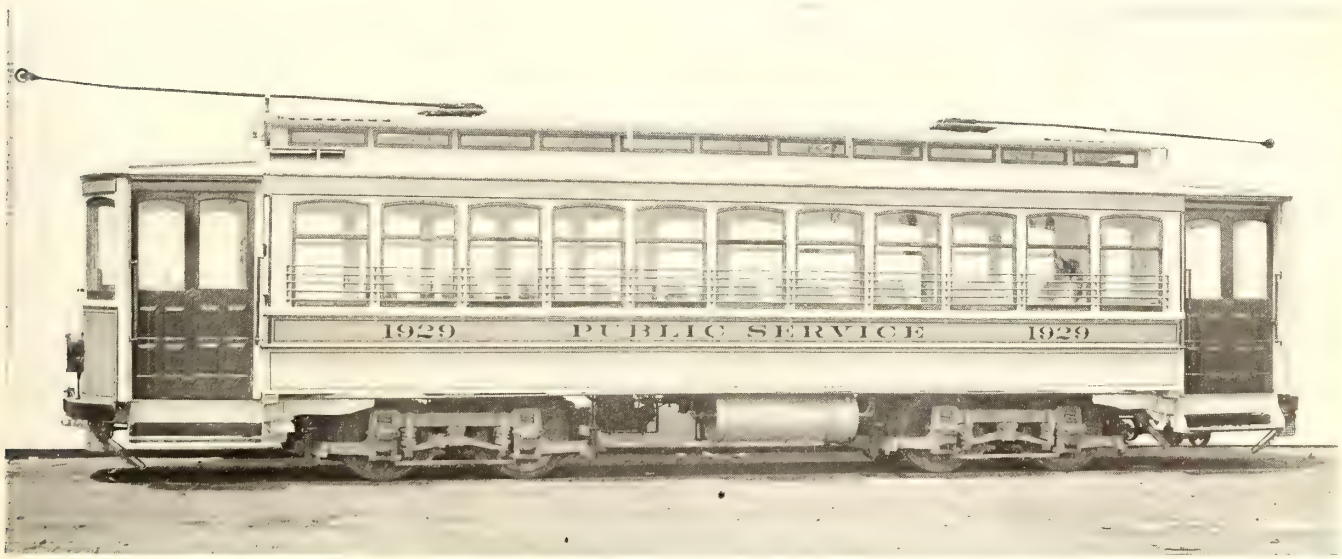
Another Example of Well-Aligned Overhead Construction as Installed in Front of the Plank Road Storage Carhouse, Newark



Exterior View of 1500 Class Double-End Closed Car



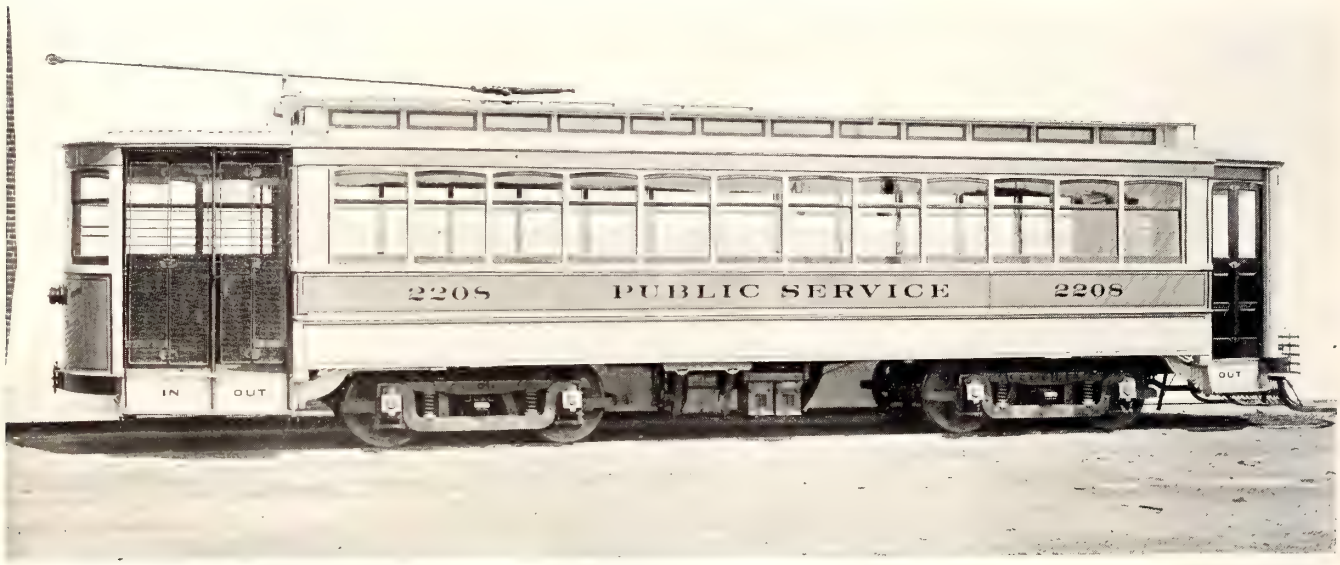
Exterior View of 1800 Class Single-End Closed Car



Exterior View of 1900 Class Double-End Closed Car



Exterior View of 2100 Class Single-End Closed Car



Exterior View of 2200 Class Single-End Closed Car



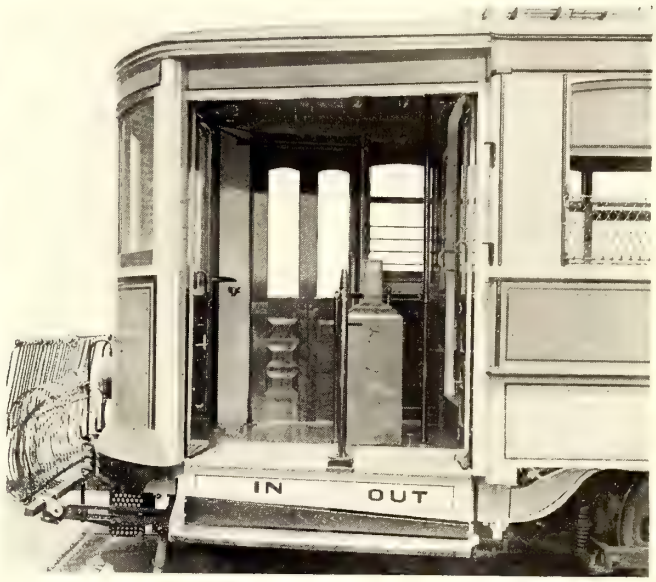
Exterior View of 3100 Class Car Used on Southern Division



Exterior View of 2300 Class Double-End Closed Car



Interior View of 2300 Class Car



Rear Platform of 2300 Class Car



Side View of 1400 Class Double-End, 12-Bench Open Car

Plate XXXVIII



Two-Car, Multiple-Unit Train



Exterior View of General Manager's Office Car



Interior View of General Manager's Office Car



Truck Overhauling Department, Plank Road Repair Shop



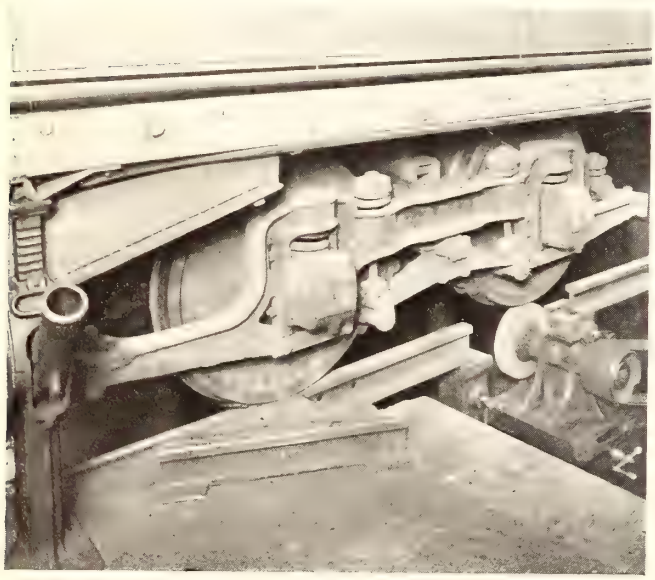
Blacksmith Department, Plank Road Repair Shop



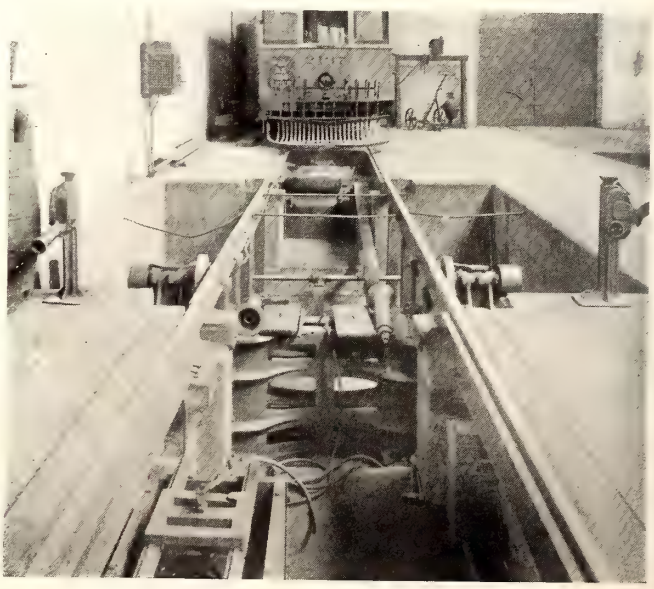
Paint Shop, Plank Road Repair Shop



Woodworking Mill, Plank Road Repair Shop



Wheel Grinder at West Hoboken Carhouse



Wheel Grinder at West Hoboken Carhouse

in the clear and an exit 25 in. wide in the clear. The double folding door which closes the entrance folds back and in against the controller, while the exit door folds in against the bulkhead. A grab handle is attached on the inside of each door, so that when the doors are open the handles are in a convenient position to be grasped by persons ascending or descending the step. No grab handles are attached outside of the doors. The exit door on the opposite side of the platform has a clear opening of 27 in. It folds back against the hand-brake wheel, and, like the doors on the right-hand side, has a grab handle attached to it.

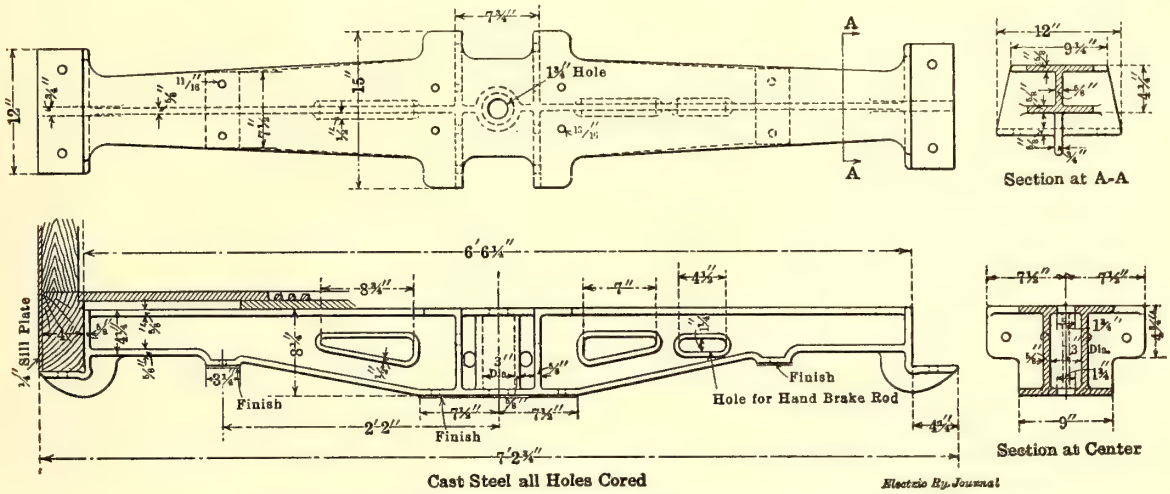
The door-operating mechanism is very simple. Each door consists of two halves hinged together. One half is mounted on a vertical rod extending down through the platform floor, and the other has attached to it at the top a roller which runs in a slotted guide above the door opening. The vertical hinge rod carries a bell crank, which is attached to the bottom of the operating-handle shaft. The operating handles are mounted on top of the post which forms a partition between the entrance and exit passageways. By revolving these handles 90 deg. either door can be opened or closed independently of the other. The exit door on the left-hand side of the platform is operated by a handle mounted above the brake wheel. The steps below all doors are stationary and are not protected by covers.

The cars are painted the standard color of the Public Service Railway. The top panel and vestibule ends are painted a chrome yellow; the bottom panel and the side posts are painted cream color; wide striping and trimming is Tuscan red, and fine striping and lettering is black.

The special equipment of these cars includes the following : Earl trolley catchers; Dayton Manufacturing Company's incandescent dash headlights; Hedley cast pattern anti-climbers; Providence fenders; Consolidated Car Heating Company's buzzer system; Agasote headlighting; Sterling-Meaker "Little Giant" hand brakes and fare registers; National Lock Washer Company's curtain fixtures; General Electric CP-27 compressors and straight-air brakes: Sherwin-Williams paint; Murphy varnish; Brill trucks.

MULTIPLE-UNIT TRAIN

During the past summer an experimental two-car multiple-unit train has been operated on some of the lines running into the Exchange Place terminal in Jersey City. The train consists of two double-truck closed single-end cars, with 25-ft. bodies and prepayment platforms. On each truck is mounted one GE-57 motor of 50 hp. The leading car is equipped with a K-35 controller, through which all four motors are operated, while the trailer car is fitted with a K-11 controller on the front platform, through which the two motors under the trailers may be operated when the trailer is detached and run as an individual unit. An illustration of this train is shown on plate XXXVIII. The company is now equipping a number of its smaller double-truck cars for multiple-unit operation.



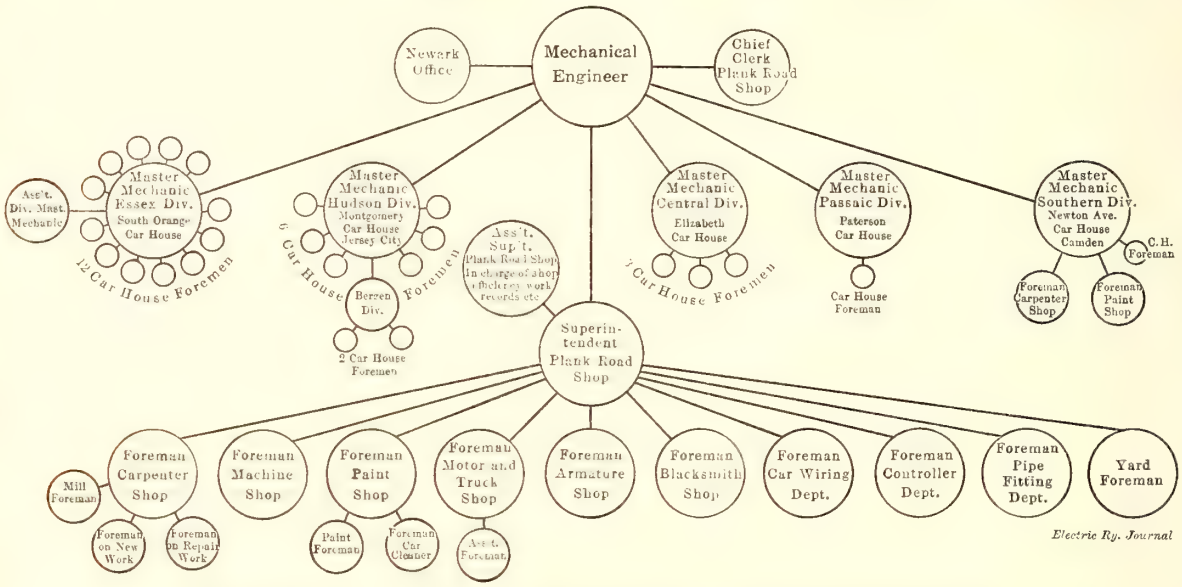
Rolling Stock—Cast-Steel Body Bolster for 2300 Class Car

MANAGER'S OFFICE CAR

Among the special cars owned by the company is an office car for the use of the general manager. Views of this car are shown on plate XXXVIII. It is 43 ft. 8 in. long over bumpers, 29 ft. long over corner posts, and 7 ft. 8 in. wide over the sides. The interior is divided into an observation and office compartment 18 ft. long and a buffet and toilet compartment 9 ft. long. The observation and office compartment has four windows 46 in. wide in each side, and the bulkhead doors are almost entirely of glass, so that a good view of the track ahead and on each side can be obtained. This compartment is furnished with comfortable wicker chairs and folding tables, which can be used for office work or for serving meals. A large scale map of New Jersey, on which are shown all of the company's lines, is mounted on a spring roller attached to the upper-deck sill. The kitchen facilities include a buffet range, denatured alcohol stove, sink, water tank, dish and linen lockers and a complete equipment of dishes, silver and linen.

MAINTENANCE OF CAR EQUIPMENT

THE 2380 cars of the Public Service Railway are cared for at twenty-four carhouses and depots scattered over the northern and central part of the State and one carhouse on the Southern division in Camden. On account of the long distances from many of these carhouses to the main repair shop of the company, which is located in the southeastern part of Newark, shop facilities are provided at eleven of the twenty-four operating depots on the Northern and Central divisions, and cars are sent to the main repair shop only for painting and heavy body repairs. Regular overhauling of the trucks and motors is done at the carhouses. The Southern division, which includes all the lines centering in Camden, has a well-equipped repair shop at the carhouse, where all light and heavy repairs to cars, including painting, are made.



Car Maintenance—Diagram of Organization of Mechanical Department

ORGANIZATION OF THE MECHANICAL DEPARTMENT

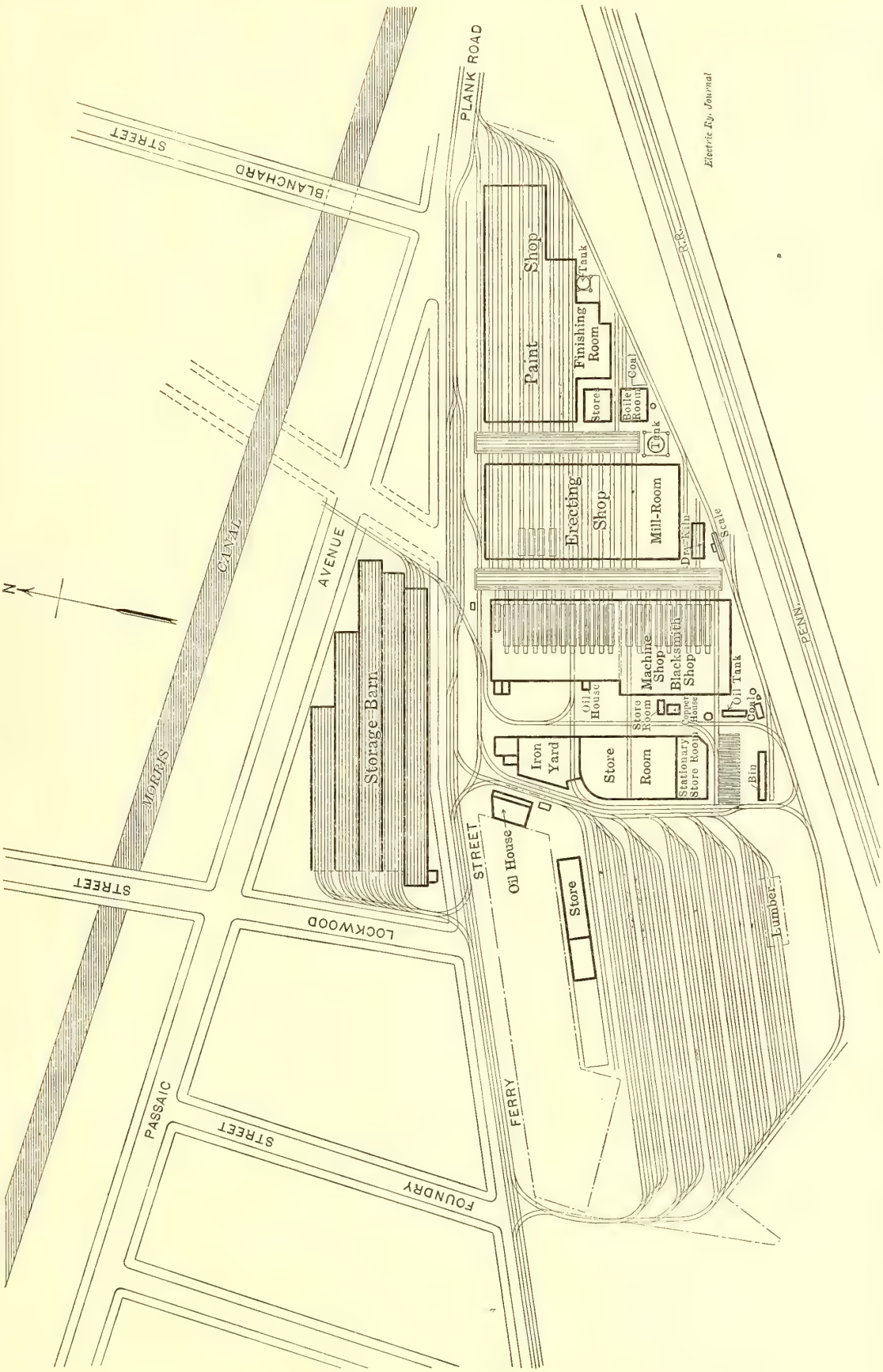
The organization of the mechanical department is very similar to that of the mechanical department of a large steam railroad system. At the head of the department is the mechanical engineer, who reports to the general manager. The inspection and maintenance of the cars assigned to each of the six operating divisions of the railway company are in charge of a division master mechanic, who reports to the mechanical engineer. These division master mechanics have supervision over the carhouse foremen at each of the twenty-five operating depots. The master mechanic of the Essex division, which includes Newark and the Oranges, has twelve carhouses under his supervision, and he has an assistant who relieves him of part of his work. The master mechanic of the Hudson division also superintends the work of the two carhouse foremen on the Bergen division, which includes the recently acquired lines of the New Jersey & Hudson River Railway & Ferry Company. The master mechanic of the Southern division, in addition to his duties in connection with the routine maintenance and inspection of cars, is in charge of the Camden repair shop. He has a foreman carpenter and a foreman painter as assistants in the shop. Each master mechanic has an office at one of the carhouses on his division and has a clerk, who attends to the necessary reports and car-maintenance records for the division.

The Plank Road repair shop has an organization which is independent of the divisional maintenance forces. The shop superintendent reports directly to the mechanical engineer. Each of the ten shop departments has a foreman, who reports to the shop superintendent, and there is also an assistant shop superintendent, who has charge of all shop records and reports, makes special investigations of shop methods and in other ways assists the shop superintendent in an executive capacity. Three of the shop foremen have subforemen under them in charge of special branches of the work.

The mechanical engineer has an office and drafting room at the Plank Road shop, with a chief clerk and a force of clerks to handle the department correspondence records and reports. He also has an office in the company's main office building in Newark, and he divides his time between these two offices and the outside carhouses.

SHOP FACILITIES

The Plank Road shop, which is the main repair shop of the company, is among the largest electric railway repair shops in the United States. The nucleus of the present group of buildings was an old power station, which was later remodeled into a two-story truck shop, mill and machine shop. In 1905 the old



Car Maintenance—Plan of Plank Road Shops and Car Storage Yards

shop was completely remodeled and greatly enlarged at a cost of nearly $500,000. The main shop building was converted into a truck and machine shop on the ground floor, and the second floor was cut out in the center to form a gallery 32 ft. wide around all four sides. On this gallery are located the armature and controller repair departments. A one-story addition 153 ft. x 140 ft. was built on the south end for the blacksmith and wheel departments, so that the main building is now 348 ft. long and contains twenty-three pit tracks leading from a transfer table pit which separates the carpenter shop on the east.

The carpenter and erecting shop and woodworking mill are in one building, 286 ft. x 140 ft. The erecting shop contains fourteen tracks on 10-ft. centers and

PUBLIC SERVICE RAILWAY CO.

ORDER FOR PIECE WORK
PLANK ROAD SHOPS

Car No._____ Job No._____

Date_____191__

WORKMAN'S NAME	CHECK No.

Schedule	Pieces	DESCRIPTION OF WORK	AMOUNT	
		GRAND TOTAL		

_____Foreman

_____Supt. Shops

_____P. W. Inspector

NOTE—Any work performed not authorized by this order will not be paid for.

Car Maintenance—Piecework Order Card

has a total capacity of 42 cars. The building is of brick with steel roof trusses and saw-tooth roof. The woodworking mill is in the south end of this building. East of the carpenter shop and separated from it by another transfer table pit is the paint shop, 354 ft. x 135 ft. It contains nine tracks spaced on 14-ft. centers and will hold seventy cars. It is of the same type of construction as the carpenter shop. The other principal buildings on the shop site are a boiler house, paint storeroom, oil house and general storehouse. On the north side of Ferry Street, opposite the shop buildings, is a storage carhouse with a capacity of 150 cars. A complete description of the Plank Road shop as rebuilt in 1905 appeared in the STREET RAILWAY JOURNAL of July 22 and Sept. 2, 1905.

All painting, heavy body repairs, wheel work, armature and field winding for the Northern and Central divisions are done at the Plank Road shop. In addition the shop manufactures and re-works a large amount of repair material and supplies, which is distributed to the carhouses for use as required. When the shop is not crowded with work cars frequently are drawn from the operating depots for overhauling. The Plank Road shop employs on an average 425 men in all departments.

PIECEWORK IN SHOPS

The piecework system has been introduced in a number of departments in the Plank Road shop. Armature repairs, controller repairs, carpenter work on new cars and in remodeling old cars and all paint shop operations are paid for on a piecework basis. The details of the system as applied in the paint shop are typical of all departments.

After a period of more than four months' careful observation the foreman of the paint shop made up a schedule of piecework prices for more than 600 painting operations as applied to car bodies of different types and sizes. This schedule was made up as a book of tables in blueprint form. Each operation is described briefly, is given a number and is followed with prices for doing the work on each of four general types of cars. At the beginning of each day each employee in the paint shop receives a piecework order card, on which are entered the car number, the shop job number, the date, workman's name, schedule number, quantity and description of each operation to be done and the amount to be paid for the work. These cards are made out by the foreman's clerk from an assignment sheet drawn up by the foreman every night, on which he lists the cars to be worked on the next day, the character of the work to be done on each and the men assigned to do it. The amount of work entered on one of these cards may be sufficient to keep the man to whom it is given busy for only part of the day or for several days. The cards are turned in at the end of every day and given out again the next morning until the work assigned has been completed and inspected and passed by the foreman, who signs the card. On the back of the card are ruled spaces, in which each man who does any part of the work called for on the face of the card enters his name, the date of doing the work, the number of hours spent and the amount earned at the piecework rate. In addition to filling out the time and piecework price on these cards, each workman turns in at night a time slip showing the numbers of the jobs on which he has worked that day, the time spent on each and the amount earned at piecework rates. These tickets are sent to the auditor's office for making up the pay roll and distributing the charges to the proper job numbers, but they are first checked against the piecework order cards in the foreman's office.

The piecework order cards are filed by car numbers and when a car has been completed the entries on all of the cards relating to that car are transferred to a repair record card which is filed for perma-

nent record. This card when filled out shows in detail all work done on the car and the cost.

The men in the paint shop work in gangs of from two to four men and each gang pools its earnings. Thus the varnishers work in gangs of four, two men being engaged on the outside of a car at the same time that the other two men are working on the inside of the car. Any work which is not satisfactory to the inspector must be made right at the expense of the man responsible for the defective work, but no charge is made against the man for extra material required to make the work right. With this system of piecework orders checked against time slips it is not possible for a man to be paid twice for the same job or to be paid for work which he did not perform.

CARHOUSE REPAIR FACILITIES

The repair shop facilities provided at the carhouses vary in the details of the tool equipment and amount of space occupied. At some of the larger depots they include machine tools, wood-working machinery and blacksmiths' forges, in addition to a complete equipment of jacks, armature buggies, taps, dies and other small tools. On the Hudson division the West Hoboken and Montgomery Street carhouses have equipment of this kind and the following carhouses on other divisions have similar equipment: Essex division, Miller Street, South Orange Avenue and Montclair; Central division, Elizabeth, Dunellen and Milltown; Passaic division, Paterson; Bergen division, Edgewater. The following list of the principal tools at the West Hoboken carhouse is typical of the equipment of other carhouses:

1 Niles lathe	1 Armature bander
1 McCabe lathe	1 Wheel grinder
1 Shaper	1 Band saw
1 Snyder drill press	1 Circular saw
1 McCabe drill press	2 Buffalo forges
1 Bolt cutter	1 Babbitting forge

1 Emery wheel.

DEPOT INSPECTION AND MAINTENANCE

All carhouse inspection and maintenance work is done during the daylight hours. Oiling, however, is done at night. The inspection crews consist of two men. One man works in the pit and inspects the trucks, wheels, journals, foundation brake gear and all other apparatus hung under the car. The other man examines the motor commutators, gages the armature clearance, inspects the gear lubrication and motor bearings and goes over the entire car body including the trolley base and pole. One controller repairman is assigned to each depot and he inspects the controllers and electrical apparatus other than the motors on all cars inspected. At the small depots the foreman attends to this work.

All cars are inspected once a week and in addition the brakes on hand brake cars are inspected every three days, the brake inspections being made between the general inspections. A general inspection requires about one hour, and at a carhouse from which ninety cars are operated two inspection crews can handle the work with some time to spare. The number of inspection crews is determined by the size of the depot. Sufficient men are assigned to do the routine inspection work and to carry on continuously some overhauling work. An effort is made to have these men overhaul in their spare time every car assigned to a depot at least once each year. This overhauling consists of removing the trucks, dismantling the brake rigging, cleaning and repairing the motors, resistances, controllers and other electrical apparatus, rebabbitting bearings and thoroughly cleaning and inspecting the car from top to bottom. The brake rigging, which is removed, is sent to the blacksmith shop to have the worn holes plugged and redrilled, and it is replaced by a repaired set of rods and levers taken from stock. Defective or charred field coils are removed from the motors and replaced by coils in good condition and the armature commutators are turned and slotted if worn.

REPAIR RECORD CARD No._____

Style of Car_____ Date In_____ 191____

Repairs Made At Plank Road Shop Date Finished_____ 191____

Car Number_____ Job Number_____ Length_____

Schedule	PIECE	DESCRIPTION	HOURS	PRICE	AMOUNT	Schedule	PIECE	DESCRIPTION	HOURS	PRICE	AMOUNT
								Total Piece Work			
								Total Day Work			
								GRAND TOTAL			

Checked by_____

Foreman Approved_____ Supt. Shop

Car Maintenance—Piecework Record Card

Wheels are changed if necessary. Any machine or blacksmith repairs which cannot be made at the smaller depots are sent to one of the large depots on the division, where the worn or broken part is replaced by a repaired part taken from stock. Defective armatures and field coils are sent to the Plank Road shop for repairs. Each depot carries a stock of one or more armatures, sets of field coils and wheels and

MAINTENANCE AND INSPECTION RECORDS

Each inspection crew is furnished with a cloth-bound blank book of convenient size to fit into a pocket, and in this book is entered a record of the numbers of each car inspected, all defects found and all parts renewed or repaired. At the end of the day the entries on these books are transferred to the daily report sheet of the carhouse foreman to the division master mechanic. These report sheets are made up in book form with duplicate leaves which remain in the book. One of them is reproduced. As will be seen, the daily report is a complete log of the day's work at the carhouse. At the top are spaces in which are entered the number of cars on hand and the number of those disabled. Below are spaces for the report of those cars sent to the Plank Road or division

PUBLIC SERVICE RAILWAY COMPANY

.....Division.....19

DAILY REPORT OF CARHOUSE FOREMAN TO DIVISION MASTER MECHANIC

Weather..... .....Foreman

CARS ASSIGNED	NO. CARS REQUIRED FOR SCHEDULE	EXTRA CARS AVAILABLE	NO. CARS DISABLED	CAUSE OF DISABLEMENT						CARS SENT TO PLANK RD SHOP	CARS REC'D FROM P. R. SHOP	CRIPPLES TURNED IN	CRIPPLES FOUND O. K.
				COLLISIONS	CONTROL TROUBLE	FLAT WHEELS	MOTOR TROUBLE	OTHER TROUBLE	CARS NOW AT P. R. SHOP				

NO. OF REPAIR MEN ON DAY DUTY ON NIGHT DUTY

CARS SENT TO REPAIR SHOP		CARS RECEIVED FROM REPAIR SHOP	
CAR NO	CAUSE	CAR NO.	REMARKS

CARS PULLED IN

CAR NO	TIME	LINE	MOTORMAN	BADGE NO	CAUSE

FIELDS AND ARMATURES CHANGED

	TYPES OF MOTORS																	TOTAL
	49	52	56	67	68	67	68	80	92	93	101	800	1000					
ARMATURES																		
FIELDS																		

CAR NO.	CARS INSPECTED AND REPAIRS MADE ON SAME

NOTE—CARE SHOULD BE TAKEN TO THOROUGHLY INSPECT CARS IMMEDIATELY AFTER ACCIDENTS AND A COMPLETE REPORT (SIGNED) COVERING CONDITION OF SAME MADE ON REVERSE SIDE OF THIS SHEET

Car Maintenance—Daily Report of Carhouse Foreman

axles for each of the types of equipment operated from that depot. As this stock is drawn upon it is replenished by the return from the Plank Road shop of repaired parts or by new equipment. Supply cars make regular trips at frequent intervals between the general storehouse at the Plank Road shop and all of the carhouses to deliver material and pick up parts sent in for exchange.

shops and of those cars returned. Following this is a space for a report of cars pulled in, and then follows a statement of armatures and fields changed. At the bottom of the card is a space for a report of the day's inspections and the work done on cars. When a car is turned in after an accident of any kind the carhouse foreman writes a full report of the accident and the condition of the car on the back of the sheet.

These report sheets are sent to the office of the division master mechanic, where they are filed by carhouses. The division master mechanic keeps a book record of every car assigned to his division. Every item on each report sheet is copied into this book

MOTOR AND TRUCK WORK REPORT

Car House——— Date——— Car No.

WORK DONE

Motors Overhauled (Type——)	
Trucks Overhauled (Type——)	
Brake Rigging Overhauled	

MATERIAL RENEWED

No.		No.		No.	
	Journal Brasses		Brake Shoe Heads		
	Check Plates		Controller (End No.——)		
	Brake Shoes		Circuit Breaker (End No.——)		

MOTOR	No. 1	No. 2	No. 3	No. 4
No. Sets Axle Bearings				
No. Sets Armature Bearings				
No. Gear Cases				
No. Field Coils Replaced				
Pinions Replaced				
Armatures Replaced				

CAR WHEELS

REMOVED — Kind——— Diam.———

Motor No.	MAKE	WHEEL Nos.	CAUSE	AXLE Nos.
1				
2				
3				
4				

INSTALLED — Kind——— Diam.———

Motor No.	MAKE	WHEEL Nos.	REMARKS	AXLE Nos.
1				
2				
3				
4				

Work done by ———

(USE OTHER SIDE FOR ADDITIONAL INFORMATION)

Car Maintenance—Overhauling Record Card

under the car number to which the item relates. When a car is overhauled the carhouse foreman makes out in triplicate a motor and truck work report, which shows in detail the work done and the material used for replacement.

WHEEL MAINTENANCE

Appliances for changing wheels and axles are provided at all carhouses and a stock of wheels mounted on axles, with the proper sizes of gears for the different types of motor equipment, is carried at each house. All wheel boring and pressing on and off are done at the Plank Road shop. Cast-iron, spoke-pattern wheels are used under most of the cars and the maintenance of these wheels in good running condition is a large problem on account of the widely scattered locations of the carhouses. Several years ago Charles Remelius, who was then superintendent of rolling stock of the Public Service Railway, designed a machine for grinding flat spots out of the treads of cast-iron wheels without requiring the removal of the wheels from under the cars. One of these machines was built by the Q M S Company, Plainfield, N. J., and installed at the Plank Road shop. Six other machines subsequently were built and installed in the following carhouses: West Hoboken, Montgomery Street, South Orange Avenue, Central Avenue, Paterson and Camden. Six more machines have recently been ordered from the Q M S Company to be installed at the Greenville, Montclair, Miller Street and Elizabeth carhouses and at the Big Tree and Springfield carhouses now under construction.

The wheel grinder is mounted in a pit and consists of two 14-in. x 2-in. grinding wheels mounted on separately driven arbors. The wheels have vertical and lateral movement on slides carried in a heavy cast-iron frame. A short piece of the rail over each wheel is removable. The grinding wheels are driven at 5000 r.p.m. by a 15-hp motor mounted on the pit floor and belted to a jack shaft.

To grind a pair of wheels the car is run over the pit and the axle of the wheels to be ground is raised by two screw jacks bearing on the motor axle bearings. A motor rheostat is inserted in the car motor circuit and the wheels are revolved at a speed of about 75 r.p.m. in a direction opposite to that of the grinding wheels. One man is required to manipulate each of the grinding wheels.

The first cost of the machines installed is about $900 and the average cost of operation is about 30 cents per wheel, which includes interest, labor and cost of supplies. The time required to grind a pair of wheels depends, of course, on the depth of the flat spots and the hardness of the metal, but in a day of ten hours one machine will grind from twenty-four to thirty-two pairs of wheels. In one month last year the two machines on the Essex division ground more than 2400 wheels working day and night shifts. Wheels can be ground from three to five times before the chill is worn through.

CAR CLEANING

The mechanical department has recently been made responsible for the cleaning of cars, which was formerly done under the supervision of the transportation department. The interiors of the cars are swept out and dusted every night, and the exterior is washed and windows cleaned once a week or more often if necessary in bad weather.

TRANSPORTATION DEPARTMENT

THE scope of the transportation department will be understood by reference to the accompanying organization chart. The ranking officer is the superintendent of transportation. He has an assistant superintendent of transportation, six division superintendents, superintendent of employment, superintendent of schedules, superintendent of ferries and a supervisor of inspection. The operators of toll roads and wagon lifts report directly to the superintendent of transportation. The subordinate officers of the division superintendents are called supervisors. The depot or station masters, inspectors, starters and carhouse clerks report to the supervisors.

APPLICATIONS FOR EMPLOYMENT

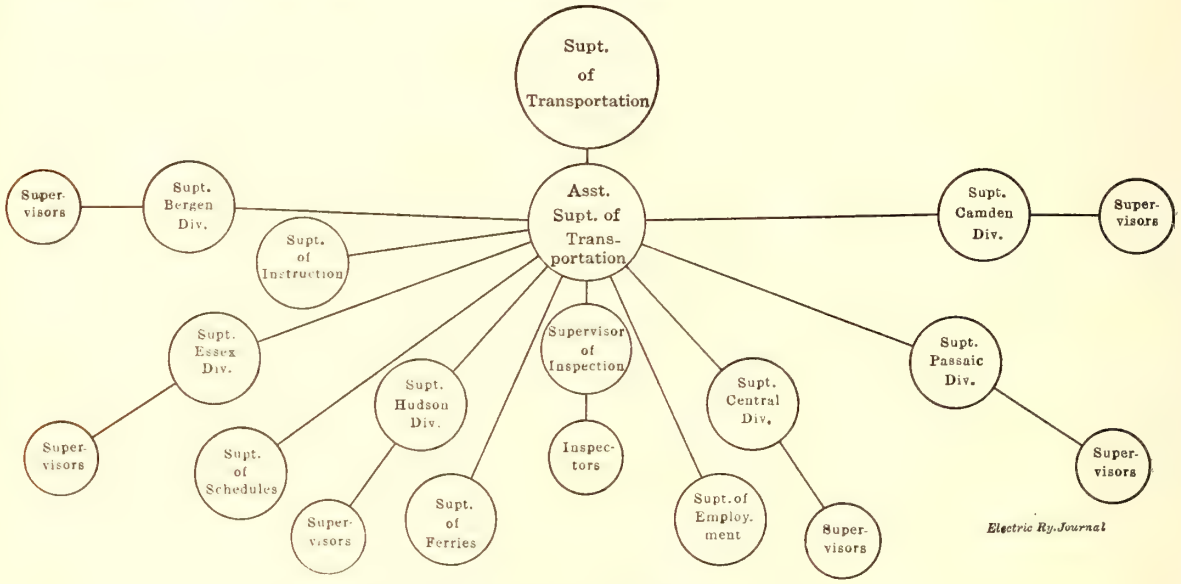
The employment bureau is under the supervision of the superintendent of employment. Notices for men wanted for platform work are posted permanently at the carhouses, shops, on newspaper bulletin boards and at other places where men go to seek news regarding employment. The notices are prepared as a schedule which states the hours and places at which applications will be received.

The first step is the filling out of the application blank by the prospective motorman or conductor. The questions to be answered are presented in the form on the next page.

Applicant must also give for references the names, addresses and occupations of four persons who have known him for at least two years. When these references are in the metropolitan district they are investigated personally. Otherwise it is the custom to send the inquiries by mail, inclosing a stamped return envelope. A form is used for recording the results of the investigations which are made personally.

It is customary for investigators not only to look up all the names that are given but to visit tradesmen, barbers and others in the vicinity who are likely to know something of the applicant's personal habits. When an inquiry is mailed to a railway, the company sends out a form which differs from that sent to other references and includes a request for a physical description of the person whose name is mentioned.

One question on the application blank asks applicants whether they are willing to accept certain provisions of the New Jersey Employers' Liability Act relating to compensation for injuries. This act, to which references were made in the ELECTRIC RAILWAY JOURNAL of April 29, page 763, and June 24, page 1129, offers to an injured employee the choice of accepting certain sums or specified percentages of his wages in case of accident, or of bringing action for recovery in the usual way.



Transportation Department—Organization Diagram

There is no difference in the wording of the application blanks used for prospective conductors and motormen, but those who wish to become conductors must fill out a bond for $150; consequently, applications for this position are looked up by the bonding company as well as by the railway. The form used by the bonding company contains space for four references and an extract from the Penal Code stating that it is a crime to obtain employment by false documents or false statements.

After the application has been approved, the applicant is given a "call-in" slip by the superintendent of employment. This orders him to report at the headquarters of the employment bureau with $2 if he is to be a motorman or $3 if he is to be a conductor. These deposits are made to cover badges, caps, etc., and in the case of the conductor the bonding fee of $1.50. A special receipt is given by the bonding company in acknowledgment of this fee.

The new men are referred to a single store for their first cap so that they will be sure to get the best, but thereafter the caps may be purchased at other stores in accordance with the specifications mentioned elsewhere in this article. The order for a cap is made out on a special blank, which has a return coupon. This coupon is sent to the supervisor who is to employ the new man.

PHYSICIAN'S EXAMINATION

The first step taken by the holder of a "call-in" slip is to appear before the physician for examination.

File No.....

Public Service Railway Company.

MOTORMAN OR CONDUCTOR.

DO NOT FILL THIS OUT

AGE.....
HEIGHT.....
WEIGHT.....
COLOR EYES.....
COLOR HAIR.....
MUSTACHE.....
BEARD.....
COMPLEXION.....
CHARACTERISTIC MARKS:

I hereby make application for a position as ..... in the service of the Public Service Railway Company with the full understanding that in the event of my securing employment, I am to abide by such rules and regulations governing the employees as the management may from time to time establish.

If employed, I promise to loyally and faithfully serve the Company, and to do all in my power to further its interests, to conduct myself honestly, soberly and with proper obedience and respect to its officials, and courtesy to passengers and the public.

1. Name in full (no initials).....
2. Present Address.....St.....City or Town, Length of Res.....
3. Previous Address.....St.....City or Town, Length of Res.....
4. Birthplace.....5. Married or Single.....
6. Period of Residence in New Jersey.....7. Housekeeping or Boarding.....
8. With whom are you Boarding?.....9. Are you a Citizen?.....
10. State what family you have, or what persons, if any, are dependent on you for support and where they live.....
11. Give name and address of nearest Relative.....
12. Are you subject to any sickness or infirmity?..... 13. Are you in any way crippled or deformed?.....
14. Are you color blind or near-sighted?..... 15. Have you any serious defect whatever in sight, hearing or speech?..... 16. Have you ever been injured? If so, when, where, how and effect of injury.....
17. Do you belong to any Labor organization? If so, give name.....
18. Have you ever been accused or convicted of any crime or misdemeanor?.....
19. Do you use intoxicating liquors?..... 20. How long have you been out of employment?
21. Have you ever been discharged or suspended from any position? If so, state particulars when and where and for what reason.....
22. Have you any relations in the employ of the Public Service Railway Company? If so, give their names and positions.....
23. Have you ever been employed by this Company, or any railroad controlled by it, or any other railroad? If so, state when, by what road and what capacity, on what division, and cause for leaving.....
24. Have you ever filed an application for a position with this or any other railroad company?.....
25. Give dates of your employment during the past five years, also the names of your employers, and their addresses during that time:
26. Are you willing to accept the provisions of Section II, and that part of Section III which relates thereto, of the New Jersey Law commonly known as the "Employers' Liability Act," relating to compensation for injuries, same being Chapter 95 of New Jersey Laws of 1911?.....
27.

State of New Jersey, } ss.
County of }

.....of full age, being duly sworn according to law, on his oath saith that he is the person named in and who signed the foregoing application; that the name signed thereto is his true name; that he has read the foregoing application and understands the purport thereof, and that the answers to all questions in said application are true; and that he makes the answers above for the purpose of procuring employment from.....

Sworn and subscribed before me this.....day of .....191 .....

Signature.

Transportation Department — Application for Employment Complete Except for Question Relative to References

The age limit of applicants for platform work is twenty-one years to forty years, and the minimum height 5 ft. 6 in. The pay-as-you-enter cars have made it practicable to accept shorter men for conductors than formerly because the register and bell cords are not so hard to reach as on open cars. The thorough nature of the examination will be apparent from the data sheet. The questions on this sheet follow:

EMPLOYMENT BUREAU.
PHYSICIAN'S EXAMINATION FOR EMPLOYEES.

Date.....
Name.....Position applied for.....
Age ..... Residence.....
(Street) (City)

(Applicant must answer the following questions):
Have you ever been rejected by any life insurance company or beneficial association, or had a policy modified in any manner?
.....
Have you ever had: (a) Consumption.....
or lived with consumptive.....
(b) Prolonged coughs.....(c) Asthma.....
(d) Delirium tremens.....(e) Chronic diarrhoea.....
(f) Piles.....(g) Difficulty in urinating.....
(h) Epileptic or other fits.....(i) Rheumatism.....
Fistula.....Gall stones.....(j) Syphilis.....
(k) Spitting of blood.....(l) Enlarged veins.....
(m) Dizziness or vertigo.....Are you ruptured.....
If so do you agree to wear a proper fitting truss while in the employ of the above-named companies?.....
Do you use alcoholic beverages?.....State kind used.....
Quantity daily.....If a total abstainer, how long so?.....
Are you vaccinated?.....
When were you vaccinated last?.....
Was it successful?.....If not, do you agree to waive all claims if you die of either smallpox or varioloid unless hereafter successfully vaccinated?.....
Have you ever been an inmate of a hospital, sanatorium or institution? If so give duration and cause.....
.....
Have you now any disease, injury or disorder?.....
Have you ever been away because of impaired health?.....
Have you ever had any personal injury or accident?.....
Have you ever had any serious illness or undergone any surgical operation? .....
.....
Do you believe in the employment of a physician in case of sickness? .....

Family history:
Married or unmarried.....
If married (a) Name of wife.....
(b) Name of children.....
If unmarried, give name and address of living parents.....
.....

I declare these answers to be true, and I agree that any misstatements shall render any and all obligations of the above companies null and void to me and any heirs or assigns.

Signed.....
Name of Applicant.

Witness.....

PHYSICAL EXAMINATION.

Vision: Right eye.....Left eye.....
Color: Right eye.....Left eye.....
Heart ..... Hearing.....
Lungs.....Enlarged veins.....
Does applicant wear glasses?.....Were glasses ordered?.....
Deformities .....
Marks of identification.....
Was applicant held over? If so, give reason.....
.....
Remarks: .....
.....
.....

I have examined the above-named person and recommend that his application be ..... accepted.

Signed.....
Examining Surgeon Employment Bureau.

Skeins of colored wool are used for tests of color blindness, but instead of merely matching colors the men must be able to name them properly. It has been found that men who matched two shades perfectly could not distinguish red and pink. Applicants are also required to read three test cards with both the right and left eye. The lettering varies considerably from the standard cards sold by opticians to prevent the cards from being memorized in advance. Motormen applicants must possess perfect vision, but the doctor often recommends conductor applicants to get glasses and return for re-examination. Tests are also made for hearing. The examination includes exercises of several kinds to show physical condition. Men who have any serious diseases, such as hernia, ruptures, etc., are not accepted. About 20 per cent of the applicants whose references are good are rejected on account of physical disability.

In the course of the examination note is made of identification marks, such as scars, moles and minor mutilations. It may be of interest to add that when a platform employee who has been concerned in an accident asserts that he did not see or hear matters which he should have done, he is sent to the physician for an examination. This policy has been found to promote good discipline.

REPORTING TO CARHOUSE

The badge given by the chief clerk of the employment bureau to the applicant who has passed his physical examination is numbered according to the division to which he is assigned. The chief clerk is guided in making these assignments by the trainmen's record, shown on this page. This form gives the number of conductors and motormen at each car depot, under the following classifications: Regular, extra, under instructions, required and appointed.

The cardboard form which is sent to the local supervisor for every student assigned contains a summary of the information which the superintendent of employment has secured through the several sources described. This includes the physical description and characteristic marks of the applicant. The supervisor must notify the superintendent of employment at once if he finds the description of the man with the badge number mentioned on the assignment form does not tally with his appearance. The bottom of this form contains an acknowledgment stub which must be signed by the supervisor and returned to the superintendent of employment for record. A filing abstract is exposed on the back of this form after it has been folded. This form makes a cover in which are placed all duplicates of discipline forms and future papers pertaining to the employee named.

Instruction of the student begins from the moment that he reports to the local supervisor. The instruction methods are described elsewhere in this article. Card records are kept of all platform employees, white cards for conductors and pink for motormen. These cards give for each man his date of appointment, his successive assignments, and the date of his resignation, discharge or transfer. One file number is used for the same man no matter how often he enters and leaves the service. The cards are filed alphabetically, according to the name of the person. They are also grouped according to months. A second series of cards is used, filed according to the badge number. This card gives the date on which the badge was issued, the name of the holder, his file number and the date at which he left the service. The practice of filing according to badge numbers is a necessity because many inquiries afford no other clew.

Notices of appointments and resignations are sent to the general auditor by the superintendent of employment, in accordance with notifications which the latter receives from the different supervisors. These notices give the name, occupation, badge number, file number and carhouse of the individual concerned. Special forms are provided for the supervisors to record the return of badges, punches, rule books, change carriers and buttons. One form goes to the superintendent of employment, one to the auditor and one remains in the carhouse. Requisitions on the superintendent of employment for supplies of this character are also made out in triplicate. One is retained in the files of the superintendent of employment. The second is sent by him to the general auditor indorsed with the statement that he has forwarded the desired material. The third copy stays with the supervisor who made the original requisition.

EMPLOYMENT BUREAU

Record of Trainmen for Week Ending 191

DIVISIONS	DEPOTS	CONDUCTORS					MOTORMEN				
		REGULAR	EXTRA	UNDER Instructions	REQUIRED	APPOINTED	REGULAR	EXTRA	UNDER Instructions	REQUIRED	APPOINTED
HUDSON	Greenville										
	Montgomery										
	Hoboken										
	Pavonia										
	West Hoboken										
	West New York										
	TOTAL										
	Broad										
	Montclair										

Transportation Department—Part of Record for Showing Employment Conditions at Every Carhouse

INSTRUCTION ON CARS AND IN SCHOOLROOM

When a student is sent to report at a given carhouse he delivers to the supervisor a card containing the data reproduced on the following page.

This card has a number of lines on which the successive platform instructors sign their names during the ten to fourteen-day period that a man receives platform instruction. When the chief instructor is satisfied that sufficient platform teaching has been given, he signs the card for return to the superintendent of employment. The stub attached to this card is retained for record at the carhouse.

After having been broken in on the cars, the new

man is sent to one of the three instruction rooms in Camden, Hoboken or Newark. Upon completion of the school course he is taken in hand by a representative of the claim department for instruction in accident prevention, preparation of accident reports, etc. These schools are also used to discipline motormen and conductors who have shown negligence in their work.

The following description of the school in the Miller Street carhouse, Newark, will give a good idea of the equipment and methods which are in use to perfect the education of the new men after they have had some platform experience.

An important feature of the schoolroom is the demonstration board to show what happens in a K-10 two-motor and a K-6 four-motor circuit. Lamps are used to represent the fields and resistance and fans are employed to show the action of the armatures. A front view of this board is shown on page 618. Two

PUBLIC SERVICE RAILWAY CO.

Newark....., 191

Mr. .....Supervisor.
Place bearer..... Badge No.....
at .....Carhouse to learn the duties of
.....
.....
Supt. of Employment.

Instructed by—
..... Instructor No.....
..... Instructor No.....
..... Instructor No.....

This is to certify that I have received the necessary instructions and thoroughly understand the duties of the position of ....., as required by the rules of the Company, and have also received the following supplies, all of which I agree to return to an authorized officer of this Company or forfeit amount shown opposite each article.

Change Carrier.....	valued at	$1.00
Punch	"	"	2.25
Rule Book, No.....	"	"	.50
Buttons, Small.....	"	"	.30
Buttons, Large.....	"	"	.50
Badge No.....	"	"	3.00

Name .....
Date.....
Examined and found familiar with Instructions and Book of Rules.
By.....
Chief Instructor.
Date.....191
By.....
Supervisor.
Date.....191

TO BE RETURNED PROMPTLY TO OFFICE OF SUPT. OF EMPLOYMENT.

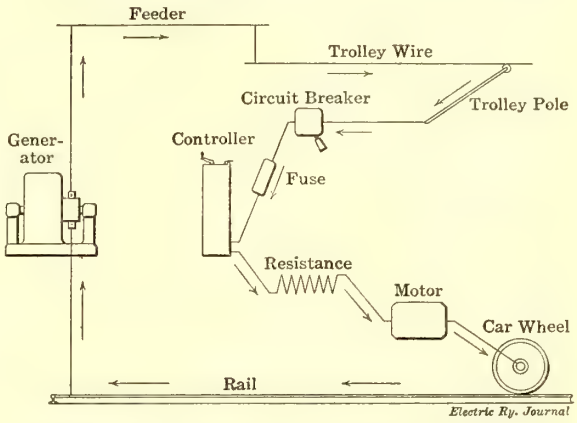
.....
Date.....191
Name .....Badge.....
Carhouse .....
Reported at Carhouse for instructions.....191
Reported for duty and card returned.....191
Failed to report in specified time, Outfit returned to Employment Department.....191

Transportation Department — Student Platform Man's Card of Introduction to Supervisor and Car Instructors' Certificate

diagrams on this page are reproductions of two very simple blueprints, one of which shows the complete course of the current from the generator through the low-tension distributing system, the car apparatus and the rail return to the power station. The other blueprint shows in outline the series and parallel positions of a four-motor equipment. Both prints are 35 in. x 26 in. in size so that they can be read easily by the entire class.

A complete four-motor car equipment with air brakes is placed on the floor of the instruction room. The motors are dummies but have lamp circuits to show when the current is in the fields and armatures. Above this equipment there is mounted a complete trolley stand and pole with trolley wires, span wires, ears and frogs. The room also contains a controller stand with complete equipment of gages, fuses, compressor switch and circuit breaker. There is also a dummy platform with two controllers, a hand brake, spindle, headlight and fender. Several motor parts are provided so that the instructor can indicate the parts more readily and explain their use.

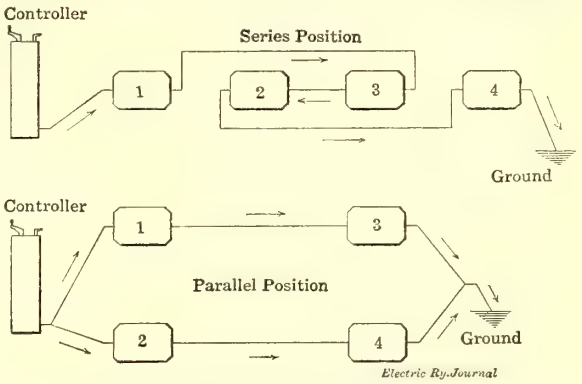
The instructor usually begins his lecture to a class



Transportation Department—Simplified Current Diagram of Railway Circuit

with the simplest possible explanations of electrical action and follows with a series of demonstrations on what should be done in case of emergencies such as open resistances, grounded wires, crippled motors, etc. Instruction in the operation of block signals has been added recently. A primer on the handling of car equipment has been prepared for the convenience of motormen students.

Motormen who are assigned for service on prepayment cars must pass a special written examination



Transportation Department—Simplified Current Diagram of Four-Motor Equipment

on subjects which relate especially to the door operation, bell signals and emergency conditions.

BOOKLET OF SUGGESTIONS TO MOTORMEN

It has also been found advisable to prepare a booklet of suggestions for motormen instructors in order to attain greater conformity in platform teaching and to insure the better handling of equipment. These instructions follow:

A FEW SUGGESTIONS FOR MOTORMEN INSTRUCTORS.

Take more interest in the student, showing and telling him all you know about a car; remember he is watching every move you make and is going to operate a car as he sees you do. If you take chances he will do the same and his judgment of distance may not be as good perhaps as yours and may get him into trouble, but encourage him if he lacks confidence.

1. Show him where all switches and fuses are located.
2. Tell him proper names of the equipment of a car, so he can report intelligently the condition of a car.
3. Show him the necessity of notching a controller, notch for notch, giving time on first and second positions, so as not to throw any passengers. A car which is started smoothly makes the best time.
4. Show him how to take off controller cover, and throw back deflector. Warn him against trying to adjust fingers.
5. Show him how to knock off overhead switch or circuit breaker and to reset same.
6. Show him how to drop and reset fender.
7. Show him how to adjust arc headlight.
8. Tell him of the necessity for making a thorough examination of his car before leaving carhouse, trying brakes and controller.

(*a*) In following a wagon going in same direction as car on or near the track if you remain at least twenty (20) feet behind wagon he will do the same.

(*b*) If you throw off your power for street intersections anticipating a wagon coming out across the street, he will do the same.

(*c*) If you have car under control passing standing car, *being able to stop in two feet*, he will do the same.

(*d*) If you remain three hundred (300) feet behind your leader when running faster than series point speed, he will do the same.

(*e*) The neat and tidy condition of the instructing motorman, also keeping car in clean condition, is very essential as an example for the new man.

9. Show him the necessity of recognizing every point on controller at all times, even after shutting off for section insulator or circuit breaker.
10. Show him the necessity of allowing his car to coast or drift at all times whenever possible, saving machines and power, and danger to motors if power is used when going down hill.
11. Show him points on lines where rail is bad and crosswalks are not to be blocked by car.
12. Tell him why he must cut out motors the minute any defect shows.
13. Tell him the necessity for reporting any defect on the car so the cars may be kept in good condition.
14. Have him properly instructed in making out accident reports, and in rendering every assistance possible in securing witnesses to all accidents.

INSTRUCT HIM, ABOVE ALL, TO TAKE THE SAFE SIDE AT ALL TIMES.

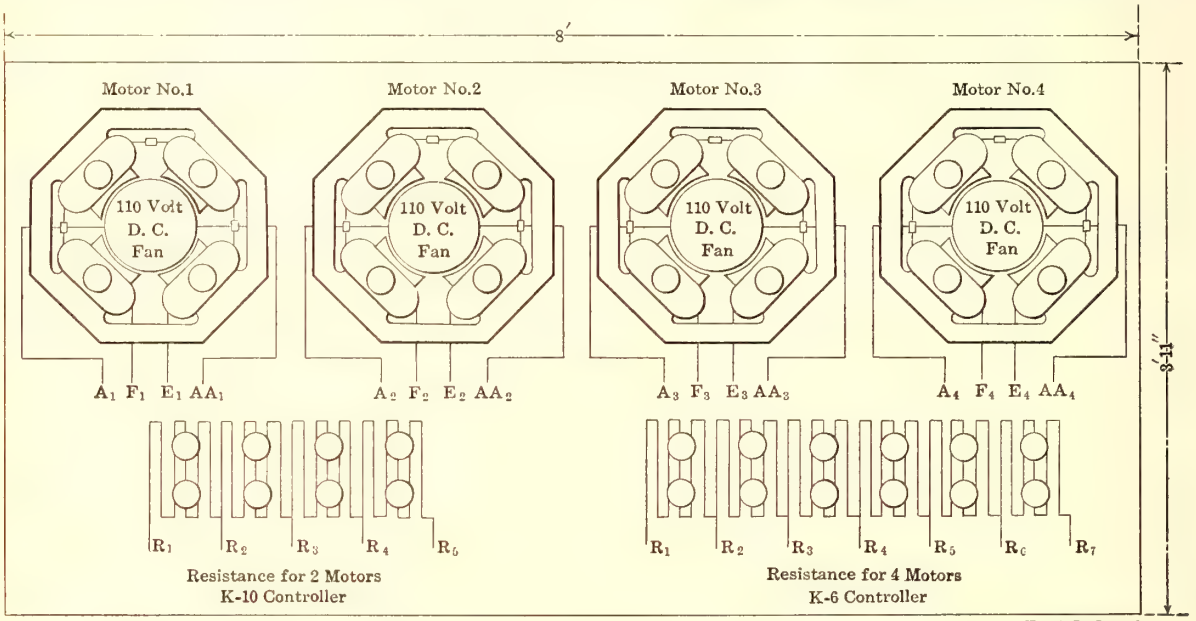
CONDUCTORS' INSTRUCTION ROOM

The conductors' section of the schoolroom contains a large blackboard on which are drawn specimens of the day cards as employed on both prepayment and ordinary cars. The board is also used for showing sample transfers, various forms of employees' tickets, transportation badges, etc. The teacher shows the men how to make out the different forms, punch transfers and perform other conductor's duties. The men are then required to pass a written examination.

The instruction room at Hoboken, which is the latest equipped by the company, is somewhat more elaborate than the Miller Street installation, especially in having a set of dummy controllers and brake stands where the men are trained to handle the spindles in synchronism with the movements of the teacher.

RULE BOOK

All platform employees are provided with a cloth-bound rule book, relating to their personal conduct, operating rules, safety of passengers, accidents, ejectments, carhouse rules and special rules for the operation of prepayment cars. This book is based on the standard code adopted in 1909 at the Denver meeting of the American Electric Railway Association and accepted as the standard of the Street Railway Association of the State of New York.



Transportation Department—Front of Demonstration Board in Miller Street Schoolroom

UNIFORMS, WAGES AND PROMOTIONS

The suits, overcoats, ulsters and caps of uniformed transportation employees are made according to standard specifications. There are four authorized firms where employees may purchase clothing or caps. The specifications do not cover buttons, which are furnished free to new employees. There is no difference in the summer and winter uniforms except in the weight of the cloth. On very hot days the men are permitted to wear black alpaca coats.

When new men are placed on the extra list they receive a minimum wage of $10.50 per week if they answer all roll calls for duty. At the end of the first year's service they are given a bonus of $10, which helps to cover their living expenses during the instruction period.

The present wages of conductors or motormen

are 22, 23, 24 and 24½ cents an hour, according to the number of years in service. Beginning on Jan. 1, 1912, these wages will be increased as follows: First year, 23 cents; second year, 24 cents; third year and thereafter, 25 cents.

Men who are selected to run the service cars are paid 25 cents an hour flat. While no extra payment is given to the crews who handle chartered cars, the men are pleased to be picked for this service because these cars are operated with long lay-overs.

The platform instructors are paid 25 cents extra for every day that they serve as teachers of student motormen or conductors.

The most reliable men are selected for the snow service. The motormen receive 30 cents an hour and the conductors 28 cents an hour for actual platform time in snow removal. Regular seniority rates are paid for waiting time. A double shift is reserved for every plow or sweeper, as every crew works a maximum of twelve hours. Each crew is assigned to a certain section of the line and to a certain sweeper or plow. The men report of their own accord upon the first signs of a snowstorm. However, it is sometimes necessary to send for them, particularly when snow begins to fall during the night. For this reason the names and addresses of the snow crews are posted in the carhouse.

Conductors and motormen receive one blue service stripe for each of the first four years. One gold stripe is substituted for five blue stripes at the end of the first five years and another gold stripe added for every additional five years. The inspectors and starters wear similar service stripes on their sleeves. Their rank is indicatd by a yellow stripe around each arm and two yellow stripes around the cap.

Inspectors and starters receive $2.65 a day for the first year, and $2.75 a day thereafter. These men also receive one week's vacation with pay. Platform men who desire to become inspectors or starters must make written application to the division superintendent, who considers their records, length of service and ability to handle men. For inspectors the company prefers active and agreeable looking men because they must board a great many cars during the day and also come into frequent contact with the patrons when they pass through the car to make register and passenger counts.

BENEFITS AND PENSIONS

A feature of the employment system of the Public Service Railway is the insurance sick benefit and pension fund which was established Jan. 1, 1911, and is conducted without cost to the employees. By this system $300 is payable at death to the beneficiaries of all employees who were with the company on Jan. 1, 1911, whose compensation at the time of death had not exceeded $1,800 annually, and who remained in the service continuously from Jan. 1, 1911, to the time of death. Employees who have entered the service since Jan. 1, 1911, do not acquire insurance rights until they have worked for one year. Thereafter the insurance rights are retained only by continuous service.

Upon the death of any employee entitled to insurance, the division superintendent where the deceased was employed reports the death to the chairman of the welfare committee and sends him the necessary records. The claim is certified for payment when the rightful beneficiaries are ascertained.

Sick benefits are paid to all employees whose period of service exceeds thirty days, whose wages do not exceed $1,800 a year, and whose compensation does not continue during absence from duty. The sick benefit is $1 for each day's disablement following the first week's absence from duty, when caused by illness or injuries. The sick benefit payable in any one year to any employee is limited to $90. These payments are practically the same as those made by a number of voluntary associations on other street railways where the cost of operation requires the collection of 50 cents to $1 per month in dues. Furthermore, the death payment in such organizations is often not more than $150, or one-half of the amount which is granted by the Public Service Railway without any assessments whatsoever.

The sick and death benefit payments as stated apply only to those employees whose wages do not exceed $1,800 a year. The pension system, however, applies to all employees who have reached the age of sixty-five and have completed twenty-five years of continuous service. Any employee who has reached the age of seventy years, after completing at least twenty years of continuous service, is arbitrarily retired on a pension. The amount of the annual pension is calculated as follows: For each year's service, 1 per cent of the average wage or salary for the ten years preceding the retirement, provided, however, that no pensions shall be less than $240 a year.

The application for voluntary retirement on pension must be verified by the immediate superior of the applicant and approved by the general manager and the president or one of the vice-presidents.

Failure to make application for retirement on pension at the time of reaching the age of sixty-five years and completing twenty-five years of continuous service does not deprive any employee of the right to make such claim at any later date during his continuous service. Retirement on pension does not deprive the employee of the benefits of death insurance, but employees retired on pensions are not entitled to sick benefits.

All of the rules mentioned in the foregoing paragraphs have been very liberally construed in practice. For instance, leave of absence on account of illness, for other urgent reasons, or even for suspension which is followed by reinstatement within three months, is not considered a break in the continuity of service. In other instances death benefits and pensions have been granted where the good record of the employee has justified some relaxation of the rules.

The inauguration of this welfare system has had

an excellent effect on reducing the number of floating employees. In fact, hundreds of applications for reinstatement have been received since the provisions of the system became generally known.

INSPECTION AND DISCIPLINE

The operating records of motormen and conductors are kept on individual cards 9 in. wide with different headings, as shown on this page. Both records begin with the date on which the man was qualified. The record of a motorman mentions the reasons for his return to the school, such as poor handling of the controller, carelessness in running too fast over the special work, failure to avoid collisions with other vehicles, disregard of the rules against permitting passengers to ride on the front platform, suspensions, times late, etc. The conductor's record shows whether there were differences in the number of passengers compared with the register reading, if he had failed to call out streets, had permitted passengers to smoke on the rear platform, had not held the trolley over special work, had not registered fares, etc.

The information on these records is obtained from uniformed inspectors, non-uniformed checkers and secret service men. The report of the uniformed inspector is very simple as it is intended principally to record the register discrepancies, but under "remarks" the inspector is at liberty to add any information which he thinks would be for the good of the service. The checker's report, as shown on page 622, is somewhat more elaborate, as these inspectors have the opportunity of watching the crew throughout the trip. The duties of the secret service men are the widest of all. They furnish reports on every phase of car operation, particularly the misuse of transfers by passengers, study traffic conditions, hunt for thieves who are robbing the company's properties, etc.

The reports of the uniformed and non-uniformed inspectors are sent to the chief inspector and the superintendent of employment. A copy of the uniformed inspector's report is also sent to the division superintendent for purposes of discipline. The discipline report on which the local supervisor indicates the offenses for which a platform man has been disciplined is reproduced on the next page. This information is placed on the individual records previously mentioned and it is also assembled on a discipline report which shows the total number of offenses of each kind throughout the entire system for the month. This report is made up for the superintendent of transportation and readily indicates to him what troubles are of most frequent occurrence and therefore most in need of correction.

The merit system is not in use on the Public Service Railway. Offenses are punished by re-instruction, warnings, suspensions or discharge as the case may warrant. Suspensions do not affect the run of a man unless he has been late four times during one year. The degree of punishment is recommended by the local supervisor, but the sentence is carried out by the division superintendent. An appeal to the superintendent of transportation is permitted, but as a rule only men who have been discharged bring their cases before him. Among offenses which result in immediate discharge are insubordination, desertion of the car in the street, drinking heavily either on or off duty, rear-end collisions and dishonesty.

One side of the inspector's daily service report on matters of registers gives the headway, the conditions of the rails and overhead line, rule violations, delays, with causes for same, and accidents. The front of this report contains fifteen headings, as follows: Car number, time, run number, crew's appearance, brakes, sand box, switch rod, drawbar, deck signs, dash signs, roller destination signs, fender, flat wheels, remarks and time depot was notified. A "v" in the

Motorman ..... File No. ..... Badge No. .....

Employed ..... Assigned to .....

Discharged ..... Resigned ..... Reappointed .....

DATE		REPORTS

Transportation Department—Headings of Motorman's Report

Conductor ..... File No. ..... Badge No. .....

Employed ..... Assigned to .....

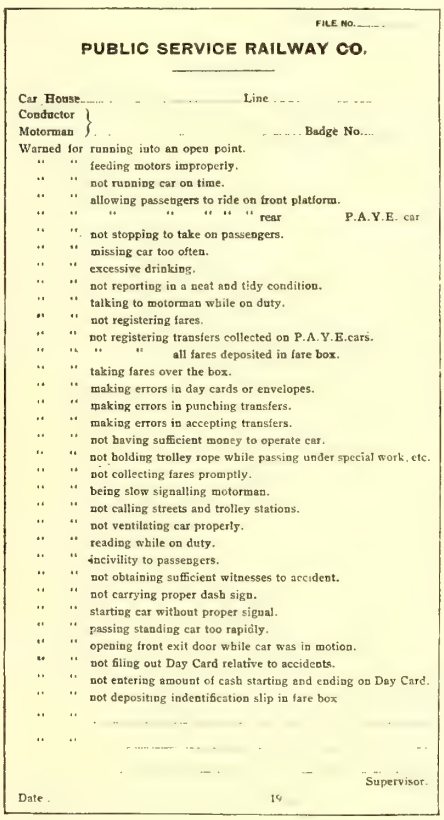
Discharged ..... Resigned ..... Reappointed .....

DATE		Car No.	Time	Rep. by	No. Pass.	No. Reg.	No. Not Dep	Difference	DATE		REPORTS

Transportation Department—Headings of Conductor's Record

proper column indicates that the items noted were O. K., and an "x" that they were unsatisfactory or defective. A car-timing report is also made out by inspectors to show the number of minutes a car is ahead or behind time.

Records of all discrepancies in register readings for individual conductors are kept on a special form which is signed by the superintendent of employment, the superintendent of transportation and the division superintendent. The main part of the form entitled "Register Records" is sent to the local superintendent, who acknowledges its receipt by forwarding the discipline record previously mentioned. A stub on the top of the register record is retained in the employment bureau as a check against the return of the discipline slip.



FILE NO.

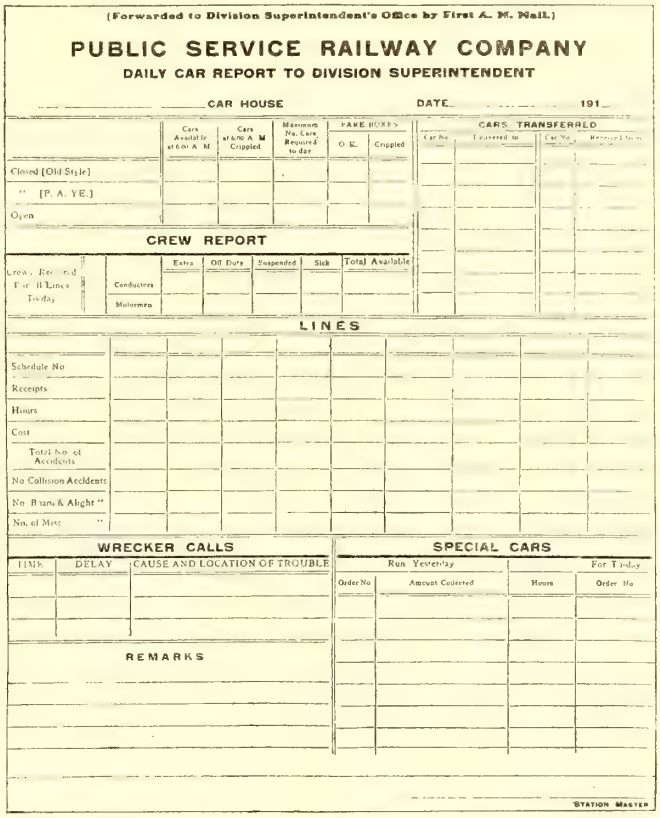
PUBLIC SERVICE RAILWAY CO.

Car House..... Line .....
Conductor }
Motorman } ..... Badge No....
Warned for running into an open point.
" " feeding motors improperly.
" " not running car on time.
" " allowing passengers to ride on front platform.
" " " " " " " rear P.A.Y.E. car
" " not stopping to take on passengers.
" " missing car too often.
" " excessive drinking.
" " not reporting in a neat and tidy condition.
" " talking to motorman while on duty.
" " not registering fares.
" " not registering transfers collected on P.A.Y.E.cars.
" " " " all fares deposited in fare box.
" " taking fares over the box.
" " making errors in day cards or envelopes.
" " making errors in punching transfers.
" " making errors in accepting transfers.
" " not having sufficient money to operate car.
" " not holding trolley rope while passing under special work, etc.
" " not collecting fares promptly.
" " being slow signalling motorman.
" " not calling streets and trolley stations.
" " not ventilating car properly.
" " reading while on duty.
" " incivility to passengers.
" " not obtaining sufficient witnesses to accident.
" " not carrying proper dash sign.
" " starting car without proper signal.
" " passing standing car too rapidly.
" " opening front exit door while car was in motion.
" " not filing out Day Card relative to accidents.
" " not entering amount of cash starting and ending on Day Card.
" " not depositing indentification slip in fare box
" "
" "

Supervisor.

Date . 19

Transportation Department—Discipline Report from Local Supervisor



(Forwarded to Division Superintendent's Office by First A. M. Mail.)

PUBLIC SERVICE RAILWAY COMPANY

DAILY CAR REPORT TO DIVISION SUPERINTENDENT

_____ CAR HOUSE DATE_____ 191_

	Cars Available at 6:00 A. M.	Cars at 6:00 A. M. Crippled	Maximum No. Cars Required to day	FARE BOXES O. K.	FARE BOXES Crippled	CARS TRANSFERRED Car No.	CARS TRANSFERRED Transferred to	CARS TRANSFERRED Car No.	CARS TRANSFERRED Received from
Closed [Old Style]									
" [P. A. Y. E.]									
Open									

CREW REPORT

		Extra	Off Duty	Suspended	Sick	Total Available
Crew Required For 11 Lines Today	Conductors					
	Motormen					

LINES

Schedule No									
Receipts									
Hours									
Cost									
Total No. of Accidents									
No Collision Accidents									
No Runs & Alight "									
No. of Miss "									

WRECKER CALLS

TIME	DELAY	CAUSE AND LOCATION OF TROUBLE

SPECIAL CARS

Run Yesterday Order No	Amount Collected	Hours	For Today Order No

REMARKS

STATION MASTER

Transportation Department—Station Master's Daily Report on Carhouse Business.

CARHOUSE OPERATION

The operation of a carhouse may be best understood by an explanation of the equipment and forms used at a given installation. The following description of the Miller Street carhouse will therefore serve for the rest of the system.

In this carhouse the assembly and locker room contains large bulletin boards on which are posted notices of importance to the men. One blackboard gives the assignment of crews for the different runs, according to seniority. This shows the name of the regular motorman and conductor on each run with the name of the usual substitute alongside of each. An "x" opposite a man's name indicates that he must report to the station master before going on his run. This board also contains the names of the unassigned extra men who report at 5 a. m. and 10 a. m. every day. On the opposite side of this room is a glass case in which bulletin notices are displayed for thirty days. These notices are then pasted into a book kept by the supervisor for the instruction of new men. The wage scale, per hour and per minute, is pasted permanently in this case. It is also the custom for the receiver to display for a week a carbon copy of the daily pay roll sent to the auditor, so that a man can check up his figures and ask for a correction before it is too late. A blackboard alongside the glass case is used for notices of local interest.

The car bulletin board to which motormen refer in the morning is posted outside of the station master's office. This board shows the car numbers, track numbers, run numbers and line.

In the operation of prepayment cars at this carhouse two types of fare boxes are used, the Johnson and the Brill. The former is a coin-counting and registering device in which the money is recorded as soon as it has been deposited. It is then available for change. Conductors who have the Brill box are furnished with $10 in change and are expected to have $5 of their own money because the fares deposited stay in the till until opened in the auditor's office. The till has four compartments, each of which the successive conductors on a car lock in turn by pulling

the side lever over for one notch. As each conductor goes on the car he drops into the box a 2¼x1¼ in. identification card, which gives his run number, box number, line, badge number, date and name. A different color of paper is used for each line. These cards enable the auditor readily to trace the responsibility for discrepancies found in each compartment.

All cars, whether of the regular or prepayment type, are furnished with separate cash and transfer registers. In addition to the regular day card of the conductor there is a supplementary car record which stays with the car. On the successive conductors write the cash box number, the compartment number and the cash and ticket readings. Great stress is laid upon the importance of a continuous register reading, no matter how many conductors have had the car.

Line _____

Date _____ 19__ Trip _____

Car No. _____ Conductor No. _____

Time on _____ Time off _____

Street on _____

Street off _____

Register on _____ Register off _____

Free _____ Transfers _____

Missed _____ Total Passengers _____

Fares Collected and not Registered _____

PAYE CARS
- Fares not Deposited in Fare Box _____
- Fares Deposited in Fare Box But not Reg'd _____
- Transfers Collected But Not Registered _____

Motorman No. _____

Operative _____ Expense _____

Transportation Department—Checker's Report Form

STATION MASTER REPORTS

The station master sends to the division superintendent the daily car report shown on page 621. This form shows the number of cars in operation on individual lines, wrecker calls and special cars. The heading under "Lines" gives the schedule receipts, car hours, platform cost and the different classes of accidents. Under "Remarks" the station master refers to reasons for extra traffic or to other matters which are not specifically called for in the reports. Reports of cars transferred must be made out every day whether cars are shifted or not. The station master also makes out a report covering the mileage of every non-revenue car. This report must be signed by the crew in charge of such cars.

A separate daily statement is forwarded to the general auditor's office only of the number of cars run, number of trips, car hours, car miles, extra trips and trips lost.

ACCIDENT REPORTS

In addition to the regular accident reports the company has found two blanks very useful in recording accident data. One of these is used for entering the data received at the carhouse over the telephone when an accident occurs. The headings on this form, besides those which identify the car, crew, time and place, are: Nature of accident, disposition made, number of passengers, number of witnesses obtained, reported by, received by, remarks. Another form is used to accompany the accident reports sent by the transportation department to the claim department. This form states the nature of the accident and the badge numbers of all employees concerned and contains a column in which may be entered the case number used in the legal department to identify the accident. This case number is written in by the claim department and the form is then returned to the carhouse, where it serves as a receipt for the papers in the cases enumerated. Knowledge of the case number makes it much easier for the station master to help in further inquiries from the claim department.

There are many other forms which are used at every carhouse but which need not be reproduced in this article. Among these forms are daily transfer reports of conductors' cash box cards; time sheets of regular platform men and of platform inspectors; carhouse employees' receipts for wages, and a weekly report on crippled cars.

SOCIAL RELATIONS AMONG EMPLOYEES

The Public Service Railway is remarkable for the great variety of social activities participated in by its platform men. Every one of these organizations is managed entirely by the men, but the company is always prepared to help to defray extraordinary expenses. The organizations vary in character throughout the system, depending largely upon local conditions. Some carhouses happen to be favored with good actors; others are fortunate in having boxers, bag punchers, or good pool and billiard players. The many tournaments in outdoor and indoor games which follow bring picked men from each division into friendly competition.

Entertainments for children form perhaps the most delightful feature of the work of these organizations. At Christmas they take the form of Santa Claus parties at the several carhouses, the bachelors naturally paying the greater share of the cost of the gifts. One entertainment of this kind, as given at the Plank Road carhouse, is shown in plate XLIV. In summer the children and their elders are amused by picnics and baby parades. One of two views on plate XLVI shows a baby parade in progress and another illustrates a part of the audience and the prizes.

The good relations which the rank and file have with their superiors are also pleasantly demonstrated by the dinners which are given from time to time in honor of officials who have been transferred, who have left the service for one reason or another or who have returned to old scenes. The illustration on plate XLV shows the guests at a banquet which was tendered to a division superintendent who had returned after three months' absence on account of ill health.

The friendly attitude of the company toward these organizations is apparent from the fact that every carhouse is provided with an assembly room, with a piano and pool tables.



Storage Air-Brake Compressor Plant at West Hoboken Carhouse



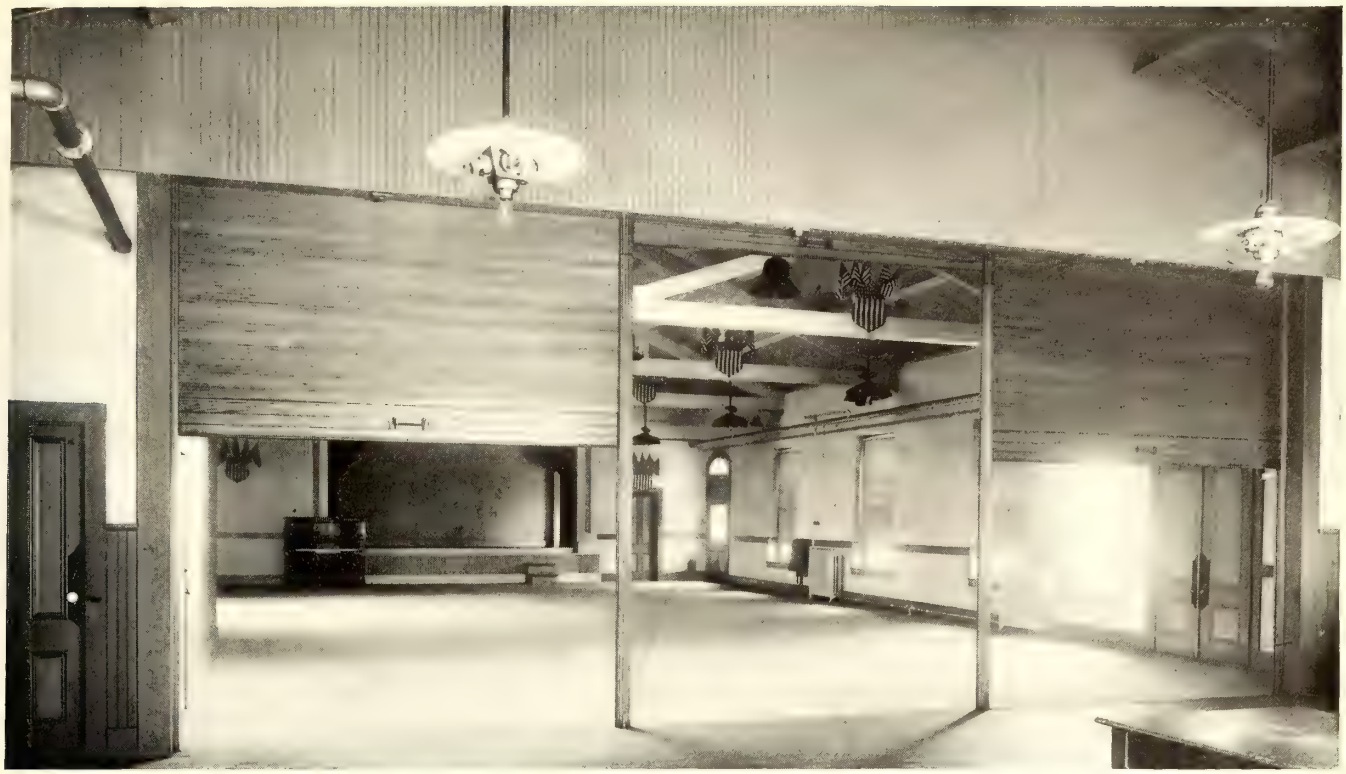
Machine Shop at West Hoboken Carhouse



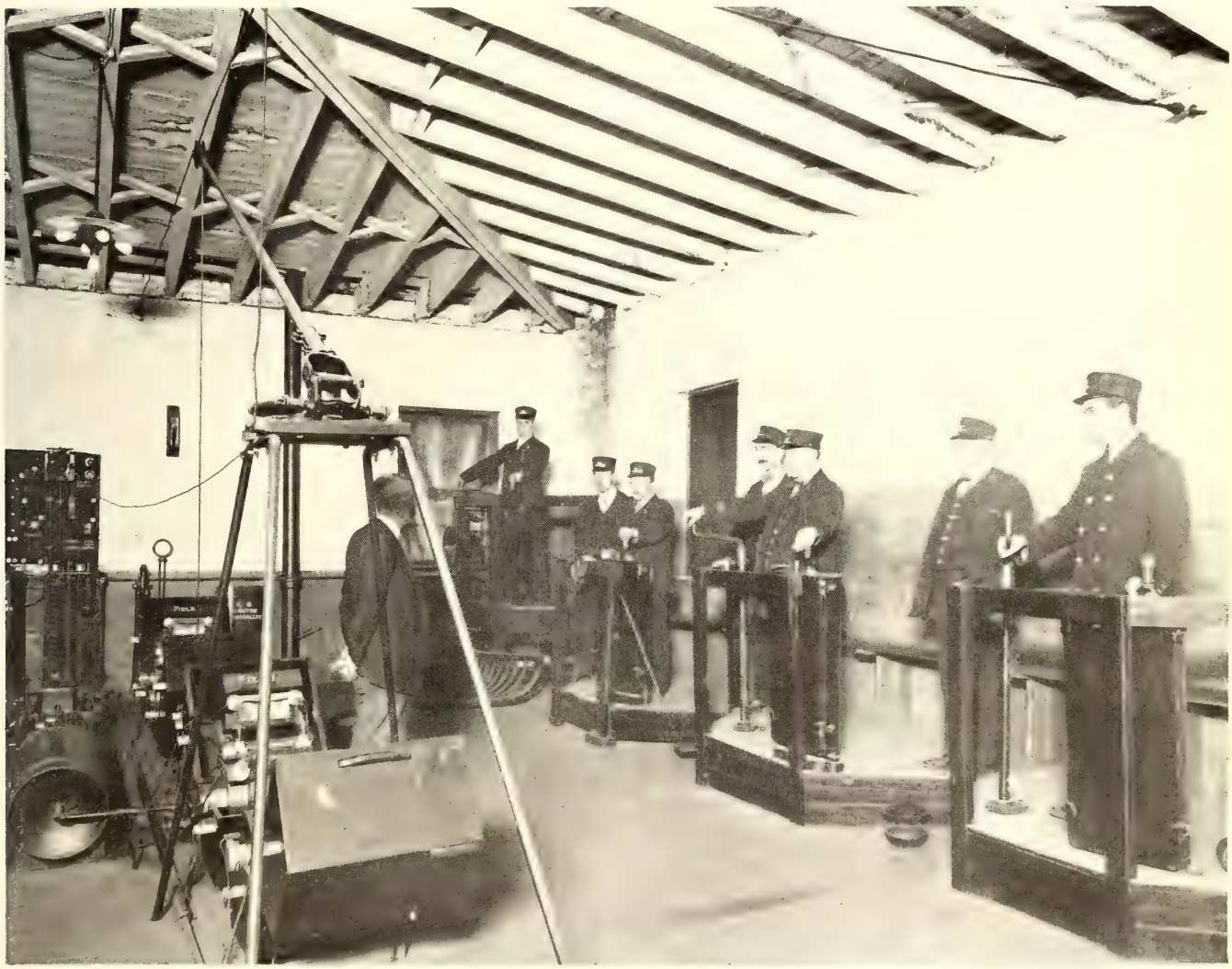
Blacksmith Shop at West Hoboken Carhouse



Machine Shop at Camden



Employees' Club Room, with Stage, Montgomery Street Carhouse, Jersey City



Student Motormen Under Instruction at the West Hoboken Carhouse



A Baseball Game in Progress at the Hilton Grounds



Plank Road Christmas Party for the Children



The Baseball Team of the Southern Division



Montclair Pool Victors in the Tournament for the President's Cup



Scene at an Employees' Banquet Given in Honor of a Division Official

Plate XLVI



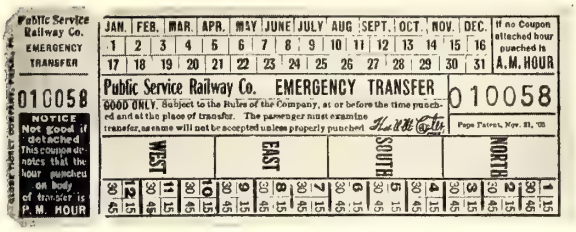
The Audience and the Prizes at the Woodlynne Park Baby Show Parade



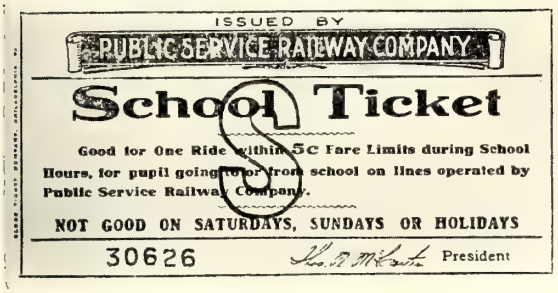
Competitors at the Baby Show in Woodlynne Park—Parading for Prizes



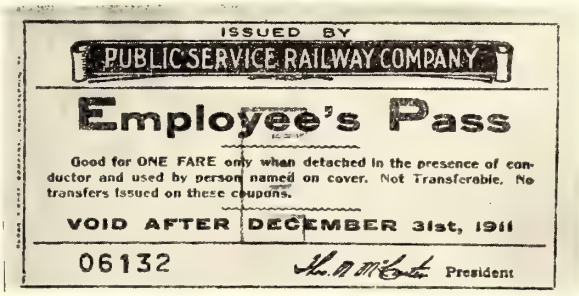
Transfer Adopted to Save Time in Punching



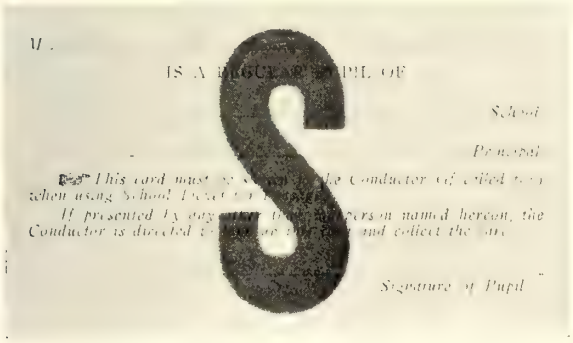
Form of Emergency Transfer



School Ticket



Employee's Ticket



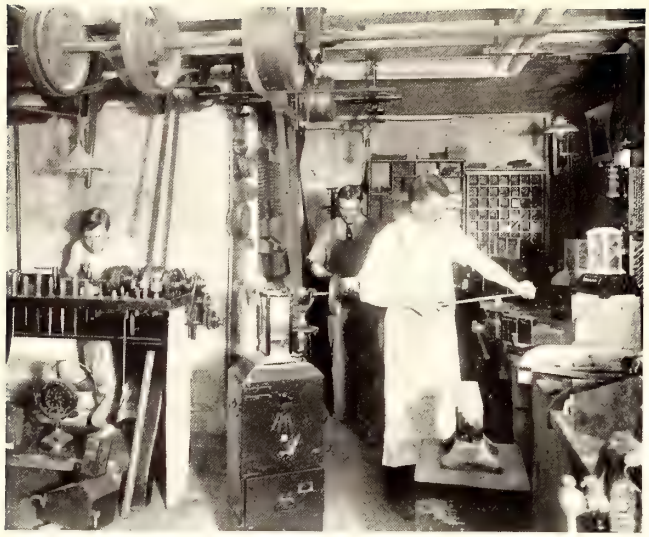
One Side of School Children's Identification Card



One Side of School Teacher's Identification Card



View of Section of Bins at Plank Road Storeroom



Fare-Box Repair Department



Delivery Windows at Plank Road Storeroom



Crates of Fare-Box Compartments



Receiving Room at Plank Road Storeroom



Room of Cashier in Which Conductors' Receipts Are Counted

PURCHASING AND STOREROOM DEPARTMENTS

THE purchasing agent acts jointly for the Public Service Corporation and the subsidiary railway, electric and gas companies. He is also the purchasing agent of the United Gas Improvement Company, and is located at Philadelphia, where he has a large office force that devotes its time entirely to the work of the Public Service Corporation properties. A local railway purchasing agent, located at Newark, is the direct representative of the general purchasing agent. Similar local purchasing agents, with offices at Newark, represent the general purchasing agent in the electric and gas companies.

Individual storerooms were maintained formerly for the line, mechanical, stationery and way departments. The storerooms for the mechanical and line departments were consolidated first and finally the stationery storeroom was added, making the one large storeroom which now exists at the Plank Road shops.

It is the policy of the company to keep its supplies at as low a point as is possible without any interruption of work. This policy, of course, does not prevent the purchase of supplies from time to time when market conditions are favorable. It is believed that the policy of buying material only so far in advance as will

PURCHASING AGENT'S COPY

PUBLIC SERVICE RAILWAY COMPANY

No. 59402 ORIGINAL

REQUISITION ON PURCHASING AGENT

PURCHASING AGENT:

PLEASE ORDER THE FOLLOWING FOR SHIPMENT TO

DATE ..... 19...

.....VIA.....

QUANTITY ON HAND	LOT NO.	QUANTITY REQUIRED	ARTICLE	FOR WHAT PURPOSE REQUIRED

St. Ry. 521 O.D.T.Q. 10M. 6-11. Order D 28163

APPROVED.....DATE.....19..... SIGNED:

APPROVED.....DATE.....19.....

APPROVED.....DATE.....19.....
GENERAL MANAGER

ORDER ISSUED NO. ..... PLACE ORDER WITH.....

Purchasing and Storeroom Departments—Form of Requisition on Purchasing Agent

The storeroom for line department, mechanical department and stationery supplies for all the northern divisions of the company is located at the Plank Road shops, Newark. A separate storeroom for the way department is maintained at Passaic wharf, Newark. This is under the direction of the general storekeeper at the Plank Road shops, and provides the greater amount of space needed for track materials which could not be furnished at the Plank Road shops. The requirements of the southern division are met by the maintenance of a separate storeroom at Camden. In order that supplies may be used as advantageously as possible all requisitions issued by the storekeeper at Camden are sent to the storekeeper at Newark before submission to the purchasing agent. If the storekeeper at Newark can furnish the material desired at any saving to the company he does so.

meet all necessities not only effects a saving in interest on the investment, but also tends to prevent the accumulation of material which, although required at one time, may not be used continuously in the history of the company. It is the intention to simplify the work in every way feasible and consistent with the provision of the necessary safeguards. New methods involving greater simplicity of operation in the storeroom which were adopted recently have been found to produce a material saving in cost and to yield satisfactory results.

REQUISITIONS ON PURCHASING AGENT

All material is purchased on requisitions signed by the head of the department interested and approved by the general manager. All requisitions for material for shops are approved by the mechanical engineer, while

the superintendent of distribution approves requisitions for material for the line department and the engineer of maintenance of way and superintendent of maintenance of way pass on requisitions for the way department. These requisitions are made out in quadruplicate. The original is sent to the purchasing agent, the general manager retains one copy and two copies are sent to the storeroom department. The latter two are filed by the storeroom department, one in a numerical file and the other in an alphabetical file, according to the name of the material ordered.

The purchasing agent issues an order for the material and sends a copy thereof to the storeroom department. The number of the order is then placed on the copies of the requisitions held by the storeroom department. The alphabetical file copy is given to the receiving clerk in the storeroom department and the copy of the requisition in the numerical file is given to the storekeeper personally. The date on which the material is wanted is placed on this copy of the requisition. These requisitions are filed according to the dates on which the material is wanted and the record is watched carefully by the general storekeeper. If the material is not received on the date specified the matter is referred to the purchasing agent in Philadelphia. A copy of the original requisition is published on page 623.

When material is received in the storeroom the principal facts relating to it are entered by the receiving clerk in the receiving book. This provides a complete record of the entire transaction in loose-leaf ledger form. It shows the date on which the material is received, the name and address of the shipper, the order number, the weight or quantity, the name of the article and lot number in the Public Service storeroom, the price, the amount of the invoice, express or freight charges if any, the cash discount, the net price, the total cost, the invoice number and any remarks which may be pertinent. The invoice number is furnished by the auditor. These pages are 20 3-8 in. wide x 14 1/8 in. high. As each page is completed it is removed from the ledger and filed. The storekeeper stamps the copy of the original order issued by the purchasing agent "complete" when he ascertains that the quantity of material received is correct and that the specifications were carried out in all details.

Before requisitions are passed by the storeroom department the condition of the stock of the material on hand is noted on the storeroom stock memorandum which is published on this page. This is checked against the ledger record of material on hand as a precaution before the requisition is passed. The stores orders are added once a month and must check with the totals in the stores ledger.

While the use of the storeroom stock memorandum slips permits practically a perpetual inventory of the stock on hand, it does not provide for material which is used very rarely, or not at all, during the course of the year. This material is checked at the time of the regular inventory made once a year. The stock balance is checked monthly with the auditor's record.

A loose-leaf stock sheet is used for the store's ledger. This shows the lot number and name of the material. It provides for the date, statement of the amount on hand on the last day of the previous month, the amount received on requisition, the total, the amount consumed and the amount remaining on hand. At the bottom of the sheet a record of material used is kept by days and months. The form of this statement is shown on page 625.

Provision is made on each stock sheet for a statement of the average monthly requirements of that class of material and the amount of stock which should be on hand. These figures are based on the average results for the last three years. It is planned to carry a sufficient supply of all materials which are in constant use to last about two months.

As both sides of the sheets are used in the same manner, the record of material used enables the storekeeper to give a total report on material required by

STORE ROOM STOCK MEMORANDUM

Date.....—191

To Stock Clerk—Please note condition of Stock, Lot No.....on hand this date.

ARTICLE	ON HAND	MINIMUM	ORDERED	
			QUANTITY	REQ. NO.

SIGNATURE .....

Purchasing and Storeroom Departments—Storeroom Stock Memorandum

months or years. The sheets are filed for permanent reference after the two years for which they are intended to be used expire.

ORGANIZATION OF STOREKEEPER

The organization of the storekeeper at Plank Road shops comprises comparatively few men. Twenty-four men are employed in the mechanical, line and stationery store departments. Three men are employed at the way department storeroom. These figures include two men for each of the three supply cars which carry materials from the storeroom to the various carhouses on the system. Two men are employed continuously in giving out material required for the Plank Road shops. One man is employed regularly in packing up material for the different carhouses.

The supply cars follow a regular schedule, making two deliveries a week to the large carhouses and one a week to the small carhouses. One of the cars is used for the general supplies, one for armatures and one for wheels and other similar heavy material. Employees at carhouses are instructed to calculate their requirements in advance as carefully as possible so as to avoid extra trips of supply cars. An extra car, however, is kept for emergency deliveries.

The division foremen at the carhouses are provided with requisitions on the storekeeper which must be approved by the head of the department before they are honored. These are in three parts. The original is sent to the storeroom, one is retained by the division foreman and another is sent to the general auditor. This requisition provides for a statement of the amount used last month, the amount on hand, the quantity wanted, the lot number, the unit cost and the amount. The storeroom employee who makes up the order initials it. When goods are delivered on these manifests, the motorman of the supply car signs his name and gives the number of the car. The foreman at the carhouse is obliged to receipt in full for the material.

The catalogue starts with lot No. 1 and shows an aggregate of about 15,000 lot numbers. These numbers, however, are not entirely consecutive, as space and numbers were left for the insertion of new classes of material.

If work of a new character is undertaken, and material is required therefor which has not been carried in stock previously and it is apparent that there will be a continued demand for the material, a request is sent by the storekeeper to the mechanical, line or way department for an order large enough to provide a working supply.

Special material that may be wanted for the Plank Road shops is ordered on a separate blank addressed to the general storekeeper and approved by the department foreman of the shops, the superintendent of shops and the mechanical engineer.

PUBLIC SERVICE RAILWAY COMPANY

STOCK SHEET

NET COST

Lot No.....

Name.....

DATE	On Hand Last Day Prev. Month	Received on Requisition	TOTAL	Amount Consumed	Remaining on Hand
JANUARY					
FEBRUARY					
MARCH					

RECORD OF MATERIAL USED

DATE	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
1												
2												
3												

Purchasing and Storeroom Departments—Form of Stock Sheet

Shop material is given out on store's orders which are signed by the foreman of the department that needs the material. These are made out in duplicate, one of which is kept by the storeroom while the other is sent to the auditing department. These forms show the number of the car on which the material is to be used, the job number, the number of the account to which the cost is to be charged and the order number. They also show the quantity wanted, the unit, the name of the article, the lot number, the quantity issued and the unit cost and amount. The order is initialed by both the storeroom employee who delivers the material and the shop employee who receives the material. The supplies of the stationery department are delivered in the same way.

A catalogue is published by the company in which an alphabetical list of articles used at the carhouse shops is given. Division foremen use this catalogue in ascertaining the lot number of material wanted. Orders are placed and honored by the lot number.

MATERIAL SECURED FROM SHOPS

Some manufacturing is done at the shops. The mechanical engineer, before approving requisitions on the purchasing agent, considers the possibility of economy in the manufacture of small articles by the use of the shop forces of the company. Occasionally quotations for material and work are secured outside and submitted to the mechanical engineer in order that he may decide whether it would be cheaper to purchase or to manufacture the material desired.

When the storekeeper wants to have material manufactured by the mechanical engineer, he prepares a requisition showing the amount on hand, the quantity wanted, a description of the material and the lot number. Provision is made for insertion of the number of the shop order if the requisition is approved by the mechanical engineer. Estimates, divided between ma-

terial and labor costs, are required on all requisitions of this nature amounting to $25 or over. The shop order made out by the mechanical engineer is in triplicate and on the reverse side space is provided for a statement of the detail cost divided between labor and material. One copy of the order is sent to the general manager and one to the general auditor.

When material for the storeroom is manufactured by the shop department a report is made to the general auditor in order that the proper accounts may be charged. This report shows the job order number, the quantity, the articles, the amount, lot number and the distribution of cost between labor and material. The report is made in duplicate and is approved by the head of the department. The duplicate is retained by the person who made the report. The general storekeeper places his name on the report, indicating that he has entered the facts in his record. If requisitions are received by the storekeeper for material which he has not on hand but for which he can furnish a substitute, he communicates with the head of the department concerned to see whether use can be made of the material in stock.

INVENTORY SHEET

A loose-leaf inventory sheet is used when the annual inventory is taken. As shown by the illustration published on this page, the sheet is initialed by five persons, those who count, price, examine and list the material and check the figures. A column provided for a statement of the surplus is not filled at the time of the inventory but is used by the storekeeper, who states the excess amount of the material on hand if it has been used very little or not at all during the year.

When the storekeeper has occasion to pay charges for freight or express on material, he takes a receipt in duplicate. Both the original and duplicate are sent to the auditor, one with the freight or express bill and the other with the bill of the material. For the purpose primarily of meeting such charges, the storekeeper has a small petty cash fund. This provides also for small emergency purchases which may have to be made. A statement accompanying material for exchange is used when old articles or broken articles which need repair are returned to the general storekeeper. This form shows the quantity and article and also provides space for information to be furnished by the storekeeper as to the price and amount of the material and the disposition that he makes of it. This form is signed by the motorman of the car in which the material is carried, the foreman of the carhouse and the receiving clerk at the storeroom. It also shows above the signature of the chief clerk of the storeroom the account to which the material is credited. It is made out in three parts; one is sent to the storekeeper, one is kept by the carhouse foreman and the other is sent to the auditor.

If material is received by the store department that is not satisfactory for any reason, or is not in accordance with specifications, authority is asked of the purchasing agent to return it. A return purchase slip is used for these transactions. This is made out in triplicate. The original is sent to the general auditor, who issues a charge against the manufacturer. The duplicate is used for posting the cost and summary. The triplicate is used for posting the quantity.

Bills are received by the storeroom directly from the general auditor and are returned to the auditing department after the material has been received and found in accordance with specifications.

The card on each bin in the storeroom shows the lot number, the minimum amount that should be on hand, the size, name of the article and the date and quantity when additional supplies of the material are received. Originally the quantity issued was stated in each case on the bin card. This required more men than are needed now, when the bin card is used only to record the amount received. The complete record of the movement of material is kept from the store's orders.

COUNTED BY ... LISTED BY ...
PRICED BY ... EXTENDED BY ...
EXAMINED BY ... CLASS ...

INVENTORY SHEET

PAGE ...
DATE ... 19 ... SHEET ...

SURPLUS		ARTICLE	LOT NO.	QUANTITY	UNIT	UNIT COST	AMOUNT	TOTAL	

Purchasing and Storeroom Departments—Form of Inventory Sheet

SCRAP MATERIAL

The general manager requests the purchasing agent to advertise for bids for scrap material, to be forwarded to the executive committee. After the acceptance of any bids, the general manager notifies the general auditor, the purchasing agent and the superintendents interested. The general auditor credits the proper accounts. The purchasing agent notifies the party whose bid is accepted. All material must be weighed before removal, on the premises if scales are available, otherwise at a standard scale.

The general purchasing agent keeps in touch with the movement of market prices on all classes of material which fluctuate from time to time and are in constant use. In order that he may be posted as to the facts before the purchase of a large amount of material of this character, the general manager requests the storekeeper occasionally for a statement of the amount on hand and the estimated amount that will be required in say four to six months.

ACCOUNTING DEPARTMENT

THE work of the general auditor of the Public Service Railway is unusually broad in its scope. In addition to the supervision of the accounting departments he has charge of the transfer and ticket systems on all lines of the company. The general auditor has also conducted an exhaustive investigation into the safeguards afforded by registering and other fare boxes. As all the statistical compilations desired by all departments of the company are prepared under the direction of the general auditor, this department of the company is in close touch with the work of all other departments and takes a more active part in their work than is the usual practice. The accounting department is under the jurisdiction of the comptroller, who is an official of the controlling Public Service Corporation and the underlying railway, gas and electric companies.

St. Ry. 443-100-11-10

.....Co.,

.....Division

CAR RECORD BOOK.

The Station Master must take the Reading from the Register and record directly in this Book in Ink.

Register Readings for.....*191*

All changes of Registers and Register Readings must be noted in this Book.

Register Reading must be taken when the car leaves the Car House in the morning and also when the Car comes in the Car House at night. Report the reading of every Register daily whether used or not. Note all transfers of Cars or Registers from this Car House, also all Cars and Registers received. Never report more than one Car or Register on any one line of the page.

Car No.	Reg. No.	Reg. Reading	Cash Box No.	Reg. Reading	Initial	Cash Box No.	Car No.	Reg. No.	Reg. Reading	Cash Box No	Reg. Reading	Initial	Cash Box No.

Accounting Department—Headings of Facing Pages of Car Record Book Used at Carhouses

In brief, the organization consists of the general auditor, assistant general auditor, two traveling auditors and the following office departments: Bookkeeping, statistical, register, transfer and mileage, timekeeping and fare box repair departments. The auditor of disbursements acts in this capacity not only for the railway company but also for the allied Public Service Electric Company and the Public Service Gas Company and he is directly under the jurisdiction of the comptroller. The traveling auditors do not have like duties. One devotes his time entirely to the work of auditing accounts at carhouses at which funds are handled, the claim department and offices at which tickets of any character are sold; this assures the auditing of all contingent or emergency funds. The other traveling auditor devotes his time to general work, including the investigation of the accounts of storekeepers.

ACCOUNTING FOR THE RECEIPTS

A daily record blank is placed in the car each day and the changes in the registers are indicated thereon, no matter how many conductors may operate the car during the twenty-four hours. This form of card has been changed recently from the original record compiled for this purpose and illustrated in a paper presented before the American Electric Railway Accountants' Association at the 1910 convention. This record provides space for a report of the commencing and ending numbers of both the cash register and the ticket and transfer register whenever during the day a change of conductors is made. Space is also provided for the cash box number and compartment number. When the station master places the records in the cars he notes the register readings in books provided for that purpose. The headings in these books are published herewith. Separate books are used for a record of the cash and transfer registers. About five books are kept in use for each division in order that holidays and Sundays may not prevent the regular auditing of the books and that each carhouse may be supplied constantly.

As transfers redeemed must be accounted for at five cents each, the work of accounting therefor is one feature of the operations affecting receipts. Conductors are supplied with envelopes in which they place at the end of each trip the collected transfers and tickets of every description. The envelopes are sealed and the number of transfers and tickets inclosed is marked on the outside; from these envelopes the conductors make up their daily reports. This report has been changed somewhat since the form was shown in a paper presented before the 1910 convention of the American Electric Railway Accountants' Association at Atlantic City. On the reverse side separate spaces are provided for remarks pertaining particularly to prepayment cars and old-style cars. For the registering or multiple-fare box the information given is as follows: Car number, cash box number, compartment number, starting number of register, total fares registered and ending number of register.

There is also a space on which the conductor is required to indicate whether or not any accidents occurred on or near his car on the day in question. If the report does not specifically include an answer to this question the auditing department notifies the supervisor in the division of the transportation department affected and the conductor is required to report over his signature upon this fact. The motorman is also required to sign below the inquiry on this point. Largely on account of this record affecting accidents these reports are kept for six years, or until the statute of limitations is operative.

Space is provided on the front side for the conductor to register his punch, and as a similar space is indicated on the envelopes in which the transfers and tickets are returned, the auditing department is enabled to see that no transfers are accepted which were punched by the conductor himself. Conductors are required to report the amount of change with which they start and end the day. Trip reports are made out by carhouse clerks and show the run number, the number of trips made and the number of envelopes containing tickets and transfers forwarded to the auditor. This permits a check on the number of trips reported by conductors. Any shortages of transfers or tickets that are found in the auditing department are marked by the counters on the envelopes. As this checking is done the employee inspects the transfers in order to see that the time and date are

St. Ry. D. 284 1M Sets-2-11-Order D 25570.

Public Service Railway Company

OFFICE OF THE GENERAL AUDITOR

NEWARK, N. J.

No. 11995

REGISTER COMPLAINT CARD

Date 191

Division .....

Car No. .....

Remarks .....

GENERAL AUDITOR

Public Service Railway Company

INVESTIGATION

Date 191

STATEMENT OF STATION MASTER

Signature .....

ACTION TAKEN BY SUPERVISOR

..... Supervisor

Respectfully referred to

..... Div. Supt.

Returned to Gen'l Auditor .....

Accounting Department—Two Sides of Card Used for Complaint and Report Regarding Register Discrepancy.

WEEK ENDED .....

	LINES	Miles per Hour	RECEIPTS P. C. Mile	RECEIPTS P. C. Hour
HUDSON DIVISION	Newark Ave.			
	Pacific Ave.			
	Montgomery			
	Erie			
	Henderson			
	Lafayette			
	Plank Road			
	Turnpike			
	Greenville			
	22d Street			
	5th St., Bayonne			
	Pavonia			
	Oakland			
	Nk. & Summit Avenue			
	Washington			
	Willow			
	Grove			
	Jackson			
	Summit			
	Bergenline			
	Union Hill			
	Fourteenth			
	Palisades			
	White Line			
	Bergen Pike			
	Homestead			
	TOTAL			

Accounting Department—Part of Form for Speed Record

properly indicated. The existence of shortages or wrong dates is marked on the envelopes. All tickets that might be of value are placed in bags, which are dated. They are sold to a paper mill and are destroyed in the presence of two representatives of the company. Transfers that have been used are placed in separate bags in a similar manner and are sold to a paper mill. The envelope records of tickets are kept for one month. If any envelope shows a shortage of transfers or tickets all the transfers and tickets are kept for an interview with the conductor.

TRANSFERS

Transfers are ordered by the auditing department on requisitions issued by the transportation department. Transfers on the system are generally of the same design. Requisitions for transfers originate with the supervisors, who estimate each month the number that will be required in the ensuing month for daily, Saturday and Sunday and emergency use. These requisitions are checked against previous orders.

A new transfer which has been adopted and is illustrated on plate XLVII is designed to have the time of conductors in punching. The conductor punches only the time in fifteen-minute intervals and the direction in which the car is bound. The transfer points are listed according to the direction. This form of transfer bears a p. m. coupon, so that if no coupon is attached the transfer is good only in the morning. The use of this form is being extended to the entire system. The emergency transfer is used at times of interruption in service. On the back of the transfer there is printed the substance of the law of the State of New Jersey which prohibits persons from giving or selling tickets or transfers. Transfers are accepted by conductors only at the diverging points indicated thereon.

DISCREPANCIES IN REGISTER REPORTS

The daily car records are checked against the daily reports of conductors. In the event of a discrepancy in the register a complaint card is sent by the general auditor to the division affected and a carbon copy thereof is retained until a reply has been received. These cards are numbered and contain spaces for the date, name of the division affected, the number of the car and remarks. The reverse side is used for a report on the case. Both sides of the register complaint card are shown above.

There is no ledger record of individual shortages; this is kept, however, by lines, separately for transfers and cash, and entries are made of each individual short list so that they can be traced easily. A record

of individual shortages is kept by each carhouse. Overages are returned to the conductor concerned if nothing develops to show that they belonged to the company. When return of cash is made in such cases conductors are required to sign and punch a receipt therefor. Shortages on cash fares and transfers, as compared with the register record, are recognized as obligations of the employees and are collected. A memorandum of shortages and overages outstanding affecting any line of a division is given to the traveling auditor and is used by him in his audits of carhouse cash. The carhouse clerk is obliged to collect shortages within twenty-four hours of receipt of short lists by him and to account therefor. The daily transfer report, prepared at each carhouse by the clerk who gives transfers to conductors, is checked against the unused transfers, which must be returned to the auditor daily.

RECEIPTS OF CONDUCTORS

Receipts of other than prepayment cars are deposited by the carhouse receivers directly in the bank before 9 a. m. each day to the credit of the company. The bank teller signs two deposit slips, one of which is sent to the general auditor and the other to the treasurer.

Compartments in fare boxes are placed in fiber crates and are collected daily at each carhouse from which prepayment cars are operated. The crates are taken to the Public Service Building, Newark, and are let into the basement on an incline conveyor built by the Link Belt Company. They are then opened by two men, who mark on slips the box numbers, etc., and drop one in each compartment. This is done so that if the conductor has not attended to that duty the compartment can be identified by the employee who counts the cash. The compartments are placed on small trucks holding 64 boxes, the doors are locked and the trucks are then taken on a special elevator which leads only to the cashier's room. In this room the money is counted by coin-counting machines and the nickels, which comprise 85 per cent of the passenger receipts, are wrapped by coin-wrapping machines.

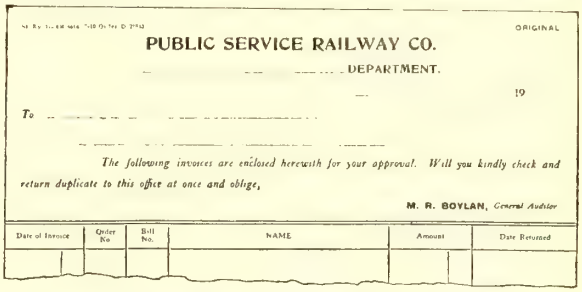
The machine shop at which repairs to fare boxes are made is located in the basement of the Public Service Building in Newark and is under the direct jurisdiction of the general auditor. It is fully equipped.

The company was one of the first in the country to investigate the subject of fare boxes. Before any fare boxes were placed on cars an exhaustive study of all types was made by the general auditor. The first fare boxes were introduced on sixty cars on April 15, 1908. At present 750 multiple fare boxes, 125 single compartment boxes and 300 registering boxes are on cars or on order for installation. This includes nearly all the prepayment cars. Prepayment cars have been introduced on all but the Central and Southern divisions, and their use is being extended gradually to all parts of the system.

INVOICES

All bills against the company are received by the auditor from the purchasing department and are checked against the carbon copy of the order of the purchasing agent. When bills are sent for approval to the departments which received the material a form to accompany them, the original of which is reproduced herewith, is made out in triplicate; two copies are sent to the storekeeper, one of which is receipted and returned. One copy is retained by the auditor. On the last copy mentioned the date on which the bills are returned approved is indicated in each case. This is filed and provides a permanent record showing the course of the bill.

Bills are sent by the auditor daily to the departments affected. Vouchers are made up daily for bills showing a discount. Bills providing for payment in thirty or sixty days are kept in an index. In the case of large manufacturing companies with which the railway does a good deal of business, vouchers are made as soon as a sufficient number of bills are on hand



PUBLIC SERVICE RAILWAY CO.

ORIGINAL

DEPARTMENT.

19

To

The following invoices are enclosed herewith for your approval. Will you kindly check and return duplicate to this office at once and oblige,

M. R. BOYLAN, *General Auditor*

Date of Invoice	Order No.	Bill No.	NAME	Amount	Date Returned

Accounting Department—Heading of Form Sent with Invoices to Be Approved

to fill the lines in a voucher. This prevents an unusual accumulation of bills at the end of each month. Ordinarily bills that do not show a discount for payment in a certain time are allowed to accumulate from the first to the twentieth day of each month and are then paid.

All bills are paid by voucher checks which are printed on safety paper. A standard voucher is used for ordinary invoices and the bills are attached thereto. On payments made by the claim department the attachment of a release or receipt is required for each voucher. About 1500 vouchers per month are issued and these are typewritten. Vouchers are numbered each month beginning with No. 1. The voucher clerk enters the classification every day in a loose-leaf book. Separate classifications are provided for operating expenses and for accidents and damages, both of which are shown by divisions.

In order that payment of the same bill twice may be avoided an individual bill record is kept in a loose-leaf book, which shows the detail amount on each invoice and the date thereof. Whenever a new entry is made a clerk goes over the record of the company supplying the material as far back as the date of the bill attached to the voucher, and if he finds the same amount entered he looks up the original data to see whether the material is the same in each case. For of-

ficials of the company who have petty cash accounts in order that they may make purchases or payments from time to time, for which they are reimbursed on presentation of the purchase slip or similar record, a notation is made in green ink under the name of the firm from which the purchase was made. This is a protection against duplicate payment in another form.

To insure the same precautions against duplicate payments of claims for accidents and damages as have been described for other classes of bills, a separate claim voucher card index is kept. This shows the number of the claim department case, the name of the person affected, the date on which the accident happened, the voucher number, the date on which the service was performed in the case of payment to a physician and a record of witness fee payments. Different cards are used for settlement payments and for witness fee or service payments. Claim department payments are indexed in this record under the names of the claimant, the attorney and the physician, or any others whose names are shown on the voucher.

CLASSIFICATION OF OPERATING EXPENSES

The company uses the eighty-eight operating expense accounts prescribed by the Board of Public Utility Commissioners of New Jersey. This is the standard system of the American Electric Railway Accountants' Association with the addition of accounts for depreciation of equipment and depreciation of way and structures. A number of sub-accounts have been added by the company in order that additional details may be furnished. The sub-accounts are as follows:

MAINTENANCE OF WAY AND STRUCTURES

SUB-ACCOUNTS OF PRIMARY ACCOUNT BUILDINGS AND STRUCTURES

	No.
Superintendence (track)	1A
Superintendence (line)	1B
Superintendence (buildings)	1C
Power plants	25A
Substations, including storage battery buildings	25B
Carhouses	25C
Shops	25D
General office	25E
Stations, waiting rooms and platforms	25F
Docks and wharves	25G
Miscellaneous buildings and structures	25H
Expenses	25I

MAINTENANCE OF EQUIPMENT

SUB-ACCOUNTS OF PRIMARY ACCOUNT PASSENGER AND COMBINATION CARS

Car bodies	32A
Painting and varnishing	32B
Fenders	32C
Headlights	32D
Fare registers and fixtures	32E
Window glass	32F
Heaters and fixtures	32G
Trucks and truck parts	32H
Air brakes and fixtures (storage)	32I
Other brakes and fixtures	32J
Wheels and axles	32K
Journals	32L
Brake shoes	32M
Shifting equipment	32N
Air brakes and fixtures (independent)	32O

SUB-ACCOUNTS OF PRIMARY ACCOUNT ELECTRIC EQUIPMENT OF CARS

Trolley stands, poles and harps	36A
Wiring	36B
Armatures	36C
Commutators	36D
Fields	36E
Controllers	36F
Gears and pinions	36G
Gear cases	36H
Motor frames	36I
Motor bearings	36J
Brush holders	36K
Miscellaneous electrical parts	36L
Shifting equipment	36M
Trolley wheels	36N

SUB-ACCOUNT OF PRIMARY ACCOUNT SHOP MACHINERY AND TOOLS

Repairs air plant	38A

CONDUCTING TRANSPORTATION

SUB-ACCOUNT OF PRIMARY ACCOUNT CARHOUSE EMPLOYEES

Air plant employees	66A

SUB-ACCOUNT OF PRIMARY ACCOUNT CARHOUSE EXPENSES.

Air plant supplies	67A

GENERAL AND MISCELLANEOUS

SUB-ACCOUNTS OF PRIMARY ACCOUNT RELIEF DEPARTMENT EXPENSES

Sick benefits	77A
Death benefits	77B

In addition to the particulars shown by the classification of operating expenses, with the sub-accounts added as indicated, the auditor compiles monthly statements for each division in the system showing more minute details of the charges. Under this plan eleven sheets of detail are compiled monthly giving the cost of labor and material for each division. Part of one of these sheets, showing typical charges to two of the maintenance of equipment sub-accounts for all divisions, is published in Table XV. In the full statement as compiled these figures are shown for each division as well as for the company as a whole.

TABLE XV.—DETAILS OF OPERATING EXPENSES.
32 H-TRUCKS AND TRUCK PARTS.

	Total— Labor.	Material.
Peckham 14-B-3	$185.06	$56.84
Peckham 14-D	26.43	12.27
Brill 27-G	428.40	75.21
" 27-D	94.74	9.20
" M. C. B.	277.02	7.88
" St'd C.-50	36.01	3.60
" 21-E	85.40	14.70
Baldwin	60.68	15.97
Nuts, bolts, etc.	....	340.58
	$1,193.74	$536.25
36 C-ARMATURES.		
52 Armatures	$14.55	....
75 "	291.53	$405.96
58 "	9.38	21.91
67 "	373.37	561.20
68 "	527.39	513.64
80 "	360.33	329.97
90 "	111.27	80.46
101 "	272.99	491.02
800 "	144.12	78.01
1,000 "	126.36	125.72
1,200 "	5.60	7.42
Tape	....	191.53
Mica	....	88.97
Drilling	....	108.30
Steel banding wire	....	73.67
Webbing	....	10.20
Solder, canvas, etc.	....	102.00
Nuts, bolts, etc.	....	92.08
	$2,236.89	$3,282.06

Under a plan adopted whereby reports of operating expenses are made by the way, transportation and mechanical departments, a separate guide number is assigned for each primary account in the various divisions. For instance operating expense account No. 2 would be 102 in the Hudson division, 202 in the Essex division, etc. A copy of this plan as used by the way department is published on page 631.

A separate classification of operating expenses, containing thirty primary accounts, is used for the ferry boats operated by the company.

JOB ORDERS

Before any expenditures for construction work, additions and betterments can be undertaken they have to be authorized by the executive committee of the company. An estimate is made annually to show the amount to be expended on each division. When the general manager is ready to have the work proceed on a specific job he prepares a requisition in duplicate

for improvements or repairs. This explains the circumstances and the estimated cost. The original is signed as recommended by the general manager and a vice-president. The original and duplicate are sent to the auditor for registration and classification. The

PLAN FOR REPORTING CLASSIFIED ACCOUNTS

STREET RAILWAY DEPARTMENT

MAINTENANCE-WAY AND STRUCTURES

	ACCOUNT NUMBER	HUDSON DIVISION	ESSEX DIVISION	PASSAIC DIVISION	CENTRAL DIVISION	SOUTHERN DIVISION	BERGEN DIVISION
Way and Structures.							
Superintendence, (Track)	1 A	101 A	201 A	301 A	401 A	501 A	601 A
Superintendence, (Line)	1 B	101 B	201 B	301 B	401 B	501 B	601 B
Superintendence, (Buildings)	1 C	101 C	201 C	301 C	401 C	501 C	601 C
Ballast,	2	102	202	302	402	502	602
Ties,	3	103	203	303	403	503	603
Rails,	4	104	204	304	404	504	604
Rail Fastenings and Joints,	5	105	205	305	405	505	605
Special Work,	6	106	206	306	406	506	606
Underground Construction,	7	107	207	307	407	507	607
Roadway and Track Labor,	8	108	208	308	408	508	608
Paving,	9	109	209	309	409	509	609
Misc. Roadway and Track Expenses,	10	110	210	310	410	510	610
Cleaning and Sanding Track,	11	111	211	311	411	511	611
Removal of Snow, Ice & Sand,	12	112	212	312	412	512	612
Tunnels,	13	113	213	313	413	513	613
Elevated Structures and Foundations,	14	114	214	314	414	514	614
Bridges, Trestles and Culverts,	15	115	215	315	415	515	615
Crossings, Fences, Gate Guards & Signs,	16	116	216	316	416	516	616
Signal and Interlocking Systems,	17	117	217	317	417	517	617
Telephone and Telegraph Systems,	18	118	218	318	418	518	618
Other Miscellaneous Way Expenses,	19	119	219	319	419	519	619
Poles and Fixtures,	20	120	220	320	420	520	620
Underground Conduits,	21	121	221	321	421	521	621
Transmission System,	22	122	222	322	422	522	622
Distribution System,	23	123	223	323	423	523	623
Miscellaneous Electric Line Expenses,	24	124	224	324	424	524	624
Buildings and Structures							
Power Plants,	25 A	125 A	225 A	325 A	425 A	525 A	625 A
Substations, inc. Storage-battery Bldgs.	25 B	125 B	225 B	325 B	425 B	525 B	625 B
Car Houses,	25 C	125 C	225 C	325 C	425 C	525 C	625 C
Shops,	25 D	125 D	225 D	325 D	425 D	525 D	625 D
General Office,	25 E	125 E	225 E	325 E	425 E	525 E	625 E
Stations, Waiting-rooms & Platforms,	25 F	125 F	225 F	325 F	425 F	525 F	625 F
Docks and Wharves,	25 G	125 G	225 G	325 G	425 G	525 G	625 G
Miscellaneous Buildings and Structures,	25 H	125 H	225 H	325 H	425 H	525 H	625 H
Expenses,	25 I	125 I	225 I	325 I	425 I	525 I	625 I
Depreciation of Way and Structures,	26	126	226	326	426	526	626
Other Operations-Dr.,	27	127	227	327	427	527	627
Other Operations-Cr.,	28	128	228	328	428	528	628

Accounting Department—Plan Used by Way Department in Reporting Classified Accounts

original is returned to the comptroller and submitted by him to the executive committee for approval; the duplicate is retained by the auditor. The general auditor places on the requisition the name of the

Department

Job Order No. _____ Charge { Acct. No. _____ / Auth. No. _____

DATE _____ Carhouse _____

Estimate for _____

Total Estimate

Approved: Signed:

GENERAL MANAGER HEAD OF DEPARTMENT

Electric Ry. Journal

Accounting Department—One Side of Envelope Job Order Record Used by Mechanical Department

special account in which the expenditure is to be carried and of the account to which the expenditure is to be charged upon completion of the job.

The requisition, if approved by the executive committee, is signed by the secretary of the committee. It is then subject to approval by the board of directors and favorable action thereon is indicated on the requisition by the signature of the secretary of the board. Formal notice of approval by the board of directors is indicated in a form letter sent by the comptroller to the general manager and general auditor.

Before the construction department interested begins work it prepares a job order covering the specific work to be done under the authorization. Statements are compiled each month showing the condition of job orders. The headings of one form as compiled for

Job Order | Car No. | Date in | Date Out

Date	Blacksmith	Carpenter	Motor	Machine	Paint	Pipe	Wiring	TOTAL
				Labor				
Total								
				Material				
Total					Grand Total, Labor and Material			

Electric Ry. Journal

Accounting Department—Detail of Mechanical Job Order Record

the mechanical department are published on page 632. The job order used by the mechanical department is an envelope which contains the store orders or material slips. The cost of the labor is also entered by slips on this envelope. The forms on both sides of the envelope are shown on this page. All job orders must be approved by the general manager. The original job order is sent to the auditor and the duplicate is retained by the general manager. All costs of work done on the job are divided between labor and material. When the cost entries on job orders exceed the estimated amount the general manager takes up the matter with the heads of the departments concerned, on the report of the auditing department.

All streets on which the company operates and all buildings owned or leased have a permanent job order. All operating work done on a particular street or building by any department is charged to the permanent job order. In the building department there are

St. Ry. 20-2600-9-10-order 22717

JOB ORDER STATEMENT—MECHANICAL DEPARTMENT

Work Completed in Month of _____ 191

Work Done	Div.	J. O. No.	Car No	Blacksmith Shop		Carpenter Shop		Motor Shop		Machine Shop		Paint Shop		Pipe Fitting Shop		Wiring Shop				Total		Grand Total Labor and Material
				Labor	Material	Labor	Material	Labor	Material	Labor	Material	Labor	Material	Labor	Material	Labor	Material	Labor	Material	Labor	Material	

Accounting Department—Headings of Monthly Job Order Statement of Mechanical Department

St. Ry. 239-10M-6-11 order. D. 27581

_____ Company _____ Division

PAY ROLL for the week Ending Thursday _____ 191

Received of the _____ CO., the amount opposite my name in the following list, in full for all demands for work done during regular and irregular working hours, in the service of the _____ Co., up to and including the date of this Pay Roll.

	Badge Number	NAME	Friday		Saturday		Sunday		Monday		Tuesday		Wed.		Thursday		SPECIAL														Sand Work		Shifting Equipment		Special Car Rev.		Miscellaneous		Total Time		Rate of Pay	Amount of Pay			REMARKS
																	Friday		Saturday		Sunday		Monday		Tuesday		Wed.		Thursday																
			Hrs.	Min.	Hrs.	Min.	Hrs.	Min.	Hrs.	Min.	Hrs.	Min.	Hrs.	Min.	Hrs.	Min.	Hrs.	Min.	Hrs.	Min.	Hrs.	Min.	Hrs.	Min.	Hrs.	Min.	Hrs.	Min.	Hrs.	Min.	Hrs.	Min.	Hrs.	Min.	Hrs.	Min.	Hrs.	Min.	Hrs.	Min.		Dollars	Cts.	
	1																																									1
	2																																									2
	3																																									3
	4																																									4
	5																																									5
	6																																									6
	7																																									7
	8																																									8

Accounting Department—Form of Pay Roll

ninety-two permanent job orders; in the track department 371, and a like number in the line department.

A time sheet is received each day for every job on which work is being done by the line department. This shows the class of material, the lot number, the size or kind, the value, the place at which the work is done and the details of the time. A similar report is received from the distribution department of the number of bonds installed during the day. From these reports pay rolls are compiled and proper charges to the accounts affected are made. Every week a copy of the pay roll is sent to the foreman for examination before payment.

PAY ROLLS

Pay rolls for trainmen, inspectors, carhouse, shop, line department and office employees are prepared by the auditing department. The track department prepares its own pay rolls, subject to the jurisdiction of the auditing department. At the various carhouses a daily record is kept by lines of all time made. This is sent to the auditing department and is then copied on a pay roll.

Trainmen make out receipt slips for their own pay and when these are signed they are given to the paymaster. The signed receipts are checked with the pay roll by the traveling auditor.

When the pay rolls are ready distribution sheets are prepared showing on one side the number of employees on the weekly pay roll and the number on the pay roll for the corresponding week of the preceding year together with the increase or decrease. On these sheets the employees are classified. The following typical classification relates to the maintenance of equipment employees:

MAINTENANCE OF EQUIPMENT.

General Repair Shops.

Master mechanics, assistants and clerks.
Blacksmiths.
Car repairmen.
Woodworkers.
Car inspectors.
Electricians.
Engineers (stationary).
Machinists.
Motor repairmen.
Truck repairers.
Armature repairers.
Controller repairers.
Painters and rubbers.
Pipe fitters.
Shop helpers and laborers.
Tinsmiths.
Watchmen.
Wiremen.
Electrical equipment repairers.
Fender repairers.
Field repairers.

Car Barns—Repair Department.

Foremen.
Blacksmiths.
Car repairmen.
Woodworkers.
Car inspectors.
Electricians.
Engineers (stationary).
Machinists.
Motor repairmen.
Truck repairers.
Armature repairers.
Controller repairers.
Painters and rubbers.
Pipe fitters.
Shop helpers and laborers.
Tinsmiths.
Watchmen.
Wiremen.
Electrical equipment repairers.
Fender repairers.
Field repairers.
Air station employees.
Oilers.

The distribution between the operating expense accounts affected is shown on the other side of the sheet.

A similar plan of classification is followed for the transportation and the way and structure departments. Pay rolls are prepared in advance on the typewriter and the details are added in indelible ink. The daily line records received from the various carhouses show separately a list of the employees who are absent on account of sickness; this is furnished for a record of the sick and benefit fund.

A weekly comparative pay roll statement for the transportation department is sent to the principal heads of departments. It is divided by divisions. This shows the expense for the current week, the standard pay roll amount, the increase or decrease and the similar expense for the corresponding week of the preceding year. A note at the bottom which is signed by the general auditor states: "The increases and decreases from the standard have been noted by me and authority shown."

REJECTION

IN THE MATTER OF AN ACT ENTITLED "An Act prescribing the liability of an employer to make compensation for injuries received by an employe in the course of employment, establishing an elective schedule of compensation, and regulating procedure for the determination of liability and compensation thereunder"

To the Public Service Railway Company.

Gentlemen:—

I, an employe of your company, hereby notify you that the provisions of Section II of the above entitled Act shall not apply to our relations while I continue in your employ, under either our existing or any future contract or contracts of employment., Dated July 5th, 1911.

In the presence of

_____
Witness to Employe's Signature.

_____ _____
Witness to Employe's Signature. *Signature of Employe.*

PUBLIC SERVICE RAILWAY COMPANY

NAME _____ (*Name in Full*) Badge or Employes No._____ Register Number_____

ADDRESS_____ (*Number*) (*Street*) (*City or Town*) (*State*)

OCCUPATION_____ AT_____ DIVISION_____

ACCEPTANCE OF EMPLOYER'S LIABILITY ACT

Whereas the New Jersey legislature at its last session passed an Act which is Chapter 95 of laws of 1911, entitled "AN ACT PRESCRIBING THE LIABILITY OF AN EMPLOYER TO MAKE COMPENSATION FOR INJURIES RECEIVED BY AN EMPLOYE IN THE COURSE OF EMPLOYMENT, ESTABLISHING AN ELECTIVE SCHEDULE OF COMPENSATION, AND REGULATING PROCEDURE FOR THE DETERMINATION OF LIABILITY AND COMPENSATION THEREUNDER".

Now, therefore, the undersigned, as a part of our contract of hire and any renewals therof, regardless of the validity or invalidity of the said Act, hereby mutually accept and promise to abide by the provisions of Secton II of said Act, and such part of Section III as relates to the compensation system provided for in Section II.

It is further agreed that should said Act be declared void by the Court of Errors & Appeals of the State of New Jersey, this agreement shall immediately terminate, but any settlement or agreement of compensation theretofore entered into under said Act shall remain in full force and effect.

IN WITNESS WHEREOF the parties hereto have hereunto set their hands this fifth day of July, 1911.

Signed in the presence of

_____ _____
Witness to Employe's Signature. *Signature of Employe.*

_____
Witness to Employe's Signature.

PUBLIC SERVICE RAILWAY COMPANY,
M. R. Boylan, *General Auditor.*

_____ Per_____
Witness to Company's Signature.

Accounting Department—Forms Used by Employees for Acceptance or Rejection of Employers' Liability Law

In the work of the auditing department in connection with pay rolls, to take the transportation department as an instance, a comparison is made with the standard weekly division pay roll for each division affected and a standard weekly terminal pay roll for the carhouse affected. These standards are changed when the winter or summer schedules are placed in operation. They show the number of men whose

employment has been authorized for each class of work, the rates per day or hour and the total estimated expense per week. These standards are compiled by the district supervisors and approved by the division superintendents. They have been found very useful in the work of checking pay rolls. If any deviation is found in the pay roll from the standard amount an explanation is asked.

CARD RECORD OF EMPLOYEES

A card record is kept for every employee, showing the date of employment and, in the case of trainmen, of changes in the rate to be paid per hour. The card shows whether or not the employee has accepted or rejected the new employers' liability act of the State and payments made, if any, under that act. It also shows the disbursements for sick benefits, insurance and pensions. In connection with the necessity for definite action by the employees regarding the employers' liability act, the company has prepared a form which is published on page 633. One side of this is used for formal acceptance of the act by the employee while the other side is used in the rejection of the act.

A daily statement of cars run, the number of trips, car hours and car miles is received by the general auditor from each division. This shows the standard scheduled number of cars for morning, middle of the day and evening and has provision for additions to or deductions therefrom, with the total. The trips, hours and mileage for each line are given. There is also provision for a notation of the time of conductors and motormen which may be shown on the time sheet in addition to the time required by the cars operated. together with a statement of the reason for the extra time. Space is also provided for a statement of the number of extra trips lost, the terminal points of these trips and the miles. Special attractions on the divisions during the day, if any, are also noted on the statement.

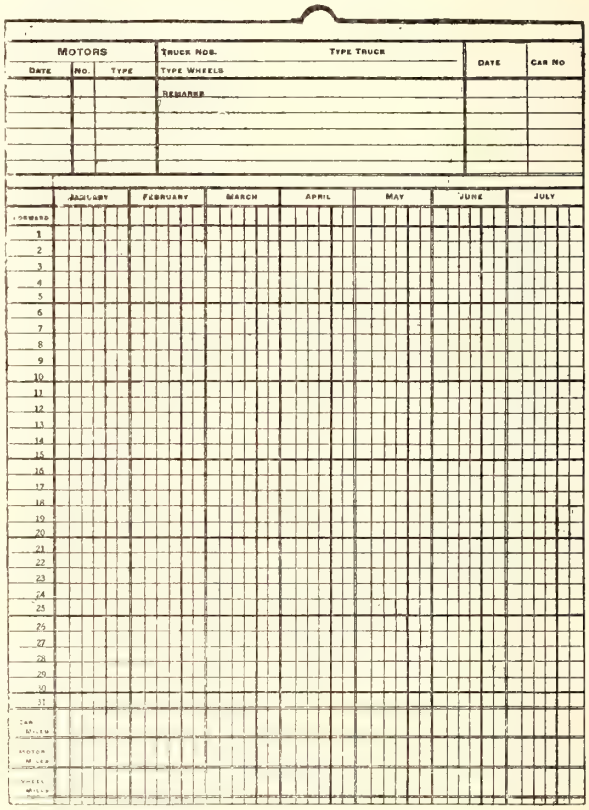
STATEMENTS PREPARED

A "speed report" is prepared each week to show the number of miles per hour and the receipts per car mile and per car hour on each line in the system. One-fourth of the form of this report is shown on page 628. The report is folded in order that it may be carried conveniently in the vest pocket for frequent reference, and is sent to the principal officials of the company. A similar report is made each month.

A statement of receipts and platform expense per car mile and per car hour is made each week for every division. It shows car mileage, car hours, average platform expense per car mile, total receipts from passengers, average receipts per car mile and per car hour and percentage of platform expense; the data are compared for corresponding weeks in two years.

A record of the miles of route in each line under the jurisdiction of every carhouse is used by conductors and in the auditing department when reports are checked. Printed cards are made for each carhouse; they show the miles of route between all points at which cars may be turned back and every crossover. Conductors are enabled by the use of these cards to compute their mileage accurately on each trip.

From the daily reports by conductors of all mileage made, after verification in the auditing department, there is listed a card record for each car. This record, one side of which is reproduced herewith, is compiled each year and shows the number and type of trucks, type of wheels, date of installation and type of motors, car miles, motor miles and wheel miles. The totals of car miles made are given every five days to the mechanical engineer, who is thus furnished with a mileage record for different items of equipment for whose maintenance a special record of this character should be kept. The installation of this system of keeping records was begun in October, 1909, and it



Accounting Department—Mileage Record

has recently been extended gradually to all divisions of the system. The projection at the top of the form is used to show the type of motor for convenience in reference to the file.

MONTHLY STATEMENTS

Every effort is made to compile monthly statements as early in the month as possible. About five years ago the monthly statements were issued by the twenty-fifth day of the following month, but the practice in this respect has been improved steadily and now the advance statements which give the principal actual totals are issued on the sixth or seventh day of the following month. They show, with a comparison with the corresponding month of the previous year, the earnings from operation, earnings from other sources, gross income, operating expenses and percentage, taxes

and percentage, total operating expenses and percentage, fixed charges and percentage, balance.

All the detail financial statements are issued by the tenth day of the following month. A comparative preliminary statement of receipts is made daily for each division. This statement shows receipts for the day and for the same day of the corresponding week of the preceding year, the increase or decrease, percentage of change, total receipts for the current month to date, the same number of days in the month last year, the increase or decrease and the percentage of change. It also shows weather conditions on the day of the current year for which the report is made and on the corresponding day of the preceding year, the temperature on each day at 9 a. m., 12 m., 3 p. m. and 6 p. m., the average receipts per day and the increase or decrease as compared with the corresponding day of the preceding year.

A comparative statement is made each month of the revenue passengers, free passengers, transfer passengers and total passengers, with the percentage of increase or decrease in each and the percentage of transfer to total passenger fares. A similar report of the gross receipts is made monthly for every line of each division. With these reports the practice is followed of giving all details to the general officers of the company and of sending to the divisions only the figures of the division affected.

A comparative statement is prepared of actual receipts of the regular or extra cars operated, car hours, car mileage and receipts per car mile for each day on every line of each division, with weather conditions.

UNIT RESULTS

Unit and total traffic results are embodied in a monthly statement, compared with the same month of the previous year and giving the figures for the cumulative period of each year, together with the percentage of increase or decrease in every case. This statement shows the averages or totals for the following:

Passengers Carried.—Revenue, transfer, complimentary, employees, total, percentage on transfers, average per day, average per car per day.

Earnings and Expenses.—Earnings per passenger, earnings per revenue passenger, expenses per passenger, expenses per revenue passenger, net earnings per passenger, net earnings per revenue passenger, platform expense per passengr, platform expense per revenue passenger, earnings per car mile, expenses per car mile, net earnings per car mile, platform expense per car mile, earnings per car per day, daily average passenger earnings, daily average earnings from operation, daily average expenses, daily average net earnings.

Car Mileage.—Car miles, chartered cars, total car mileage, average per day, average per day per eighteen-hour car, car miles per mile of track.

Car Hours.—Total car hours, average per day, number eighteen-hour cars operated, average number eighteen-hour cars per day.

Power.—Kw-hours sold, kw-hours bought, kw-hours lost, transmission and conversion (d. c.), kw-hours used (d. c.), kw-hours used per car mile (d. c.), cost of power per kw-hour used, percentage of claims paid and expenses of claim department to earnings from operation, unexpended accident reserve, percentage of operating expenses (including taxes) to earnings from operation, percentage of taxes to earnings from operation, percentage of operating expenses (including taxes) to earnings from operation, miles of track operated, depreciation reserve.

A number of machines of different types are used to facilitate the work of the auditing department, including a large mimeograph machine and twelve computing machines of different types.

TICKETS

The stock of tickets of the company is kept by the ticket agent, who is in the department of the general auditor. The tickets used represent principally employees' free tickets, complimentary tickets, special fares for school children, special forms of tickets for ferries, wagon elevators and a toll road owned by the company. A report of tickets sold is made each day by the agents.

On account of the registering fare boxes the school, employee and complimentary tickets are made about 4⅛ in. x 2 in. in size. As the tickets are therefore too large to be deposited directly in the fare boxes, they are handed to conductors and are turned in with transfers.

School tickets are issued on orders signed by the principal of the school and these orders must be shown to the conductor on his request when the school tickets are used for passage. The orders on which school tickets are issued to pupils and teachers are similar except that a large T is printed in red ink on the card issued to teachers and a large S in red ink on the card issued to pupils.

One form of a ticket issued on the Southern division is known as a club car ticket. Under this plan special tickets are issued for the Moorestown Rapid Transit Club and the Merchantville Rapid Transit Club. Each ticket is good for a ride on a special car which is practically an express car between Camden and Moorestown or Merchantville respectively. These cars are run between the hours of 6 and 9 a. m. and 3 and 6 p. m. and make better time than the regular cars, which are operated all day with more frequent stops. Anyone may become a member of one of these rapid transit clubs simply by the purchase of $1 worth of tickets.

St. Ry. 210-1M 2-11 Order D 25462

PUBLIC SERVICE RAILWAY COMPANY

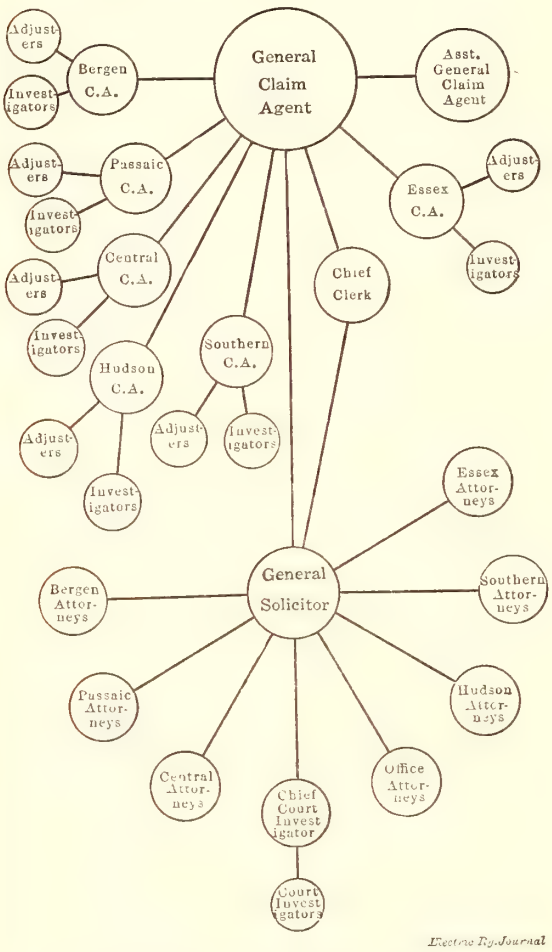
Comparative Statement of Receipts and Platform Expense per Car Mile and per Car Hour for Week Ended 19

DIVISION	CAR MILEAGE		CAR HOURS		AVERAGE PLATFORM EXPENSE PER CAR MILE		TOTAL RECEIPTS FROM PASSENGERS		AVERAGE RECEIPTS PER CAR MILE		AVERAGE RECEIPTS PER CAR HOUR		% of Platform Expense to Total Receipts from Passengers	
	19	19	19	19	19	19	19	19	19	19	19	19	19	19

Accounting Department—Statistical Statement for the Transportation Department

CLAIM DEPARTMENT

THE work of the claim department may be divided into two distinct branches, one relating to the handling of claims outside of court and the other to proceedings after the claimant has sought damages in court. The former branch of the department drops the case as soon as it goes to trial, with the exception of settlement, which is still handled by the division claim agent under the direction of the general claim agent, who is the head of the department.



Claim Department—Organization Diagram

The organization of the claim department will be understood by referring to the accompanying diagram. It will be seen that the staff which carries on the work of investigation and adjustment consists of an assistant general claim agent and six division claim agents, each of whom has his own staff of investigators and adjusters. These division claim agents have the authority to make settlements up to a certain amount, which, if exceeded, must be submitted to the general claim agent and general manager for approval.

The trial branch is headed by the general solicitor, who is assisted by division attorneys, an office attorney and a chief court investigator and staff. The investigators furnish the attorneys all the necessary aid in securing witnesses, making special inquiries and doing such other work as is not covered by the duties of the investigators attached to the claim branch. The general office routine and records of the claim department are in the hands of the chief clerk.

This department also handles the claim work of the allied gas and electric companies, as there is not enough business of this kind to justify separate organizations by those companies. The department is associated with several bureaus for the collection of data concerning "fake" and other accident claims.

In addition to his regular duties, the general claim agent renders active assistance to the transportation department in the prevention of accidents by lecturing on this subject to platform men as occasion may require. A former employee of the claim department also gives instructions to student motormen and conductors on this topic.

CLAIM DEPARTMENT STATISTICS

Most of the blanks of the claim department do not differ materially from the forms used by other companies, but there are some which warrant a description because they indicate the thorough methods of the company. Among these records are five 10¾-in. x 13½-in. loose-leaf forms on which are summarized the comparative statistics of the claim department from month to month. The first form shows the principal traffic statistics, the detailed expenses, the efficiency of the department as shown by the percentage of claims paid to gross receipts, the number of witnesses per accident, etc. All costs are compared with the same month of the preceding year and they are also integrated to compare the same fractions of the past and current year. The headings of this form follow:

HEADINGS OF STATISTICS

Gross receipts.
Passengers carried.
Car miles.
Accidents reported.
Claims made.
Number settlements claim this month.
Number settlements claim prior to month.
Total number settlements.
Number judgments claim this month.
Number judgments claim prior to month.
Total number judgments.
Total number claims paid.
Per cent claims settled of those made this month.
Judgments.
Settlements.
Total claims paid.
Salaries.
Personal expenses.
Medical expenses.
Wheelwright and veterinary expenses.
Office supplies and expenses.
Services.
Sundry miscellaneous expenses.
Legal salaries.
Legal personal expenses.
Counsel fees.
Legal medical expenses.
Medical testimony.
Legal witness fees.
Legal transcripts.
Legal miscellaneous expenses.
Total expenses (from salaries onward).
Total expenditures of department.
Per cent claims paid to gross receipts.
Per cent expenses to gross receipts.
Per cent total expenditures to gross receipts.
Probable cost of unsettled claims as of Dec. 31, 19—.
Per cent claims made to accidents reported.
Per cent suits brought to claims made.
Per cent expenses to total expenditures.
Per cent claims paid.
Witnesses per accident.

The second form is used to record monthly and annually the cost of each kind of accident as classified, the number of each kind and also the number of fatal accidents. These figures are compared with those of five years previous. The classifications follow:

CLASSIFICATION OF PAID ACCIDENT CLAIMS

A—Boarding cars.
B—Leaving cars.
C—Collisions with cars.
D—Collisions with teams.
E—Collisions with bicycles.
F—Collisions with autos.
G—Derailments.
H—Ejectments.
I—Falls from cars.
J—Injuries on cars.
K—Pedestrians struck.
L—Employee accidents.
M—Miscellaneous.
Total.
Expenses.
Total expenditures.
N—Fatal accidents
Payments to employees.

The third form has the same classifications of accidents as the second, but it is arranged to show the statistics for the individual carhouses on each division, including those accidents which were not reported. The fourth form has the same headings as the third, but in this case the cost of each class of accident is given, including payments to injured employees. It might be added that in addition to the standard classification of accidents special statements are made up from time to time to analyze accidents according to the type of rolling stock and equipment.

The last form of this group is the litigation or legal statistics sheet. This is a summary of all trial business for the current month and for the same month of the preceding year, under the headings reproduced herewith:

LEGAL STATISTICS.

SUITS PENDING AND DISPOSITION.

Suits pending, beginning of month.
Suits instituted during month.
Suits revived by appeal, etc. (After verdict for defendant or non-suit.)
Suits revived by opening of non pros. or non-suit.
Suits revived after decision on demurrer.
Suits retained (a, b, c, d, e.)
Suits revived after decision for defendant on appeal, etc.
TOTAL.
Verdicts plaintiff (a).
Verdicts defendant.
Non-suits.
Disagreements (b).
Mistrials (c).
Cases non-prossed.
Decisions for plaintiff on demurrer (d).
Decisions for defendant on demurrer.
Cases discontinued.
Friendly judgments (e).
Cases disposed of by warrant to satisfy.
Decisions for defendant on appeal, etc., including dismissals of plaintiff's appeals, except decisions that leave a verdict to be paid.
TOTAL—DEDUCT FROM FIRST TOTAL UNDER THIS HEAD.
Suits pending, end of month.

CASES APPEALED, ETC., BY PLAINTIFF

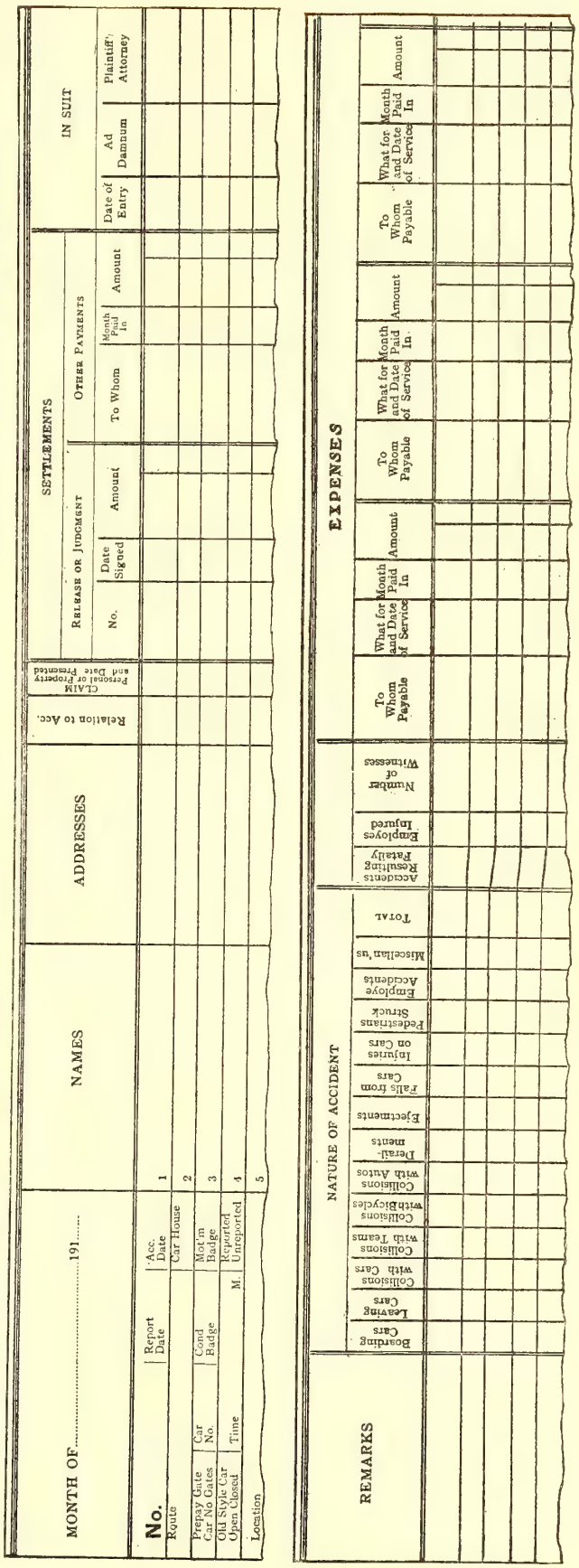
Suits pending on appeal, etc., by plaintiff beginning of month.
Suits appealed, etc., during month.
TOTAL.
Decisions for plaintiff.
Decisions for defendant.
Appeals, etc., discontinued or dismissed.
TOTAL—DEDUCT FROM FIRST TOTAL UNDER THIS HEAD.
Suits pending on appeal, etc., by plaintiff end of month.

CASES APPEALED, ETC., BY DEFENDANT

Suits pending on appeal, etc., by defendant beginning of month.
Appealed, etc., during month.
Total.
Decisions for plaintiff.
Decisions for defendant.
Verdicts reduced (original amount).
Appeal, etc., discontinued or abandoned.
TOTAL. DEDUCT FROM FIRST TOTAL UNDER THIS HEAD.
Suits pending on appeal, etc., by defendant end of month.

VERDICTS REDUCED

	No.	Amount.	Inc. or Dec. Over Last Year. No.	Amount.
Reduced from.				
Reduced to.				
Saving.				



Claim Department—Ledger Summary of an Accident Case

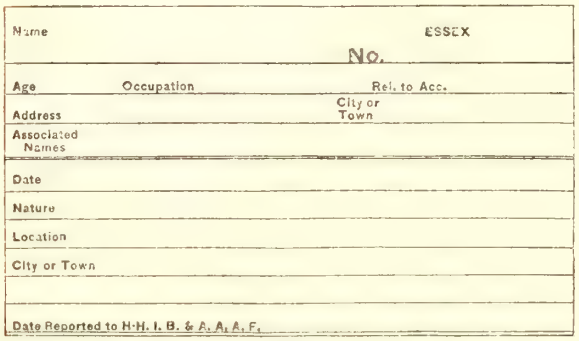
PAYMENTS MADE

	No.	Amount.	Inc. or Dec. Over Last Year No.	Amount.
Cases settled and paid during month.				
Judgments paid, inc. costs during month.				
Total payments during month.				
*Judgments and settlements paid but open on court record beginning of month.				
Total.				
*Judgments and settlements paid and cleared from record by discontinuance or warrant to satisfy during month.				
*Judgments and settlements paid but open on record, end of month.				

*Refers to cases paid since Jan. 1, 1909, only.

COMPILING DATA ON A CASE

The company has found it good policy to gather all available information on an accident from the moment that the first telephone call is received, no matter how trivial the occurrence seems to be. The procedure followed will be best understood by mentioning the character of the papers which are compiled to make up a record of a given case, say, a collision with a wagon. The order of the papers is as follows: Preliminary accident report received by telephone; signed reports from the crews and witnesses; a synopsis of



Claim Department—Card Index of Accident Case Filed at Newark Headquarters

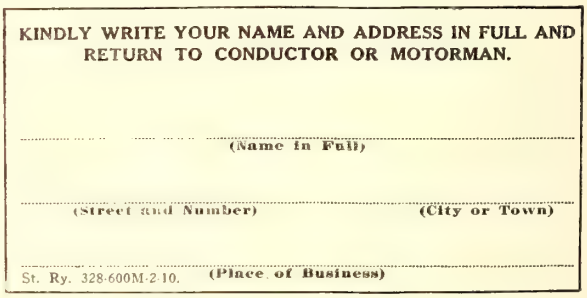
the foregoing information attached by the filing clerk and indexed in the local division office; reports of investigators; reports of adjuster on value of damaged goods; medical examiner's report on possible plaintiff; veterinary surgeon's report on the horse which drew the damaged wagon; wagon driver's affidavit secured by one of the investigators; newspaper clippings about the accident; statement that the plaintiff was not inclined to settle, so case was turned over to special investigators to look up his personal history; settlement declined and suit brought, thereby bringing the matter into the hands of the legal investigators; preparation for trial; final adjustment.

FILING SYSTEM AND MISCELLANEOUS FORMS

Every case is given a serial number, depending upon the division. A summary of the principal facts of each case is kept in ledgers as the latter are more permanent and not likely to be misplaced so easily as cards. These ledger references are found by referring to index cards which give the name, occupation and address of the claimant and also the names of persons associated with the claimant. These names are carefully examined by the filing clerk who, if he should note any suspicious duplication or resemblance in names, notifies all divisions of the company and the several index bureaus with which the department exchanges information. Each division has a local file in addition to the general file at headquarters.

Conductors' and motormen's accident reports are made out in duplicate, as one copy remains with the division on which the accident occurred. Every conductor is supplied with envelopes containing twelve printed cards which he distributes to accident witnesses with a request for their names, addresses and places of business. This simple procedure is much more effective for securing signatures than having the conductor carry the same paper from person to person.

The reports of investigators and adjusters are made as narratives instead of being put in question and answer form. In a catechism a man is likely to report only those circumstances which are specifically covered by the questions and so overlook special circumstances. Adjusters and investigators are provided with forms upon which they must report their daily work in detail, giving the names of persons called upon, statements of the progress of each case handled, deaths, etc. This record is returned to the local division office after it has been checked up at headquarters.


KINDLY WRITE YOUR NAME AND ADDRESS IN FULL AND RETURN TO CONDUCTOR OR MOTORMAN.

(Name in Full)

(Street and Number) (City or Town)

St. Ry. 328-600M-2-10. (Place of Business)

Claim Department—Witness' Card Distributed by Conductor or Motorman

The examining physicians formerly were provided only with the standard form of report on injured persons. Their work has been facilitated, however, by furnishing them with a memorandum book which contains miniature loose-leaf forms of the regular reports. These miniature forms are 3½ in. x 6 in. in size and serve very well for jotting down briefly the facts, which can afterward be transferred to the regular form.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVIII NEW YORK, SATURDAY, OCTOBER 7, 1911 No. 15

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President; C. E. WHITTLESEY, Secretary.
TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1021 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Thursday, 9 a. m., of the week of issue.

Copyright, 1911, by MCGRAW PUBLISHING COMPANY.

Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 11,000 *copies are printed.*

NEW YORK, SATURDAY, OCTOBER 7, 1911.

CONTENTS.

The Dailies..... 639
Unjust Complaints Against Platform Men..... 639
Car Destination Indicators..... 639
Small Points in Power-Plant Fire Protection..... 640
The Convention Issue This Year..... 640
High Tension Line Construction..... 641
The Value of Car Meters..... 642
Comparisons of Operations of Interborough and Brooklyn Systems... 643
Motor Cars for the Spiez-Frutigen Railway..... 644
German Electric Railway Conventions..... 646
Single-Phase Locomotives for the Midi Railway, France..... 647
Arch-Roof Cars Built by the Chicago Railways..... 648
Accident Work of the Future..... 654
Illinois Traction Passenger Station at St. Louis..... 656
Prime Movers for Central Stations..... 657
Car Meter Experiments in England..... 658
Wiring of Multiple-Unit Train of Public Service Railway..... 660
Policy of English Municipal Tramways Respecting Renewals..... 661
Discussion at Tacoma on Medical Testimony in Accidents..... 663
Convention Notes..... 664
Composite Wood and Steel Cars for Kansas City..... 665
Two New Types of Single-Motor Trucks..... 666
Interpole Railway Motor for Light Service..... 667
New Gasoline Car..... 668
A Telephone Train Dispatching System Paralleling a High-Tension Transmission Line..... 668
Thermostatic Control of Electric Heaters and Tilting Heat Deflector..... 669
Roller Bearings on Suburban Cars..... 669
Soap for Car Washing..... 669
Metal "Unit Sections" for Car Construction..... 670
A New Coin Register for Prepayment Cars..... 671
Cloth Pinions..... 672
Brushes to Increase Operating Efficiency..... 672
Gasoline Car for Dutch West Indies..... 673
Horn-Gap Type of Circuit-Breaking Apparatus..... 674
Pneumatic Door Devices..... 674
News of Electric Railways..... 675
Financial and Corporate..... 676
Traffic and Transportation..... 679
Personal Mention..... 680
Construction News..... 681
Manufacturers and Supplies..... 684

The Dailies

This is the last issue of the ELECTRIC RAILWAY JOURNAL to be published before the Atlantic City convention of 1911. At that convention our headquarters will be at booths 2, 4, 6 and 8, just at the right of the main entrance, and from those headquarters we shall publish our convention dailies. The first daily issue of the ELECTRIC RAILWAY JOURNAL will appear Tuesday morning, Oct. 10. Others will be published on the mornings of Wednesday, Thursday and Friday, and each will contain a report of the proceedings and the other association events of the preceding day. The issue of Saturday, Oct. 14, which will be printed in New York, will contain an account of the proceedings on Friday. We shall be glad to welcome all readers of this paper at our Atlantic City headquarters on the Pier.

Unjust Complaints Against Platform Men

It is the common experience of transportation managers that many of the complaints brought against platform men are so trivial that they merit little or no disciplinary treatment. Nevertheless, it is the part of wisdom to lend a respectful ear to the complainant and to appease him if possible. Nine times out of ten he will leave the office happy if assured that his case will be investigated immediately and that proper discipline will be meted out to the offending employee. The transportation manager, however, should not give his visitor the slightest inkling as to the nature of the punishment, because the chronic kicker is just the kind of person who would use that knowledge to humiliate the same man in the future. A change of run which works no harm to the employee is often the most effective means of giving such unjust complainants the flattering impression that their word is mighty in the councils of the company. As in the days of the patriarchs the proverb, "A soft answer turneth away wrath," still holds true.

Car Destination Indicators

A more or less justifiable complaint about American railroading is that scant attention is given toward the guidance of the stranger. The passenger who enters an interurban railway terminal or joint station of importance for the first time or only occasionally should not be expected to know that the car with the red-and-green lamps is bound for Homeville and the one with the blue-and-yellow lamps for Cottagetown. The familiar practice on steam railroads is to employ a train announcer who bawls out the destination of the train and the number of the platform some five minutes before its departure. This method is costly, and furthermore does not always prevent people who arrive after

the announcement from missing their trains. At some terminals sliding board indicators are in use, but these also require the constant care of a station platform man. A more effective and economical method for keeping passengers posted is offered by electrically operated announcers such as are used at several large electric railway stations in this country and in many steam railroad stations abroad. In one pattern an announcer is placed on each side of every platform and is controlled by the dispatcher or tower man. The announcer is fitted with several shields which are motor-operated by selective control apparatus. These announcers not only give the direction and destination of the train, but also indicate its character, whether local, express or extra fare. Devices of this kind require no platform space, as they can be suspended from the platform roof, where they are also free from tampering by unauthorized persons.

Small Points in Power-Plant Fire Protection

No better evidence of the importance of little things in power-plant fire protection can be cited than the effect which many apparently trifling features of construction or operating practice have upon the insurance rates. Much has been written about the ease with which small points of neglect become magnified to conditions capable of causing serious fire loss, but somehow the happy-go-lucky habits too common in this country continue to reign in far too many installations. We do not propose at this moment to repeat the features of power-plant fire protection which no carefully operated installation should overlook, but it is worth noting that the failure of a company to pass the scrutiny of the insurance inspector's microscopic eye means an additional cost of protection per annum in the shape of increased rates per hundred dollars of station valuation. Thus, in a representative case, the location of the boilers in a brick building adjoining the turbine room, without a parapet on the dividing wall between the two rooms, raised the rate 10 cents per hundred. In another case the existence of cables with combustible insulation grouped too closely near a switchboard added 5 cents to the rate, and in another instance a high wooden roof added no less than 28 cents per hundred per year to the company's premium. The support of a power-station roof by unprotected steel trusses added 2 cents, and the existence of a wooden porch between the operating room and a transformer substation raised the rate a like amount. The carrying of a curtain wall above the sheathing of steel columns added 4 cents to the rate, and in a substation the absence of sand pails cost the company 10 cents more per hundred per year, while the use of non-closing waste cans raised the rate 3 cents. These points illustrate the fact that no matter how much operating companies may fail to realize the increased hazard of neglecting apparently small features of protection, such omissions or sins of commission have a money value to the insurance interests, which must naturally charge higher premiums in the face of increased risks. The lesson should not be lost. If operating men were more generally acquainted with the basic reasons for increased cost of protection more attention would be given to the betterment of conditions inside the plant.

THE CONVENTION ISSUE THIS YEAR

We include in this number our usual "Convention Section," which is complete in itself. The subject selected for treatment this year is the Public Service Railway of New Jersey. This topic was selected partly for its technical interest and partly because of the proximity to Atlantic City of Newark, Camden and other cities in which the Public Service Railway operates cars.

The Electric Railway Journal began the publication of special convention issues about twenty years ago, when it was the custom for the American Street Railway Association to meet each year in a different large city. We felt that it would be a convenience to the delegates to have at the time of such visits recently prepared accounts of the system and practice of the local street railway company or companies. They would thus be able more easily to select those phases of the work which they would like to inspect and would be relieved to a large extent of taking notes on what they saw. This plan has since been followed, except under two sets of conditions. In some years the subject has been expanded to include more territory, as in the convention number of 1906, when the location of the convention in Columbus suggested the desirability of describing the interurban railway practice of the Central West, and in 1909, when the meeting in Denver offered the opportunity for publishing an account of the electric railway systems of the Far West. The other exception noted has been those years in which the association has met at a pleasure resort like Atlantic City when some special topic of live interest has been considered. Thus, in 1907, the convention issue was devoted to the subject of heavy electric traction; in 1908 various topics connected with operating practice were treated, while in 1910 the issue contained a description up to date of the practice followed in promoting traffic.

This year it has been felt that the most fitting topic for treatment would be the Public Service Railway, which is by far the largest electric railway company in New Jersey and one of the largest in the country, because practically every delegate to Atlantic City will pass through Newark or Camden and, if he desires, can easily stop off to make a study of the methods of this corporation. The subject is also rich from a technical aspect, as the railway system combines city, suburban and interurban operation, as the latter is practised in the Eastern States, and in many phases of its work it has been a notable pioneer. The power distribution system of the Public Service Railway is one of the most extensive in the country, owing in part to the fact that the corporation conducts a very extensive lighting business as well as railway business. A high standard of maintenance has been established for its rolling stock, track and overhead equipment. A number of new carhouses have been built during the past few years and the repair facilities have been enlarged and improved. Nor has the company been less forward in the adoption of modern ideas in its relations with its men. All of the carhouses built within recent years have been fitted with special facilities for their comfort and entertainment, and the officers have been indefatigable in their efforts to establish a cordial relation between employer and employee. The

results have been the establishment of a splendid system which it will well repay street railway visitors to New Jersey this year to inspect.

HIGH-TENSION LINE CONSTRUCTION

The growing use of high-tension electrical transmission for railway purposes brings to the engineer a weight of responsibility totally unknown in the earlier days of electric railways. To deal with the ordinary 500 or 600 volts for the trolley wire or with transmission to substations at 10,000 volts or so is a very different proposition from transmission at anywhere from 30,000 to 60,000 volts over long distances. One passes from a region in which construction is of an entirely commonplace character to one in which extreme precautions, not yet fully determined by experiment, have to be taken, and these precautions have to be carried not only through the general design of the line but into the details of construction. In the last resort the success of high-tension transmission depends upon the insulators. At 10,000 or 15,000 volts almost any well-made double or triple petticoat insulator of fair dimensions mounted in the customary way on wooden pins answers the purpose well. When it comes to the higher voltages the real trouble begins.

The most usual fault in line construction is an insufficient factor of safety upon the insulators. There is a very natural tendency to use the smaller and less expensive forms if possible. We have known several railway lines which have experienced considerable trouble by reason of incautious economy of this sort. An insulator may do perfectly well at 15,000 or 20,000 volts, giving so little trouble that it seems entirely secure and yet cause all sorts of difficulties when the voltage is raised to 25,000 or 30,000. In this particular region and above it one begins to find the coronal effects which arise from the imperfection of the air itself as an insulator and greatly weaken the insulation strength of the system. Success in transmission for railway purposes requires a high degree of security against interruptions of service. Nothing is more serious or exasperating than a break-down on a railway transmission line, since it not only interrupts service and stalls the cars, just as it would break down the service of lights and motors on any other system, but it also hopelessly disorganizes the schedule and causes a long period of bad service, much longer than follows an actual interruption of similar length in the case of an ordinary commercial power system.

In the construction of a high-tension railway transmission the first great problem that arises is the nature of the supporting structure. Modern practice in general high-voltage work has tended to the use of lines carried on steel towers similar to windmill towers, the whole structure being made of steel, including cross-arms and pins. The tower construction, from the height and stability of the supports, gives opportunity for long spans, averaging say 500 ft. or 600 ft., with the collateral advantage of a relatively small number of insulating supports, which is a very good thing in itself. Wooden poles such as are used in the majority of railway transmissions have customarily been placed at a little over 100 ft., running forty or fifty poles to the mile. Either system can be made thoroughly successful for high voltage, but there is a radical difference in the characteristics of the insulation as commonly employed. With the tower construction the full earth potential is carried clear up into the interior of the insulators, and the insulators therefore have obviously to bear the burden of the insulation. In wooden construction the poles, cross-arms and pins are not without insulating value, and in dry weather the earth potential is far removed from the lines. In tower work or lines on steel poles with steel cross-arms and pins one must therefore figure the factor of safety of the insulator so that there will be no break-down even although the earth is virtually within an inch or two of the live conductor. One has to follow out the maxim attributed to Andrew Carnegie of putting all one's eggs into one basket and then watching that basket.

Much of the trouble which has at times been experienced with wooden transmission lines arises from failure to realize the changed conditions that occur when passing from modern voltages to those high enough to produce marked coronal effects. If these exist on a steel-built line there is a strong likelihood, unless the factors of safety on the insulator are exceptionally high, of a flashing over which then and there puts the line out of business. With wooden construction, even when the cross-arms and pins are boiled in insulating material as they should be, there is always a chance, unless the same precautions are taken with the insulators, that the coronal discharges, which in ordinary weather seem perfectly harmless, may gradually tend to break down the wooden insulation between wire and wire and earth and earth. This action is not a violent one, but often gradually produces an effect which has been aptly termed a "digestion" of the pins, and is accompanied as well with a burning of the cross-arms and similar destructive effects.

Now, the moral of this tale is really perfectly simple. If the insulators are so proportioned that in and of themselves they are sufficient to hold up the working voltage under all conditions, it makes no particular difference what material is used to support them, and material becomes merely a matter of convenience and cost. If the insulating power of the insulators themselves is insufficient, that is, if too small a factor of safety over and above the working voltage is allowed, then trouble is likely to be experienced with any kind of supporting structure, immediate and violent if steel is used, gradual and exasperating in the case of wood. Not infrequently steel pins are employed on account of their greater convenience and strength where large insulators are to be supported, but this does not alter the general insulation materially. If the insulators themselves are strong enough and as good as they should be in an all-steel structure, the nature of the poles and cross-arms cuts very little figure. The long and short of the whole matter is that if one provides suitable insulating supports for the high-tension wires he is safe. If he scrimps on his insulators he is pretty certain to get into trouble whatever kind of a pole line he uses. This theoretical deduction is amply borne out by the results of practice. High-tension lines up to 50,000 or 60,000 volts are successfully operated on all kinds of supporting struc-

tures. In passing it should be noted that very admirable pole lines may be made by the use of latticed steel poles instead of steel towers. Where a single circuit is to be employed these poles can be spaced at 200 or 300 ft. and produce a considerably cheaper line than the tower construction. At the same time they possess all the mechanical strength and permanence of the latter at a price which in some sections would make them well worth while. Failing in this, a sturdy wooden construction, with poles spaced twenty-five or thirty to the mile, provides absolute security, at least in most climates. Such construction is used very successfully in California, and can be applied with equally good results elsewhere.

As regards the insulators themselves, the main thing is that they should neither break down nor spill over, even in a fine spray, at anywhere near the working voltage. A factor of safety of 2.5 is none too small. As a matter of fact most pin-type insulators will flash over under adverse conditions at or near 100,000 volts, so that they should be employed with caution when the working voltage rises to 40,000 or 50,000. The success of the modern extremely high-voltage lines has practically been brought about by the introduction of the suspension insulator, in which a sufficient number of disks can be put in series to raise the breaking-down point even in bad weather high enough to permit of operation certainly up to 100,000 volts and probably considerably beyond this figure in case of need. Up to 60,000 volts or thereabouts pin insulators are actually in successful use, but at this figure they reach the point where the factor of safety is rather too low, and in unfavorable climates it would be better here to pass to the suspension type. All insulators should be rigorously tested before installation, and if this is done there will be comparatively little trouble afterward unless the voltage is raised, as it sometimes is. With these precautions rigidly carried out the nature of the line construction ceases to be an important matter. Precautions like grounding the steel pins, when these are used, turning up the ends of the wires and other similar methods which have been employed on different occasions do not have much significance if the insulators themselves are fully adequate. They may serve as palliatives in the re-equipment of somewhat inadequate lines for higher voltage.

The worst external foe of power transmission for any service is lightning. Sufficiently good results have been obtained by a strong steel cable run well above the working conductors and grounded at every pole to indicate that the precaution is in exposed regions worth the while. The principal service of the so-called lightning arresters is to keep violent discharges out of the station apparatus, which as a whole they are fairly successful in doing. Finally, it should be remembered for the encouragement of transmission that experience shows that with proper construction high-voltage lines are subject certainly to no more trouble than those at moderate tension, perhaps to rather less. This is owing in part usually to somewhat less violent surging, but more to the high margin of insulation necessary, which minimizes the effect of minor rises of voltage whether they are produced by lightning or from other line phenomena.

THE VALUE OF CAR METERS

The paper on "Tramcar Meters" by Messrs. Cunliffe, of Manchester, which is published in abstract in this issue, gives the results of a thorough study of the merits of different types of car meters and their field of usefulness. It is customary to consider the car meter almost exclusively as a check upon the efficiency of the motorman. The authors of this paper, however, have attempted to broaden its usefulness by endeavoring to gage from it the economical life of car, track and power transmitting equipment by noting the increased energy losses rather than the extent of the wear.

The experiments were begun in 1907, at which time so little was known about the general reliability of car meters that the authors were obliged to use every type then available, namely, watt-hour meters, ampere-hour meters and the German clock or time-meters. The readings of the first were theoretically self-contained, those of the second were completed by a volt-hour meter per feeder section, while those of the third were used principally for checking purposes. The first point which the tests showed was that, owing to its greater reliability in car service, the ampere-hour meter gave really a closer record of the actual energy consumed than the type of watt-hour meter used. The second principal point determined was that there was no very close relation between the readings of the energy meters and the indications of the time meters. In fact, the record of the excellence of the men with one type of registers did not correspond with those made with the other, due probably in large part to differences in the rate of acceleration.

It does not follow from these tests in Manchester, however, that time-meters are a failure in the improvement of car operation. Experience with them in Berlin and elsewhere has given abundant proof that the drawbacks cited can be greatly reduced, if not made negligible, by a system of discipline which checks the abuse of equipment and fixes the minimum or maximum limits of controller or coasting time according to the conditions on each route. As a matter of fact, the mere presence of a checking device of any kind will exert temporary good at least, but the best meter conceivable will not give permanent benefits unless proper education and possibly some system of recognition for the economical men are applied to keep them from relapsing into slipshod operation of their controllers.

The possibilities of the use of the records so obtained for checking the economical life of equipment, as in Manchester, seem to us of somewhat doubtful value. The economy of additional generating or distributing capacity, better bonding circuits or more efficient motor operation should be demonstrable more directly than by an analysis of the readings of hundreds, even thousands, of car meters in addition to the recording instruments of the generating plant and substations. It is probable that the same improvements would have been obtained at less expense by intelligent observation of equipment. The company that maintains its physical properties in first class condition is not likely to suffer much from leaks in energy from defective equipment.

COMPARISON OF OPERATIONS OF INTERBOROUGH AND BROOKLYN SYSTEMS

Publication of the annual reports of the Interborough Rapid Transit Company of New York and the Brooklyn Rapid Transit Company for the year ended June 30, 1911, permits a comparison of the recent operations of these large properties at an opportune time. As the relative position of the companies in the transportation system of Greater New York will be changed by the new subway program, it is interesting to study the main differences in present earnings, expenses, trackage and passengers carried. The comparisons are of greater interest because the accounting systems of the companies are presumably now substantially uniform in compliance with the rules promulgated by the New York Public Service Commission, First District, which has jurisdiction over the Interborough company and the subsidiary operating railways of the Brooklyn system. The Brooklyn Rapid Transit Company is a business corporation controlling a number of operating railways.

During the last fiscal year the Interborough company reported gross operating revenue of $29,767,352. The Brooklyn system reported gross revenue from operation of $21,986,543. The Interborough revenues are thus 35.4 per cent greater than those of the Brooklyn system. A further division may be made in the case of both companies. The Interborough revenues are received from the Manhattan Railway (elevated) division and from the subway division. The former contributed $15,414,146, or 51.8 per cent of the total; the latter furnished $14,353,206, or 48.2 per cent. The passenger earnings of the Brooklyn system, comprising 97.1 per cent of the gross revenue from operation, were furnished by the surface and elevated divisions in the following proportions: Surface, $12,976,397, or 60.8 per cent; elevated, $8,377,966, or 39.2 per cent. The Interborough gross revenues as stated included the amount of $843,415, comprising other street railway operating revenues, or 2.8 per cent of the total.

When we take up operating expenses it is found that notwithstanding the great difference in gross revenue the expenditures of the two companies are nearly the same, being $12,368,981 for the Interborough company and $12,166,367 for the Brooklyn system. The operating ratio, of course, shows a wide discrepancy. For the Interborough company it was 41.55 per cent and for the Brooklyn system it was 55.34 per cent.

Differences in the maintenance expenditures may be considered first. The Interborough company spent for maintenance of way and structures $1,581,750, or 5.3 per cent of gross operating revenue. The corresponding expenditure by the Brooklyn system was $1,423,108, or 6.5 per cent of the total revenue from operation. On maintenance of equipment the Interborough company spent $2,562,800, or 8.6 per cent of gross revenue, while the Brooklyn system shows a total outlay for this purpose of $2,125,580, or 9.6 per cent of gross revenue. The Interborough company spent on the subway about 44 per cent of its total expenditure for maintenance of way and structures and about 61 per cent of its total expenditure for maintenance of equipment. The Brooklyn system does not show the division of expenses between the surface and elevated lines. Combining the maintenance expenditures, it is found that the Interborough company spent on both divisions of the system a total equal to 13.9 per cent of gross operating revenue, or 33.5 per cent of the total operating expenses. The Brooklyn system spent for maintenance the equivalent of 16.1 per cent of gross revenue, or 29.2 per cent of the total operating expenses.

On its transportation expenses the Interborough company expended $7,110,510, an amount equivalent to 23.9 per cent of gross operating revenue, or 57.5 per cent of the entire operating expenses. Differences between the general operating expense accounts in the annual reports of the two companies should be mentioned at this point. The Brooklyn system shows the following expenditures for 1911: Operation of power plant, $1,339,552; operation of cars, trainmen's wages, $3,714,683; operation of cars, other expenses, $1,584,180. The aggregate of these is $6,638,415, which is equivalent to 30.2 per cent of total revenue from operation and 54.6 per cent of the total operating expenses.

Other detailed expenditures shown in the Brooklyn report include damages, which cost $750,854, or 3.4 per cent of total revenue from operation, and legal expense in connection with damages, which amounted to $232,616, or 1.1 per cent of total revenue from operation. This is a total for these two items equivalent to 4.5 per cent of the total revenue from operation. It compares with the low cost reported by the Interborough company of 1 per cent of the gross operating revenue. On account of the dissimilarity between the physical conditions of the companies, these results are not fairly comparable.

General law expenses of the Brooklyn system aggregate $60,115, or 0.3 per cent. Other general expenses were $707,369, or 3.2 per cent. Freight and mail expenses amounted to $227,004, or 1 per cent. Expenses of the American Railway Traffic Company are stated as $1,306. The aggregate of the last four items mentioned is $995,794, or 4.5 per cent. The Interborough company reported general expenses of $1,112,175, or 3.7 per cent of the gross operating revenue. Its traffic expenses, making the final item in the total operating expenses, were $1,746.

The number of passengers carried by the Interborough lines was 578,154,088. As the Brooklyn system carried 571,881,446, the totals are very near together. The Interborough total, however, represents either revenue traffic alone or an amount of transfer traffic that is negligible, while the Brooklyn total includes its large transfer business. There is a material difference in the trackage operated by the two companies. The Interborough company shows a total of 203.3 miles of single track as compared with 613.2 miles for the Brooklyn system. The Interborough trackage is divided as between the subway, 85.3 miles, or 41.9 per cent of the total, and the Manhattan Railway, 118 miles. The Brooklyn mileage is divided as between the surface lines, 541.9 miles, or 88.2 per cent of the total, and the elevated lines, 71.3 miles. Per mile of total track the Interborough company carried an average of 2,843,863 passengers, as compared with 932,618 for the Brooklyn system. There is a still greater difference in the gross earnings per mile of track, which averaged $146,421 for the Interborough company as compared with $35,855 for the Brooklyn system.

Motor Cars for the Spiez-Frutigen Railway

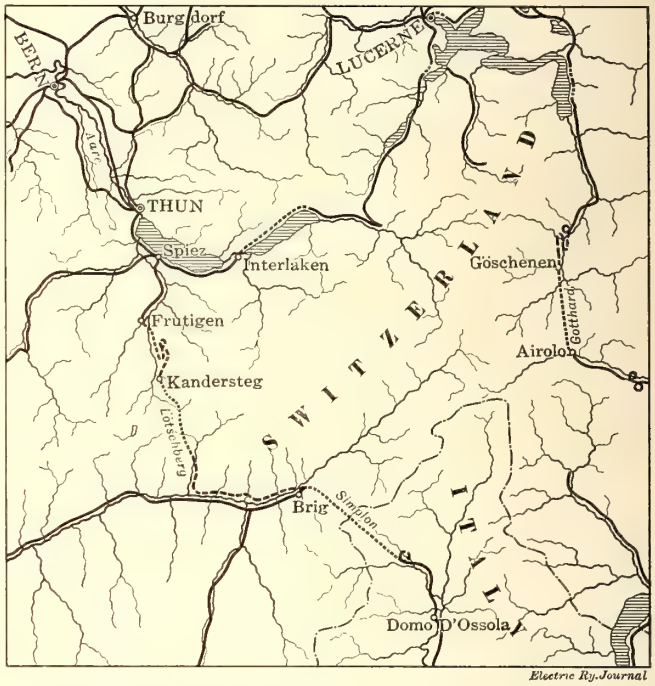
This Railway Is the Most Important Now Being Electrically Equipped in Switzerland

In the Electric Railway Journal of July 29, 1911, an article was published regarding the 2000-hp single-phase locomotive recently built by the Siemens-Schuckert interests for the Spiez-Frutigen section of the Lötschberg Railway. As shown in the accompanying map, this Frutigen line is the most northerly of three sections between Spiez, in Switzerland, and the Italian end of the Simplon tunnel. The route length of the section is 8.37 miles with a maximum grade of 1.55 per cent. The middle section is the Lötschberg (part tunnel) railway, 45.3 miles long with a maximum grade of 2.7 per cent, and the Simplon railway, also part tunnel, is the third section. The completion of the two more northerly sections will provide a cut-off between Bern and northwestern Europe to the Simplon tunnel, which can now be reached from Bern only by a somewhat circuitous route.

The average grade of the Spiez-Frutigen line is 1.1 per cent, and 40 per cent of it is on curves with a minimum radius of 300 meters (984 ft.). The track construction in open country consists of 72-lb. rails with seventeen oak ties per rail length of 39 ft. on tangents. In the tunnel, which is 5261 ft. long, the rails weigh 84 lb. per yard, and are fitted with chairs. The total length of single track is 14 miles. The overhead construction is of the Siemens-Schuckert double catenary type. The trolley current is delivered at 15,000 volts, 15 cycles, the latter being the frequency recommended as standard by the Electrification Commission of the Swiss government.

GENERAL EQUIPMENT

As stated in the issue of this paper for July 29, the first order for rolling stock comprised three motor cars and two 2000-hp locomotives. The motor cars will be operated to Kandersteg upon the completion of the Lötschberg tunnel. The locomotives are used to handle freight between Spiez and Frutigen, but they were designed for eventual use in the Lötschberg tunnel service to Brig.



Spiez-Frutigen Railway—Route and Connecting Lines

MOTOR CARS

The motor cars are of the double-truck type. They have smoking and non-smoking compartments, each seating thirty-two passengers; a toilet room in the middle of the car and two inclosed cabs for the motorman. The passengers' platforms separate the cabs from the rest of the car. A short end platform is also provided in front of each cab for the use of the crew in stepping from car to car during train operation. The cars are 66.6 ft. long over the buffers.

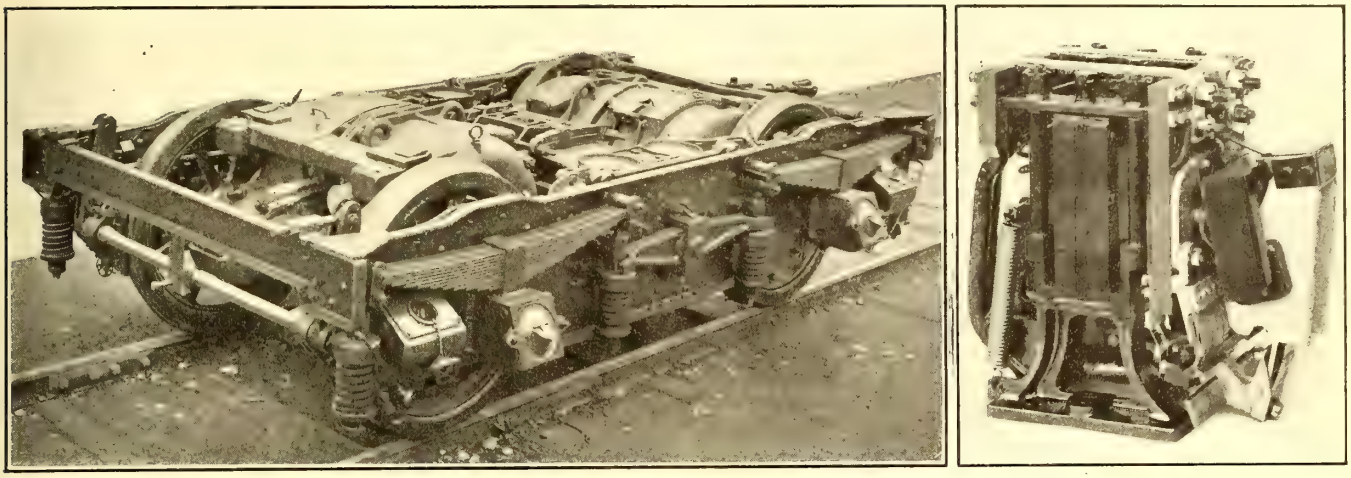


Spiez-Frutigen Railway—Standard Two-Compartment Motor Car

Each truck is designed to carry two motors having an hourly rating of 230 hp each, making the possible motor capacity per car over 900 hp. However, only two motors, which are carried on one truck, are used, as half-capacity is enough to satisfy the present operating requirements.

It was specified that a fully equipped car should be capable of running at the rate of 27.9 m.p.h. for at least an hour and at a maximum speed of 43.4 m.p.h. The continuous tractive effort developed at the diameter of the wheels for an hour was to be at least 11,000 lb. during running and 16,280 lb. at starting. A motor car must therefore be capable of hauling a total load of 240 metric tons at 45 km an hour (27.9 m.p.h.) on a 1.55 per cent grade, or 160 tons on a 2.7 per cent grade. The cars are equipped with lighting, heating and sanding devices. The wiring is so arranged that the main circuits will be unaffected by the change to four-motor operation.

The current collectors can be operated for clearances over the height of the rails varying from 15 ft. 9 in. to 23 ft. 1 in. Under certain conditions the contact piece can be lowered to a point 14.7 ft. above the rails. The width of the sliding bow is only 3.9 ft., on account of the clearances which will have to be met in the Lötschberg tunnel;



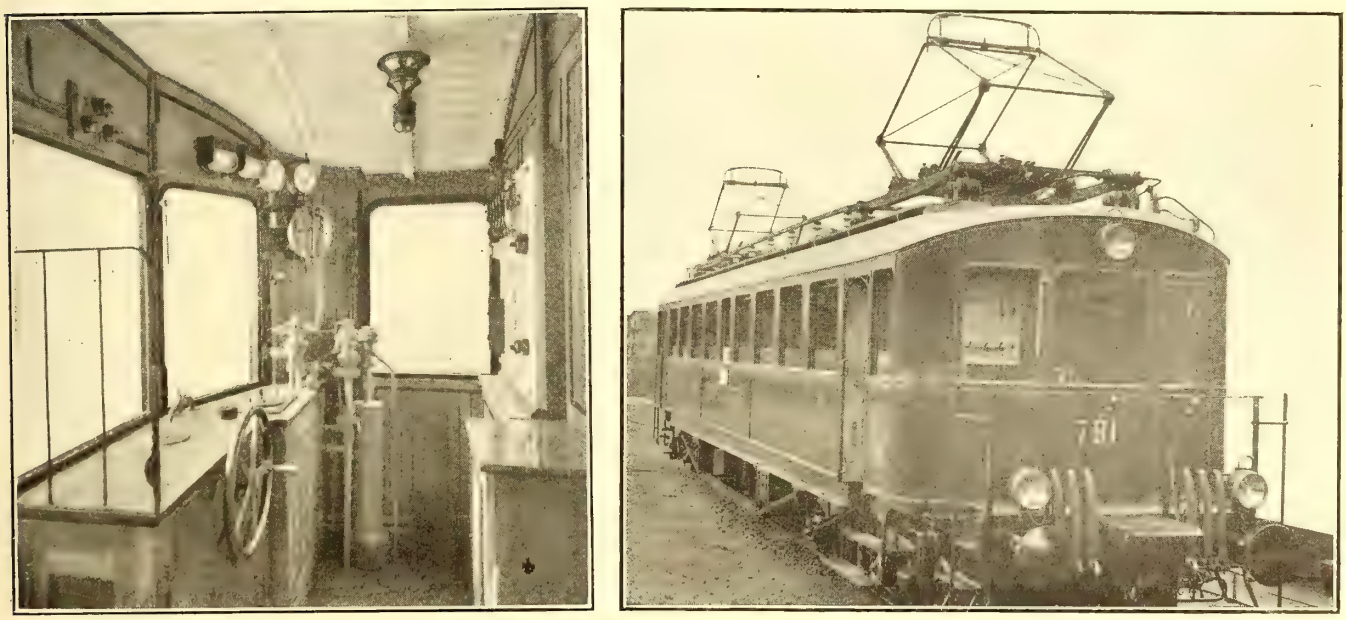
Spiez-Frutigen Railway—Motor Truck and Control Contactor

independent hand brakes for each truck and with the Westinghouse air brake. Every wheel is fitted with pneumatic sanding apparatus which can be electrically thawed if necessary. There are six electric signal lamps, besides oil lamps and candles for emergencies.

DETAILS OF ELECTRICAL CAR EQUIPMENT

The electrical equipment per car is divided into two similar sets made up as follows: high-tension oil switch, oil transformer, two motors with voltage regulator and controller, choke coil and mechanical draft apparatus. The parts common to both groups are the two bow pantograph current collectors, the lightning-protection devices, the compressor which supplies the brake cylinders, sanders, signal pipes and the cylinders through which the pressure of the pantographs against the trolley wire is regulated; also a motor-generator lighting set, storage batteries and the

therefore the trolley wire must not be staggered more than 15.7 in. from the center line of the track. The pantographs are mounted on sets of grooved high-tension insulators. The pantograph frame is adjusted for important variations in height by means of compressed air and chain transmission, but it is lowered by its own weight. The contact bow reverses automatically, and owing to its small mass it also adjust itself easily to minor irregularities in the wire. The contact piece is made of aluminum and contains two lubricated grooves. It can be replaced merely by loosening a few screws.

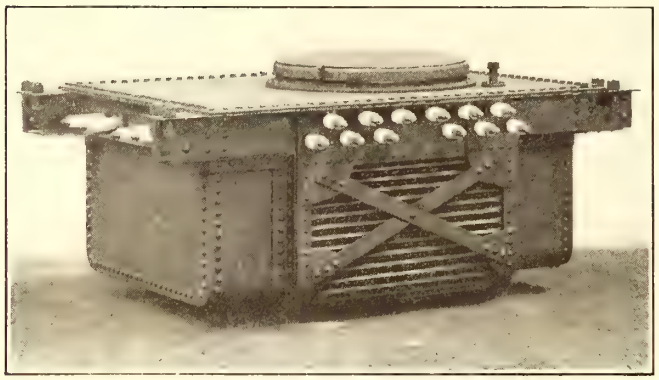


Spiez-Frutigen Railway—Motorman's Cab and End View of Car

The protection against lightning and other high-tension discharges consists of a horn arrester which is placed on the car roof and grounded to a 2900-ohm, oil-immersed resistance, which consists of forty-eight pieces of carborundum. A choke coil is placed in the high-tension cir-

cuit just before the entrance to the high-tension chamber.

The high-tension oil switches open and close the circuit to the car transformer. These interruptions are made at four places on account of the high voltage. These switches are controlled from the motorman's stand by means of a switch-in coil, although they could be operated by hand in emergencies. They are so constructed that a high-tension

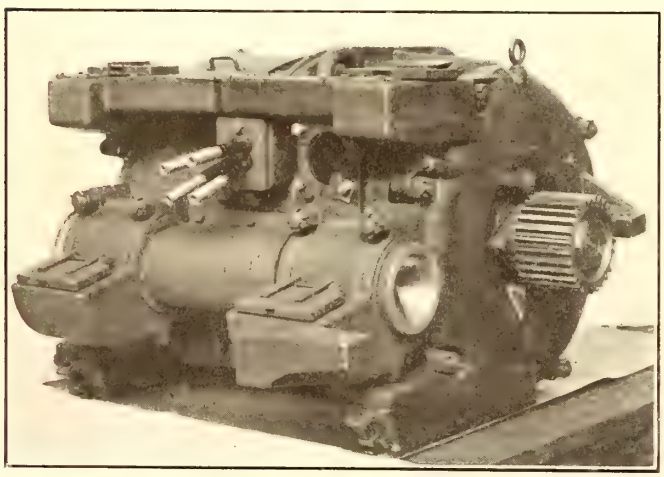


Spiez-Frutigen Railway—Main Transformer

resistance is kept in circuit temporarily to prevent the immediate application of full voltage on the transformers. The high-tension switches are cut out of circuit by means of a relay which is actuated through a push button at the motorman's stand.

All high-tension apparatus is placed in a separate compartment under the middle of the car body. The mica-insulated high-tension circuits are led to this compartment from the roof via the toilet room through a grounded brass pipe which is filled with cable insulation. The high-tension compartment can be opened only when all high-tension circuits are opened, and the pantographs cannot be raised while the door of this compartment is open.

The transformers are of the oil-insulated, core type with an hour rating of 450 kva. They are mounted under the car to obtain the benefit of air cooling during running. If necessary, the primary or high-tension winding can be operated at 7500 volts instead of 15,000 volts. The secondary coils are divided for a large number of running steps, in addition to which two auxiliary coils are provided



Spiez-Frutigen Railway—Single-Phase Motor

for the excitation of a part of the motor compensating winding to act as a commutating winding.

Each half of the electrical equipment has ten contactors, six of which are used for running and four for reversing. Each set includes two contactors for the circuits which excite a part of the motor compensating winding, as noted in the foregoing paragraph.

MOTORS AND CONTROL

The motors are of the eight-pole Siemens-Schuckert series—type WBM—300 geared 1:3.45. The top to bottom dimension of the motor housing is 36.6 in., which allows a clearance varying from 6.3 in. to 5.9 in., according to the wear of the wheels. Consequently, with a spring depression of 1 in. on one side, the clearance will be within the limits of 3.93 in. permitted by the Swiss government.

The motors have only two windings on the stator structure. One is the exciter winding which is placed in two slots of every pole and which overcomes the armature magnetomotive force locally to provide the main field; the other is the actual compensating winding which is placed in the remaining pole slots. There is no special commutating-pole auxiliary winding. On the contrary, the auxiliary commutating field is created by the external excitation of a part of the compensating winding. This combination of the exciting and compensating winding makes it possible to use a separate exciter winding for each direction of running without requiring extra copper. This arrangement has the further advantage of making it possible to use two ordinary contactors per motor instead of the reversers.

In every control step except the first the transformer current is taken through two simultaneously operated contactors, whence it is led to the ends of a choke coil. The latter prevents the current from being interrupted in going from step to step while permitting it to divide between the two contactors.

Energy for the several auxiliary purposes is also taken from the transformers. The current for control is taken at 178 volts, for the compressor and ventilator motors at 109 volts, and for the heating circuit at 300 volts. Current for the car and signal lamp lighting and for the initial operation of the electromagnetic multiple-unit control is obtained by means of a 1.2 kw, 35-volt, d.c. motor-generator set and a storage battery of 81 amp-hours capacity.

GERMAN ELECTRIC RAILWAY CONVENTION

The German Street & Interurban Railways Association held its annual meeting in Berlin from Monday, Sept. 18, to Friday, Sept. 22. The members and delegates were received in the Imperial Parliament Buildings on Monday evening. The next morning reports were presented from the various committees. Among the subjects dealt with were "The Standardization of Holes in Fishplates and Rails," "Fares," "New Grounding Regulations," "The Employment of Motor Vehicles on Light Railways" and "The Shape of Rail Grooves." After the Tuesday morning session the members and their friends were taken over the lines of the Berlin City Railways. They also visited the works of the Allgemeine Elektricitäts Gesellschaft at Oberspree. In the evening a conversazione was given by the city authorities in the town hall. On Wednesday morning five papers and one report were considered, and in the afternoon the visitors were conveyed by automobiles to the Siemens-Schuckert works at Nonnendamm. In the evening the members were entertained to dinner by the Allgemeine company and Siemens & Halske in the great hall of the Zoological Gardens. Thursday was devoted to excursions by special train and tramcars to Potsdam and Charlottenberg. In the afternoon special steamers took the visitors along the Havel Lakes to Wannsee, whence, after dinner, they all returned to Berlin by special train. The last meeting took place on Friday. The afternoon was left free, and the proceedings ended with a dinner and reception given by the Grosse Berliner Strassenbahn.

The National Board of Fire Underwriters has just issued the rules and requirements for electric wiring and apparatus as amended for the year 1911. Among the data of particular interest to electric railways are the rules relating to the car wiring and equipment of cars and carhouses.

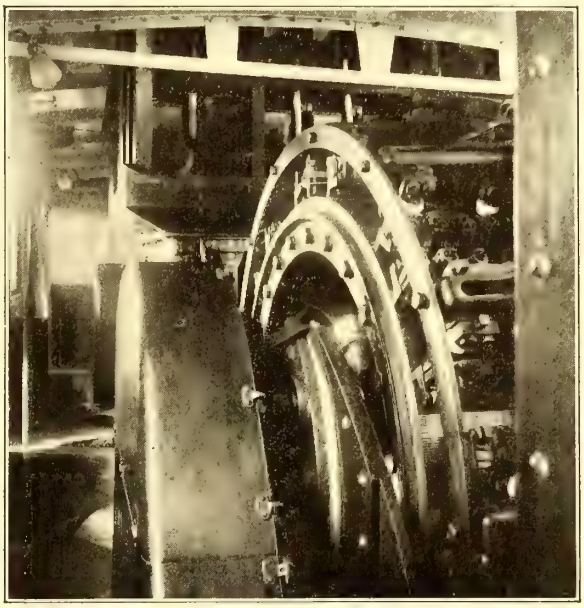
SINGLE-PHASE LOCOMOTIVE FOR MIDI RAILWAY, FRANCE

The accompanying illustrations show the exterior and interior of the experimental single-phase locomotive built by the Allgemeine Elektricitäts-Gesellschaft, Berlin, for the Midi Railway, France. A reference to the electrification plans of this railway was published in the Electric Railway Journal for June 3, 1911, on page 692. This locomotive was built for 15,000-volt, 16⅔-cycle operation over a standard gage line to comply with the following specifications: Length of locomotive over the buffers, 13,140 mm (43 ft.); greatest width, 3150 mm (10 ft. 4 in.); greatest height, 425 mm (13 ft. 11 in.); total wheel base, 9600 mm (31 ft. 6 in.); fixed wheel base, 3600 mm (11 ft. 9 in.); driving-wheel diameter, 1310 mm (4 ft. 3 in.); trailing-wheel diameter, 8500 mm (33 in.); side play of the two trailing axles, 55 mm (2.2 in.); weight on driving axles, 18 metric tons; weight on trailing axles, 15.5 tons; total weight, 85 tons; weight available for adhesion, 54 tons; maximum speed, 75 km an hour (46.5 m.p.h.); maximum drawbar pull, 12,500 kg (27,500 lb.); continuous drawbar pull for one hour, 8000 kg (17,600 lb.).

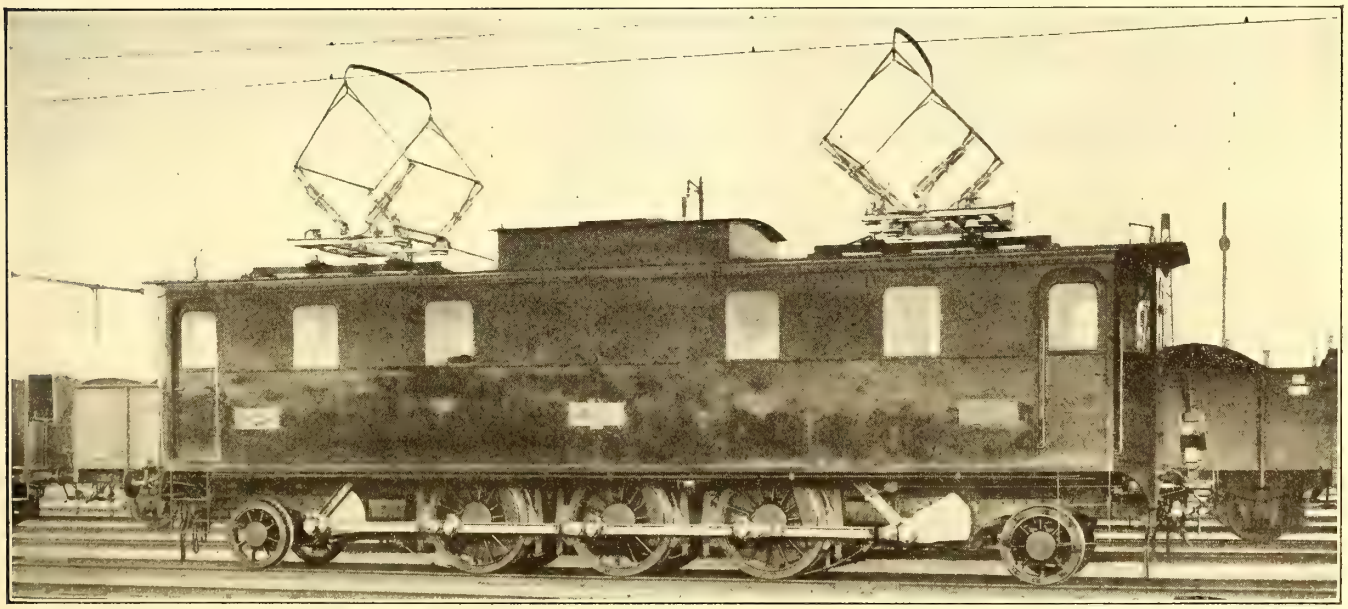
The two motors, which have an hour rating of 800 hp each, operate with the driving rod set at an angle of 45 deg. to the horizontal on two intermediate crankshafts placed outside the driving axles. The moment of inertia of the locomotive has been kept comparatively small by placing the two motors and the main transformer in the center of the locomotive. This matter was important, as the fixed wheel base was specified not to exceed 3600 mm (11 ft. 9 in.). The leading axles permit the locomotive to travel easily around curves of 160-m (525-ft.) radius.

Only the two outer coupling axles are rigidly fixed to the frame, in order to obtain flexibility on curves. The center coupling axle has a side play of 20 mm (0.8 in.) on each side so that it can run on the outer rails on sharp curves and thus is guided independently of the frame. The locomotive is guided by the two front axles on curves of 250-m (820-ft.) radius or more. On curves of less than 250-m radius the leading coupling axle is drawn off the outer rail, leaving the locomotive to be guided by the front running axle only. Suspension springs support the locomotive at six points. Each running axle is connected to the adjoining coupling axle by means of a bell crank. The ends of the coupling rods are provided with non-adjustable bushings, but the motor bearings and intermediate crankshaft bearings may be adjusted for wear.

The upper part of the locomotive is completely inclosed. The main transformer is mounted in the center on double T-irons arranged between the main frame covers. The high-tension oil switch and a part of the control gear are mounted on a special frame over the transformer. The central part of the roof has hinged doors so that the high-tension oil switch or the contactors can be taken out after the removal of the apparatus above it. In like manner doors are provided in the roof over the motors. The motorman's cab at each end contains the necessary measuring instruments and operating gear. An aisle on one side of the locomotive gives access from the cabs to all apparatus. End gangways allow the attendants to pass from the locomotive to the train.



View of Motor and Contactor Cells



Single-Phase Locomotive for Midi Railway, France

The operating equipment of this locomotive, which has recently been completed, includes hand brakes, Westinghouse air brakes, air sanders and whistles, oil signal lamps and two speed indicators.

Arch-Roof Cars Built by the Chicago Railways

These Cars, Which Are Being Built in the Company's Shops, Are the First Arch-Roof Cars for Use in Chicago. They Were Designed Jointly by the Railway Company's Engineers and the Board of Supervising Engineers, Chicago Traction.

The engineering and mechanical departments of the Chicago Railways Company have just completed the first car of a lot of 215 double-end, prepayment, arch-roof, steel-underframe cars which are to be built in the railway company's shops. Exceptionally complete specifications and detail drawings were prepared previous to the construction of this first car with a view to obtaining a stanch car of comparatively low weight. The designing and car construction work is being done under the direction of the Board of Supervising Engineers of Chicago Traction. The Chicago Railways Company has about 1600 cars, of which 1328 are arranged for pay-as-you-enter fare collection. The pay-as-you-enter cars are of three types—the all-steel cars built by the Pressed Steel Car Company and described in the Electric Railway Journal for Aug. 28, 1909, page 312; the steel-underframe, wood-body cars built by the Pullman Company and described in the issue of this paper for Nov. 7, 1908, page 1326, and the 328 wooden cars originally built by the St. Louis Car Company, which were rebuilt by the Chicago Railways Company and were described in the Electric Railway Journal for Nov. 27, 1909, page 1092.



Chicago Car—Exterior View

The general characteristics of the new cars now under construction at the railway company's shops compare with those of the three other types of cars as follows:

Built by—	Company Shops.	Pullman Co.	Pressed Steel Car Co.	St. Louis Car Co.
	Ft. In.	Ft. In.	Ft. In.	Ft. In.
Length over bumpers	44 0	49 2	49 2	41 0
Length over end panels	31 2	32 5	32 5	28 0
Truck center distance	19 5	20 1	20 1	17 5
Truck center to bumper	12 3½	14 6 5/16	14 6½	11 9½
Width over drip rails	...	8 7	8 6½	8 6
Width over belt rails	8 6	8 7½	8 8	8 6
Width over guard rails	8 7½	8 9	8 9	8 6
Height top of rail to top of trolley board	11 9	11 8	11 8	11 4
Height top of rail to sill	2 8¾	2 7½	2 9⅝	2 8
Window post spacing	2 6	2 8	2 8	4 6
Seating capacity	40	40	40	36
	Lb.	Lb.	Lb.	Lb.
Weight of body and accessories	21,390	24,000	26,420	21,100
Weight of car complete	43,558	53,000	52,700	46,000
Weight of four motors without gears and cases	7,800	9,564	9,564	9,656
Total car weight per horse-power	311.1	331.3	329.4	287.5
Total car weight per seat	1,089	1,325	1,318	1,277
Horse-power per car at 500 volts	140	160	160	160

Inasmuch as the new cars have been designed with a view to saving all unnecessary weight the following subdivision of the total weights is of interest :

	Lb.
4 motors at 1,950 lb	7,800
4 gears at 220 lb	880
4 gear cases at 125 lb	500
4 axle collars at 20 lb	80
2 truck frames at 3,000 lb	6,000
4 axles at 400 lb	1,600
8 wheels at 525 lb	4,200
2 truck guards at 125 lb	250
Oil, grease and waste	80
Running gear	21,390
Body and fittings	22,168
Total	43,558

UNDERFRAMING

The underframe of the new car is of particular interest. Its principal members are two built-up side girders. Plate-girder side sills were preferred to the truss form of side construction because of the greater stability obtained and because with girders it is not necessary to cut the window posts to recess the top member of the truss. Each side girder is made up of one 3/16-in. x 18-in. plate reinforced on the outside along the bottom by a 2¼-in. x 2½-in. x 5/16-in. angle, and at the top by one 2-in. x 5/16-in. bar extending the full length of the girder. Additional top bars, stiffener angles and plates are added where reinforcement is necessary. The bottom outside angle carries a Norway pine subsill to which the body posts are fastened. The side girders are supplemented by one center floor tee made up of two 2-in. x 2-in. x 5/16-in. angles and by two intermediate sills, each made up of two 2-in. x 2-in. x ¼-in. angles. Part of the cross-members are 3-in. I-beams weighing 5.5 lb. per foot and part are 4-in. 6.25-lb. channels. Two underframe crossings of 3-in. 5-lb. channels are provided at each body bolster. The end sills are 10-in. 15-lb. channels with flanges turned away from the center of the car.

The body bolsters are built of structural steel and weigh 490 lb. apiece. Structural-steel bolsters were used in preference to cast-steel bolsters because more strength was obtained at less cost and weight. The bolster is 6 11/16 in. deep at the center by 10 in. wide and is made of 15/16-in. plates connected by 2-in. x 2-in. x 5/16-in. angles. It is designed to carry a load of 10,000 lb. at each end when supported at the center by the truck center plate. Roller side bearings are used.

The underframe is securely tied by diagonal bracing made of 1½-in. x 5/16-in. bars connected with each other and with the flanges of all sills and crossings by gusset plates. These diagonal members were riveted in place under tension. The use of riveted diagonal members avoided the possibility of loose turnbuckles.

The stress diagram printed on page 650 shows the unit stresses in the members of the underframe. It should be noted that the maximum allowable unit stress in the side girders was less than 13,000 lb. and in the platform substructure was less than 10,000 lb.

PLATFORM FRAMING

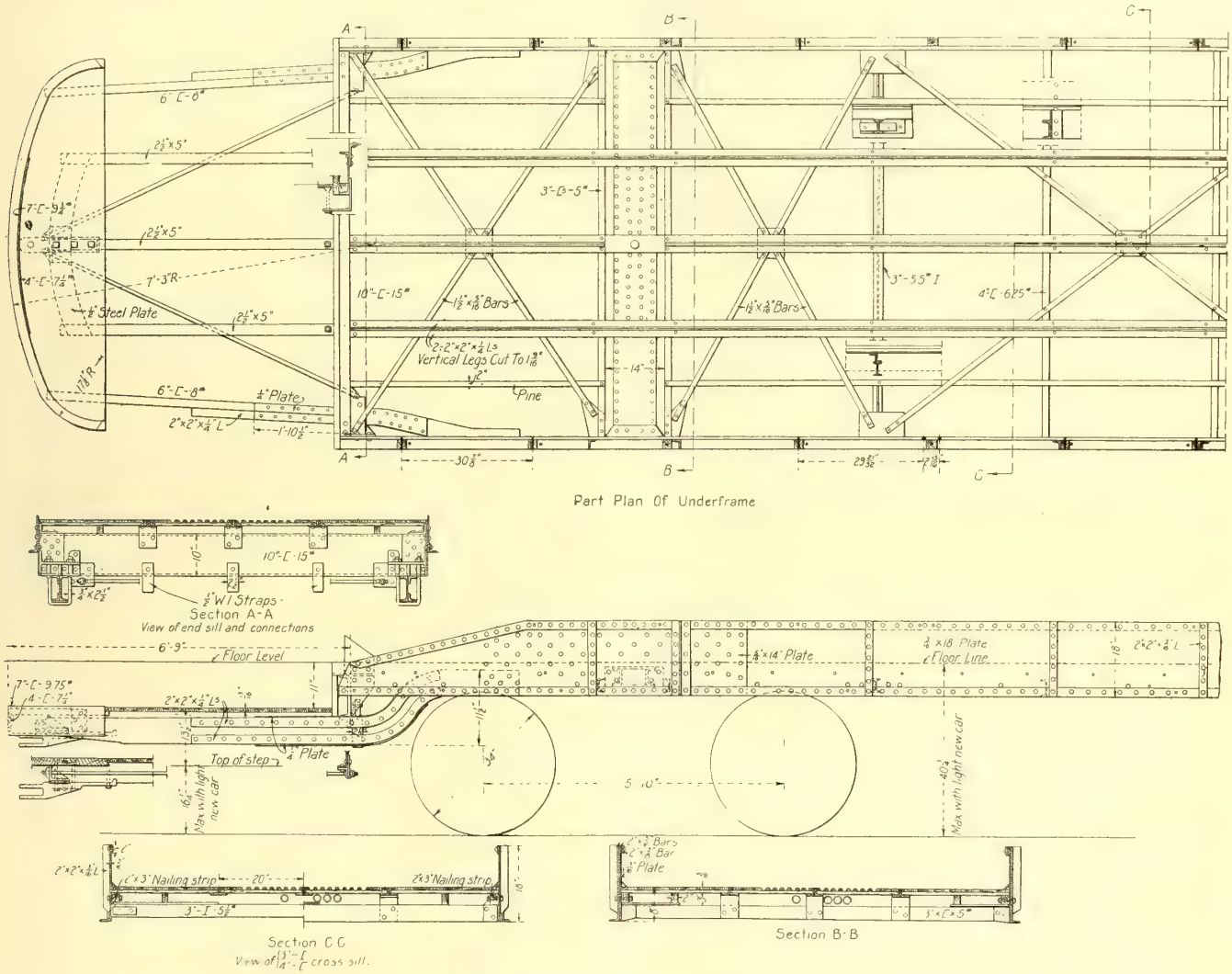
The platform overhang is 12 ft. 3½ in and the platform framing connections were designed to make the platforms, as far as possible, integral with the side frame. The platforms were given an upward camber of ⅝ in. Each platform knee consists of 6-in. 8-lb. channel irons reinforced near the connections by 2-in. x 2-in. x ¼-in. angles and ¼-in. cover plates. The center and two intermediate platform sills are 2¼-in. x 5-in. Norway pine. Each bumper consists of a 7-in. 9¾-lb. channel, reinforced on the inside by a 4-in. channel. The platform framing is tied from the center sill at the drawbar casting to the end sills at the platform knees by two ¾-in. rods.

FLOORING

The design of the floor construction was simplified by omitting the closely spaced small wooden sills used in former cars and replacing them with double-angle floor tees and 2-in. Norway pine floor stiffeners. The floor consists of a bottom layer of ⅝-in. Norway pine laid crosswise and covered with ⅝-in. hollow-back, 3¾-in. face, maple flooring laid lengthwise of the car. Wood flooring was used in preference to composition flooring, reinforced with steel because the wooden construction showed a saving in weight of about 2 lb. per square foot of floor area. The floor strips in the aisle are ⅝-in. x ¾-in. hard maple spaced ⅝ in. apart. The platform floor is 11 in. lower than the car floor and is made of maple fastened with face screws. Safety treads are placed at the doors.

BODY FRAMING

The body side framing is of the concave and convex type. The pier posts are 2½ in. thick and have ⅜-in. steel rods extending through them, tying the metal roof carlines and top plates to the steel angle side sills. The intermediate posts are 2 in. thick and are anchored to the Norway pine subsills by means of hook bolts. The Chicago Railways Company has had considerable experience with sheet-steel panels, but in these cars is using wood. The outer concave and convex side panels are yellow poplar 9/16 in. thick.



Chicago Car—Part Plan, Side Elevations and Sections of Underframing

ROOF FRAMING

The body has a plain arch roof substantially built. The roof has an outside center radius of 8 ft. 8 in. Pressed steel carlines were designed and made for this type of car. These carlines are complete in one piece and are made of No. 16 sheet steel. They weigh 7½ lb. each and have a depth at the center line of the car of 6⅛ in. The flanges pressed on the edges of the carlines are 1 in. wide. A nailing strip is attached to the outer edge of each carline and four openings are provided through the webs. These openings connect the intermediate spaces between the ceiling

and the roof and form the exhaust chamber of the vacuum ventilating system.

The metal carlines are placed over the posts on 30-in. centers. Two intermediate carlines of wood are placed between each pair of pressed-steel carlines. The roof sur-



Chicago Car—Interior View

face is made up of 2½-in. x ⅜-in. poplar sheathing covered with National prepared roofing applied canvas in one piece without longitudinal seams. This canvas was pre-stretched and is mildew-proof. V-shaped copper gutters are attached to the roof above all door openings. The trolley boards rest on ash saddles cut to the shape of the roof and secured over ⅛-in. rubber cushions.

Round-end vestibules of wall construction similar to the car body are provided. Each vestibule has three end windows, a single exit door on the right-hand side looking forward and a full-width entrance and exit door on the left-hand side. The car roof is continuous over the vestibules. No. 16 U. S. gage steel was used for paneling the vestibules, inside and outside, and all panels are removable. The bumpers are covered with steel. The inside finish rail of the vestibules just below the sash is reinforced with a ⅜-in. x 3½-in. iron bar which provides secure anchorage for the controller, air valve and brake staff. Prepayment fare collection is arranged for by providing two bulkhead doors, and a pipe railing, reversible so that it may serve as a motorman's guard rail at the front end of the car and a division between incoming and outgoing passengers on the rear end. Folding steps of the Chicago Railways Company standard are used. The steps on the opposite sides of the car are connected by bell cranks so that when one step is down the other is up.

DOORS

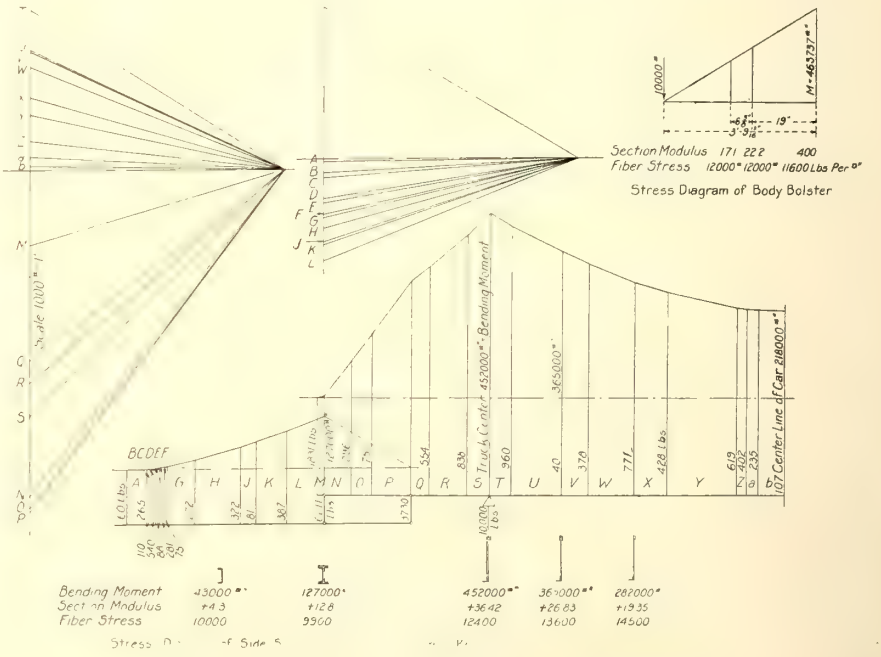
All doors are made of cherry and those at the entrance steps to the platforms have three leaves with a total width of 4 ft. 6 in. The platform exit doors are 2 ft. 3 in. wide and are operated by the railway company's design of mechanism. Each end of the body is fitted with two doors having clear openings of 2 ft. 2¾ in. wide and 6 ft. 6¼ in. high. These doors slide into pockets in the center section of the body end. Earlier types of cars have swing doors, but only sliding doors are to be used in the new cars because of a desire to avoid accidents from broken glass and torn clothing. The sliding doors have ⅛-in. to 3/16-in. play, but when closed are wedged in place by leather cushions which prevent rattling. All doors are 1 in. thick and are hung on Burdette-Rowntree ball-bearing hangers, with statuary bronze housings to match the other car hardware.

BODY DETAILS

Eleven windows are placed on each side of the body and each has two rectangular sashes. The window glass, which is 28 in. x 26 in. and 28 in. x 12 in. in size, is held in Forsyth brass sash frames fitted with Forsyth sash locks and stops. The curtains have Curtain Supply Company's No. 88 ring fixtures with pinch handles instead of friction rollers as used in the other cars. A cherry curtain box, continuous for the full length of the car body, serves as the molding between the car ceiling and side finish. Illuminated sign boxes are built behind each center end window and center side window, conforming in size to the upper sash, which is designed to drop a distance equal to its height. Muslin signs with a black background and white letters are used in these boxes, each sign being stretched on a light wooden frame.

Storm sashes with brass frames are provided for each body window opening for winter use and wire guards are provided for summer use.

A new curtain arrangement has been provided for the two sliding doors at each end of the body. Formerly the curtain was mounted on the center bulkhead, and when it was desired to darken the platform the curtain was buttoned on to the door frame so that it pulled the curtain over the glass as the door closed. Experience has shown that this arrangement is not entirely satisfactory and that the curtain roller spring has a tendency to open the door when assisted by the lurching of the car. In the new arrangement the curtain roller is inserted in a metal box which is mortised into the door and protrudes about ½ in. on one side. The door post is cut away so that the curtain box does not interfere with it. With the curtain box embedded in this position in the door and the curtain edges held in place by brass grooves placed close to the glass, a substantial arrangement is provided, which should fully meet the requirements of operation and not be open to the objections to the old device.



Chicago Car—Stress Diagram of Underframing

All the inside finish and the doors and window sashes are made of cherry stained to a uniform color and finished dull in imitation of mahogany. The inside finish is fastened with bronze oval-headed screws. The headlining is ¼-in. composite board secured to the ash sub-carlines and stiffened by cherry ceiling bands. This interior lining is brought down the sides of the car to connect with the molding at the curtain boxes just above the windows.

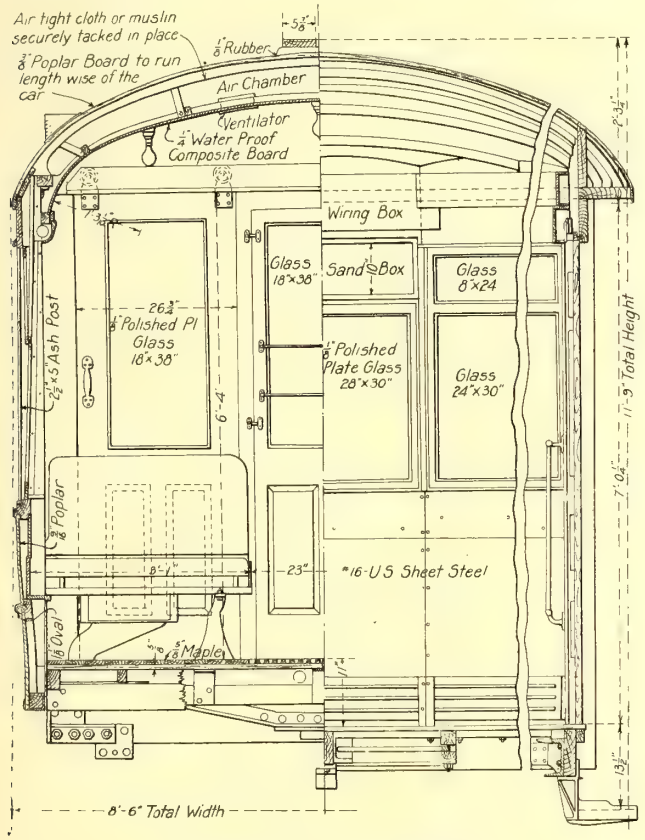
With a view toward improving the appearance of the car interior the unsightly bell cord has been inclosed in a straight run of ¾-in. conduit installed between the ceiling and the roof. The cord pulls directly into the conduit from a pulley at each end and is protected from chafing by bell mouths at the ends of the pipe. The signal bells are inclosed in sheet-steel hoods, which muffle the sound and prevent interference.

HEATING AND VENTILATING

Fourteen cross heaters, four panel heaters and two large platform heaters of the Consolidated type are installed in this car. The platform heaters are secured in an upright position against the end bulkhead directly behind the conductor's position. They are wired in series on the second heating point. The car body heaters are designed not to exceed the following energy consumption at 500 volts:

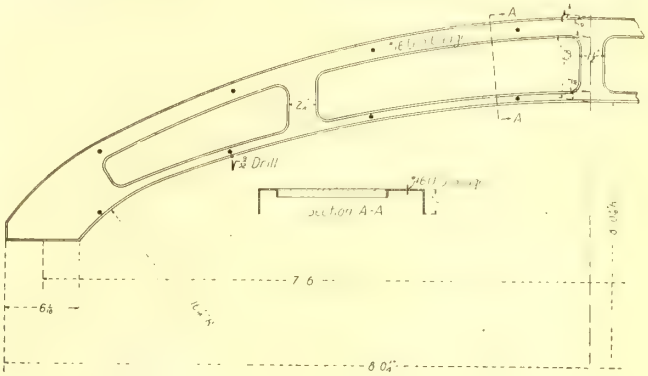
First point of regulation	2.666 kw
Second point of regulation	4.833 kw
Third point of regulation	7.500 kw

The heaters are designed to keep the body heated at a temperature of 50 deg. Fahr. All heater wiring is run in iron-pipe conduit with threaded connections to the heater junction boxes.



Chicago Car—Cross Section

The car is ventilated by the Cooke vacuum ventilating system with fresh-air intakes installed under eight cross-seat heaters. These intake ducts are of pressed steel and admit air through screens in the car floor and discharge it through the electric-heater coils. The vitiated air is discharged from the car body by a motor-driven fan in a sheet-steel fan housing, mounted close to the ceiling above one platform. The air is collected from the interior of the car through fourteen ceiling openings, each 5½ in. in diameter and provided with a shutter so adjusted as to compensate for the decrease in vacuum as the distance from the fan increases. These ceiling openings connect the body of the car with an exhaust chamber formed between the car ceiling and the roof. This chamber is made of air-tight cloth tacked in place and passed through the rectangular apertures in the pressed-steel car lines. The



Chicago Car—Pressed-Steel Car Line

fan discharges the vitiated air outside of the car through two outlets in the platform roof. This method of ventilation is in use on 350 other cars of the Chicago Railways Company.

LIGHTING

Sixteen tantalum lamps are used for the illumination of the car-body interior. Seven lamps are arranged in a line along the ceiling on each side of the car approximately over the center of the cross-seat cushions and two lamps are placed in the center of the ceiling and near the ends of the car. One lamp is placed on each vestibule ceiling about over the conductor's position, one lamp in each headlight and one lamp in each vestibule and side-sign box. Series-burning, 37-watt, 16-cp tantalum lamps are used, as described in this paper for Sept. 23, 1911, page 501. It has been found that sixteen tantalum lamps give considerably better illumination within the body than twenty-one carbon lamps and afford considerable economy in energy and lamp renewals.

SEATS AND FITTINGS

Fourteen Hale & Kilburn walkover cross seats and four longitudinal seats provide seating accommodations for forty passengers. The cross seats are placed 30½ in. between centers and extend 37 in. from the side of the car, providing an aisle 23 in. wide between seat ends. The grab handles and edges of the seats are made of malleable-iron enameled green. The longitudinal seats are 54 in. long and have cherry ends. Sand boxes lined with galvanized iron and fitted with removable top screens and hinged cherry-wood covers are built in the spaces between the corner posts and the ends of the four longitudinal seats. Four handstraps fastened to the ceiling molding by bronze hangers are provided above each longitudinal seat.

The miscellaneous fittings of the new car include bronze push buttons with the Consolidated Car Heating Company's buzzer system, taking energy from the 500-volt circuit; portable seats for motorman and conductor; T-section coupling bar weighing 10.1 lb. per foot and carried on hooks under one side sill; H. B. non-protruding fenders with automatic and foot-actuated trips; truck-wheel guards of the company's standard design; Adams & Westlake pressed-steel headlights with semaphore lenses; Wilson trolley catchers; 12-in. foot gong and pneumatic bell ringer; National air brakes with A-4 compressors; Peacock hand brakes. The body and truck brake rigging is designed so that with 3300-lb. pressure on the cylinder push rod not less than 90 per cent braking power will be provided

WIRING

All electrical wiring beneath the car floor is inclosed in watertight conduit and that above the ceiling in circular loom. Three lines of conduit extend from end to end of the car body just below the floor and close to the center. A wiring box is provided around the vestibule interior just above the window openings, thus furnishing a neat inclosure for the heavy cables from the conduit breaker to the body of the car. The specifications require wires of the following sizes:

Lighting currents, No. 14, in circular loom.

Push-button circuits, No. 18, in circular loom, except down the side posts.

Fan-motor circuits, No. 14, in circular loom.

Heater circuits, stranded, various sizes, in metal conduit.

Air pump, No. 14 stranded, in metal conduit.

The wiring work and all the electrical apparatus were designed to withstand a test of 1000 volts alternating current for one minute.

PAINTING

The Chicago Railways Company process of painting was followed, the coats being applied to the body exterior in the following order:

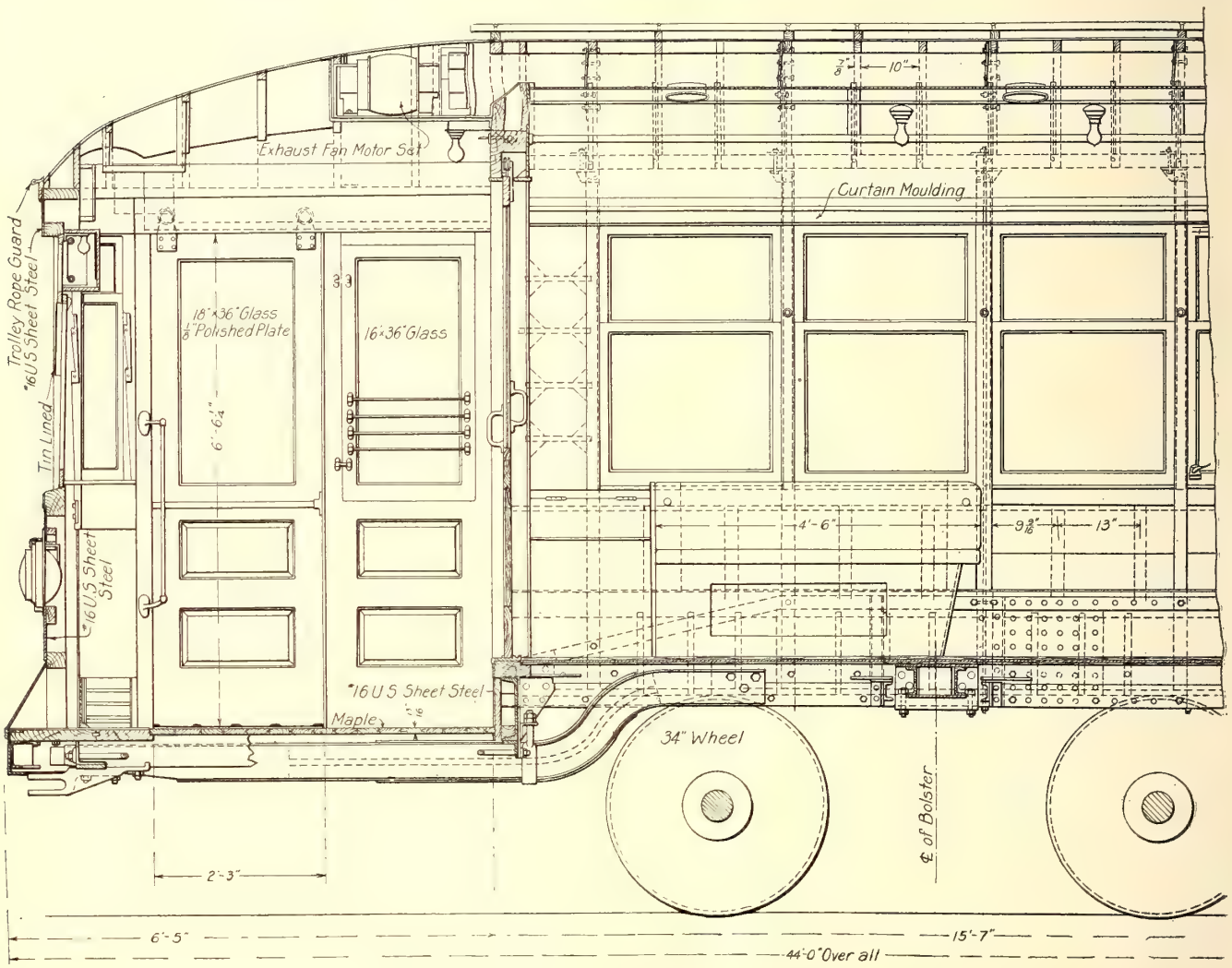
(1) Primer.
(2) Putty and one coat of lead.
(3) Two coats surfacer—rubbed.
(4) Two coats olive-green color.
(5) Gold-leaf decorations.
(6) Two coats finishing varnish.

The foregoing process required about twelve days. All cherry on the outside of the car was stained mahogany and given two coats of finishing varnish. The interior woodwork, all of which is cherry, was stained mahogany, then shellacked, then given two coats of interior varnish and rubbed to a dull finish. The ceiling was given two coats of flat color, then decorated, then given two coats of varnish and rubbed. The trucks and all metal parts under the body were given two coats of green paint. The roof canvas was painted before application and then given two coats in place.

TRUCKS

The trucks were designed with a view to low weight as well as riding and service qualities. The type used is the Brill 27 G. E.-1. It has the following characteristics:

Wheel base of truck	4 ft. 10 in.
Gage of track	4 ft. 8½ in.
Length of axles	6 ft. 11¼ in.



Chicago Car—Part Longitudinal Section

Distance from top of rail to bottom of car body bolster, with weight of light car body resting on the truck, with 3½-in. depth allowed for center plates ..... 2 ft. 5¾ in.

Distance from top of rail to top of truck side frame at pedestals, with weight of light car body ..... 2 ft. 4½ in.

CENTER-PLATE LOADS

Weight of empty car body completely equipped, approximately	11,250 lb.
Weight with seated load of 40 persons in car, approximately	14,250 lb.
Weight with load of 100 persons in car, approximately	18,750 lb.
Weight with maximum load of 110 persons in car, approximately	19,500 lb.
Weight of passengers taken at	150 lb. each

To operate around curves with radius of 35 ft.

These trucks have forged side bars. The transoms consist of 5-in. x 3½-in. x ½-in. angles. The pedestals are fitted with wearing gibs made of 4-in. wide channels. Cast-steel bolsters are used. The following specifications were prepared by the Board of Supervising Engineers for the manufacture of the springs.

"Springs of truck shall be proportioned so that the car will ride easily at all loads, and particular attention shall be given to this subject. Bolster springs to be of the half-



Chicago Car—Exit Door on Front Platform

elliptic type and shall have a length of not less than 36 in. under light car. Coil springs shall be as large in diameter and as long as is consistent with the design of truck, so as to insure easy riding. The springs of the trucks shall be proportioned so that the difference in height from top of rail to top of truck bolster between empty car body and car body with 17,000 lb. live load equally distributed on each center plate does not exceed 2¼ in. Springs of similar type shall show substantially the same deflection under equal loads, the difference in the deflection in no case to exceed ¼ in. Analysis of springs to be in accordance with the following specifications:

SPIRAL SPRINGS

Carbon	0.90 to 1	per cent
Manganese, not above	0.50	per cent
Phosphorus, not above	0.07	per cent
Silicon, not above	0.10	per cent
Sulphur, not above	0.03	per cent

ELLIPTIC SPRINGS

Carbon	0.90 to 1	per cent
Phosphorus, not above	0.05	per cent
Manganese, not above	0.50	per cent
Silicon, not below	0.15 or above 0.30	per cent
Sulphur, not above	0.05	per cent
Copper, not above	0.05	per cent

"Trucks shall be designed to receive outside-hung motors. The motors shall be spring-suspended and the suspensions shall be of the bar type or equal and arranged to receive the General Electric Company's No. 226 motor."

AXLES

An illustration showing the axle dimensions is presented. The journals are 3¾ in. x 7 in., which are the dimensions of the American Electric Railway Engineering Association's standard axle EA, and the journal boxes also conform to association standards. Rolled-steel wheels 34 in. in diameter are used.

Very complete specifications were drawn for the axles, requiring heat treatment of the steel. The size was reduced from 5 in. to 4½ in. in view of the use of special steel and desire to save weight. The requirements for chemical composition of the steel from which the axles were forged were as follows:

Carbon, not over	0.60 per cent
Manganese, not over	0.40 to 0.80 per cent
Phosphorus, not over	0.05 per cent
Sulphur, not over	0.05 per cent

The physical requirements were:

Ultimate strength, not less than	85,000 lb. per sq. in.
Elastic limit, not less than	50,000 lb. per sq. in.
Elongation in 2 in., not less than	22 per cent
Reduction in area, not less than	45 per cent

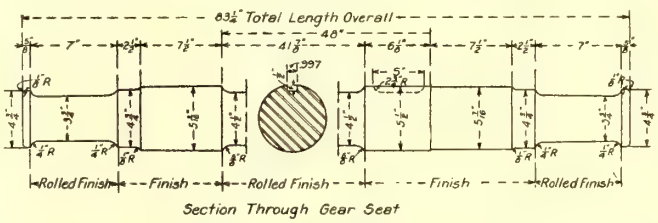
"The elastic limit to be determined by extensometer. Above 40,000 lb. per square inch each increment of load shall be not more than 1000 lb. per square inch.

"A cold-bend test shall be made from the crop end of one axle from each treating-plant heat; if more than one open-hearth heat is represented in a treating-plant heat a test shall be taken from each open-hearth heat represented. The test shall be made with a ½-in. square specimen, not exceeding 6 in. in length, around a mandrel with edges of ½-in. radius, and the specimen shall bend without fracture 180 deg. around said mandrel. Specimen for cold-bend test to be taken parallel to the axis of the axle and on any radius one-half the distance from the center to the circumference."

MOTORS

A new type of interpole box-frame motor was designed especially for this equipment by the General Electric Company. It has K-35 control. The standard motors used on the Chicago Railways have a rating of 40 hp. The new motors are rated at 35 hp at 500 volts and weigh about 440 lb. less per motor than the company's former standard type.

The maximum speed desired with these equipments is 24 m.p.h. on level track at 500 volts potential and the schedule speed is approximately 9 m.p.h. with about seven stops of 6 seconds' duration per mile. The gears were made by the Tool Steel Gear & Pinion Company and have 5½-in. face and eighty-two teeth on three and a half diametrical pitch. The pinions have sixteen teeth. A gear ratio of 17 to 69, with three pitch, is used on this company's 40-hp motors, but a change is contemplated with a view to saving energy. The specifications required that the



Chicago Car—Standard Axle

efficiency of the new 35-hp motors, with gears, be not less than 81.6 per cent with an armature speed not greater than 605 r.p.m. at 500 volts.

The specifications for the new cars and equipment here described were signed by the following members of the Board of Supervising Engineers of Chicago Traction: Bion J. Arnold, chairman and chief engineer; George Weston, representing the city of Chicago, and John Z. Murphy, representing the Chicago Railways Company.

Accident Work of the Future

A Discussion of the Possible Means for Reducing the Number of Accidents

BY F. W. JOHNSON, SUPERINTENDENT BUREAU FOR PREVENTION OF ACCIDENTS PHILADELPHIA RAPID TRANSIT COMPANY

The peculiar temperament of the American people, with its impetuous haste, its reckless disregard of the sacredness of human life and the attendant economic waste in many kindred directions, constitutes a problem of such relatively vast proportions as to challenge the best thought of some of the foremost thinkers of our day. From time to time disasters of far-reaching importance occur throughout the country and momentarily the public is stirred to action. Spasmodic efforts are made to profit by the knowledge gained from these catastrophes so as to prevent their repetition. The effect as a whole, however, appears to be of a more or less temporary character, for the people unfortunately soon turn their thoughts to other matters, only to be shocked at intervals by the recurrence of similar misfortunes. It is indeed singular that such should be the case, yet is the fact one which requires verification?

It is inevitable, then, that eventually there must come a real awakening, when the true significance of the subject will be disclosed and the incentive found for concerted action by the masses for the mutual good of all. Until that time has arrived, however, it clearly is the duty of those to whom is intrusted the safety of others not only to exert every reasonable energy in the direction of safeguarding their welfare but to strive as well constantly to educate the general public so that eventually their earnest co-operation may be brought to bear upon a project so vitally essential to their own good.

As conditions gradually improve, benefits and advantages, both direct and indirect, whose existence has not been anticipated, will accrue to those immediately concerned. There should be a lessening tendency toward the enactment of radical legislation as affecting such matters. The interest of employer in employee will in nowise weaken those harmonious relations so essential to the well-being of each. Vast sums which formerly were devoted to the liquidation of damage claims and kindred expenses will become available for more satisfactory uses. The feeling of additional security to be enjoyed by all is something which will not prove possible of measurement in dollars and cents.

THE POSITION OF THE RAILROADS

While this advancement will eventually become more or less general throughout the entire industrial field, the proposition is essentially one in which the railroads of the country may be expected to take the initiative. With their well-organized systems and daily contact with many millions of people, their opportunities for successful work of this character are unsurpassed by any other line of industry. In like position stand the electric railways, with problems confronting them of an even more complex character.

The larger systems doubtless will organize and equip separate departments whose sole duty it shall be to keep posted upon the latest and most approved methods wherever introduced and to direct and supervise the development of the work upon their own individual lines. Smaller roads situated within a convenient area may find it to their advantage to combine, as it were, and thus to equalize the expense, while at the same time securing all of the benefits enjoyed by the larger companies. Blanks, forms, methods and other incidentals will be standardized and the cost to each thus reduced to a minimum. Various railway associations, may even retain the services of recognized authorities upon the subject, with whom member companies may consult when in need of advice or assistance in meeting troublesome conditions. The establishment of a central bureau representing electric railway interests throughout the country may prove to be an eventuality of the future in accident work.

MEANS AT HAND

I look for an increasing degree of liberality in dealing with employees as a means, incidentally, of arousing interest in the work. In large measure the success of the undertaking will depend primarily upon the existence of a mutual feeling of friendly co-operation between the two. The importance of this cannot be overestimated. Existing problems, which to-day continue to disturb an otherwise tranquil situation, are not impossible of solution if approached in the light of reason and justice.

The adoption of practical safety devices of established merit will receive more serious consideration than can truthfully be said of the present day. Seeming reluctance along this line will give place to a more earnest desire to conserve the element of safety in the ordinary transaction of business. An indication of the trend of events may be observed in the literature issued by a number of the transcontinental systems wherein the attention of travelers is especially directed to the various safeguards with which the operation of trains is protected. In like manner will all places of public amusement and accommodation eventually give prominence to this feature as a medium for attracting patronage. Coincidental with this tendency may we expect the gradual growth of an insistent demand upon the part of the general public that closer supervision shall be expected of those to whom the safety of others is intrusted.

Greater prominence necessarily will be given to the subject in our national conventions as time advances, with the possibility eventually of a separate body being organized, to be composed principally of men actively engaged in furthering the success of this feature of the business. The resultant interchange of ideas and suggestions cannot but prove to be of material assistance and encouragement to those directly interested.

As the scope of the work broadens and the field of its activity becomes more general, the editors of trade journals will find it to their advantage to give proper recognition to the subject through their columns and to lend their aid to its promotion. In time we may look for the appearance in electric railway circles of a periodical to be devoted largely, if not exclusively, to this particular phase of railroading. If rightly conducted, it should prove of absorbing interest to transportation, claim and accident officials, and at the same time a source of much real assistance.

The more general keeping of accurate statistics concerning the various types of accidents, as well as the manner and frequency of their occurrence, will furnish officials with data of a highly important character from which deductions may eventually be drawn of inestimable value. The interchange of this information as between one community and another should still further add to the general fund of knowledge upon the subject.

DISCIPLINE OF EMPLOYEES

The general attitude toward dismissal consequent upon the occurrence of accidents will sooner or later undergo a marked change for the better. The fallacy of the old "hoss car" theory of holding accidents in check through the frequent dismissal of men was supposed to have been exploded many years ago, but the report seems not to have penetrated some communities as yet. In dealing with

conductors and motormen, as with all other classes of men, reasonable allowances must be made for honest mistakes and excusable errors of judgment. We do not always discharge a superintendent, general manager or other official immediately he errs in judgment, even though the lapse oftentimes may chance to be of a rather unfortunate character. More often than not we go over the matter in detail with him and endeavor to guard against its probable repetition by strengthening him. Yet, in dealing with not dissimilar cases among car men we seem disposed to regard a serious error of judgment more in the light of an unpardonable sin.

In many years' intimate contact with car men in the development of accident work it has been my experience to observe that the great majority of serious liability accidents occur as the result of thoughtlessness, forgetfulness, momentary inattention to duty or disturbed mental poise consequent upon worrisome domestic conditions. Deliberate, intentional disobedience of orders without regard to consequences plays a much more insignificant rôle in railroading than the policies of some companies would seem to indicate. It is one thing to endeavor to secure a man's support and co-operation along a given line by holding constantly before him the fear of the loss of his position, and it is quite another thing to seek the same end through the medium of encouragement, education and instruction, together with a proper appreciation of his efforts in your behalf. The one lacks "red blood"; the other inspires confidence and a desire to give satisfaction.

Much has been said in the past concerning the desirability of bringing to the work a higher and more efficient class of labor. The uncertainty of the work, as hereinbefore described, however, has always militated strongly against the accomplishment of this end. Many men, apparently, have come to regard electric railroading as a more or less temporary means of occupation. This, of course, has had its direct effect upon the quality of labor obtainable, as well as the character of service rendered. If the standard of efficiency among the rank and file in railroading is to be raised and an even better element attracted to the calling, the subject under immediate discussion is one, among others, to which careful consideration may well be devoted in its proper sphere.

The application of this to accident work may at first seem somewhat obscure. A moment's reflection, however, will quickly establish the relationship, for in this branch of railroading, even more than in any other, the measure of success possible of attainment will depend primarily upon the intelligence and competency of the operators. Experience is ever an asset. The constant replacement of reasonably competent men with green material, which necessarily will be subjected to identically the same dangers and the same temptations but without the benefit of the experience gained by the former, has always proved a problem of considerable moment in railroading and especially so in accident work.

A more general introduction of the merit system in connection with the tabulation of employees' records will be found desirable. In this way an ideally complete record may be kept of each man, setting forth in minute detail such information as may be deemed of value and affording at the same time an eminently fair and just method by which the competency or incompetency of an employee may be determined with accuracy and dispatch. The system already has reached a high state of perfection upon several important lines and is regarded by them with much favor. Identically the same scheme is applicable to the development of advanced accident work and in time should prove equally valuable.

CO-OPERATION OF ALL DEPARTMENTS REQUIRED

The really ideal combination in accident work requires the mutual support and co-operation of no less than four distinct departments, viz., the operating, claim, legal, and accident departments. In some instances conflicts have arisen as between one department and another, each feeling that the other was attempting to usurp its functions. Such misunderstandings should not be permitted to interfere with the success of the work. A broader view of affairs with the consequent elimination of such trifling issues will permit of a more satisfactory concentration of thought and of energy than has as yet proved practicable in some localities. The interests of the concern as a whole must be recognized as being paramount to those of any individual department.

A continuation of the present thorough methods of inspection of rolling stock and equipment is an additional item of vital concern to the success of our subject. Mishaps caused by mechanical defects or failures are everywhere being reduced to a minimum. They clearly come within the classification of "avoidable accidents," and if a concern is to demand of its employees a high degree of efficiency it is incumbent upon the management to give evidence of its good faith by maintaining the equipment in a satisfactory condition. The old axiom of "penny wise, pound foolish" never had a truer application than it has to the management which pursues a policy of false economy in this direction.

EDUCATION OF THE PUBLIC

Probably the most interesting developments in accident work within the next few years will have to do with the education not only of car men but of the general public as well. The first real test of the successful accident man will be that of his ability to attract and to hold the interest of others in his subject. Originality, resourcefulness, an attractive style and the ability to drive home his argument in a clean-cut, forceful and convincing manner will speedily demonstrate his usefulness as an important adjunct to the electric railroading of the future.

In lieu of something better, many an otherwise successful railroad man of years gone by has taken refuge behind the hackneyed, stereotyped old excuse of "accidents are a part of railroading." We are not prepared to-day to admit the soundness of this argument without certain qualifications. Even if we grant that many mishaps occur which clearly are of an unavoidable character, and that others arise out of circumstances over which we have no control or from conditions which could not ordinarily have been foreseen or anticipated, there still remains a class of accidents for which we ourselves alone stand responsible. Accidents of this latter classification unfortunately are usually of a liability character and constitute, therefore, a somewhat costly feature of the subject. If, however, mishaps of this type are in large measure susceptible of elimination through the application of advanced theories in railroading, it clearly is beside the question for one to put forth so fallacious an argument as the foregoing.

While it is true that the electric railway interests of this country are expending in the aggregate many millions of dollars annually in the investigation, defense and adjustment of accident damage claims, it is a peculiar fact that the immensity of the proposition as a whole does not especially appeal to the average concern, except in so far as its immediate influence may be felt upon its own individual resources or expenditures. Presumably the old adage, "what is everybody's business is nobody's business," still applies. It is not unreasonable to believe, however, that in time this state of inertia will give way to one of greater activity and the problem eventually will be regarded as one not only of local but of nation-wide concern as w

---

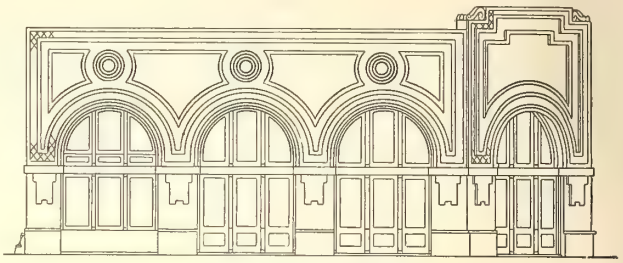
The Allgemeine Oesterreichisch-Ungarische Gaschaft, Austria-Hungary, has purchased the Möd works and has offered to establish a power plar construct an electric railway either direct to Vi Wiener Neudorf to join the Vienna-Baden li

ILLINOIS TRACTION PASSENGER STATION AT ST. LOUIS

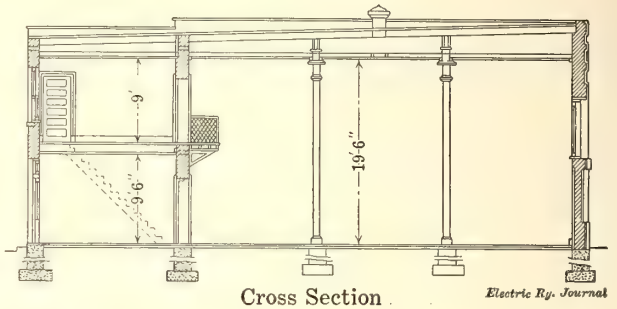
The comprehensive St. Louis terminal project of the Illinois Traction System, which includes the large McKinley Bridge, the two-story Broadway passenger station and the large express station, now used partly for depot purposes, also contemplates the erection of a ten or twelve-story combination passenger station and office building at High Street and Lucas Avenue, St. Louis. At present a temporary station of the design shown in this article is being erected on the terminal passenger station site.

At this location the Illinois Traction system owns a lot 218 ft. long by 143 ft. wide, and the southwest corner is one and one-half blocks north of the Jefferson Hotel. The express station is across the street. The building now under construction will cover a ground space of 100 ft. x 58 ft. and will be of the so-called "World's Fair" type, finished on the outside with a heavy cement coat. Parking space will be provided for three trains, the tracks connecting with the comprehensive yard layout in the neighborhood of the terminal express station.

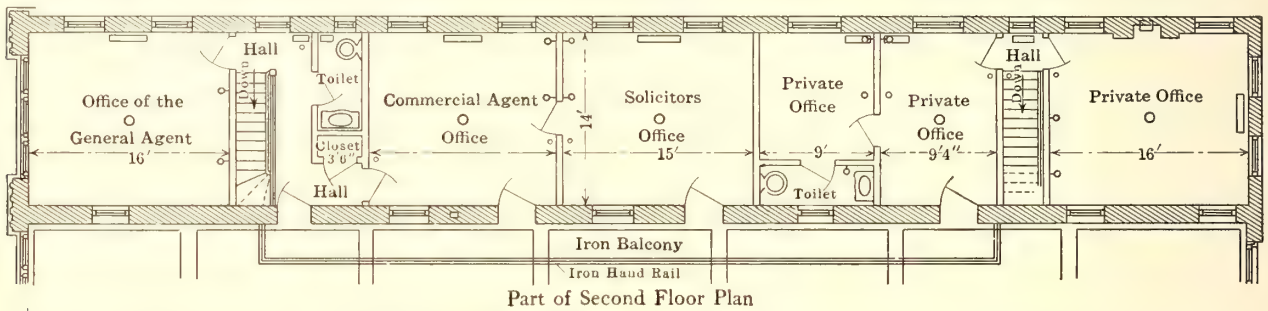
The new passenger station building will inclose a general waiting room, 40 ft. wide by 100 ft. long, with ceiling 19 ft. 6 in. high. Adjoining this waiting room are two rows of smaller rooms and offices, one row above the other, the offices on the second floor opening onto an iron balcony overlooking the main waiting room. As shown on the general plan the subdivisions on the first floor include a ladies' retiring room, two toilet rooms, a hall leading to the offices on the second floor, lunch stand and kitchen, and a baggage room 14 ft. wide by 50 ft. long. The upper tier



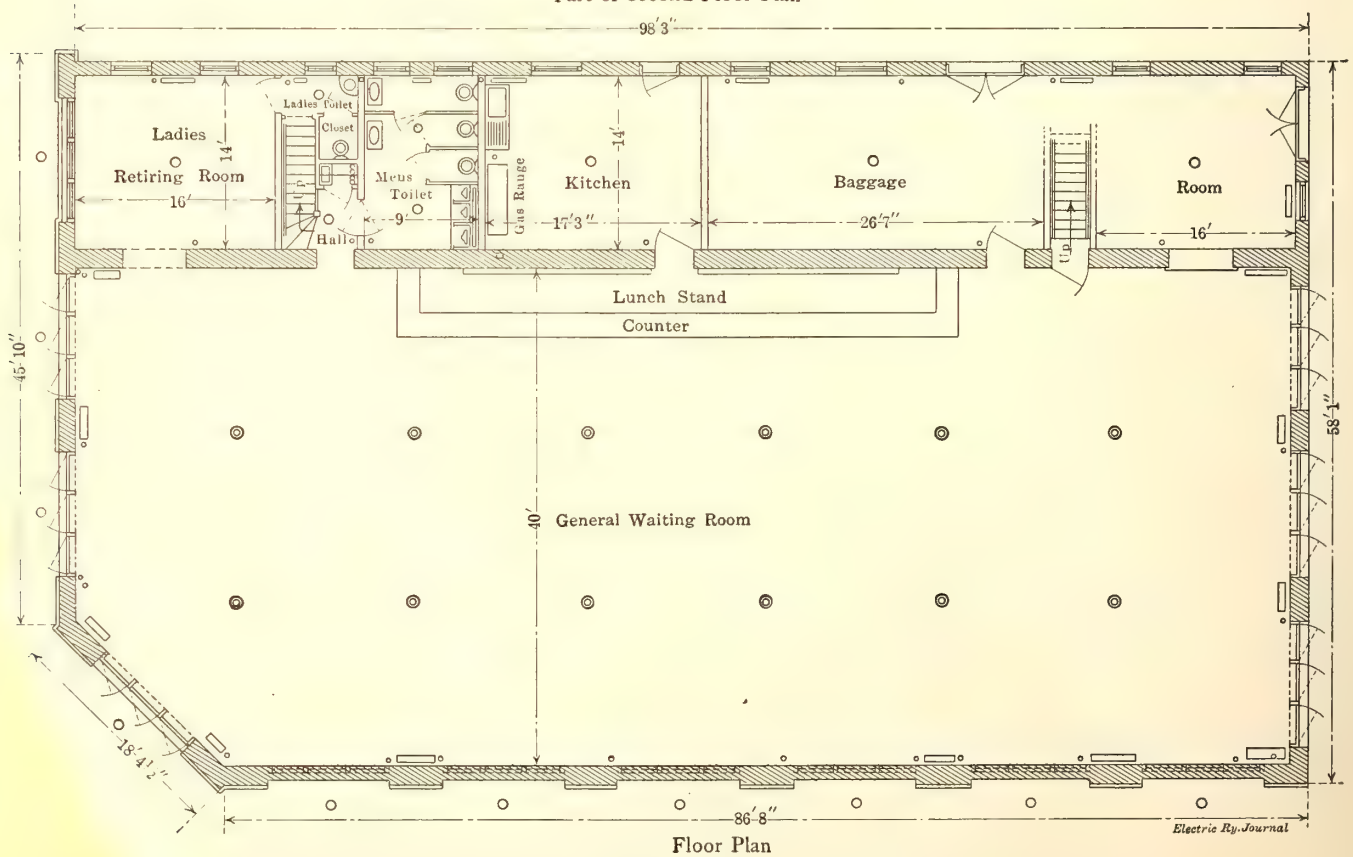
Main Elevation



St. Louis Terminal—Elevation and Cross Section



Part of Second Floor Plan



Floor Plan

St. Louis Terminal—Plan of Ground Floor and Part Plan of Second Floor

of rooms includes offices for the St. Louis general agent, commercial agent, solicitor and three other private offices. The iron balcony for interconnecting these offices permits utilizing the floor space to the fullest extent. All of the offices on both floors have outside windows.

PRIME MOVERS FOR CENTRAL STATIONS

In a paper read before the annual convention of the Association of Iron and Steel Electrical Engineers in New York, Sept. 28, Edwin D. Dreyfus, commercial engineer Westinghouse Machine Company, made some general comparisons of different types of prime movers for power stations. The curves in Fig. 1 were presented by Mr. Dreyfus to show the superior efficiency of the internal combustion engine within certain ranges. The gas engine also remained more uniform in efficiency through various sizes than other types. Oil engines led with an efficiency of 30 per cent to 33 per cent, referred to the shaft horse-power, whereas gas engines ordinarily showed about 23 per cent to 26 per cent heat efficiency on the same basis. Steam piston engines and turbines had a wide range of thermal efficiency from 5 per cent or less to as high as 21 per cent on brake horse-power tests. Both steam and gas engine efficiencies were reckoned on the heat delivered to the throttle valve and included no losses due to boilers or producers.

Ignorance of the fact that the fractional load consumptions of oil engines were in no wise proportionate had led to much misunderstanding of the proper conditions for which such engines were most suitable. It was also necessary to consider decline in efficiency through service. The piston type engine experienced greater losses from wear than turbines. It was true that the plates and walls of turbines might become seriously affected because of the chemical properties of the steam, but in two prominent examples of such erosive and corrosive action the efficiency of the turbine had decreased but 7 per cent to 10 per cent, whereas piston engines might suffer as much as 25 per cent impairment in efficiency.

Referring to Fig. 2, Mr. Dreyfus showed a series of curves on plant instalment costs of normal rated units, including buildings and foundations. He pointed out as a characteristic feature of the gas plant that the unit cost steadily decreased until two or more 2000-kw units are run, whereupon the investment begins to increase directly with the capacity installed. On the other hand, the kilowatt or horse-power cost on the steam turbine station constantly diminishes with increase in size. Therefore the ratio cost of steam and gas stations must constantly grow in favor of the former. This meant that the gas engine would find but limited application in the large station except where the fuel existed in a gaseous state as a by-product or until such time as coal had materially increased in price. Widely fluctuating loads were a hardship to the gas engine because the engine must be operated at a low loading, due to its limited overload capacity. The steam turbine, however, developed generous overloads and therefore could be operated at an economical rating. If the load was characterized by peaks the conditions would be still more unfavorable to the gas engine, thereby raising the ratio of cost of steam and gas prime movers over that shown in Fig. 2.

A study of the relationship of gas, steam and oil power developed the fact that a change in basic fuel conditions might easily turn the tide in favor of one type or the other. Labor was also an element to be considered. In a steam plant the wages varied from 13 per cent to 19 per cent of the total power plant charges and in a gas-producing plant from 20 per cent to 23 per cent when considering the charge at 50 per cent plant load factor with fuel at $2.50 per ton. Under the same conditions non-producer gas plants and oil engine installations paid for labor about 13 per cent to 20 per cent of the total expense. In general the labor cost in the producer plant is one and one-half times to two times that of a steam plant, depending upon the size and number of units installed. Where producers are not required the labor is practically equal and in small one-unit plants may

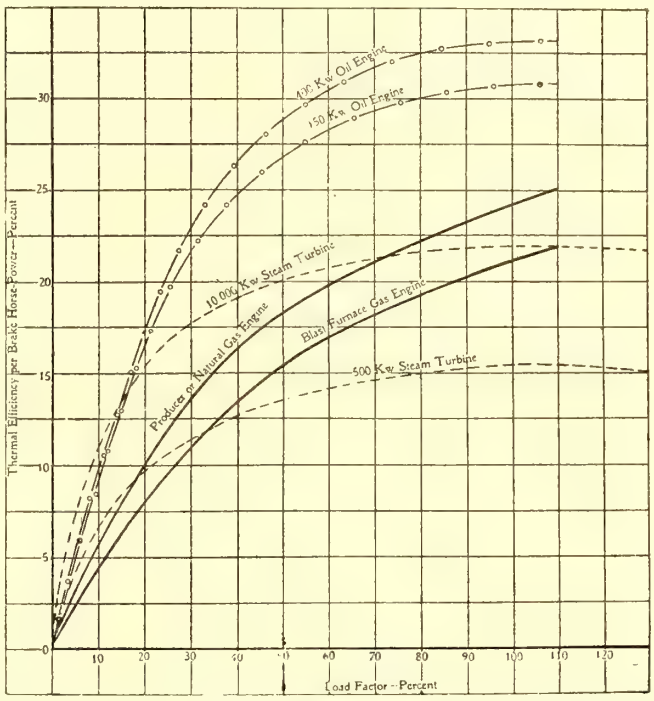


Fig. 1—Ordinary Thermal Efficiencies of Main Units Based on Total Heat Value per Brake Horse-power, with No Allowance for Auxiliaries

be less. Owing to their complexity and greater wear and readjustment gas and oil engine plants require a larger labor force than turbine installations. For these reasons the salaries of the chief engineer and his assistants should also be slightly higher, but otherwise the rate of pay should be regardless of the type of prime mover. A fair average cost of oil, waste and miscellaneous supplies was 20 per

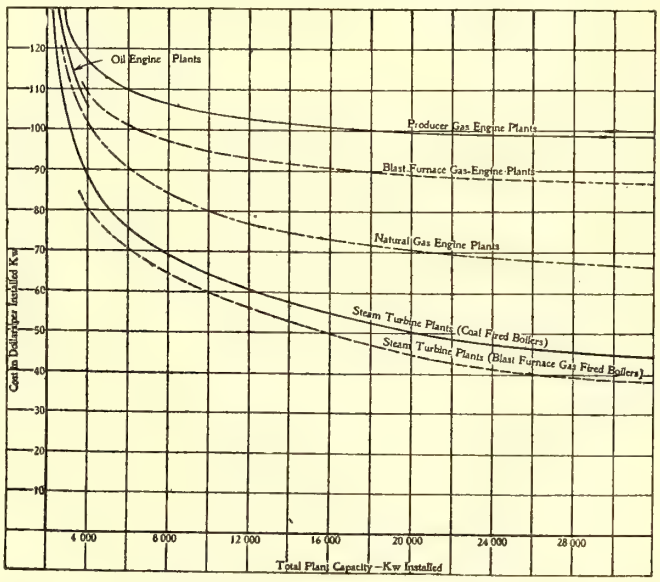


Fig. 2—Plant Instalment Costs of Normal Rated Units, Including Buildings and Foundations

cent of the labor charge. The maintenance charges from a series of analyses of actual repairs seemed to justify the following arbitrary rates: Turbine systems, 1.75 per cent at 100 per cent load factor to 1.37 per cent at 25 per cent load factor of the original cost of the plant; gas and

oil engine systems, 2.25 per cent at 100 per cent load factor to 1.8 per cent at 25 per cent load factor of the original cost of the plant. Since the initial cost of the gas engine was more than that of the turbine, the repair and maintenance charges would evidently be much greater for the gas engine than these percentages indicated.

The author concluded that in small capacities, with high coal cost and no other requirement than power, the gas engine should ordinarily prevail, the oil engine sharing where the price of oil might introduce its competition. Large stations should contain steam equipment unless exceptional conditions favored internal combustion machines.

CAR METER EXPERIMENTS IN ENGLAND

At the tenth annual conference of the Municipal Tramways Association, held in Glasgow Sept. 27 to 29, inclusive, R. G. Cunliffe, technical assistant, and J. G. Cunliffe, assistant electrical engineer, Manchester Corporation Tramways, read a paper entitled "Tramcar Meters." The authors treated the question from two standpoints; first, economical life of equipment as determined by increasing energy requirements rather than by the extent of the wear and, second, means of measuring the comparative care and skill exercised by the motorman in saving electrical energy. The authors made experiments with watt-hour meters, ampere-hour meters and time meters. As an auxiliary meter they also developed a volt-hour meter, the reading of which when divided by the time gave the average value of the fluctuating voltage along a given route. All meters were carefully calibrated, in addition to which graphical recording and measuring instruments of many kinds were employed for checking purposes under actual operating conditions.

THE AMPERE-HOUR METER

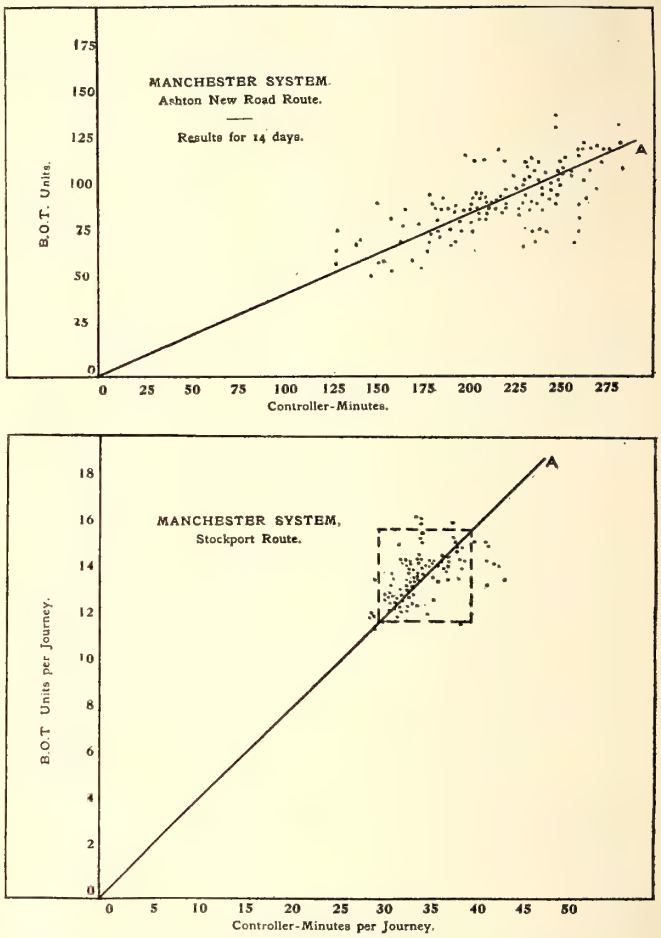
The average voltage on a route as determined by the volt-hour meter was found to be practically independent of the car on which the volt-hour meter was installed, so that a single instrument of this kind would give the true average voltage for a route. Ampere-hour meters on the same route failed to register the consumed energy by the same percentage throughout. Hence uncorrected ampere-hour meters could be employed to place motormen in their correct order of merit as regards consumption of energy, although they could not be used to determine accurately the percentage difference between the values of the various men or cars. The readings of the ampere-hour meters when corrected for the true average voltage gave the actual energy consumption. This correction needed to be applied only to average daily, weekly or monthly values for separate cars or for an entire route as desired in order to estimate the value of the line losses by comparison with the meters or to compare the consumption of cars on different routes.

THE WATT-HOUR METER

There was no direct method of checking the accuracy of the watt-hour meter under service conditions, but numerous readings were taken of watt-hour meters operating in series with ampere-hour meters and checked by volt-hour meters. Under these conditions it was found that watt-hour meters did not work very accurately on a line with wide voltage variation. The difference between the uncorrected ampere-hour meter reading and the watt-hour meter readings was found to be within the limits of permissible error of the instruments due to the difference between the average line pressure and the 500 volts for which the ampere-hour meters were calibrated. In Manchester, however, the differences between the average voltage and 500 volts were so small that it was found desirable to repeat the investigation on lines in Salford, where a voltage variation of some 30 per cent or more was available. It was found that the watt-hour meter appeared to read high at the lower voltages, the error exceeding 10 per cent on a 35 per cent voltage variation. Laboratory experiments showed that the variations exceeded 6 per cent and, of course, would be greater under conditions where fluctuations of current and voltage were simultaneous and rapid. It was evident, then, that if these results were typical of the watt-hour meter, it failed under the very conditions which would render its use desirable.

TIME METERS COMPARED WITH ENERGY METERS

If the time meter was to be of any use as a means of obtaining absolute values, that is, as an energy meter, there



Figs. 1 and 2—Car Meter Tests—Relation Between B.O.T. Units, or Kw-hours, and Controller Minutes

must be a direct proportionality between its readings and the energy consumption. Even if it was to be used only to compare motormen or cars, there must still be some relationship, although not necessarily a direct one. To investigate this relationship entire routes were equipped with both energy meters and time meters. The analyses of daily averages proved not only that the time meter could not be made to give absolute values, but, further, that it could not have been employed with fairness to the men as a means of comparison, although the general tendency of a reduction in controller time was to save energy.

Figs 1 and 2 show typical comparisons taken from practice. In commenting on these the authors said it would be apparent that if the meter in itself was to be of any value the points for individual motormen ought to lie on or be reasonably close to a straight line, such as *O A* or some other line either straight or of a continuous curvature. The fact that they do not do so proved that there was no relationship between energy consumption and controller time. This was further shown by a table giving the order of merit as determined separately from the energy meter and time meter records. In most cases there were wide variations in the two orders. Thus, the first man under energy meters was the fifth under time meters, the tenth

was the fifteenth, the fifteenth was the twenty-ninth, the twentieth was the twenty-fourth, the twenty-fifth was the twenty-second, etc.

The general tendency of a reduction in controller time to reduce energy consumption was apparent from the tests, but the energy saving was very indefinite and actual harm, it was thought, might be caused if the process was carried too far. Car meters were generally supposed to effect a saving in energy by promoting careful and skilful handling of the controller. They tended to prevent waste of energy through running with the brakes on, running on the resistance notches, approaching stops too rapidly with consequent loss in braking, etc. Without meters the motorman might like to have his brake so tight that he would only have to switch off the controller in order to stop his car. With meters, however, the motorman would complain if the brakes were set too tight and would watch jealously the state of the equipments on each car assigned to him. This attention expressed the meaning about the "moral effect" of meters. Nevertheless no amount of coercion, whether by meters or otherwise, could make a man

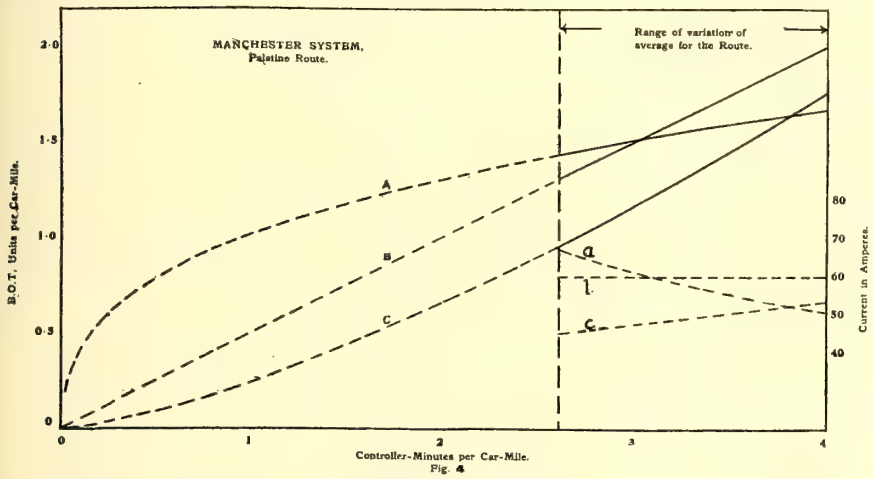


Fig. 4

Fig. 3—Car Meter Tests—Relative Performance of Three Men Over Same Route and with Similar Cars

operate skilfully if he did not know how to do so. If the full measure of economy was to be obtained better methods of instructing the motormen in the use of the controller were necessary.

Numerous experiments were made in Manchester to determine the various effects of controller operation. Although the knowledge gained was by no means complete, many interesting results were obtained. Whole routes were equipped with both an energy and a time meter on each car and separate daily records were kept for every man and car. In one case each of the twenty cars on a certain route was operated by the same two men working alternate weeks on early and late finish duty. These tests confirmed the previous observation that there was no definite relationship between energy consumption and controller time, as various motormen obtained the same kw-hours per car mile with very different controller minutes per car mile. This is shown on the curves *A B* and *C* in Fig. 3, which were platted from results given by three men on the same route with cars exactly alike. The working range was from 2.6 to 4 controller-minutes per mile, as indicated. It was evident that with the same value of energy consumption these three men would have very different meter readings. Thus, at 1.6 kw-hours per car mile, which was about the average monthly value for this route, the controller-minutes per car mile would be 3.2, 3.5 and 3.74 respectively. This variety of possible curves was the real reason why the time meter did not classify either men or cars according to their energy consumption. There was a different curve for every man according to his method of operation.

SAVINGS FROM METERS

With regard to the savings obtained from the use of meters, the authors found that under the favorable conditions existing on the Bury system a reduction of 21.79 per cent was made in energy consumption, corresponding to a saving of £41.6 per annum. It was quite out of the question to expect such results on a large city system owing to the complications of traffic and equipment. Although comparatively little could be done in car operation, there was no reason why the full saving resulting from the use of efficient equipment should not be realized.

Companies that used meters ought to exert a continual pressure on the men, as otherwise they would slip back into the old values. In Manchester it had been found profitable to fix a limiting value better than that obtained by the best motorman for each route and to encourage the men to aim at reaching that value.

CONCLUSIONS

The authors reached the following conclusions:

The ampere-hour meter can, with proper supervision, be made to operate with an accuracy of within 1 per cent. Its uncorrected values may be employed to place motormen and cars in their correct order of merit. Furthermore, when corrected for variation of average voltage by the volt-hour meter, it gives the true energy consumption. If percentage differences between the results of various men are required the corrected values must be used.

The watt-hour meter owing to its delicacy, greater complexity and greater inaccuracy is not so desirable or valuable an instrument as the corrected ampere-hour meter.

The time meter, although very accurate in its measurement of time, cannot be trusted to measure the relative consumption of energy within 10 per cent. If used at all, it should be employed only in conjunction with the energy meter for purposes of investigation, in which connection it is very valuable.

The volt-hour meter is indispensable for many purposes and ought to be employed by electric railways to measure average voltages.

On small systems with light traffic approximately equal savings may be effected in car operation and in the detection of faulty equipments, but as the traffic congestion increases the state of the equipment becomes of increasing importance.

NORWEGIAN ELECTRIFICATION STUDIES

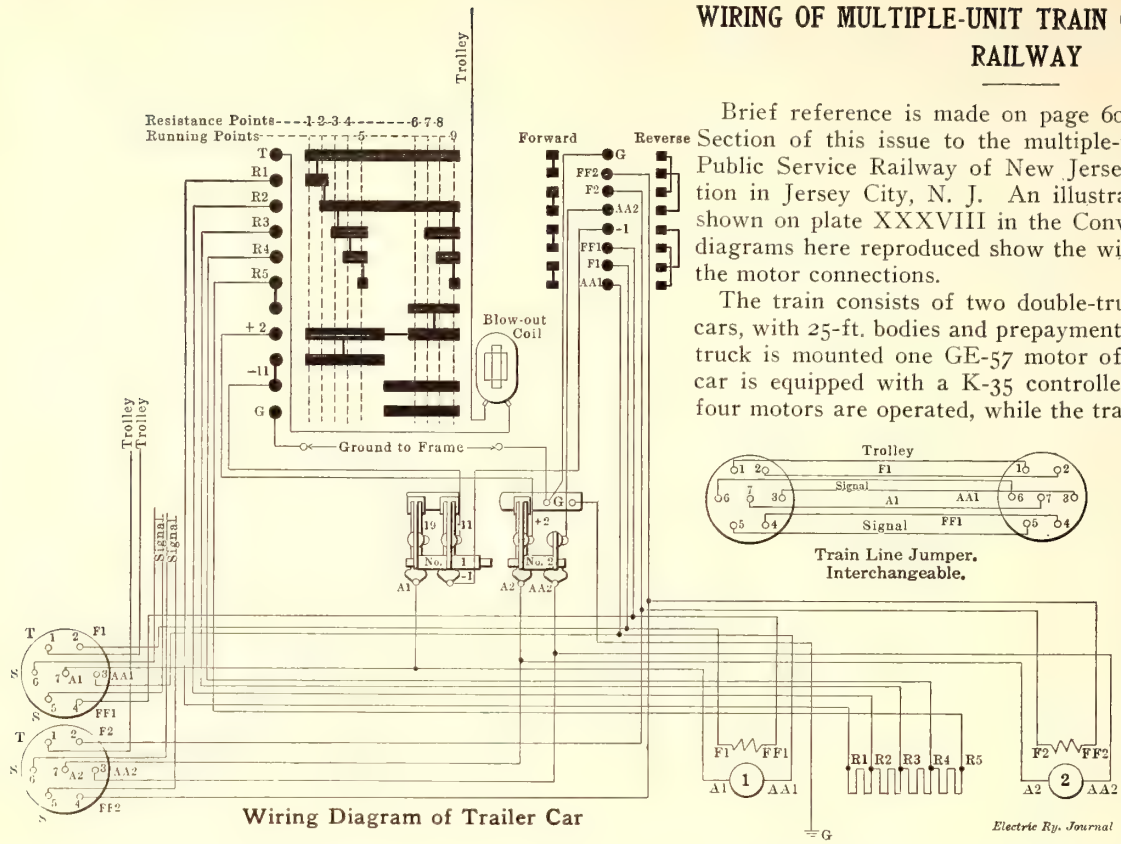
A committee appointed to look into the question of the electrification of Norwegian railways has handed in a preliminary report which strongly recommends a thorough technical study of the situation. In spite of spirited railway building in recent years, Norway's railway system is far from complete. The electric system could therefore be tried on new lines without considering the expense of replacing earlier steam equipment. The unsatisfactory traffic returns of Norwegian railroads in general make it desirable to have some cheap form of motive power, a possibility which is offered by the numerous waterfalls in Norway. The State railways have prepared some provisional plans for the electrification of a number of new and old railways, including the Christiania-Drammen Railway. Norway now has privately owned electric railway systems as follows: Hafslund-Sunnesund (transport), Christiania-Hohnkollen, Thamshavn-Lokken, Notodden-Tinoset and Rollag-Staalheim. The two last-named lines are still under construction.

WIRING OF MULTIPLE-UNIT TRAIN OF PUBLIC SERVICE RAILWAY

Brief reference is made on page 607 of the Convention Section of this issue to the multiple-unit train which the Public Service Railway of New Jersey now has in operation in Jersey City, N. J. An illustration of this train is shown on plate XXXVIII in the Convention Section. The diagrams here reproduced show the wiring of the train and the motor connections.

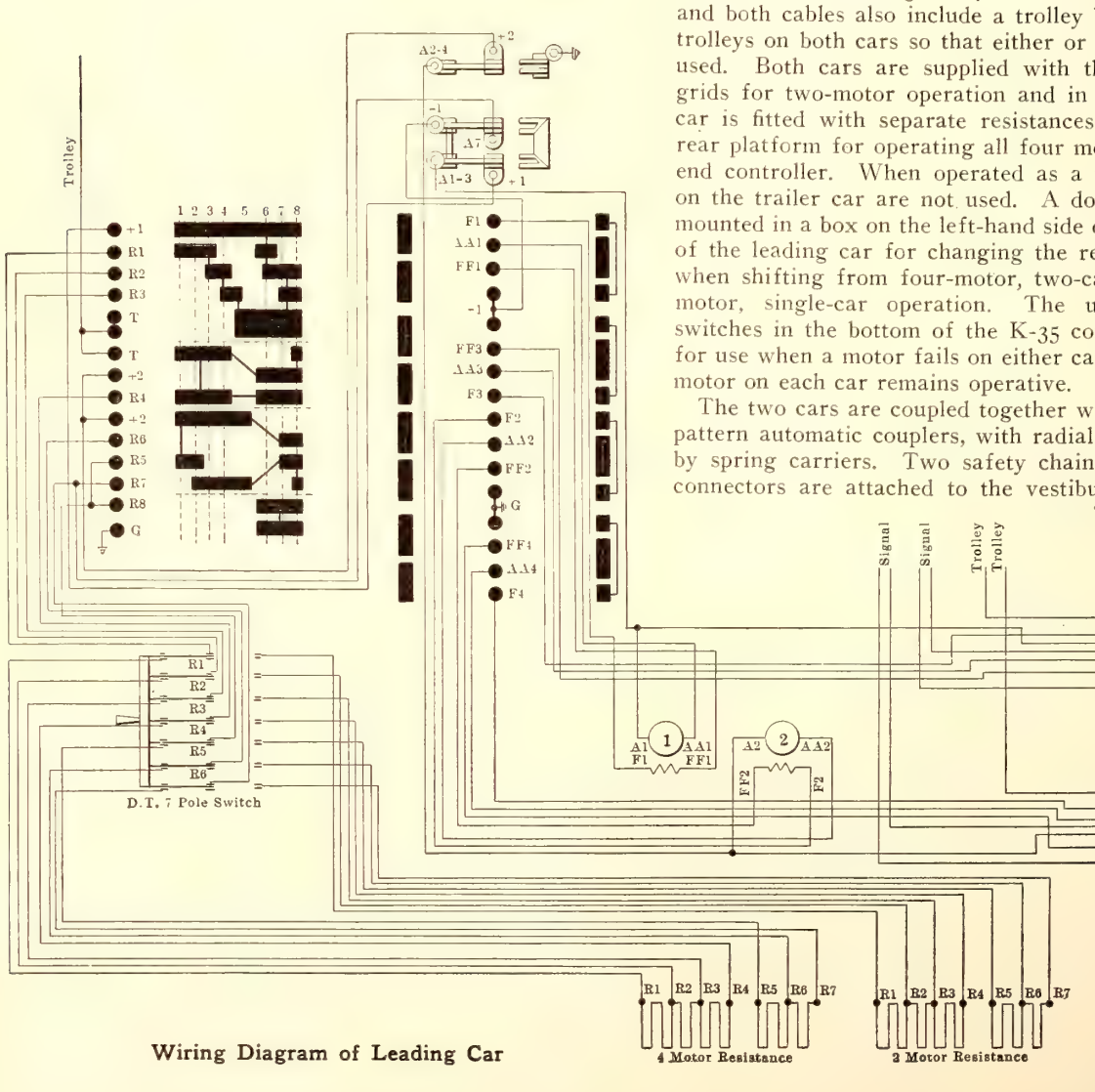
The train consists of two double-truck closed single-end cars, with 25-ft. bodies and prepayment platforms. On each truck is mounted one GE-57 motor of 50 hp. The leading car is equipped with a K-35 controller, through which all four motors are operated, while the trailer car is fitted with a K-11 controller on the front platform, through which the two motors under the trailer may be operated when the trailer is detached and run as an individual unit. The four motors are connected up with Nos. 1 and 2 under the leading car and Nos. 3 and 4 under the trailer. The leads to motors Nos. 3 and 4 are made up in separate cables and both cables also include a trolley bus connected to the trolleys on both cars so that either or both trolleys may be used. Both cars are supplied with the proper resistance grids for two-motor operation and in addition the leading car is fitted with separate resistances mounted under the rear platform for operating all four motors from the head-end controller. When operated as a train the resistances on the trailer car are not used. A double-throw switch is mounted in a box on the left-hand side of the front platform of the leading car for changing the resistance connections when shifting from four-motor, two-car operation to two-motor, single-car operation. The usual motor cut-out switches in the bottom of the K-35 controller are retained for use when a motor fails on either car. In that event one motor on each car remains operative.

The two cars are coupled together with Tomlinson heavy pattern automatic couplers, with radial drawbars supported by spring carriers. Two safety chains with spiral spring connectors are attached to the vestibules on each side to



Wiring Diagram of Trailer Car

Train Line Jumper. Interchangeable.



Wiring Diagram of Leading Car

prevent persons from stepping in between the cars. The coupler heads are fitted with automatic air-hose connectors for the brake-pipe connections between the cars. The brake equipment consists of a General Electric type CP-27 compressor on the head car and straight-air brakes with quick-action valves. A hand-brake wheel is provided on the rear platform of the trailer car for use by the conductor in case of break-in-twos or other emergencies.

The entrance and exit of the trailer car are at the rear platform only. The front platform is fitted with a single seat cushion on top of the sand box on the left-hand side and a movable double seat against the exit door on the right-hand side. The front exit door is locked and the step is covered with a shield when the car is operated as a trailer. In addition to the bell signal the rear car is provided with a switch on the rear platform which sounds a buzzer on the rear platform of the head car, and a similar switch on the rear platform of the head car can be used to sound a buzzer on the rear platform of the trailer car.

POLICY OF ENGLISH MUNICIPAL TRAMWAYS RESPECTING RENEWALS

A paper on "Tramways Finances and Policy" was read at the annual conference of the Municipal Tramways Association, Glasgow, Scotland, on Sept. 27 to 29, 1911, by Councilor James H. Rodgers, chairman of the Newcastle Corporation Tramways committee. It is mainly a criticism of many of the municipal tramways for their failure to provide reserve funds for renewals. An abstract of the paper follows:

"There are eighty-eight corporations that own and work their tramways at this time, while there are eighty-eight others that own them; these are often short lengths of line in small urban or rural districts, which are rented or have a working agreement with larger corporations or private companies to work in conjunction with other lines. My remarks will therefore be confined to the eighty-eight that are working their own tramways at present.

"We ought not to be satisfied with the knowledge that thirty of the eighty-eight tramways may be financially sound, while the other fifty-eight are either struggling to make ends meet or are kept going by the assistance of the rates.

"I have frequently been amused at these conferences, and elsewhere, by hearing speakers give figures in bulk to prove that the municipal tramways of this country are a financial success, thus:

Capital expenditure	£49,568,775
Interest and dividends	1,163,946
Repayment of debt and sinking fund	1,111,888
Reserve (including depreciation and renewal fund)	761,646
Relief of rates	346,274
Aid from rates	64,215

"These are the figures published in November last by order of the House of Commons, and are, no doubt, very interesting; but I have seen them quoted to show the success of municipal tramways, and I have seen them given also to prove how rankly bad they are. To lump figures together in this way, and use them to prove success or otherwise, is simple folly, unless all the municipal tramways were run by a large trust or company and the successful made good the losses of the less fortunate.

"The only correct way to my mind is to take separately the financial position of each.

"The first consideration of a tramways committee ought to be to make the undertaking financially sound by the building up of a sufficient reserve and renewal fund; the second consideration, to see that the traveling public is supplied with proper accommodation and facilities; the third, to see that good conditions of labor are given to all their workers; and the fourth, to see that when the first three are complied with the ratepayers who backed the bill and over whose streets the cars are run should have some return in the shape of contributions toward the rates.

"The financial safety seems frequently to be the last consideration, and not the first.

"No fewer than twenty-six of our municipal tramways undertakings are without any reserve or renewal fund at all, while many of the others are far from satisfactory in that respect. In coming to this opinion I have not set up a high standard and then judged them by it; I have really taken a very low estimate of what in my opinion the reserve and renewal fund ought to be.

"By some committees provision is made in the reserve fund for the depreciation of everything—track, car sheds, rolling stock, machinery and overhead equipment; while in others, and I believe this applies to the most of places, car sheds, rolling stock, machinery and overhead equipment are kept up out of revenue, and provision is only attempted to be made in the reserve fund for track renewals. It is from the latter basis that I propose to judge the financial position of our municipal tramways.

"The loans for rolling stock are generally for fifteen years, and I consider that, with care, the life of the cars can easily be extended over that period, and the cost of so doing be a correct charge on revenue. After the fifteen years have expired and the original debt is fully discharged, if new cars are required a loan could be got to replace them.

"The same remarks apply to machinery and overhead equipment. The upkeep of these is also in my opinion a proper charge on revenue account until the loan period has expired, and then the committees are free to borrow again if need be.

"The track, however, is in a very different position. The money for its formation is borrowed over thirty and sometimes forty years. While the foundation may last that time, I think everyone will admit the rails won't, and will need renewing long before that period is passed. In towns that are hilly or where a very quick service is given, the wear, I admit, is greater than on the level."

A list is then given of places in which expenditures out of renewals and reserve funds have been made for renewals. This is followed by a list of twenty-six places that have no reserve fund whatever. The paper then continues:

"I certainly think these places would have been well advised if they had built up their reserve funds, even though it had required a rate to do so. It would have divided the cost over some years instead of, perhaps, causing a large rate later on, leading the ratepayers of the future to make good this shortage.

"I expect it will be suggested by some that when the time does come they can borrow again to relay the track, seeing that a certain amount of the original cost will have been paid off. If you cannot have a satisfactory margin of profit now, how are you going to get it when you increase still further your expenditure on interest and redemption of a new loan? I consider that at the very least provision ought to be made to defray this cost. It is satisfactory to see that about sixty-seven of the committees are attempting to do so.

LIFE OF RAILS

"We ought, I suggest, to take a life of fifteen years for the rails. It may be quite true that on some routes a year or two longer might be possible, but on other routes the rails may have to be relaid two or three times in that period.

"Many present will have had an experience similar to that of my own committee in Newcastle-upon-Tyne, where the rails in some parts of the city are lasting fairly well, while others, I am sorry to say, are not. In fact we are having for the second time to relay some, although we have not yet been running ten years.

COST OF RENEWALS

"It is generally accepted, I believe, that the net cost of relaying will be about £4,000 per single mile of track, but experience shows it is frequently higher. The inland revenue authorities, who are never eager to make allowances, have agreed, I think, to the allowance of £4,400 per single mile of track for this purpose. I have noticed that in several districts where renewals have already taken place the cost is oftener higher than lower. In one town I find, from its published accounts, the cost of relaying a little over six miles was £33,000, which is over £5,000 per mile.

"What I suggest, then, is that £200 per mile of single track ought to be set aside each year, and if that amount was invested at 3½ per cent in fifteen years you would have £3,800 for each mile of track, and thus be able to relay your rails as they were required. I do not think it can be said that I am placing the amount too high; personally, I consider I am keeping the figure very much on the low side.

"It must not be overlooked that all the money would not be invested during the fifteen years. Some of it would be drawn out long before the time had expired to relay those places that had worn out quicker than the others; thus the interest on such money would not be earned. In that case the money would not represent £3,800 per mile, but something less than that amount.

"In suggesting £200 per mile I wish it clearly to be understood that I do not suggest that as the maximum, but as the extreme minimum.

"Many of the committees, I am sorry to say, appear to think a reserve and renewal fund is quite unnecessary; while others seem to think a few thousand pounds is all that is required, and then hand their surplus over to the rates. To give something to the rates no doubt brings them a great deal of *éclat,* but will it be the same when the time comes to relay their rails and they have not the money to do the work? Will they then receive the plaudits and congratulations of the ratepayers, when they have to levy a rate so that the system may be again put into proper working order?"

A list of thirty-four tramways that showed a loss on their operations last year is then given. The paper continues:

"This is an increase of five over the previous year. I greatly fear that the list will be extended considerably unless some of the committees alter the present policy of handing over all, or the greater part, of their surplus to the rates, and of granting further concessions to the public and the workmen; the incomes of the systems will not allow them to do so."

CLASSIFICATION OF PROPERTIES

The paper then gives statistics of the operations of various tramway systems, which are divided by the author into four lists according to the outcome of their operations. The lists show the number of years that the properties have been operated, the miles of track, the surplus required on the basis of £200 per annum per mile of track, the actual surplus realized, the amount handed over in relief of rates, the amount set aside for renewals, the total amount in the reserve and renewal fund, and the total amount expended out of the reserve or renewal fund for all purposes.

List No. 1 shows thirty undertakings which in the opinion of Mr. Rodgers are doing well. In only three of these cases did the committee place less than £200 per mile in the reserve and renewal fund.

List No. 2 gives the names of fourteen tramways, each showing in the opinion of the author fairly good results. In his judgment the committees in charge were not justified, taking into full consideration the low state of the reserve and renewal funds, in paying the amounts which they did toward the rates. Commenting on these lists and several specific instances to which he calls special attention, Mr. Rodgers says: "It is a great mistake to risk the financial safety of such splendid undertakings in that way."

List No. 3 contains names of sixteen tramways, all of which showed a surplus on the operations of the year, but not sufficiently large to allow a provision of £200 per mile of single track for the renewal fund. The author contends that unless that can be done the tramways are not in a sound financial condition.

List No. 4 shows thirty-two tramway undertakings which reported no surplus at all. All but three of these showed a net charge upon the rates. The paper says that this list will receive additions from list No. 3 unless the committees responsible alter their present policy and see that the tramways are placed on a sound financial basis. Continuing, the paper says:

"I think the committees would do well to consider their position and see if the losses are not caused by having reduced their fares too low, and by giving other concessions which the moderate amount of traffic they carry does not warrant them in granting.

"On my fourth list I have placed a column showing the number of times the different places carry their population in the year; it is surprising to find such a small traffic return notwithstanding that many of the places have adopted the half-penny fare stages which are supposed to increase traffic, if not receipts.

"I hope it will not be thought that I am hostile to the municipal trams; I can assure you that I am not. My only desire is to endeavor to obtain a greater interest in the financial position of the several undertakings by the responsible committees, and to prevent, if possible, the municipal trams from becoming a failure and a permanent charge upon the ratepayers, or perhaps handed over to some private company to make a success where municipalization had failed.

"I am a great believer in corporations owning and working their own tramways; but I also believe that when it is done, it ought to be done on purely business lines.

"Any chairman or manager will tell you that at the present time it is almost impossible to do this. You have members of the councils voting away the profits to the relief of the rates, irrespective of any future requirements in the way of renewals.

"There are others who contend that the ratepayers are not entitled to any financial assistance by contributions toward the rates; that any surplus should be used in giving better and cheaper facilities to the car users, and in granting extra good conditions of labor to the employees.

"With this policy I also entirely disagree; the ratepayers, I consider, for several reasons have a right to expect a return sooner or later.

"I believe in giving every facility possible to the public, consistent with the yield of an adequate profit; but I do not see why we should run cars at a loss, or even at a loss of profit, for the sole benefit of the riding public, when frequently one-third or more of those using our cars may be non-residents in our districts.

"Why should we run, say, a five-minute service at a loss, if a ten-minute service could be run for a profit? Or why should we have half-penny fares, when it perhaps takes a penny fare to pay the cost? No business company would do it; then, why should the municipal corporations?

"The policy of some of our committees would really make one believe they cannot appreciate the difference between a city like Glasgow, with its population of over 1,000,000, carried over 200 times every year, and a district with its 30,000 or 40,000 inhabitants, whose population is only carried by the trams forty or fifty times in the year. In Glasgow, or two or three other cities with their densely crowded streets, a half-penny fare may be both useful and successful; but that, I think, cannot be said of thinly populated areas.

"In no fewer than twelve towns where losses are made

each year the committees have granted half-penny fares; while in six others where the profits are not sufficient to make proper provision for track renewals the committees have made the same concession.

"In only ten places that may be looked upon as financially successful are half-penny fares allowed.

"This goes to prove very clearly, I think, that half-penny fares ought not to be given, especially by small tramway systems; even the larger systems should be exceedingly careful before granting such facilities.

"I shall now refer to what I consider another mistaken policy which some of our committees have adopted, viz.: the running of cars at cheap fares each morning. In several towns all passengers are allowed to travel at half the ordinary fare up to 8 and 9 o'clock in the morning, issuing return tickets at the same rate in many places; that, to my mind, is undoubtedly a great mistake and a decided loss to those undertakings.

"Excepting six towns, we all, I believe, run workmen's cars. I wonder how many make them pay; very few, I should think, if any.

"I do not say we ought not to run workmen's cars, but I do contend that we ought to have a return from these cars sufficient at least to pay the cost of working them; they ought not to be a charge upon the undertaking.

RELATIONS WITH EMPLOYEES

"We have had recently several strikes, and others threatened, and a general feeling of unrest has been exhibited by the men.

"Personally I think this unrest arises very largely from a misconception on the part of the men. I rather think they have got the idea which is put forward by some members of the councils and others that they ought to be the first and last consideration of the committees; that the trams are a kind of copartnership arrangement, they being the only partners, and that any surplus ought to be expended in giving them shorter hours and more money; but should any loss occur, the ratepayers can make that good.

"This, to my mind, is altogether wrong. I believe in dealing with the men fairly and even generously. We ought to give them a somewhat higher wage than that paid in the respective districts to men doing the kind of work from which our employees are generally drawn; we ought to grant them reasonable hours of labor, and these ought to be worked in the least possible compass; we ought to do our very best to ease away any irritation that may from time to time arise.

"We have no right to raise those men to a position equal with skilled mechanics, who have had several years to serve to learn their trade.

"A skilled mechanic has frequently to suffer financial loss from slackness of work; all his holidays, compulsory and otherwise, are deducted from his wages, and he must purchase all his own working apparel, while the tramway employee is provided with a full uniform, is allowed holidays each year with full pay, and enjoys regular work, without any lost time, unless it is caused by his own neglect.

"If, then, we compare the average income of the two, it will be found that the wages and emoluments of the tram employees, who are generally drawn from unskilled labor, will equal the net income of the skilled artisan. To place him higher still, either by granting more wages or by reducing his hours of labor, would, in my opinion, be not only an injustice to the trained mechanics, but quite unfair to the undertakings we have to manage and direct.

"I do not suggest that employees on all tramways are quite free from grievances. That would be almost an impossibility, but I do think that any grievances they may have could easily be put right by a conference between the manager and representatives from committee and men.

"It is certainly not for the benefit of either the employees or the general public to make things so difficult that the tramway undertakings cannot be made financially successful by the corporations. If committees are driven into excessive expenditure, and their undertakings become a regular charge upon the ratepayers, we can rest assured that in a very little while the latter will rebel and endeavor to free themselves of the incubus; they will demand that the tramway undertaking shall be handed over to private enterprise to make the best of it, and thus free themselves of the yearly loss."

DISCUSSION AT TACOMA ON MEDICAL TESTIMONY IN ACCIDENTS

The subject of medical expert testimony in accident cases was the topic for discussion at a banquet of the Stone & Webster Club which was held at the Tacoma Hotel, Tacoma, Wash., on Sept. 13. The toastmaster of the evening was E. H. Odell, general claim agent, Puget Sound Electric Railway. The first speaker was Dr. Read, who considered the relations of the courts to the medical expert, the lack of legal control of the medical witness, and finally the duties of the medical witness.

With regard to the relations of courts to the medical expert, he pointed out the deplorable conditions due to having highly technical questions decided by juries and judges, who are laymen, and therefore not competent to distinguish right from wrong in the statements made by conflicting experts. The lack of legal control of the medical witness was largely the fault of the courts and of the absence of a little suitable legislation. As a rule, competent physicians did not differ in cases of injury or disease when they met at the patient's bedside or in consultation. There should be no greater differences of opinion when like matters are brought into litigation. Lawyers always differed and selected the medical expert as the butt of their differences. Opposing counsel rarely interpreted the law alike. Medical experts would become more and more discredited until there was some law which defined their status and the conditions under which they should be allowed in court.

With regard to the duties which a witness owed to the public, he said that he was remiss when he allowed either party in the litigation to use him as a tool for selfish ends. It was the contingent fee that made the doctors and lawyers for the prosecution so positive in their questions and answers.

Conditions would be bettered if cases which involved expert testimony were taken out of the hands of juries. The courts could be assisted in reaching a decision by their own experts who had been selected in competitive examinations. Furthermore, no physician should be permitted to give any testimony except that which related to his personal knowledge of the case nor should he receive more than the customary medical fees for his court services. His testimony should be reviewed by court experts paid out of the public funds.

Reply to Dr. Read was made by Hon. John A. Shackleford, president of and counsel for the Tacoma Railway & Power Company. He did not believe in the abolition of the jury system unless something better could be substituted for it. A new system in which questions of fact would be submitted to judges would, he thought, fail to produce better results, because three or five judges were far more likely to split hairs about technicalities than a dozen plain jurymen. He hoped to see the time when most expert questions would be submitted not to juries or judges, but to special commissions.

Dr. L. L. Love, surgeon for the Tacoma Railway & Power Company, mentioned his court experiences. He always tried, he said, to tell the truth, but it seemed to him that his testimony became of little value as soon as he admitted that he was an employee of the railway company.

Dr. W. C. Cox, surgeon for the Everett Railway, Light & Water Company, agreed with Mr. Shackleford that expert testimony cases ought to go before commissions.

Dr. Park W. Willis, physician and surgeon for the Seattle Electric Company, said that juries should not be allowed to pass upon matters over which experts themselves were in doubt, but nevertheless they could be trusted to decide questions of simple fact even in medical cases. The value of testimony was not necessarily impaired because the physician happened to be an employee of the railway. It depended largely upon his own attitude and personality. He could not be discredited if he never testified to anything that he did not know, no matter how small a detail it seemed.

Frank D. Oakley, trial attorney for the Tacoma Railway & Power Company, said that many misunderstandings in expert testimony cases were due to the excessive and often needless use of technical terms. The Supreme Court of the United States had rules that a federal judge had no authority to appoint a physician to examine the plaintiff, and if he should do so the verdict would be reversed and a new trial granted. In most cases the medical expert who appeared for the plaintiff was one of the ablest men in his profession. The railways who were fighting these cases should also be willing to get men of standing and give them ample compensation.

CONVENTION NOTES

PROGRAM FOR ENTERTAINMENTS

The entertainment committee of the American Electric Railway Manufacturers' Association has announced certain features which have been decided upon in connection with the annual reception. This reception will be on the evening of Monday, Oct. 9, and will be held on the Convention Pier, which is to be the center of all of the events on the entertainment program. The reception will begin at 9 o'clock and the following booths will be reserved for the convenience of the officers and ladies of the various executive committees: American Electric Railway Association and American Electric Railway Manufacturers' Association, booths of the Dearborn Drug & Chemical Company and The J. G. Brill Company; American Electric Railway Engineering Association, booth of the Pennsylvania Steel Company; American Electric Railway Transportation & Traffic Association, booth of William Wharton, Jr., & Company; American Electric Railway Accountants' Association and American Electric Railway Claim Agents' Association, booth of the General Electric Company.

The reception will be preceded by a musical program lasting for about an hour. After the reception there will be informal dancing in the ballroom in which the reception is held on the Convention Pier.

Special attention has been given to this year's concerts. Wassili Leps, conductor of the Philadelphia Symphony Orchestra, will have charge of the music for the entire week. Mr. Leps has achieved marked prominence in Philadelphia among the critics, and his morning and afternoon concerts will undoubtedly be appreciated by the ladies and gentlemen of the various associations. At the concert held in connection with the reception on Monday evening Miss Charlotte Guernsey, operatic soprano of the Philadelphia-Chicago Grand Opera Company, will render a special program and will be accompanied by Mr. Leps' orchestra of thirty pieces. The Leps orchestra will give two other concerts at the Pier on Monday, one at 11:30 a. m. and the other at 3 p. m. Special musical programs in pamphlet form have been prepared showing the entire week's music.

ROLLER CHAIR SERVICE

A special effort has been made this year to have the roller chair service attractive, effective and efficient. The chairs, of course, will be furnished from stations at Convention Pier, at the Marlborough-Blenheim and at the Chalfonte to those wearing the official badge without charge between the hours of 9 a. m. and 7 p. m. In addition, on Monday, Tuesday and Thursday evenings roller chairs will be furnished to convey the delegates to Convention Pier. The chairs are, of course, furnished at appreciable expense for the convenience and pleasure of all members and guests of the different associations, and it is hoped that the members will take throughout the week full advantage of this special privilege.

OBSTACLE GOLF

Another entertainment feature which promises to be popular is the obstacle golf contest, which may be played on the side lawn, Marlborough-Blenheim Hotel, any morning and afternoon. On this lawn is a small nine-hole course with all kinds of fool hazards. A round can be played in twenty minutes. Any person who is mechanically or intellectually inclined, but has no other knowledge of golf, is able to play this game as well as the veteran golfer. Such a course at the Cooperstown convention of the Street Railway Association of the State of New York last June created all kinds of fun and sport.

THE CHICAGO TRAIN

The transportation committee in charge of the special train to Atlantic City from Chicago reported on Monday morning that all reservations had been taken and that fourteen cars would be required to carry those who had applied for accommodation on this train.

ARTIFICIAL LEATHER FOR CAR SEATS

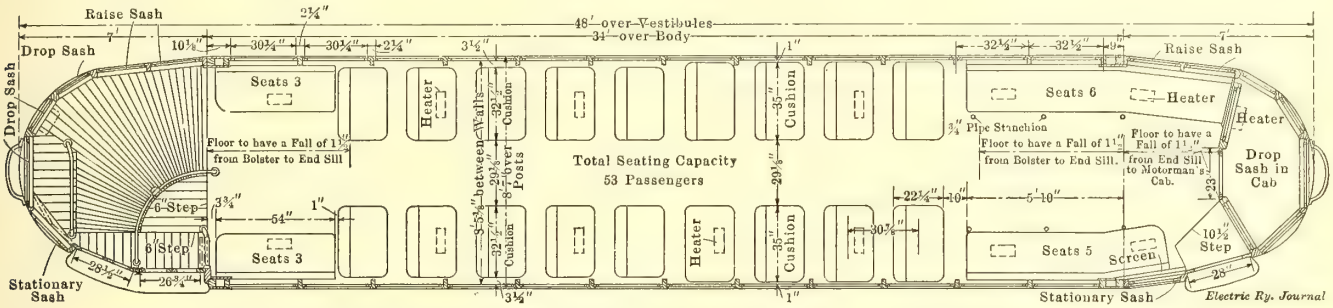
The I. E. du Pont de Nemours Powder Company, Wilmington, Del., is making an improved artificial leather known as Fabrikoid. This material is designed for most of the uses of natural leather as well as for other purposes for which the latter is not adapted. Its principal field in electric railway work, however, is for car seats, for which it appears especially desirable because of its durability and sanitary qualities. It is stated that Fabrikoid is tough, pliable or non-cracking, stain-proof and washable with soap and water. This material is made of any desired color, grain and finish in various convenient widths up to 54 in. in continuous rolls of 30 yd. to 60 yd. with cloth backing. It can be matched with previous installations far more easily than natural hide leather.

A. H. Carlisle, of Carlisle & Company, New York, N. Y., has recently returned from London, England, after organizing the P-A-Y-E (London) Syndicate, Ltd. This syndicate is about to incorporate the International P-A-Y-E Tramcar Company, Ltd., which will own the patents and the license to manufacture prepayment cars in the continent of Europe, including Great Britain and Ireland. The British Electric Traction Company at the present time is placing prepayment cars in operation at Gateshead, England. Negotiations are also under way to introduce prepayment cars in Milan, Italy, and Paris, France. Mr. Carlisle reports great interest in the prepayment car among the electric railway managers on the Continent and in England.

It is stated that the Japanese government has authorized the municipality of Tokio to take over the electric tramways of the city. It is proposed to abolish 13 miles or 14 miles of the existing lines and to construct five new lines, three of which were especially ordered by the government to be completed by July 31, 1916. An endeavor is to be made to finish the lines by the end of 1914. The municipal authorities propose to build about 500 new cars. It is stated that electric lighting will first be transferred to the city, for the Tokio electric tramways have their own electric lighting department, which the city will now have to maintain.

COMPOSITE WOOD AND STEEL CARS FOR KANSAS CITY

The Metropolitan Street Railway Company, Kansas City, Mo., has just received from the Cincinnati Car Company twenty-five cars of the design shown in the accompanying illustrations. These cars are similar to the twenty-five which were built for the same company last year. Their principal features are the straight steel plate sides which form a stiff girder and eliminate both upper and lower trusses; the narrow side wall which is secured by using raise instead of drop sashes; the cross seats, which are bolted directly through the side steel plate; the arch type roof, which is lighter and costs less to maintain than the monitor deck, while giving greater stiffness to the upper part of the car body and permitting more effective ventilation.



Plan of Kansas City Single-End Prepayment Car, Showing Ramp on the Conductor's Platform

The cars are arranged for single-end prepayment operation with the vestibules at each end inclosed on the devil-strip side. This prepayment method, which was designed by the Metropolitan Street Railway, embodies several interesting features. As indicated on the accompanying plan, the body flooring at both ends of the car has an inclination of 1½ in. from the end sill to the body bolster. The entrance on the rear platform is inclined 12 in. from the floor at the entrance door opening to the end sill, as shown in one of the halftone illustrations and the plan. This ramp is provided with strips of Mason safety tread. This arrangement gives an exceptionally low step from the rail to the step tread. The step opening at the rear vestibule has one set of double folding exit doors and one two-part sliding entrance door, both of which are manually operated by the conductor. Four steps are required from the rear exit of the car body to the pavement. Pipe division rails divide the entrance from the exit and also divide the conductor's stand from the entrance. The conductor's position is at the extreme rear of the platform behind the railing, whence he has a clear view of both passages while always facing passengers inside the car body. He can observe patrons approaching the entrance from the front before giving the signal to start the car.

The motorman's cab partition extends the full width of the front vestibule. It is glazed in the upper portion to give the motorman a clear view in every direction. The single sliding exit door at the right-hand front end is hand-operated by the motorman. A small mirror on the vestibule post on the motorman's right hand enables him to observe the movement of passengers who are leaving via the front exit. As there is no bulkhead at either end of the car, the full opening between the corner posts is obtained.

The principal dimensions of the car are as follows: Length over the corner posts, 34 ft.; length over the bumpers, 48 ft.; length over the rear platform, 7 ft.; length over the front platform, 7 ft.; width over the side posts, 8 ft. 7 in.; height from the bottom of the sill to the top of the roof, 8 ft. 9¾ in.; height from rail to the bottom of the sill, 33¼ in.; truck centers, 21 ft. 10 in.; wheel base of trucks, 4 ft. 10 in.; diameter of the wheels, 34 in.

The underframing is of composite construction, the side sills being formed of yellow pine plated on the outside with 3-16-in. x 32-in. steel plate, both the sill and plate extending the full length of the car body proper. The steel plate forms the side wall of the car body below the windows. The end sills and cross joists are of oak reinforced with steel angles and plates respectively. The platforms are supported on the step side with 7-in. steel channels and on the closed side by 3-16-in. x 42-in. steel plate, which forms the outside sheathing of the vestibule. This steel plate is spliced to the 3-16-in. x 32-in. car body steel plate, thereby dispensing with the usual under platform knee at this point and saving weight. The two center platform knees are of 4-in. x 3-in. x 3-8-in. steel angles spaced to accommodate drawbars.

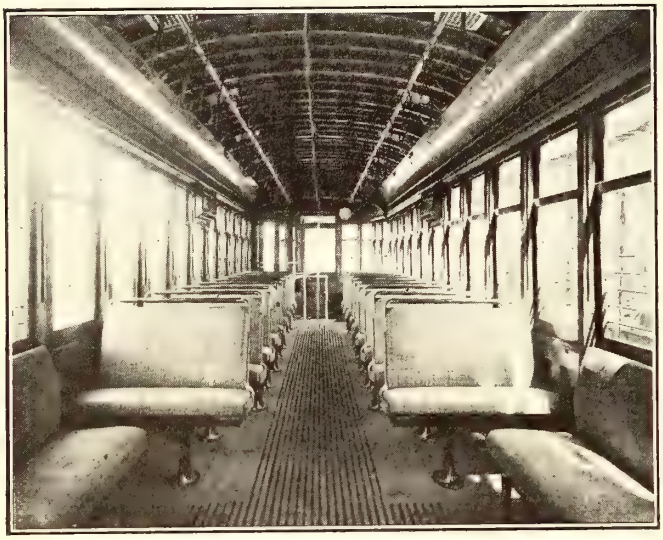


Single-End Prepayment Composite Wood and Steel Car Used in Kansas City, Mo.

There are twelve windows on each side of car, each in two parts; the upper part is stationary and the lower part is arranged to rise straight up behind the letter board. The windows have the Dayton Manufacturing Company's raise sash locks, racks and compression rollers. There are ten ventilators per car mounted on the roof beside the trolley boards. The openings to the interior of the car are equipped with Hart & Cooley pressed metal registers measuring 9 in. x 9 in. The interior view shows eighteen Hale & Kilburn steel cross seats and the longitudinal corner seats. The total seating capacity is 53.

A Willard storage battery is employed for operating signal push buttons and for operating the tail lamps when the trolley current fails. The fare register is installed inside of the rear vestibule over the position of the conductor, who operates it by pedal mechanism.

The cars are mounted on Standard Motor Truck Company's No. O-50 trucks with 34-in. forged steel wheels.



Interior of Kansas City Car, Looking Toward Rear Platform

The electrical equipment consists of four Westinghouse No. 306 interpole motors with single-end K-35 control. All the power wiring is run in iron conduit underneath the car floor. The air brakes are of the National Brake & Electric Company's straight-air type. The weight of the car complete ready to run is 48,400 lb., or 913 lb. per seated passenger.

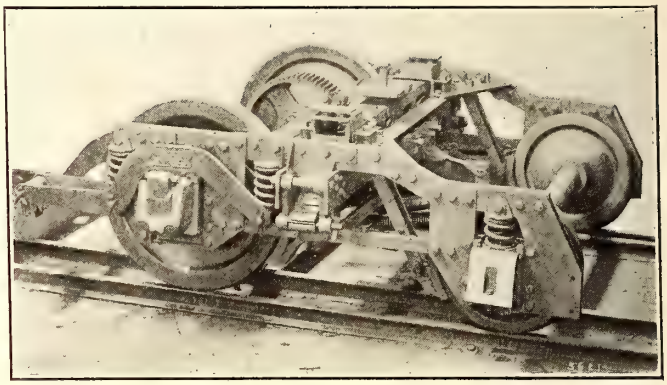


Ramp for Entering Passengers on Rear Platform of Kansas City Car

The special equipment consists of Metropolitan Street Railway standard sanders, radial couplers, corrugated buffers, International fare registers, Consolidated electric heaters, Faraday buzzers, United States No. 1583 headlights, Eclipse fenders, Peacock hand brakes, cast-steel body bolsters and Curtain Supply Company's No. 49 Pantasote curtains.

TWO NEW TYPES OF SINGLE-MOTOR TRUCKS

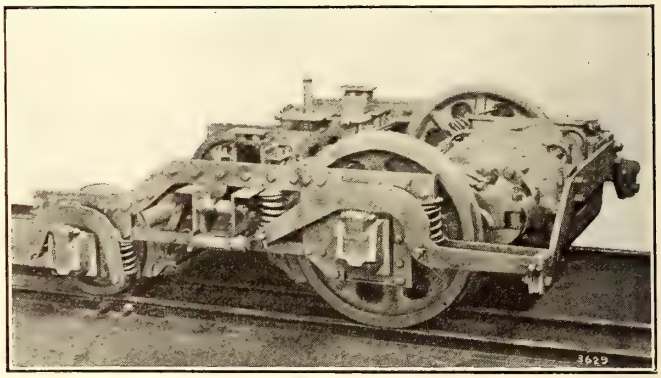
The Baldwin Locomotive Works, Philadelphia, Pa., have recently built for the Philadelphia Rapid Transit Company and the Richmond & Henrico Electric Railway two types of single-motor trucks in which several new features are embodied. The trucks built for the Philadelphia Rapid Transit Company are designated by the builders as class 54-18-M. They have a wheel base of 54 in. and are designed to carry a load of 18,000 lb. on the center plate. Each truck carries a GE-70 motor supported with the Baldwin system of equalizing beams over the journal boxes of the driving axle. The side frames of these trucks are of



Single-Motor Truck for Philadelphia Rapid Transit Company

bar iron, 1½ in. x 4 in. in section and placed vertically to secure maximum strength. The pedestals are of steel plate, fitted with removable malleable iron gibs. The transoms are 3¾-in. x 7-in. channels secured to the side frames by a single gusset plate on each side. This plate is cut out to provide clearance for the bolster and is flanged to form a suitable bolster stop. The bolster is of cast steel, supported at each end by a half-elliptic spring suspended by links.

The pony axle supports one end of the side frames through coiled springs placed over the journal boxes. On the motor end the equalizing beams fulcrum directly on the journal boxes and the motor suspension bar is hung from the outer ends of the beams. The weight is transferred to the truck frames through coiled springs, which are so located that the motor reaction on the frames is always upward and the tilting effect on the frames when the motor is developing torque is reduced to a minimum.



Single-Motor Truck for Richmond & Henrico Electric Railway

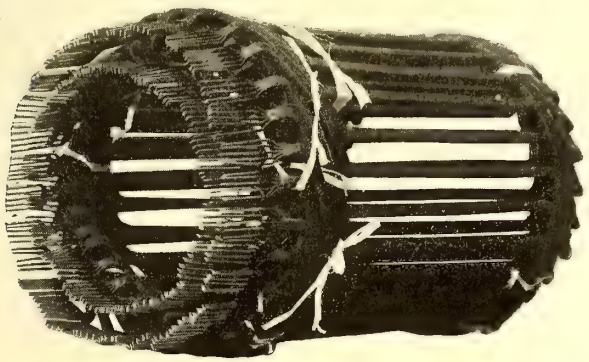
The wheels are of forged and rolled steel, 33 in. and 22 in. in diameter, and the journal boxes are of liberal size, so that sufficient packing can be carried to insure effective lubrication. These trucks weigh 2750 lb. without wheels, axles, boxes and motor. The weight complete without motor is 5400 lb.

The trucks built for the Richmond & Henrico Electric

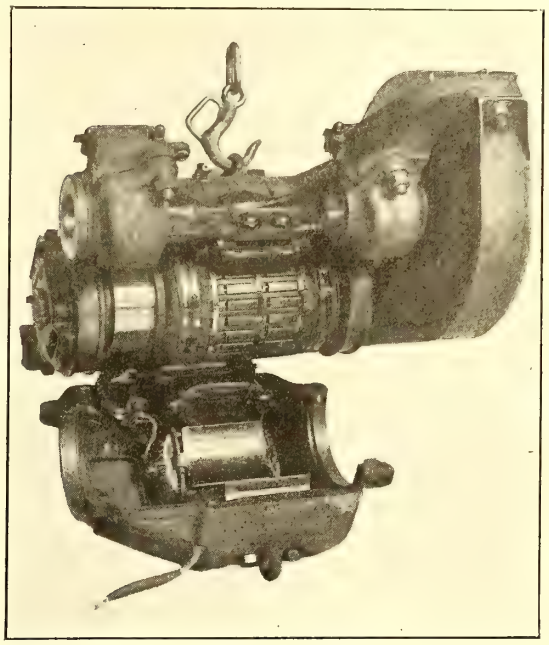
Railway are very similar to those built for the Philadelphia Rapid Transit Company. They have a wheel base of 56 in. and a carrying capacity on the center plate of 20,000 lb. The principal difference between these trucks and those built for the Philadelphia Rapid Transit Company is in the method of supporting the load on the journal boxes of the pony axle. The pony axle journal boxes carry yoke-shaped equalizers and the load is transferred to these equalizers through a coil spring on each side of the box. The driving wheel equalizing beams are arranged precisely like those of the Philadelphia truck and the arrangement of the frames, pedestals and transoms is also the same. The Richmond trucks will be fitted with one Westinghouse No. 310-D motor.

INTERPOLE RAILWAY MOTOR FOR LIGHT SERVICE

Anticipating the demand for a 500-volt to 600-volt interpole motor of 32 hp to 38 hp, to supersede old non-interpole motors in light city service, the Westinghouse Electric & Manufacturing Company has recently developed a new motor, the No. 323, shown in the accompanying illustrations.



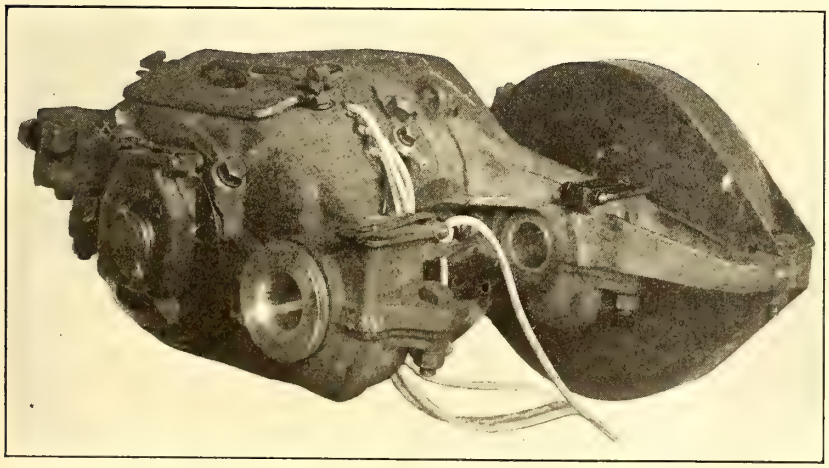
Complete Set of Two-Turn Strap Armature Coils



Interpole Motor, Showing Field and Armature

Among its advantageous features are light weight, split frame, superior spider construction, bolted commutator, strap-wound armature coils and double-stud brush holders.

The frame is of cast steel and is divided horizontally. Armature, bearing housings and field coils may be removed without jacking up the car and removing the truck.

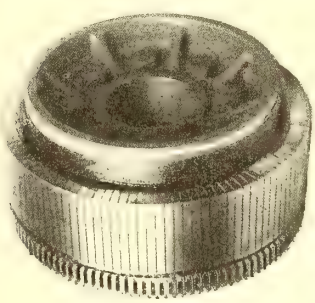


Small-Size Interpole Motor

A large opening is provided above the commutator for ready access to the brush holder. A cover is furnished which is securely fastened to the frame with a T-bolt and a dam-locking device.

The armature and axle bearings each have two separate oil compartments connected at the bottom. The large reservoir is filled with long fiber-wool waste, through which all the oil is filtered while being fed to bearings by capillary attraction. The small pocket is an individual gaging chamber which enables the inspector to measure the oil and thus prevent waste. The field coils are strap-wound, impregnated, and equipped with heavy cushion springs to prevent vibration. In the armature coils wires of rectangular cross section are used to utilize space to better advantage than round wires. There is also a tendency for round wires to cut into the insulation, due both to tension in winding and to chafing in service. Great stress can be applied in winding a strap coil with small likelihood of injuring the insulation, as the pressure is distributed over large surfaces. While being made, the coils and leads are formed into the exact contours they should assume in the armature slots, so that no bending or excessive forcing is necessary to insert or connect them.

The spider armature construction makes it possible to remove the shaft whenever necessary without injuring the windings. The spider also reinforces the shaft so that the probability of bent shafts is reduced to a minimum. The commutators are bolted, a construction to prevent the bars from becoming loose. The mica extends beyond the bars in the rear of the commutator to eliminate the possibility of short circuits between segments. The mica is slotted below the surface of the bars to insure uniform wear on both the commutator and the brushes and also to prevent the flashing and flat spots which are caused by the jumping of the brushes over the high mica.



Bolted Commutator

The weight of the complete motor is 1890 lb. The clearance of lowest point of motor above rail with 30-in. wheels is 2½ in. The minimum distance required on axle between finished wheel hubs is 37 in. The over-all height of the motor is 24½ in.

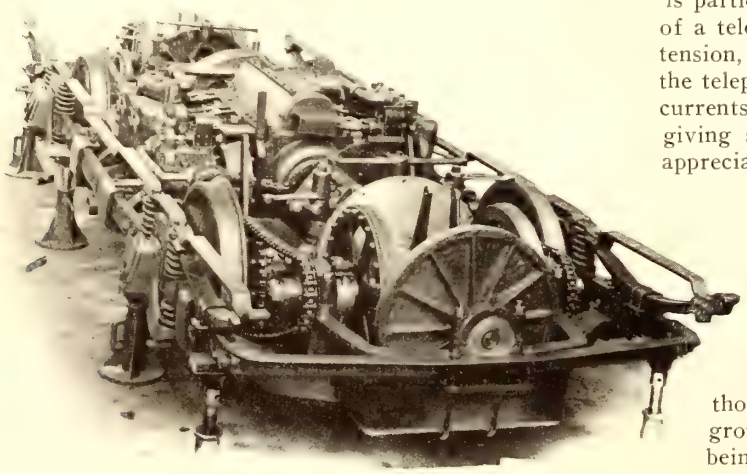
NEW GASOLINE CAR

An article on page 666 of the Oct. 8, 1910, issue of the Electric Railway Journal described a 32-ft. gasoline motor car built by the Railway Motor Car Corporation, Philadelphia. Two of these cars have been built and have been in operation for periods of six and twelve months respectively. One is on the system of the Schuylkill & Dauphin Traction Company, Williamstown, Pa., the other on a branch of the Pennsylvania Railroad at Millersburg, Pa. The success with these cars has encouraged the Railway Motor Car Corporation to build a larger, heavier and more powerful car designed for interurban service. This car is known as type C.



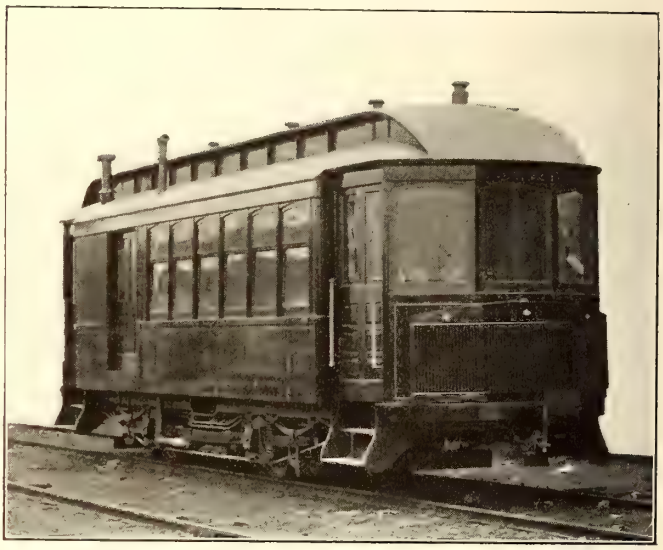
Type B Car of 60-hp Mounting a 10 per Cent Grade on Schuylkill & Dauphin Railway

The accompanying half-tone engraving of the truck of a type C car show the peculiar friction drive employed. The truck is equipped with a 115-hp, 4-cycle horizontal gas engine carried in the center of the truck and driving a longitudinal shaft provided at each end with two disk wheels 30 in. in diameter. Between these two disks on each end of the truck are two additional steel contact disks which are provided with fiber rims, and by a system of levers they may be pressed against either of the driving contact disks. The driven interior disks may also be moved on the shaft on which they are mounted in and out from the center of the driving disks. In this way variations in the speed of the car may be secured without any change in the speed of the engine, which runs continuously. The four driven disks are mechanically connected with each other so that they move in unison, and their position on their shaft is controlled by the motorman from either end of the car.



Type C Truck

The weight of the engine, disks and other parts of the motive machinery on a type C car is 5000 lb. and the weight of the complete truck 13,000 lb. The car body weighs about 17,500 lb., making the weight of the car complete, without load, 30,000 lb. The car of the C type illustrated is one of six now being built by the Railway Motor Car Corporation for the Rahway Valley Railroad, Rahway, N. J. Another illustration shows a type B car of the Schuylkill & Dauphin Railway mounting a 10 per cent grade. This car has frequently hauled freight cars of 60,000 lb. weight.



End View of Type C Car Mounted on Single Truck with 115-hp Motor

Up to the present the manufacturers have confined their output to single trucks, but double trucks may be built.

A TELEPHONE TRAIN-DISPATCHING SYSTEM PARALLELING A HIGH-TENSION TRANSMISSION LINE

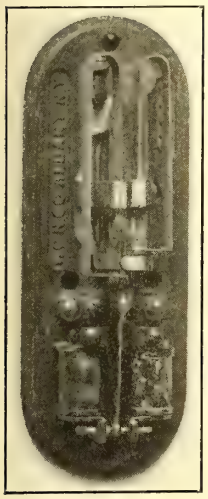
The New York, Westchester & Boston Railroad is now installing a Western Electric telephone installation which is particularly interesting because it is the first installation of a telephone train-dispatching system paralleled by high-tension, single-phase circuits. The method of protecting the telephone user, keeping the cable drained from induced currents from the transmission line and at the same time giving standard transmission, is a problem which will be appreciated by those who have endeavored to operate telephones when used in connection with high-tension distribution lines. The telephone system will be complete, consisting of train dispatchers' circuits and message-wire circuits of various kinds. All the circuits with the exception of the train wires will have intercommunicating features.

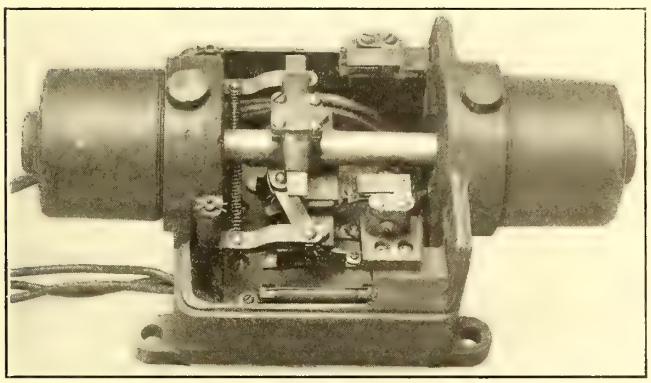
As this road is to be electrically operated by 11,000-volt, 25-cycle, single-phase current it was thought best to make the distribution system of underground cable. Accordingly, a four-duct subway is now being constructed between 180th Street, New York, and Columbus Avenue tower, Mount Vernon. At that point the road branches off, extending to White Plains, a distance of approximately 8 miles. Over this branch and also over the New Rochelle branch, which extends 3 miles from Columbus Avenue Junction, a three-duct subway will be built. The layout for the complete telephone system had to be designed for future extension and to afford good transmission through considerable cable. The dispatcher's office will be located at 180th Street station, as will also the message operator, who will monitor the various message circuits and have charge of the local telephone service.

THERMOSTATIC CONTROL OF ELECTRIC HEATERS AND TILTING HEAT DEFLECTOR

The Consolidated Car-Heating Company has recently put on the market two devices for use on cars with electric heaters. One is an electric thermostat for controlling the temperature of cars by turning the electric heaters on and off at a predetermined point, and the other is a tilting heat deflector.

The thermostat proper is made of two metals with different coefficients of expansion, which work according to well-known physical laws and which never vary. Hence when they are once set they can be depended upon to maintain absolutely the temperature at a constant point within a degree or two of neutral. The thermostat proper is shown in Fig. 1. It takes current direct from the trolley and operates a thermostatic switch which opens and closes the main heater circuit. There is no arcing whatever on the thermostatic points. Current flows through the main switch only during the moment of operation, as the thermostat circuit is broken upon completion of the stroke of the switch in either direction. The thermostatic switch is shown in Fig. 2.

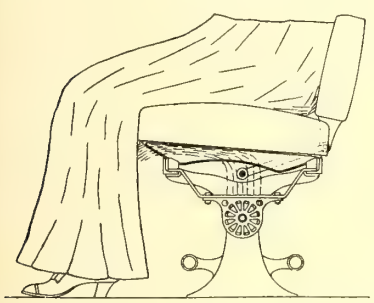


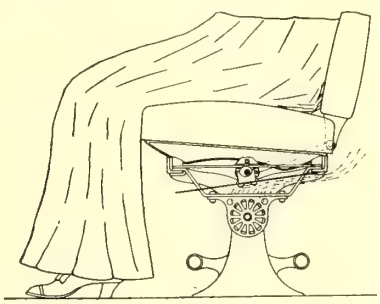


Figs. 1 and 2—Thermostat and Thermostatic Heater Switch

One of the advantages of thermostatic control is a large saving in current, because the control of the heaters is taken out of the hands of the train crew entirely. Overheating is prevented both in mild weather and in rush hours, when the cars are crowded. Ten large railways in this country have already adopted this device.

The tilting heat deflector is placed above the electric heater on a cross-seat in order to deflect the heat to the back of the seat and to prevent the pocketing of same. Fig. 3 shows how the heat from an electric heater ordinarily rises from the heater; that is, the seat being high at the front, the heated air naturally goes to the front of the seat. This makes a heat pocket and prevents free escape of the heat to the car body proper. Fig. 4 shows the free radiation of heat when the deflector is used. This rocks with the seat and directs the heated air always to the back of the seat, thus allowing free escape and utilization of every heat unit possible. The deflector is made up in many different styles so that it can be attached to all classes of standard seats.





Figs. 3 and 4—Direction of Heated-Air Currents With and Without Deflector

ROLLER BEARINGS ON SUBURBAN CARS

The Frankford, Tacony & Holmesburg Street Railway, which operates a suburban line 8 miles long between Frankford, on the outskirts of Philadelphia, Pa., and Torresdale, placed in service four months ago two Brill semi-convertible double-truck cars, equipped with Rollway journal bearings made by the Railway Roller Bearing Company, Syracuse, N. Y. These cars are mounted on Brill-39-E trucks and each truck carries one GE-216 hp motor of 50 hp. The cars weigh 38,000 lb., without passenger load, and have a seating capacity of forty-six. At times as many as 140 passengers have been carried, making a total weight of car and passengers of close to 60,000 lb. The two motors, which total 100 hp, are sufficiently powerful to propel these cars at an average speed of 15 m.p.h., although the line has several long grades of as much as 3 per cent. This result is attributed largely to the low friction losses in the bearings.

Henry Glazier, superintendent of the railway company, states that while no power consumption tests have been made with these cars observations of the ammeters in the power station show that they require only about 10 per cent more current than the light thirty-six-passenger, single-truck open cars of the company. The bearings have required very little attention, and are lubricated only once in two months. After four months' service they show no signs of wear.

The journal boxes installed in these two cars were the first bearings to be placed in operation with double-end thrust bearings as distinguished from the single-ball thrust bearings which were previously furnished by the Railway Roller Bearing Company. During the past four months all journal boxes installed by this company have been of the double-thrust bearing type. The double-thrust type of bearing is said to be more efficient than the single-thrust type, and has the advantage of requiring no adjustments whatever after being placed in operation. It is said that it prevents any end movement of the box and rollers relative to the journal sleeve, regardless of any flexibility in the truck frames or the amount of play which exists between the pedestal and the box.

SOAP FOR CAR WASHING

The J. B. Davies Company, Dayton, Ohio, is marketing a soap known as the "Buckeye Cleanser," which is made expressly for washing painted and polished surfaces of steam and electric cars. It is described as a strictly neutral non-alkaline oil soap for use without the slightest injury to the finish on any surface that will stand clear water. This material is highly concentrated, as 10 lb. of it dissolved in 50 gal. of water will serve for 100 3-gal. pails of washing water, while one 400-lb. barrel will take care of 4000 pails or 12,000 gal. of washing water. This cleanser is distributed by the manufacturers from forty-six warehouses throughout the United States and Canada so that quick delivery can be made at all times.

METAL UNIT-SECTIONS FOR CAR CONSTRUCTION

The New York, Westchester & Boston Railway, of which L. B. Stillwell, New York, is consulting electrical engineer, will soon receive the first of its new steel motor cars. These cars will be 72 ft. ¾ in. long over coupler faces, will be fitted with full vestibule and buffer platforms and will have a seating capacity for seventy-eight passengers. The cars are equipped for single-phase operation with two Westinghouse No. 409 motors mounted on one truck.

The design of these large car bodies, which was made in the office of the consulting engineer, is of particular interest because it includes the use of pressed-metal side unit-sections. Accompanying illustrations show the characteristic appearance of these sections before assembly. The sections are manufactured by the Forsyth Brothers Company, Chicago, to suit any design of car for city, interurban or steam-railway service. The chief advantages claimed for these unit-sections are increased car-body strength and decreased weight as compared with car bodies built up of commercial plates and sections. The unit-sections are pressed to conform to the desired outside contour of the car and are finished with L-shaped flanges of such dimensions that the unit is rigid. Each unit-section extends from the center of one pair of windows to the center of the next, and includes the fully formed pier post, together with a complete letterboard section which needs no additional plating and three extensions below the level of the arm rail to connect with the underframe and securely stay the upper part of the car against longitudinal movement. The manufacturer is prepared to press these sections to conform to any design of body structure.

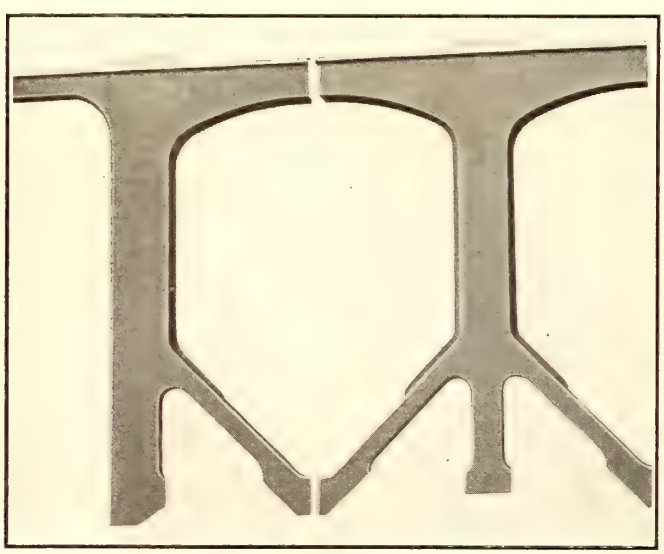
One advantage claimed for this type of car construction is that of low cost of making renewals after a car body has been damaged. In such an event any damaged unit-section could be replaced by another of standard design, and since all sections of the same design would have been pressed by the same dies, the work of fitting the joints would be greatly lessened.

The advantages with regard to decreased weight and increased strength which this form of pressed metal side unit-section car construction offers as compared with the building up of a car body from commercial plates and sections should command careful attention. The need for reducing car weights is now so well recognized that every means available for avoiding unnecessary weight, providing the car structure is not weakened, is being given consideration by car designers. The pressed unit-sections are the result of considerable experimental work. A large plant for the manufacture of these parts is now being completed near Chicago.

The manufacturer states that in designing this unit-section it has been the aim to provide more than the usual strength for service conditions and at the same time press the sections from such light material that when assembled in a car the total weight would be less than that for the usual type of steel-car construction. The rapid and economical repair of injured cars also has been considered, and therefore these sections have been formed in units of such length as to permit ready removal for repairs. The forming of the sheets and the various designs with L-shaped flanges assits the material in carrying its load and resisting cross strains and permits the use of much thinner steel than otherwise would be possible. This pressed-unit side construc-



Steel Motor Car for New York, Westchester & Boston Railway



Outside of Unit-Section Car Side

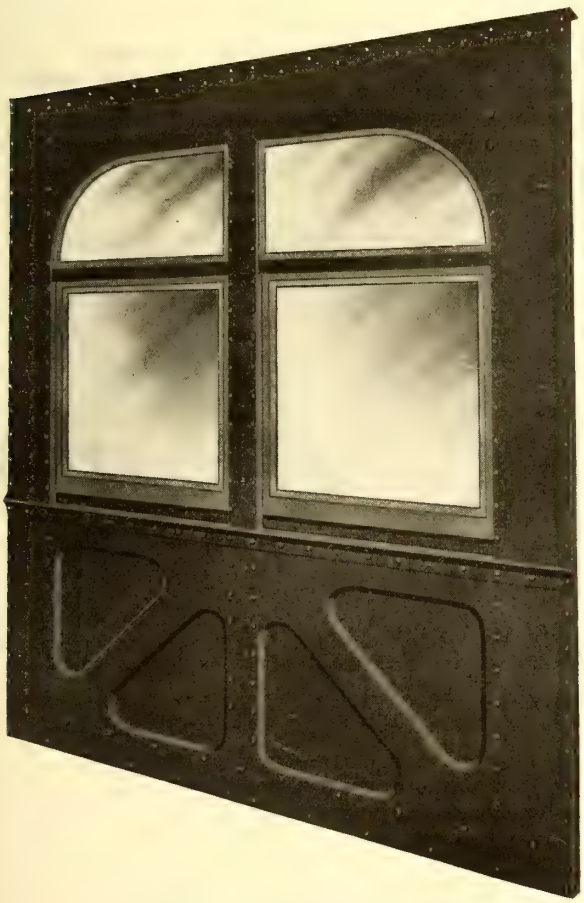


Inside of Unit-Section Car Side

tion was employed in the design of the Hudson & Manhattan cars, and was chosen because by utilizing the full height of the car side as a girder (with the windows framed in the structure) a car of extraordinary strength and rigidity could be built with minimum weight.

The elimination of many rivets is a desirable feature to be obtained by the use of pressed unit-sections for car sides. With a riveted-steel structure any bending tends to stress the rivets and eventually to loosen some of them. The presence of riveted joints also increases the weight over that of a formed section. Consideration of the need for reducing the number of riveted joints in a car structure and thus obtaining rigidity at lower weight led to the design of the pressed unit-section, wherein the side posts, diagonal braces, letterboard, etc., are formed of one sheet of steel. Severe service conditions have shown the advantages of this form of construction, which practically surrounds the passenger with a steel shield. The buffing shocks, if desired, can be transferred by the end sills to the side structure, and thus the center-sill construction may be made comparatively light.

The manufacturer furnishes these sections in any size



Complete Unit-Section Car Side

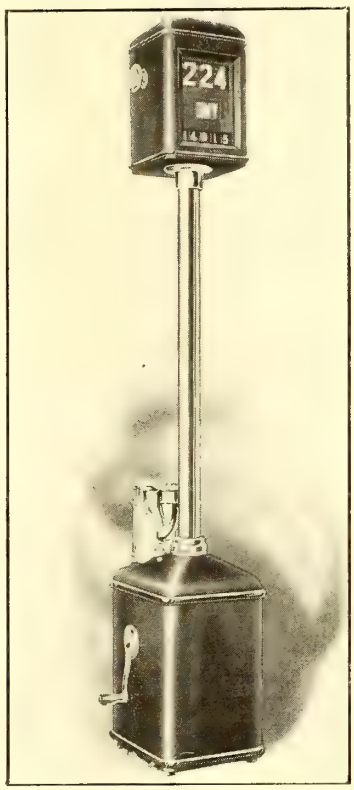
direct to the railroads or to the car builders. The Forsyth Brothers Company also manufactures a variety of other metal parts for car construction, including one-piece metal doors, self-adjusting metal sash in brass and steel, metallic weather strips, the Doyle and other designs of metal car posts, metal car lines and buffing and draft devices for all classes of equipment.

An accompanying illustration shows a unit-section as assembled for a city car, including the use of pressed sheathing riveted to the body framing and so designed that the sheathing serves as a side girder. With this form of construction rectangular or Empire windows with wood or metal sash may be used. These pressed sections may be had also for interior car finish in accordance with the designs of railroad or car-building companies.

A NEW COIN REGISTER FOR PREPAYMENT CARS

The International Register Company, Chicago, Ill., has added to its well-known line of registers a new type which has been especially designed to meet fare-collection requirements on any type of prepayment car. The accompanying cut shows the standard arrangement for pay-as-you-enter cars. On pay-within cars, where the register is mounted on the control stand from which the doors are operated, the crank for operating the register is located on the column on the opposite side from that shown in the cut; the conductor's change door is also on the other side.

The coins received are cents, nickels and dimes. When quarters are put into the hopper they are retained at the top so they may be readily withdrawn by the passenger. Anything anywhere near the size of the smaller coins named will go through the holes in the hopper and will be registered according to the diameter, after which it is immediately accessible to the conductor for return to the passenger, should he find that the coin is not current. Dirt and small objects, such as matches, nails, screws, peanut shells, etc., are automatically removed without passing through the counting mechanism, provided they are smaller in diameter than a dime. Objects smaller than a dime and larger than a nickel are retained without interfering with the registration of the coins.



Coin Register for Prepayment Cars

The hopper includes a cylinder of thick glass 3½ in. in diameter and 4¼ in. high, which is mounted securely on the case with a metal frame having four vertical rods to protect the glass on the outside. The top of this frame supports a bowl having five bottom holes which are a little larger than a nickel in diameter to stop larger coins from going down. A five-pointed casting in this bowl, with ridges between the holes, prevents balancing a coin anywhere on the top of the hopper, unless it is larger than a nickel. The shape of the bowl is such that coins thrown in the hopper or dropped on it will immediately pass down on to the trap door at the bottom of the hopper, where they may be inspected. After inspecting the coins the trap door may be opened by a slight left-hand or reverse movement of the operating crank. This greatly simplifies the operation, because the right-hand rotation of the same crank registers the coins.

From the trap door the coins drop through a 1½-in. diameter tube into a pan of original design. On turning the crank to the right the coins are picked up one by one in the holes in the bottom of the pan and are carried into the counting mechanism, where they are counted by a mechanism which is so positive that the crank may be turned by hand as fast as possible without causing an error in the count. The counting can be accomplished at the rate of four coins per second. An extremely high speed of the crank does not facilitate the counting, as more coins will be passed through per minute at a speed below the extreme

speed. After counting the coins are delivered into the conductor's coin box at the bottom of the machine. This box has a capacity of about 100 fares, and could be made larger if desired. The door to this receptacle is operated by the thumb of either hand, while the fingers are held so as to receive the coins which come down the snout on the door into the palm of the hand.

The counting mechanism is connected directly to the register above through a shaft in the column, and both the trip register and the totalizer are driven from this shaft by positive gearing. The trip figures are 1¼ in. high and ¾ in. wide, and read to 999. The trip counts one for each nickel, two for each dime and one for each five cents. The trip may be reset by a knob on the left when the crank is in the down position only, as it is interlocked with the crank through a rod in the column. During the process of resetting the crank is locked against operation, and during the process of registration the resetting knob is locked so it cannot be operated.

The totalizer figures are ½ in. high, reading to $999.99. Both the trip and totalizer figures are lithographed on steel, showing white figures on black background, this being the same method used satisfactorily for many years in this company's type R5 register. The bell is 4 in. in diameter, which is much larger than the ordinary register bell. It is located in the extreme top of the register in a separate compartment having an opening all the way around the case for the emission of the sound. As the bell is in a separate compartment, no dust can find its way into the register. The bell rings once for each nickel, twice for each dime and once for each five one-cent pieces.

The direction indicator is located between the trip register and the totalizer. It has letters 1 in. high, which can be plainly read from any part of the car. In order to be of any value the trip register must be reset at the end of each trip, and the only means of checking this is by means of the direction indicator.

The case is made of heavy rolled phosphor bronze, with statuary bronze finish to give maximum stiffness for minimum weight. On account of the dark color of the phosphor bronze it should present a neat appearance even after the finish is worn off. The case on the upper part is held by a latch controlled from the lower part. The lower case is made in two pieces, separating horizontally at the crank, the upper part containing a glass signature seal similar to that used for many years on "International" registers. In breaking this seal and pushing a lever a lock on the column nut is released so this part can be unscrewed and the column and upper part removed. Then the upper part of the case may be lifted off, taking with it the hopper and trap door. The lower case may then be removed by taking out three screws, which leaves the entire mechanism exposed. The column is so located that it will be used more or less as a grab handle by passengers. Therefore the frame is made very stiff to provide for this condition. At the same time, the frame can be readily taken apart to get at the mechanism.

The counting mechanism is mounted in a separate frame, complete in itself, which may be removed by taking out four screws after the case is taken off. Below this is the coin-handling mechanism, which has its own frame and may be removed by taking out two more screws. The trip register and totalizer also has its own frame. All of these separate frames may be taken apart in a very short time should repairs be necessary. The coin-handling parts are made of tempered tool-steel gears and the principal wearing parts of a hardened alloy steel. The bearings are of phosphor bronze. Only six springs are used in the coin-handling and counting mechanism and five in the register. All are of the compression type, mounted on rods, so that a broken coil does not interfere with their operation.

All parts are made with accurate special tools and dies and tested with limit gages. The degree of interchangeability obtained is believed to be equal to that in any other small machine on the market. The total weight of the machine is about 35 lb., depending on the height of the column. The latter may be made to suit the particular type of car for which the machines are ordered.

In mounting this apparatus in pay-as-you-enter cars a bracket is fastened to the bulkhead between the two doors and near the rail separating the conductor from the passengers. This bracket has two holes into which two pins on the bottom of the machine enter. Above the window is located another bracket, which supports the top of the machine by means of a sleeve which passes over a pin on the top of the trip register. In removing the register to transfer it to the other end of the car it is lifted against the spring on the sleeve until the lower pins are removed from the holes on the bracket and then may be lifted backwards a little and dropped to release it above. On pay-within cars the machine is mounted in the same way at the bottom on a bracket attached to the control stand from which the doors are opened. The support above is from a bracket on the underside of the car roof.

CLOTH PINIONS

The General Electric Company has developed a line of cloth pinions for shop tool and other service which are asserted to be noiseless, self-lubricating and unaffected by moisture and changes in temperature. The blanks from which the pinions are cut consist of a filler of cotton or similar material confined at a pressure of several tons per square inch between steel side plates, the whole structure being held together by means of rivets, or in the case of very small pinions by threaded sleeves. The teeth are cut to the 14½ deg. involute system according to Brown & Sharpe's standard. Diametral pitch is the standard of measurement, and companion gears should be cut to similar form. The teeth are said to be stronger than those of any other type of non-metallic pinion and are sufficiently elastic to allow the meshing teeth to bear evenly across the full width of the face, thereby enabling the combination to absorb shocks which might fracture cast iron or brass. After the teeth are cut the cloth filler is impregnated in oil, thereby making the pinions self-lubricating. Ordinarily non-metallic pinions constitute the smaller members of the gear train, but practically any size and form of gear can be obtained.

BRUSHES TO INCREASE OPERATING EFFICIENCY

The National Carbon Company, Cleveland, has developed three types of brushes for dynamo-electric machines, known as the Cophite, Graphoid and Laclede 255-G brands, which are said to have the requisite requirements of an efficient brush, namely, small coefficient of friction combined with high thermal conductivity and mechanical strength.

Cophite brushes are made in six grades from a metal-graphite composition that insures the maximum carrying capacity consistent with a small coefficient of friction. They are especially adapted to high-current generators operating at low peripheral commutator speeds and for slip-ring work. Graphoid brushes are made from a nearly pure graphite composition in five different grades. The lowest coefficient of friction consistent with good carrying capacity makes this brush especially desirable for d.c. generators, slip-ring machines and even for a.c. turbo-generators.

The Laclede 255-G brush has been developed for direct-current generators operating at high commutator peripheral speeds and for railway motors. The coefficient of friction is very low and the mechanical strength high. The resistance of the brush is proportioned to help commutation by damping out the current in the short-circuited coils.

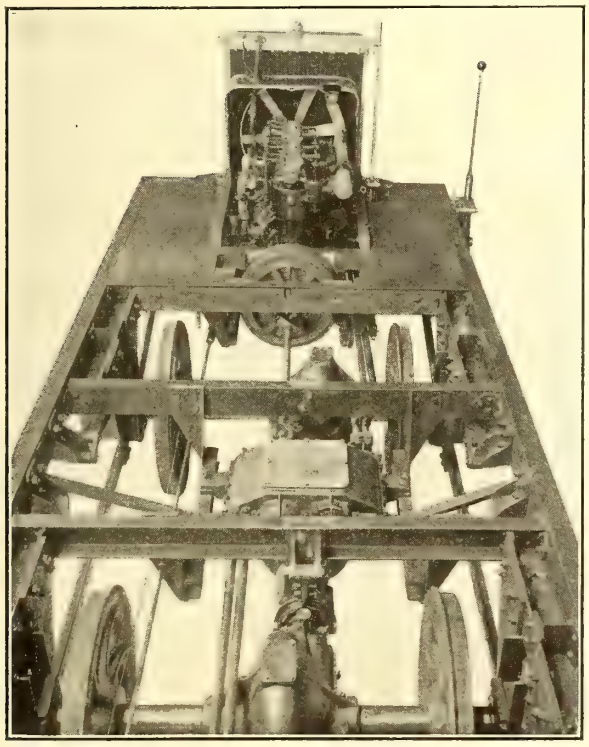
GASOLINE CAR FOR DUTCH WEST INDIES

The availability of a self-contained vehicle for small, isolated railways is shown by the recent shipment of a gasoline car to Curaçao, Dutch West Indies, by Sidney Straker & Squire, Ltd., of London, Eng. This car is constructed to run on street railway lines. As shown in the accompanying views, it is fitted with an open-type body to accommodate thirty passengers, there being six transverse seats for five passengers on each seat. All seats except the two end ones have turnover backs. The general dimensions are as follows: Over-all length, 22 ft. 4 in.; over-all width, 7 ft. 6 in., and wheel base, 6 ft. The cars can be built for a rail gage of 3 ft. 6 in., as in this case, or for the standard gage of 4 ft. 8½ in.

The underframe is of channel steel, well braced by cross members connected by gusset plates. The car is carried on two axles fitted with 30-in. diameter wheels, and both axles are driven. The power is transmitted from the motor to the gear box through a leather-faced cone clutch fitted with ball thrust withdrawing bearing. At the engine speed of 900 r.p.m. the gears provide three speeds—5 m.p.h., 10 m.p.h. and 15 m.p.h.—in either direction. The gears are of the sliding type, and are case-hardened.

Power is transmitted from the gear box to the axles by a bevel reducing gear, one on each axle. The gearing runs in thick oil or grease, and is inclosed in oil and dust-tight, cast-iron casings. The driving shafts from the gear box have universal joints to allow for the play of the springs.

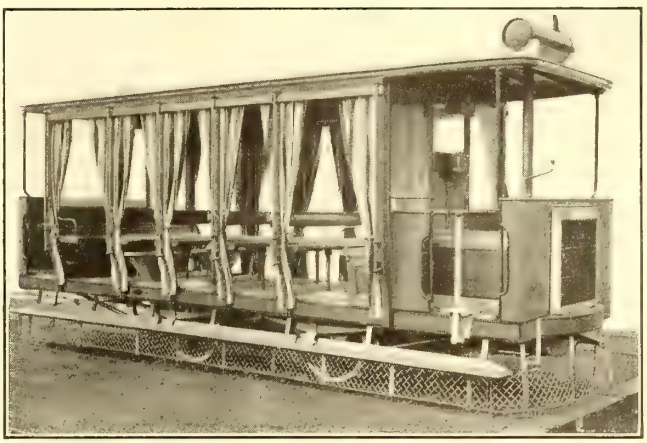
The motor is fitted at the front of the frame, inclosed by a suitable sheet-steel casing. It is of the four-cylinder, vertical type, with cylinders 5 in. x 5⅛ in., and developing upward of 32 b.h.p. The principal feature of the engine



View of Truck Showing Gasoline Engine and Driving Equipment

consists in the placing of the cam shaft which actuates the inlet and exhaust valves, as well as the ignition tappets on the top of the cylinders. By this means the inlet and exhaust valves are arranged at opposite sides of the cylinders, and actuated with one common shaft which is driven off the crankshaft by means of skew bevel gear and a vertical shaft. The cam shaft and cams are one forging of nickel steel. Motion is transmitted to the valves by means of the rocking levers at each side. This arrangement is used to insure great certainty of action with the least wear. The case-hardened cam shaft and rollers at the end of the rocking levers run in an oil bath.

The easy access to the valve gear renders the engine highly suitable for railway work. The entire valve gear



Gasoline Street Car for Service in Curaçao, Dutch West Indies

and cam shaft can be readily removed as a self-contained whole by unscrewing a few bolts. All valves are mechanically actuated and are interchangeable. The valves are readily removable through the openings immediately below them, which are closed with flanged pieces. As this equipment is placed on the top of the cylinders doors can be provided on each side of the crank chamber, to give access for adjusting the connecting rods and crankshaft. All valves are made of nickel steel, with thick stems.

The cylinders are cast in pairs, and the water jacket is so arranged that both the explosion chambers of the cylinders and the valve chambers are completely surrounded. The water is let in at the exhaust side of each pair of cylinders, and passes out at the inlet side to the tubular radiator at one end of the chassis. A belt-driven fan is located behind the radiator. The crank chamber has three specially long bearings for the shaft, these having split bearings of phosphor bronze faced with white metal. The connecting rods are of "H" section, to secure exceptional lightness. All connecting rod bearings are lined with white metal. The crankshaft is in chrome nickel steel. The crankshaft bearings and the big ends are lubricated on the splash principle, as well as with a force feed by an oil pump.

The carburetor is of the jet type, fitted with auxiliary air valve; situated just below it is a valve which can be operated by the driver to vary the proportion of air as required. The ignition is obtained by the use of a high-tension magneto.

To the vertical shaft is fixed a governor, which acts directly on the throttle of the engine. The throttle can also be controlled from the driver's seat, securing a variation of speeds from 300 r.p.m. to 900 r.p.m.

The actuating equipment is removable from end to end, and comprises the following: Lever for actuating clutch, lever for change speed gear and pedal or controlling engine throttle.

The brakes are actuated by means of a ratchet handle, fitted at both ends of car.

A pedal-operated sand box of the intermittent flow type is fitted at each side.

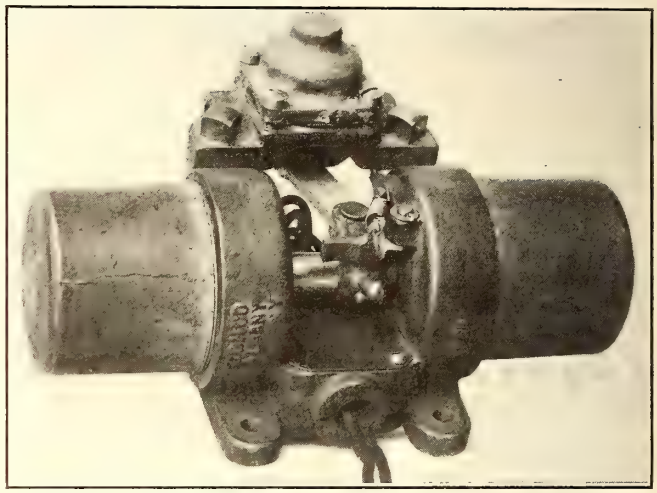
The exhaust silencer is carried on the roof of car, the exhaust pipe being carried direct up from motor and passing through the roof. A petrol tank of 30 gal. capacity is fitted under one of the car seats.

HORN-GAP TYPE OF CIRCUIT-BREAKING APPARATUS

The Railway & Industrial Engineering Company, Pittsburgh, Pa., is manufacturing a line of high-voltage switches, fuses and lightning arresters which operate on the principle that an arc can be extinguished on a pair of diverging horns. The switches are intended to open a loaded circuit without causing any voltage disturbance to the system other than that occurring from a change of current. They are so constructed that their operation is not affected by a heavy coating of ice, sleet or rain. They are now in operation on high-tension systems carrying current ranging in potential from 11,000 volts to 44,000 volts.

The current entering the middle of a switch is carried jointly by means of a heavy switch blade and diverging horns to the switch jaws and thus to the outgoing line. These shunted horns are so arranged that when the switch is closed there is considerable torsion in the center horns. Thus when the switch is opened the switch blade leaves the switch jaws while the horns are in contact. When the switch is opened further the arc starts and extinguishes itself, due to the widening of the gap, which is brought about by the joint action of the switch opening and the arc rising on the diverging horns.





Figs. 1 and 2—Push-Button and Solenoid for Operating Pneumatic Valve for Door

The switches are manufactured in single-pole units, each unit consisting of a stationary and a movable casting. In the stationary casting there is a brass bearing. The movable casting has an extended stem, part of which is machined to fit this bearing, the remainder being squared off to receive a bell crank or sheave wheel for operating several switches simultaneously. A high-voltage porcelain insulator is cemented on the extended arms of each of the movable castings. Each insulator top has a removable sherardized iron cap to which the switch blades, horns and jaws are bolted. Provision is made for grounding so as to afford protection to the operator.

Following the successful operation of these switches this company has placed on the market other disconnecting apparatus which operates on the same general principle. This apparatus includes high-tension fuses and a combination horn-type lightning arrester and spade-type choke coil

Horn-type switches have been found particularly desirable by transmission companies for supplying loads as small as 10 kw without using the more costly oil switch. This type of apparatus has also been used in sectionalizing transmission lines to insure continuity of service and for use as outdoor cut-outs on the high-tension side of substations. Air-break switches of this type can be placed in portable substations as substitutes for automatic circuit-breakers.

PNEUMATIC DOOR DEVICES

The Consolidated Car-Heating Company has placed a new electro-pneumatic door device on the market within the last year. While the device proper operates by compressed air the valve is controlled electrically, there being a solenoid for operating the valve in either direction. The valve is built on the latest approved electrical lines and is entirely iron-armored and arranged for conduit connections, so that it can be placed in an exposed position in the car if desired.

Instead of using pressure air for checking the motion of the door at the end of its travel atmospheric air is used, and a separate cylinder is provided for compressing it by the motion of the door. This prevents the slamming of the door, should it be held up at any point in its travel and then released, because the ports are all designed for low-pressure checking.

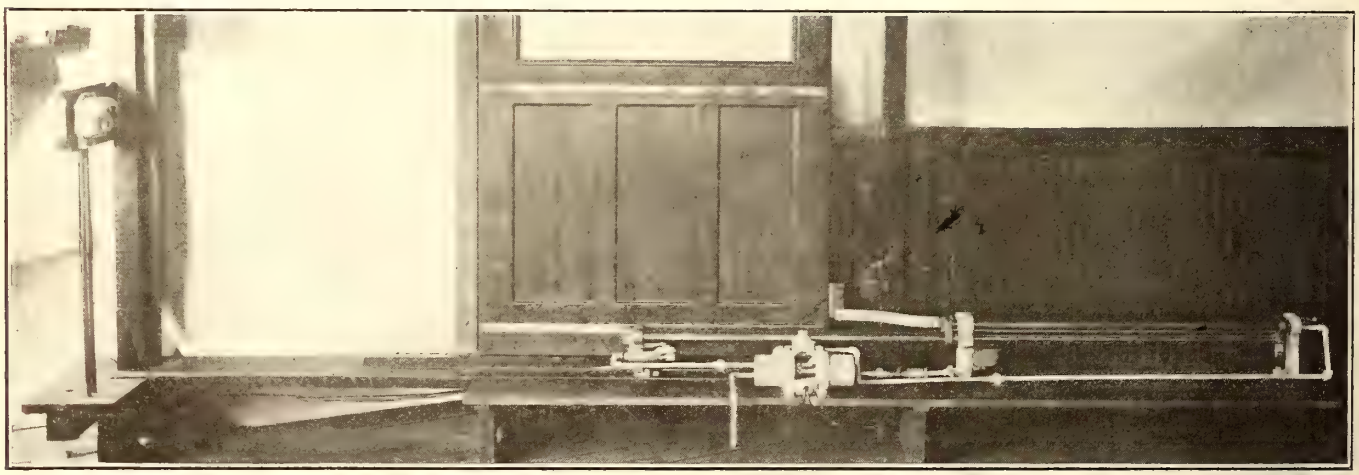


Fig. 3—Electrically Controlled Pneumatic Door-Operating Device

Fig. 1 shows the push-button, Fig. 2 the valve and Fig. 3 the two-button switch group for controlling two doors. These switch groups are also made for controlling both motions of one, two or three doors.

No gears or racks are used, inasmuch as the device operates on a straight line back of the door and the cylinder extends the full length of the door travel.

News of Electric Railways

Boston Subway Leases Submitted

Drafts of the contracts between the city of Boston and the Boston Elevated Railway, whereby the latter leases the new subways and tunnel extension, are now in the hands of the company. They have been drawn by the Boston Transit Commission, which acts for the city, and have been sent to the company. To become effective they must be signed before Dec. 21, 1911. The merger act is going into effect by successive stages, and the signing of the papers, now in the hands of W. A. Bancroft, president of the Boston Elevated Railway, will be the last act required to give the law full force. When they are signed the Transit Commission may go ahead with the work of construction. Precisely how the provisions of the merger act have gone into effect, by degrees, as the parties to it have passed upon it, is shown in the following summary and announcement given out by the Transit Commission:

"Chapter 741 of the Acts of 1911, entitled 'An Act Relative to Electric Railway Transportation Facilities in the City of Boston and Its Vicinity,' and providing for the construction of the Dorchester tunnel, the Boylston Street subway, the East Boston tunnel extension, and the extension of existing subway and tunnel leases until July 1, 1936, goes into operation by successive stages.

"Section 14 of this act, providing for preliminary investigations, surveys, etc., by the Boston Transit Commission, took effect upon the approval of the act, July 20, 1911, and this work was at once entered upon and has made rapid progress.

"The act further provides that its remaining provisions shall not take effect until accepted by vote of the City Council of Boston, approved by the Mayor and by the Boston Elevated Railway, by vote of its board of directors, subsequent to action by the stockholders of the West End Street Railway. This latter action was taken on Sept. 6, 1911, and the act was accepted by vote of the board of directors of the Boston Elevated Railway on Sept. 13, 1911, and by vote of the City Council of the city of Boston, passed on Sept. 18, 1911, and approved by the Mayor on Sept. 21, 1911.

"The next step required by the act before the work of constructing the new subways and tunnels can be begun is the execution of contracts between the city of Boston, represented by the Boston Transit Commission, and the Boston Elevated Railway, covering the use of the new subways and tunnels and making the extensions of the existing leases. The act provides that such contracts must be executed within ninety days after the act takes full effect; that is, within ninety days from Sept. 21. With a view to expediting further action as much as possible, the Boston Transit Commission has already prepared drafts of the leases of the new subways and tunnels and of the extensions of existing leases and has submitted these to the Boston Elevated Railway."

Los Angeles Mayor on Franchise Conditions

Mayor Alexander of Los Angeles, Cal., concluded in part as follows his recent special message to the Council of Los Angeles in regard to franchise terms which he feels should be imposed in future grants made by the City Council:

"In the first draft of the proposed general ordinance now pending before your legislative committee it was provided that the companies should pay the city 30 per cent of the net profits derived from the exercise of any franchise to be granted after the passage of that ordinance. It is a serious question whether the city should receive any part of its income in this way. Suppose, for instance, that the entire revenue of the city was derived from its share of such net receipts. That would practically relieve the wealthy property owners from tax burdens. It is far better that the benefit be derived in the shape of better service or lower fares.

"Under the present system our franchises are granted for twenty-one years. Some of the older franchises were granted for fifty years. These various franchises expire at many different times. Recently it has been the custom to provide that franchises for extensions shall expire at the same time with the franchise for the line of which the extension is a part. Thus it is hoped that eventually all the franchises will expire at the same time, thereby giving the city the opportunity to take over the entire system at once. If this purpose were accomplished it would mean that during the last few years of the life of the franchises the street car systems and their equipment would be allowed to deteriorate. The remedy, as I see it, is the indeterminate franchise; that is, a franchise which provides that at any time after due notice the city may end the franchise and take over the property used in the exercise thereof. The terms of such a franchise, however, must be equitable. Indeterminate franchises enable the termination of all franchises of that kind at the same time. They also tend to induce the holders of the franchises to give good service, because they would know that poor service would mean municipal ownership.

"It is the duty of the Board of Public Utilities to determine the value of the properties of the electric light and power companies and each year to fix the rates charged by them. If we are to regulate the street railways it is just as necessary that the Board of Public Utilities investigate the railway companies, the value of their properties, the income, expense, etc. This investigation should be made not alone for rate-fixing purposes. It should be the duty of the city to see that proper service is provided and that extensions are made where the growth of the city demands it.

"In view of the pressing need for crosstown and other car lines, I would recommend that at an early date and before any more franchises are granted your honorable body declare the general policy of the city in regard to the granting of franchises, and that the matter of such car lines, upon proper terms, be brought to an early issue. I would also recommend that you grant the request of the Board of Public Utilities for the authority and for the funds necessary to investigate the street railways of this city."

Through Routing Considered in Cleveland

Newton D. Baker, city solicitor of Cleveland and candidate for Mayor on the Democratic ticket, has made a feature in his campaign speeches of advocating through routing of east and west lines instead of looping at the public square. In view of the ideas advanced by him Mr. Baker was invited to attend the meeting of the street railway committee of the City Council on Sept. 28, 1911, to explain his plan before the Haserodt resolution which provides for this change is reported to the Council. Mr. Baker stated that a study of the service should be made on both the east and west sides to determine whether cars could be routed through instead of looped at the square. He thought that running the cars through would be economical and would avoid congestion and danger at the square. G. M. Dahl, street railway commissioner, replied that the study had been made and that it would mean a loss of money to run the cars through. Mr. Dahl asserted that if the east and west cars were routed through the operation of two lines instead of one would be interfered with every time there was delay at the Superior viaduct. Another point was that the east and west lines were operated on different schedules. Chairman Kramer intimated that the report of the committee would be against the Haserodt resolution and that the routing would remain as at present.

The suit brought by A. G. Stafford to compel the interurban railways to operate their cars at a straight 3-cent fare within the city limits was heard before Judge Vicery, beginning on Sept. 27, 1911. D. R. Wilkin, of Kline, Tolles & Morley, attorneys representing the companies, argued that these cars were brought into the city by other

companies under contract allowed by statute and that the fare should not be reduced from 5 cents to 3 cents. Attorney George D. Hile, representing Mr. Stafford, insisted that the State laws require interurban railways which enter cities to operate at the same rate of fare as do the urban companies. The court reserved decision.

Hudson & Manhattan Railroad Extends Its Line in New Jersey

The Hudson & Manhattan Railroad, operating between New York and New Jersey, ran its first train to Manhattan Transfer, on Sept. 28, 1911, making the distance of 8 miles in fifteen minutes, one minute better than scheduled. This adds eight miles to the Hudson & Manhattan Railroad and brings the line within 0.8 of a mile of Newark. It is at this point that the Hudson & Manhattan Railroad and the Pennsylvania Railroad will exchange passengers. Regular passenger service was begun on Oct. 1, at 12:01 a. m. This line will open through service from Manhattan to Jersey City, including the Henderson Street and Summit Avenue stations. When construction is carried on to Newark it will leave only the extension in New York from Thirty-third Street to the Grand Central Station to complete the system. The first run carried a five-car train and included about forty officials of the Hudson & Manhattan Railroad and the Pennsylvania Railroad. Thirty-four trains will be operated each way on week days and twenty-eight on Sundays between the terminal and Manhattan Transfer.

Recommendations in Regard to Track Return.—The city authorities of Dayton, Ohio, have made some suggestions to the Ohio Electric Railway, Cincinnati, Ohio, of a minor nature in regard to track return, such as insulating track joints, and where the company is affected by the recommendations the matter will be given proper attention.

Everett Plans to Purchase Water System.—The Council of Everett, Wash., has passed an ordinance looking to the acquisition of the present water system of the city, which is owned by the Everett Railway, Light & Water Company, at a price to be determined at a conference between the Board of Public Works of the city and the officers of the company.

Strike on Trenton, Bristol & Philadelphia Street Railway.—The employees of the Trenton, Bristol & Philadelphia Street Railway, which operates 17.5 miles of electric railway connecting Philadelphia, Bristol, Tullytown, Morrisville and Trenton, went on strike on Oct. 1, 1911. The men demand an increase in wages, recognition of the union and other changes in the terms of service with the company.

Strike in Chihuahua.—On Sept. 26, 1911, the Compañia Electrica y de Ferrocarriles de Chihuahua, S. A., Chihuahua, Mex., announced that the places of its employees who went on strike recently had all been filled and that the former employees need not apply for reinstatement. Rioting attended the inception of the strike, and as a precautionary measure the company announced that it would not operate cars at night until the new men were familiar with their work.

Strike in Spartanburg.—The strike of the employees of the Spartanburg Railway, Gas & Electric Company, Spartanburg, S. C., which was declared on Sept. 20, 1911, was terminated on Sept. 26, 1911, by the men agreeing to return to work under the conditions fixed by the company. On Sept. 24, 1911, the strike assumed such serious proportions that Governor Blease ordered three companies of the State militia to hold themselves in readiness for service in Spartanburg to suppress disorder.

Bill Passed to Facilitate Subway Work.—Under an emergency message from Governor Dix both houses of the New York Legislature passed, on Sept. 29, 1911, the bill introduced at the instance of the Public Service Commission of the First District which repeals a law enacted early in the session requiring that contractors on public works furnish a bond to the amount of one-third of the contract to protect the dealers who provide the materials. It was found that contractors experienced difficulty in furnishing bonds of such large amounts and that the subway contracts in New York would be delayed under the law.

Financial and Corporate

New York Stock and Money Markets

Sept. 30, 1911.

The week just closed offered a strange medley in price changes. The market was violently active, with Steel common the center of interest. On Monday Steel common sold down to 51⅝, the lowest price in two years, but at the close of the week it had advanced 10 points from this low price. Four of the six trading days were million-share days, and the total transactions for the week reached 6,655,000 shares. The increased activity in the bond market was even more pronounced, although the total value of bonds sold on the Stock Exchange exceeded only slightly the record for last week and the corresponding week two years ago. In the money market quotations to-day were: Call, 2¼@2¾ per cent; sixty days, 3¼@4 per cent.

Other Markets

In Philadelphia the most significant feature was the initial dividend of 1 per cent on Lehigh Valley Transit preferred. This declaration was followed by an advance in the preferred to 22¼. The common remained quiescent.

The Boston market has been irregular. Massachusetts Electric has been the only feature in tractions.

In Baltimore the first mortgage 4s of the United Railways continue strong and in demand at 85½, the funding 5s at 84¼ and the incomes at 62 and 62¼. The 5 per cent three-year notes are quoted at 99 and interest.

Quotations of traction and manufacturing securities follow:

	Sept. 26.	Sept. 30.
American Light & Traction Company (common)	a290	a295
American Light & Traction Company (preferred)	a106	a107
American Railways Company	a44	a44
Aurora, Elgin & Chicago Railroad (common)	a42½	a43
Aurora, Elgin & Chicago Railroad (preferred)	a87	a87
Boston Elevated Railway	a125	a125
Boston Suburban Electric Companies (common)	a14	a14
Boston Suburban Electric Companies (preferred)	a75	a75
Boston & Worcester Electric Companies (common)	a12	a10½
Boston & Worcester Electric Companies (preferred)	a51	a51
Brooklyn Rapid Transit Company	a72⅝	a74⅛
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	83	*83
Capital Traction Company, Washington	a130	a128
Chicago City Railway	a180	a180
Chicago & Oak Park Elevated Railroad (common)	a3	3
Chicago & Oak Park Elevated Railroad (preferred)	a6	6
Chicago Railways, ptcptg., ctf. 1	a95	a95
Chicago Railways, ptcptg., ctf. 2	a27	a27¼
Chicago Railways, ptcptg., ctf. 3	a10	a10
Chicago Railways, ptcptg., ctf. 4	a6½	a6⅜
Cincinnati Street Railway	*132	a131½
Cleveland Railway	a99½	a100
Columbus Railway (common)	*83	83
Consolidated Traction of New Jersey	a75	a75½
Consolidated Traction of N. J., 5 per cent bonds	a104	a104
Dayton Street Railway (common)	a25	a25
Dayton Street Railway (preferred)	a101	a101
Detroit United Railway	a70	a70
General Electric Company	146	149½
Georgia Railway & Electric Company (common)	a158	a162
Georgia Railway & Electric Company (preferred)	a93	a93
Interborough Metropolitan Company (common)	13⅝	21⅛
Interborough Metropolitan Company (preferred)	40¾	57
Interborough Metropolitan Company (4½s)	77½	77½
Kansas City Railway & Light Company (common)	a19	a19
Kansas City Railway & Light Company (preferred)	a42	a45
Manhattan Railway	132	135½
Massachusetts Electric Companies (common)	a17	a19
Massachusetts Electric Companies (preferred)	a87¼	a89
Metropolitan West Side, Chicago (common)	*27	*27
Metropolitan West Side, Chicago (preferred)	*75	*75
Metropolitan Street Railway, New York	*15	a8
Milwaukee Electric Railway & Light (preferred)	*110	110
North American Company	65	65
Northern Ohio Light & Traction Company	*57	a57
Northwestern Elevated Railroad (common)	*30	*30
Northwestern Elevated Railroad (preferred)	*70	*70
Philadelphia Company, Pittsburgh (common)	49	a50
Philadelphia Company, Pittsburgh (preferred)	42	a42¼
Philadelphia Rapid Transit Company	21	a20⅞
Philadelphia Traction Company	83	a83
Public Service Corporation, 5% col. notes (1913)	*94	94
Public Service Corporation, ctfs.	a103	a103½
Seattle Electric Company (common)	a110	a110
Seattle Electric Company (preferred)	a100	100
South Side Elevated Railroad (Chicago)	a95½	a95½
Third Avenue Railroad, New York	7⅞	8
Toledo Railway & Light Company	6½	6½
Twin City Rapid Transit, Minneapolis (common)	*106¾	a106½
Union Traction Company, Philadelphia	48¾	a49¼
United Ry. & Electric Company (Baltimore)	*17¾	18
United Rys. Inv. Co. (common)	29	31
United Rys. Inv. Co. (preferred)	53½	56
Washington Ry. & Electric Company (common)	a41	a40
Washington Ry. & Electric Company (preferred)	a89	a89
West End Street Railway, Boston (common)	a85½	a85½
West End Street Railway, Boston (preferred)	a100½	a100¾
Westinghouse Elec. & Mfg. Co.	60¾	62
Westinghouse Elec. & Mfg. Co. (1st pref.)	a118	a111½

aAsked. *Last sale.

ANNUAL REPORT

American Railways Company

Gross earnings of the subsidiary companies of the American Railways Company, of Philadelphia, excluding the Johnstown (Pa.) Traction Company, were $4,049,188 in the year ended June 30, 1911, a gain of $243,765, or 6.51 per cent, over the previous year. The report of the American Railways Company, whose income is received chiefly from subsidiary companies, compares as follows with the two preceding years:

Year ended June 30.	1911.	1910.	1909.
Gross income	$810,413	$693,678	$527,114
Expenses, taxes, interest, etc	387,926	340,385	216,385
Net income	$422,487	$353,293	$310,729
Dividends	381,786	342,072	305,706
Surplus	$40,701	$11,221	$5,023

J. J. Sullivan, president, says in part in the report:

"The total number of passengers carried was 86,675,437, showing an increase of 10,103,331, at the rate of 13¼ per cent.

"After paying all operating expenses, fixed charges, interest and taxes (including the new United States government tax, amounting to $7,839), we have spent during the year 18 per cent of the gross earnings in maintenance of way and structures and maintenance of equipment, in order to keep the properties up to the highest standard. In addition to the regular charges for depreciation a special appropriation of $39,909 was made to this fund, leaving the amount to the credit of the depreciation reserve account of the subsidiary companies $529,551.

"The net income of the American Railways Company amounted to $422,487, out of which was paid 6 per cent dividend on $6,363,150, amounting to $381,786, leaving a surplus of $40,701, which, added to our previous surplus, makes that amount $554,187.

"The credit of our fire insurance fund has been increased during the year in the sum of $31,171, making the amount in that fund $231,247.

"The accident insurance fund shows a credit of $33,237, a gain for the year of $2,250, with the claims pending somewhat below normal.

"During the year the company bought the control of the Ohio Valley Electric Railway, acquiring about 99 per cent of its capital stock. That company owns the street railways and operates the same from Guyandotte, W. Va., to Huntington, W. Va., in and through Huntington to Ceredo and Kenova, W. Va., to Catlettsburg and Ashland, Ky., and from Coal Grove to Ironton and to Hanging Rock, Ohio. The purchase includes the control of all of the capital stock of the Consolidated Light & Railway Company in all of the West Virginia towns, the Ashland Electric Light & Power Company and the Ironton Electric Company, which does all the lighting from Coal Grove to Hanging Rock, Ohio.

"We also purchased the electric light plant at Bellwood, Blair County, Pa., and consolidated it with the Home Electric Light & Steam Heating Company, of Tyrone, Pa."

In his comments on the affairs of the subsidiary companies Mr. Sullivan says in part:

"Altoona & Logan Valley Electric Railway, Altoona, Pa.—During the year the gross earnings increased $45,506. The wages of our employees were increased $10,000. A new Columbia car hoist has been bought for the repair shop; also an armature winding machine and a device for removal and replacement of steel tires.

"Home Electric Light & Steam Heating Company, Tyrone, Pa.—This company shows an increase in gross receipts of about 20 per cent. During the year several extensions were made to accommodate the public demand for lighting.

"Chicago & Joliet Electric Railway Company.—For the year the gross receipts were $482,490, showing a decrease of $5,306. The light and power lines were extended in Argo and Summit. Two new double-truck and four single-truck cars were purchased; also one new sprinkler and snow plow. One combination flat and gondola car and five second-hand cars were added to the equipment. Sixty-nine battery tanks were replaced, the repair shop was enlarged, a new wheel lathe, armature bander, 26-in. drill press, power hack saw and portable floor crane were added to the shop equipment.

"Scranton (Pa.) Railway Company.—The gross earnings increased $64,862. On the Moosic Lake Railroad 9 miles of track were rebuilt, longer sidings installed, track bonded, trolley poles and wire erected and operation begun in May, 1911. Ten new steel double-truck cars with motors were bought. A new double-truck work car was built and a new express car is nearly completed; 186 automotoneers were installed. A new coal conveyor was purchased. New substation cars were placed on the Moosic line. Thirty cars were overhauled and made practically as good as new.

"The People's Railway, Dayton, Ohio.—The gross income increased during the year $21,027. Five new single-truck pay-within cars were bought and are in use. Ten double-truck cars are being built.

"The Springfield (Ohio) Railway.—Gross earnings increased $18,278. On account of the city doing a large amount of street paving, we were obliged to rebuild our tracks, using new 6-in. rail on steel ties in concrete and new brick paving.

"Roanoke (Va.) Railway & Electric Company.—During the year the gross earnings increased $61,728. New double track was built to the park and track relocated. A new work car and a new snow sweeper were bought. A number of automotoneers were installed. The tailrace was improved and coal trestle rebuilt. A motor-driven pump was installed. At Mountain Park a keeper's cottage was erected and the skating rink was rebuilt.

"Lynchburg (Va.) Traction & Light Company.—The gross earnings increased $20,038. During the year an extension was built to Fairview Heights.

"Bridgeton & Millville Traction Company, Bridgeton, N. J.—The gross earnings increased $5,718.

"Bridgeton (N. J.) Electric Company.—During the year a determined effort was made to increase the business, which met with considerable success. The gross earnings increased $9,042. Several line extensions were made to reach the new customers; also a good many power customers were obtained. This feature of the business is likely to have much more growth in the future.

"The purchase of the Ohio Valley Electric Railway has added to our car equipment fifty-six cars; with thirty-six new cars bought during the year we have on the different roads owned by the company a total of 784 cars and 415.4 miles of track.

"All of the properties are in a satisfactory condition."

Georgia Railway & Power Company

The Georgia Railway & Power Company, Atlanta, Ga., the incorporation of which was noted briefly in the Electric Railway Journal of Sept. 23, 1911, will lease the property of the Georgia Railway & Electric Company and the Georgia Power Company and has contracted to purchase outright the property of the Atlanta Water & Electric Power Company. As previously stated, the company will be capitalized at $27,000,000, of which $15,000,000 will be common stock, $2,000,000 first preferred stock and $10,000,000 second preferred 4 per cent non-cumulative stock. The terms on which the leases will be arranged have not been announced, but J. J. Spalding, Atlanta, one of the incorporators of the new company, has issued a statement in regard to the purpose of the company, in which he says in part:

'The Georgia Railway & Power Company was formed to acquire the water-power properties of the Georgia Power Company, the Atlanta Water & Electric Power Company, and to acquire by lease the Georgia Railway & Electric Company, and especially to construct and operate in connection with the development of these water powers a system of interurban electric railways. The first of these lines will be run from Stone Mountain to Decatur.

"By leasing the Georgia Railway & Electric Company the new company will acquire the supplemental steam plants situated in Atlanta, which will enable it to double the capacity of the water-power development by supplementing it in dry weather, and also enable the new company to protect all of the towns and cities which it reaches with lines in case of accident or emergency.

"All of the money furnished is coming from Canadian and English sources. The new company will be organized under Georgia law and all of its properties will be subject to taxation in Georgia. The lease of the Georgia Railway & Electric Company will guarantee its present dividend, payable quarterly, and also all of its indebtedness."

Bristol (Tenn.) Belt Line Railway.—The Bristol Belt Line Railway has filed with the Secretary of State of Tennessee an amendment to its charter, changing the name to Bristol Traction Company and increasing the capital stock from $100,000 to $300,000.

California Midland Railroad, San Francisco, Cal.—The California Midland Railroad recently placed through the Rideout Bank and A. C. Irwin, Marysville, Cal., at 90 and interest, $1,800,000 of first mortgage 5 per cent sinking fund forty-year gold bonds to provide funds to complete the road from Marysville to Grass Valley and to pay for acquired lines, which include the Nevada County Narrow Gage Railroad, operating between Colfax and Nevada City, 20½ miles, and the Marysville Traction Company. The bonds are dated May 1, 1907, and are due on May 1, 1947, but are callable on or after March 31, 1917. The Mercantile Trust Company, San Francisco, Cal., is trustee of the issue.

Dallas (Tex.) Electric Corporation.—The Dallas Electric Corporation has declared a dividend of 3 per cent on the $2,000,000 of present 5 per cent non-cumulative second preferred stock, payable on Oct. 9, 1911. This compares with 2 per cent paid in April, 1911, and 1 per cent in October, 1910.

Lake Erie, Bowling Green & Napoleon Railway, Bowling Green, Ohio.—The receivers of the Lake Erie, Bowling Green & Napoleon Railway have been authorized by Judge Killits, of the federal court, to expend $50,000 for improvements to the hot water heating and electric light plants at Bowling Green, Ohio.

Lehigh Valley Transit Company, Allentown, Pa.—The Lehigh Valley Transit Company has declared an initial dividend of 1 per cent on the $4,979,687 of 5 per cent preferred stock, payable on Nov. 10, 1911. The dividend on this stock is cumulative after Nov. 3, 1910.

Metropolitan Street Railway, Kansas City, Mo.—The receivers of the Metropolitan Street Railway report as follows for the three months ended Aug. 31, 1911: Passenger earnings, $1,442,094, an increase of $23,401 over the same period of 1910; total disbursements, $1,422,278.

Republic Railway & Light Company, New York, N. Y.—The Republic Railway & Light Company has declared an initial quarterly dividend of 1½ per cent on the $5,200,000 of 6 per cent cumulative preferred stock, payable on Oct. 16, 1911.

Salt Lake & Ogden Railway, Salt Lake City, Utah.—The Harris Trust & Savings Bank, Chicago, Ill., Harris Forbes & Company, New York, and N. W. Harris & Company, Inc., Boston, are placing $75,000 of first mortgage 5 per cent gold bonds of the Salt Lake & Ogden Railway, dated 1909, due Feb. 1, 1934, but callable at 105 and interest on and after Feb. 1, 1914.

Sao Paulo Tramway, Light & Power Company, Sao Paulo, Brazil.—It is announced that the Sao Paulo Tramway, Light & Power Company has arranged to dispose of £150,000 additional perpetual consolidated debenture stock.

Second Avenue Railroad, New York, N. Y.—Supreme Court Justice Bijur has given permission to George W. Linch, receiver of the Second Avenue Railroad, to issue $3,065,000 of receivers' certificates to meet an issue of receivers' certificates for $3,000,000 due on Oct. 1. The entire issue will amount to $3,200,000, the remaining $135,000 being held for emergency.

Springfield & Xenia Railway, Springfield, Ohio.—The Springfield & Xenia Railway has declared a dividend of 1½ per cent on the $300,000 of 5 per cent cumulative preferred stock, payable on Sept. 30, 1911. This compares with 1¼ per cent in July and April, 1910, and 1¾ per cent in January, 1911.

Virginia Railway & Power Company, Richmond, Va.—The Virginia Railway & Power Company has declared an initial semi-annual dividend of 1 per cent on the $7,450,500 of common stock, payable on Oct. 20, 1911.

Youngstown & Ohio River Railroad, Leetonia, Ohio.—The Youngstown & Ohio River Railroad has declared a quarterly dividend of 1 per cent on the $1,000,000 of 5 per cent preferred stock, payable on Sept. 30, 1911. This compares with ¾ of 1 per cent paid quarterly from October, 1910, to July, 1911.

Dividends Declared

Auburn & Syracuse Electric Railroad, Syracuse, N. Y., quarterly, 1½ per cent, preferred.

Boston (Mass.) Suburban Electric Companies, quarterly, $1, preferred.

Central Pennsylvania Traction Company, Harrisburg, Pa., $3.

Cincinnati, Newport & Covington Light & Traction Company, Covington, Ky., quarterly, 1⅛, preferred; quarterly, 1¼, common.

Ft. Smith Light & Traction Company, Ft. Smith, Ark., quarterly, 1¾ per cent, preferred.

Honolulu Rapid Transit & Land Company, Honolulu, Hawaii, quarterly, 1½ per cent, common.

Kokomo, Marion & Western Traction Company, Kokomo, Ind., 3 per cent, preferred.

Manchester Traction, Light & Power Company, Manchester, N. H., quarterly, 2 per cent.

Memphis (Tenn.) Street Railway, quarterly, 1¼ per cent, preferred.

Nashville Railway & Light Company, Nashville, Tenn., quarterly, 1¼ per cent; quarterly, 1 per cent, common.

Ottumwa Railway & Light Company, Ottumwa, Ia., quarterly, 1¾ per cent, preferred.

Syracuse (N. Y.) Rapid Transit Company, quarterly, 1½ per cent, preferred; 1 per cent, common.

Utica & Mohawk Valley Railway, Utica, N. Y., quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

Western Ohio Railway, Lima, Ohio, quarterly, 1½ per cent, second preferred; quarterly, 1¼ per cent, first preferred.

Wheeling (W. Va.) Traction Company, quarterly, 1 per cent.

MONTHLY ELECTRIC RAILWAY EARNINGS

AURORA, ELGIN & CHICAGO RAILROAD COMPANY.

Period.			Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1 m.,	Aug.	'11.....	$189,282	$92,749	$96,533	$36,444	$60,089
1 "	"	'10.....	178,730	87,477	91,254	33,039	58,215
2 "	"	'11.....	375,553	184,286	191,266	72,919	118,348
2 "	"	'10.....	361,118	175,089	186,029	65,608	120,421

MONTREAL STREET RAILWAY.

1 m.,	Aug.	'11.....	$443,108	$232,530	$210,578	$73,634	$136,945
1 "	"	'10.....	398,829	216,314	182,514	65,743	116,771
11 "	"	'11.....	4,319,819	2,478,725	1,841,094	549,607	1,291,488
11 "	"	'10.....	3,889,475	2,237,830	1,651,645	485,290	1,166,355

NORTHERN TEXAS ELECTRIC COMPANY.

1 m.,	July,	'11.....	$131,383	$66,878	$65,505	$25,592	$38,913
1 "	"	'10.....	125,943	68,147	57,796	20,273	37,523
12 "	"	'11.....	1,545,631	803,959	741,672	276,604	464,769
12 "	"	'10.....	1,367,246	737,475	629,771	218,299	411,472

PADUCAH TRACTION & LIGHT COMPANY.

1 m.,	July,	'11.....	$22,477	$12,559	$9,918	$7,842	$2,079
1 "	"	'10.....	21,577	11,697	9,880	7,023	2,857
12 "	"	'11.....	257,760	141,453	116,307	91,523	24,785
12 "	"	'10.....	240,492	143,406	97,086	82,411	14,675

PUGET SOUND ELECTRIC RAILWAY.

1m.,	July,	'11.....	$163,774	$92,832	$70,941	$50,818	$20,123
1 "	"	'10.....	182,986	102,204	80,782	51,292	29,491
12 "	"	'11.....	1,828,195	1,230,329	597,866	602,820	4,955
12 "	"	'10.....	1,943,290	1,280,796	662,494	599,315	63,178

SAVANNAH ELECTRIC COMPANY.

1 m.,	July,	'11.....	$64,039	$45,482	$18,556	$18,358	$199
1 "	"	'10.....	59,140	40,942	18,198	18,193	5
12 "	"	'11.....	666,946	447,124	219,822	218,444	1,378
12 "	"	'10.....	615,165	401,655	213,510	213,193	317

SEATTLE ELECTRIC COMPANY.

1 m.,	July,	'11.....	$467,869	$247,595	$220,275	$115,681	$104,593
1 "	"	'10.....	459,059	261,509	197,550	110,108	87,175
12 "	"	'11.....	5,560,422	3,090,276	2,470,146	2,432,001	1,130,153
12 "	"	'10.....	5,852,062	3,420,061	1,339,993	1,287,517	1,144,485

TAMPA ELECTRIC COMPANY.

1 m.,	July,	'11.....	$57,253	$29,450	$27,803	$6,930	$20,873
1 "	"	'10.....	51,506	28,900	22,607	6,711	15,895
12 "	"	'11.....	621,111	327,588	293,523	76,827	216,696
12 "	"	'10.....	619,517	349,716	269,800	57,310	212,491

TOLEDO RAILWAYS & LIGHT COMPANY.

1 m.,	Aug.	'11.....	$252,534	$156,738	$95,795	$79,158	$16,637
8 "	"	'11.....	2,041,174	1,275,387	765,787	633,539	132,248

Traffic and Transportation

New Orleans Company Issues Pamphlet of Suggestions for the Prevention of Accidents

Under the direction of D. A. Hegarty, manager of the railways, operating and electric departments of the New Orleans Railways & Light Company, New Orleans, La., the company has prepared a four-page pamphlet, "Important Suggestions—How to Avoid Accidents," copies of which are being sent to all the schools in that city so that teachers can distribute them to pupils. Under the heading "Caution" there appears this advice in a series of "don'ts";

"Don't cross the street when a car is coming within the square.

"Don't roller skate on streets where there are car tracks.

"Don't play ball on streets where there are car tracks.

"Don't get on or off a car until it stops.

"Don't ride on the rear platform of a car. This is dangerous.

"Don't touch any loose wire that you see in the street. It may be charged and hurt you.

"Don't send your little brother or sister across the street to buy candy.

"Don't forget the instructions of your teacher and parents.

"Don't jump or hang on any wagon or other vehicle on the street. This is extremely dangerous.

"Don't cross any street until you first ascertain if any fast vehicles are approaching.

"Don't get off a car backwards. Always face the front end.

"Don't cross the street directly behind a car. You are liable to be run over by a car going in the opposite direction.

"Don't throw rocks or brickbats at a car. You are liable to injure someone.

"Don't tease irresponsible persons on the street. They may throw at you and cause you to run in front of a car at the risk of your life.

"Don't roller skate behind vehicles by holding on to same This is very dangerous.

"Don't hitch the rope of your cart or wagon to any car or other vehicle when you ride in the street.

"Don't hold on to cars or wagons when you are riding a bicycle. This is very dangerous.

"Don't come suddenly into streets that cross car tracks with your wagon or cart while playing in the street; and don't ride it in streets on which street cars run."

Under the heading "Things Children Should Do" appears this advice:

"Tell your playmates to be careful when crossing a street and look out for all kinds of vehicles.

"Tell your mother and sisters to wait until a car comes to a full stop before getting off or on.

"Tell your mother and sisters always to get off a car facing the front end.

"Tell your playmates that you will not play ball or roller skate in streets where there are car tracks. It is dangerous.

"Tell your playmates to keep away from all wires that they see hanging in the street.

"If you see a wire in the street emitting sparks or flashes, get away. It is very dangerous, especially in damp weather.

"Always hold to your mother's hand when crossing a street with her."

Fenders Ordered in Centralia, Ill.—The City Council of Centralia, Ill., has passed an ordinance directing the Centralia & Central City Traction Company to equip its cars with fenders.

Dayton Companies Arrange to Interchange Tickets.—The People's Railway and the Dayton Street Railway of Dayton, Ohio have arranged to interchange tickets as an accommodation to the people who use both lines.

Car Plunges Into Canal.—A car of the Trenton & Mercer County Traction Corporation, Trenton, N. J., plunged through an open draw at Trenton, N. J., on Sept. 21, 1911, and into the Delaware & Raritan Canal. None of the passengers were seriously injured.

Fare Between Birmingham and Ensley.—A. O. Lane conferred recently with A. H. Ford, president of the Birmingham Railway, Light & Power Company, Birmingham, Ala., in reference to the 5-cent carfare between Ensley and Birmingham. Commissioner Lane said after the conference that some action might certainly be expected in the immediate future.

Local Service Between Albany and Schenectady.—The Public Service Commission of the Second District of New York made an order requiring the Schenectady (N. Y.) Railway to change the schedule upon which its local cars are now running between Schenectady and Albany during the hours in which limited cars are operated, so that the local cars will leave Albany and Schenectady terminals fifteen and forty-five minutes after each hour. The arrangement which is provided for in the order was agreed upon after conferences held between Electric Railroad Inspector Barnes of the commission and E. F. Peck, general manager of the Schenectady Railway.

Milwaukee Electric Railway & Light Company Folder.—The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., in its latest timetable folder, which consists of sixteen pages and cover, presents the timetables, rates of fare and descriptions of towns along the interurban lines, and short essays which should help to educate the public to a better understanding of the company's position in the community which it serves. These educational articles are: "Misunderstanding and Prejudice," "The Streets Belong to the People," "Franchises, What Are They?" 'How the Street Railway Helps the City's Growth," "Increased Cost of Street Railway Operation," "Insufficiency of Present Street Railway Fares," "Good Street Railway Service and What It Means." The cover of the new folder shows a map of the interurban system and a view of one end of the large Public Service Building and Terminal at Milwaukee.

Bridge Traffic in New York.—The bridge commissioner of New York reports that for the last quarter the cars of the Gates Avenue line of the Brooklyn Rapid Transit Company made 31,810 trips over the Brooklyn Bridge, the cars of the Graham Avenue line 29,517 trips, and the cars of the Court Street, Putnam Avenue, Fulton Street and Bergen Street lines more than 20,000 trips. The cars of the DeKalb Avenue and the Smith Street lines of the Coney Island & Brooklyn Railroad made more than 20,000 trips. The Fulton Street elevated line made 71,234 trips; the Lexington Avenue elevated line, 62,033 trips; Myrtle Avenue elevated, 55,086; Brighton Beach elevated, 53,270; Fifth Avenue elevated, 45,235; West End elevated, 36,719. All of these elevated lines are operated by the Brooklyn Rapid Transit Company. The largest number of trips over the Williamsburg Bridge was made by the Ralph Avenue line of the Brooklyn Rapid Transit Company. The surface car tolls over the Brooklyn Bridge for the quarter were $18,736.50 and the elevated tolls $35,530.70. The surface car tolls over the Williamsburg Bridge amounted to $21,078.65 and the elevated tolls to $8,681.80.

Permission Granted for Removal of Third Track.—The Public Service Commission of the Second District of New York has given the International Railway, Buffalo, N. Y., permission to take up its third track on the east side of Main Street between Eagle Street and North Division Street, Buffalo. The line is now used for the operation of the William Street and Clinton Street cars through Main Street. The company is also permitted to remove the curves connecting the track in question with the track in Eagle Street and the track in North Division Street. The company now proposes to make the turn of the Clinton Street and William Street cars by taking them through Washington Street from North Division Street to Eagle Street. At the hearing there was considerable opposition to the removal of the tracks, the principal objection raised being the inconvenience to patrons of the William Street and Clinton Street lines in making transfers to west side lines. The company showed that the block in question on Main Street was one of the busiest in the city and was very much congested during the rush hours of the day; that the third track interfered with vehicular and pedestrian traffic, and that in seventeen months and twenty days ending in September eighty-eight accidents had happened on this block, due largely to the existence of the third track in the street.

Personal Mention

Mr. Clyde Russell has resigned as master mechanic of the Elgin & Belvidere Electric Company, Chicago, Ill.

Mr. J. A. Wilcox has been appointed master mechanic of the Corning & Painted Post Street Railway, Corning, N. Y.

Mr. J. A. Dorman has been appointed dispatcher and accountant of the Elmira, Corning & Waverly Railway, Waverly, N. Y., and the Corning & Painted Post Street Railway.

Mr. J. B. Stewart, Jr., has been appointed superintendent and assistant engineer of the Elmira, Corning & Waverly Railway, Waverly, N. Y., and the Corning & Painted Post Street Railway.

Mr. W. H. Burke, formerly purchasing agent of the Illinois Traction System, has been placed in charge of the wholesale and retail coal selling and delivery business of the McKinley properties at St. Louis, Mo.

Mr. A. M. Campbell, formerly assistant storekeeper of the Atchison, Topeka & Santa Fé Railway at Topeka, Kan., has been appointed storekeeper of the Illinois Traction System, with headquarters at Decatur.

Mr. R. M. Howard has been appointed general manager of the Winona Railway & Light Company, Winona, Minn., to succeed Mr. F. H. Plaice, whose resignation was announced in the Electric Railway Journal of Sept. 23, 1911.

Mr. F. E. Fisher, superintendent of construction of the Chicago, Ottawa & Peoria Railway, has been appointed general superintendent of that property, vice Mr. H. J. Vance, appointed purchasing agent for all the McKinley properties. Mr. Fisher was formerly an official of the Joliet & Southern Company.

Mr. J. C. Bacon, whose appointment as general superintendent of the Augusta Railway & Electric Company, Augusta, Ga., was noted in the Electric Railway Journal of Sept. 2, 1911, has assumed his duties with that company. Mr. Bacon was formerly connected with the Metropolitan Street Railway, Kansas City, Mo.

Mr. D. C. Hintsdorff has resigned as assistant superintendent of the Elgin & Belvidere Electric Company, Chicago, Ill., to become superintendent of the Waukegan, Rockford & Elgin Traction Company, Waukegan, Ill., which has just begun to operate between Wauconda and Palatine. Mr. Hintsdorff was formerly connected with the Chicago & Milwaukee Electric Railroad.

Mr. Llewellyn H. McLain, one of the inspectors of the Railroad Commission of Massachusetts, is soon to go West and sudy the construction, equipment and operation of electric railways in Montreal, Toronto, Syracuse, Buffalo and Albany, observing especially how the roads deal with the fender question. Mr. G. W. Bishop, of the commission, is later to make a trip South and West on a similar tour of inspection.

Mr. Henry C. Page, vice-president and general manager of the Worcester (Mass.) Consolidated Street Railway, entertained as his guests recently the members of the Lynn & Boston Street Railway Veterans' Association. Mr. Page began his street railway career with the Lynn & Boston Street Railway more than twenty-five years ago, and is vice-president of the Lynn & Boston Street Railway Veterans' Association.

Mr. H. J. Vance has resigned as general superintendent of the Chicago, Ottawa & Peoria Railway and been appointed purchasing agent for the Illinois Traction System and the Western Railways & Light Company. The latter corporation owns among other properties the one which Mr. Vance has operated for the last three years. Mr. Vance succeeds Mr. W. H. Burke as purchasing agent. The office of the purchasing agent has been removed from Decatur to Peoria, Ill.

Mr. David E. Pepin has resigned as superintendent of the Ware & Brookfield Street Railway, Ware, Mass., to go to Seattle. Mr. Pepin was born in Minneapolis. He became connected with the Hampshire & Worcester Street Railway, the predecessor of the Ware & Brookfield Street Railway, in 1900 during construction and when the road was placed in operation in 1901 he was appointed superintendent and has continued in that capacity since that time.

Mr. Calvert Townley has been elected president of the Lackawanna & Wyoming Valley Rapid Transit Company, Scranton, Pa., and its subsidiary companies to succeed Mr. George C. Smith, who is leaving the Westinghouse interests to devote his time to affairs of his own. Mr. Townley, as assistant to the president of the Westinghouse Electric & Manufacturing Company, represents directly the control by that company of the Lackawanna & Wyoming Valley Rapid Transit Company.

Mr. J. D. Evans has been appointed supervising engineer and superintendent of construction for the Montreal (Que.) Street Railway. Mr. Evans is also resident engineer for J. G. White & Company, Inc., on the Canadian Light & Power Company's works. Mr. Evans has had charge of engineering and construction work in Canada, the United States and the South American republics. Prior to going to Montreal he had charge of the engineering and construction work of the Buffalo, Lockport & Rochester Railway.

Mr. Alfred Craven has been appointed chief engineer of the Public Service Commission of the First District of New York in charge of rapid transit construction. Mr. Craven has been acting as chief engineer ever since the resignation of Mr. Henry B. Seaman a year ago. Mr. Craven is a son of Rear-Admiral Craven of the United States Navy and is himself a graduate of Annapolis, class of 1867. In 1884 he was appointed on the staff of the old Aqueduct Commission which built the Croton water system for New York City. In 1900 he became a division engineer of the old Rapid Transit Commission of New York, and subsequently succeeded Mr. George S. Rice as engineer in charge of subway construction.

OBITUARY

N. B. McPherson, auditor of the Toledo & Chicago Interurban Railway, Kendallville, Ind., is dead.

NEW PUBLICATIONS

Straight Line Engineering Diagrams. Compiled by Manifold & Poole, engineers, Los Angeles, Cal. Published by the Technical Publishing Company, San Francisco, Cal. Cloth, 44 diagrams. Price, $3.

This book contains a number of computing diagrams, giving rapid, approximate solutions of the common problems in the design and construction of electric systems and similar undertakings. These include the diagrams to be used in the design of foundations, arches and reinforced concrete walls, reducing stadia readings to linear dimensions, calculations of the capacity of pipes and flumes, the horse-power of engines and the power transmitted by shafting, gearing and belting calculated. Electric distribution problems are also worked out with suitable diagrams.

Electric Traction for Railway Trains. By Edward P. Burch. McGraw-Hill Book Company. New York, 1911. 583 pages; illustrated. Price, $5.

This is the most complete treatise yet published on the subject of heavy electric traction and has been prepared especially for students, electrical and mechanical engineers and superintendents of motive power. The substance of the work was delivered by the author in a series of lectures during the last four years to the senior students of electrical engineering at the University of Minnesota. The first part of the book is very largely a record of what has been accomplished in this country and abroad, to which Mr. Burch has added a critical comparison of the results obtained with different electrical systems and with steam locomotives operating under different conditions. Tables of performance and copious references to the technical press at home and abroad make these chapters most valuable as a handbook to an engineer in charge of work of this kind. The author then discusses the procedure to be followed in undertaking a problem of steam railroad electrification and adds tabulated statistics of the costs of different existing and proposed installations. The concluding chapter is a summary of the work done in railroad electrification. The book is accompanied by a comprehensive index.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Mobile Interurban Motor Railway, Mobile, Ala.**—Application for a charter has been made by this company in Alabama to build a 2-mile line from the terminus of the Spring Hill line of the Mobile Light & Railway Company to the Pinehurst subdivision. Capital stock, $25,000. Incorporators: C. C. Meecham, Mobile; J. J. Dowling, Steubenville, Ohio; J. D. Atkins, A. H. Brinkman. [E. R. J., Feb. 11, '11.]

Eastern Indiana Traction Company, Richmond, Ind.—Application for a charter has been made in Indiana by this company to build an electric railway between Richmond and Portland, via Liberty, Brookville and Harrison, Ohio. Capital stock, $50,000. Officers: Sharon E. Jones, president; Adam H. Bartel, vice-president, and Charles W. Jordan, secretary and treasurer. [E. R. J., April 1, '11.]

***Oklahoma Northwestern Railway, Oklahoma City, Okla.**—Chartered in Oklahoma to build a railway from Oklahoma City to Woodward, via the Counties of Oklahoma, Canadian, Kingfisher, Blaine, Dewey and Woodward. It is the intention to build a branch from the North Canadian River near Canton to Seiling Cestos and Mutual. About 30 miles of surveys have been completed. Capital stock, $100,000. E. A. Wagener, Oklahoma City, president.

FRANCHISES

***Tuscaloosa, Ala.**—F. G. Blair and Henry B. Foster have asked the City Council for a franchise in Tuscaloosa.

Texarkana, Ark.—The Texarkana Gas & Electric Company, Texarkana, has received a franchise from the City Council to double track its East Side line in Texarkana.

Los Angeles, Cal.—The Board of Supervisors passed an ordinance authorizing the sale on Oct. 2, 1911, of a forty-year franchise to build an elevated electric railroad over El Monte Road.

San José, Cal.—C. P. Anderson has asked the County Board of Supervisors for a franchise to build an 11-mile electric or gas-electric railway from San José to New Almaden. [E. R. J., Sept. 16, '11.]

***San Francisco, Cal.**—Paul B. Fay has received a franchise from the Supervisors to build a double-track electric railway on Bryant Street to connect the existing tracks on Army Street and Twenty-sixth Street. The line will be operated by the United Railroads.

Woodland, Cal.—The Sacramento Valley West Side Electric Railway will apply for a franchise through Yola, Colusa, Glenn & Tehama Counties. [E. R. J., Aug. 19, '11.]

North Haven, Conn.—The Connecticut Company has asked the Common Council for approval of proposed method of construction of a double-track line in North Haven and Hamden, on Whitney Avenue, from Lake Whitney to the Mount Carmel railroad station. The company will also ask for a franchise in North Canaan.

Stamford, Conn.—The New York & Stamford Railway, Port Chester, has asked the Borough Board for a franchise to double track its Putnam Avenue line from Greenwich Avenue to Pit's Hill in Stamford.

Pueblo, Col.—The Pueblo & Suburban Traction & Lighting Company has received a twenty-five-year extension of its franchise from the City Council in Pueblo.

East St. Louis, Ill.—The Southern Railway has received a franchise from the City Council to build a second track to its belt line around the southern half of East St. Louis.

Gary, Ind.—The Indianapolis, Chicago & Meridian Railway, Indianapolis, has asked the City Council for a franchise in Gary. This railway will connect Indianapolis, Sheridan, Flora, Gary, Monticello, Hammond and Warsaw. M. J. Mooreland, secretary. The company also asked the Marion County Commissioners for a franchise through Marion County. [E. R. J., July 15, '11.]

Indianapolis, Ind.—The Indianapolis & Delphi Traction Company has received a fifty-year franchise from the County Commissioners to build an interurban electric railway between Forty-second Street, Indianapolis, and the Hamilton-Marion County line. [E. R. J., April 15, '11.]

Hagerstown, Md.—The Hagerstown & Clearspring Railway has received a franchise from the Washington County Commissioners to build over various county roads in Maryland to the Pennsylvania State line. L. N. Downs, Hagerstown, president. ([E. R. J., Sept. 16, '11.]

Montague, Mass.—The Miller's River Street Railway, Miller's Falls, has received a franchise from the Town Council in Montague. This line will connect Miller's Falls, Montague, Irving, Wendal and Orange. [E. R. J., Sept. 2, '11.]

Revere, Mass.—The Boston & Eastern Railway, Boston, has asked the City Council for a franchise in Revere. This line will connect Boston, Beverly, Danvers, Lynn, Chelsea, Revere, Salem and Swampscott. [E. R. J., Sept. 16, '11.]

Duluth, Minn.—The Duluth Street Railway has asked the City Council for a franchise in Duluth from Raleigh Street to the bay.

Virginia, Minn.—W. M. Prindle and W. M. Prindle, representing the Virginia, Eveleth & Gilbert Traction Company, Duluth, have received a franchise from the City Council in Virginia. The line will connect Virginia, Eveleth and Gilbert. [E. R. J., April 1, '11.]

***Laurel, Miss.**—P. H. Saunders and S. M. Jones have received a twenty-five-year franchise from the City Council to build a 3-mile electric railway over the principal streets in Laurel.

St. Joseph, Mo.—The Kansas City, Clay County & St. Joseph Railway has received a franchise from the County Court to build an electric railway from St. Joseph southward across the county. [E. R. J., Sept. 16, '11.]

Newark, N. J.—The Public Utility Commission of New Jersey has approved franchise ordinances passed in favor of the Public Service Railway in Newark and Montclair.

Schenectady, N. Y.—The Schenectady Railway has received a franchise from the City Council to extend its tracks on Union Street to North Terrace and to build several lines in the northern section of Schenectady to the American Locomotive Works.

Newburg Heights, Ohio.—The Council of Newburg Heights will be asked to cede the right-of-way to that portion of land needed for the Denison and Harvard Street line extension to Newburg Heights from Cleveland.

Sapulpa, Okla.—The Union Traction Company, Tulsa, has asked the City Council for a franchise in Sapulpa.

Eugene, Ore.—The Oregon Electric Railway has received a franchise from the City Council to build a loop from Eighth Street to Ninth Street in Eugene.

Junction City, Ore.—The Oregon Electric Railway, Portland, has received a franchise from the City Council for a franchise in Junction City.

New Castle, Pa.—The New Castle, New Wilmington & Sharon Electric Railway has received a year's extension of its franchise from the Councils in which to begin the construction of its proposed 15-mile electric railway between New Castle, Bethel, Sharon, New Wilmington, Middlesex and Meadville. James Campbell is interested. [E. R. J., April 1, '11.]

Burlington, Wash.—The Bellingham-Skagit Railway has received a franchise from the City Council to build an electric railway in Burlington from north to south and to build a spur to the northwest paralleling the Great Northern Railway to Anacortes.

TRACK AND ROADWAY

Fresno, Hanford & Summit Lake Interurban Railway, Fresno, Cal.—Grading has been completed by this company and the laying of rails will begin Oct. 15.

Clear Lake Railroad, Lakeport, Cal.—The surveys being made by this company are nearly completed for its 44-mile railway from Hopeland to Lakeport. Z. T. Spencer is interested. [E. R. J., June 10, '11.]

Pacific Electric Railway, Los Angeles, Cal.—This company has awarded a contract to Robert Shearer for the construction and material required for a roadbed for a double-track line, known as the Watts-Homeward line, from a point on the Long Beach line near Watts to a point on Moneta Avenue. The company has begun extensive improvements on its lines in Whittier.

Oakland (Cal.) Traction Company.—Work has been begun by this company on its 3-mile extension from Fourteenth Avenue to Fruitvale Avenue on its Hopkins Street line in Oakland. Work will begin at once on San Pablo Avenue in Albany, which when completed will be a double-track line from Fourteenth Street and Broadway out San Pablo Avenue to the county line.

***Redlands, Cal.**—The University of Redlands and other interested parties will build a 4-mile electric railway from Redlands to the University of Redlands' grounds.

Central California Traction Company, San Francisco, Cal.—Work has been begun by this company laying double tracks on its Magnolia Avenue line.

West Side Railroad, San Francisco, Cal.—In a statement by an official of this company it is denied that the company intends at this time to build an electric railway from Sacramento to Rio Vista. The company is organized in connection with the West Sacramento Company and is to assist in developing the holdings of that company on the west side of the Sacramento River, opposite Sacramento. To do this a road 5.7 miles long will be built. [E. R. J., Sept. 9, '11.]

City & Suburban Railway, Brunswick, Ga.—Work has been begun by this company on its extension over L Street to Glynn Avenue in Brunswick.

East Rome Car Company, Rome, Ga.—This company advises that it will soon begin the construction of its 3-mile gasoline railway in Rome. Capital stock authorized, $50,000. Officers: W. E. Davies, Rome, president, and F. W. Copeland, Rome, secretary. [E. R. J., Sept. 23, '11.]

Quincy & Western Illinois Electric Railway, Quincy, Ill.—This company, which plans to build a 75-mile electric railway from Niota to Quincy, has elected the following officers: Henry Dayton, president; Henry Bastert, secretary; W. T. Duker, treasurer; David E. Mack, Carthage, Rudolph Anton, Nauvoo, C. A. Chittendon, Mendoon, and S. J. Prosser, Warsaw, vice-presidents. [E. R. J., Sept. 2, '11.]

Springfield & Northwestern Railway, Springfield, Ill.—This company has completed surveys for its projected 40-mile line from Springfield through Casey, Cantrall, Athens, Petersburgh and Greenview to Mason City. The capital for construction has not been secured as yet and no definite time has been decided upon for awarding construction contracts. Ralph N. Baker, Springfield, Ill., president. [E. R. J., Aug. 26, '11.]

Indiana Union Traction Company, Anderson, Ind.—This company is required to remove its tracks from Southerland Avenue and build an entrance into Indianapolis by way of Martinsdale Avenue or the Fair Ground. The change to either route will require an expenditure of $200,000.

Evansville & Chrisney Railway, Evansville, Ind.—This company has made arrangements to begin the construction of its line to connect Lynnville, in Warrick County, and Chrisney in Spencer County, with Evansville. Substantial subsidies have been voted in aid of constructing the line. It is the intention of the officials to let a contract for the construction in a few weeks. J. P. Chrisney is interested. [E. R. J., Aug. 26, '11.]

Gary, Hobart & Eastern Traction Company, Hobart, Ind.—Plans are being made by this company to begin at once the construction of its line between Gary and Hobart. [E. R. J., Aug. 26, '11.]

Indianapolis, Chicago & Meridian Railway, Indianapolis, Ind.—This company announces that it expects to let contracts for the construction of the road. The line will connect Indianapolis, Sheridan, Gary, Hammond and Warsaw. M. J. Mooreland, secretary. [E. R. J., July 15, '11.]

New Albany, Ind.—F. E. Segrave, Toledo, Ohio, who is promoting an electric railway from New Albany to French Lick, reports that capitalists back of him have instructed him to ask for bids and undertake the work. [E. R. J., Sept. 23, '11.]

Richmond & Eastern Indiana Traction Company, Richmond, Ind.—Sharon E. Jones, president of this company, announces that the directors will be able to finance and construct that portion of the line between Richmond and Portland this year. The line will connect Portland, Union City, Bethel, Cox's Mills, Richmond, Brookville and Harrison. A. H. Bartel is interested. [E. R. J., Sept. 23, '11.]

Vincennes, Washington & Eastern Interurban Company, Vincennes, Ind.—This company's line, which is to connect Vincennes, Wheatland, Washington and Loogootee, will be completed by the Brindley Construction Company. Work will begin Oct. 1.

***Farley, Ia.**—S. G. Durant, Omaha, Neb., and associates plan to build an electric railway between Farley, Garnaville and Luxemburg.

Ft. Dodge, Des Moines & Southern Railway, Ft. Dodge, Ia.—Plans are being made and right-of-way secured by this company for its 6-mile extension from Ankeny to Des Moines.

Iowa City (Ia.) Electric Railway.—Construction has been begun by this company on the 1½-mile extension of its line in Iowa City.

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.—Work has been begun by this company upon a new steel bridge on the Cedar Falls line.

Kentucky Southwestern Electric Railway, Light & Power Company, Hickman, Ky.—This company will not only build an electric interurban line from Paducah toward Mayfield, Union City, Clinton and Hickman, but a belt line will be run from near Milburn, probably to Lovelaceville, thence to Blandville, to Wickliffe and from Wickliffe back to Paducah. Edward F. Wheaton, Nashville, Tenn., manager. [E. R. J., Sept. 16, '11.]

Portland, Gray & Lewiston Railway, Portland, Me.—This company has nearly completed the roadbed of its extension between Portland and Lewiston, and tracklaying will begin in a few weeks.

United Railways & Electric Company, Baltimore, Md.—This company placed in operation on Oct. 1 its new Hamburg Street extension of the Fremont Avenue line in Baltimore.

Frederick (Md.) Railroad.—This company has practically completed its improvements at Frederick, which include between 7 and 8 miles of new track with terminal facilities. The entire system, including the Thurmont division, has been electrified. It is understood that the company will extend the line from Jefferson to Brunswick, a distance of about 7 miles, intersecting the main line of the Baltimore & Ohio Railroad. The extension of the Thurmont division to Emmitsburg and Gettysburg is also being considered.

Hagerstown & Clearspring Railway, Hagerstown, Md.—This company has awarded a contract to the Maryland Steel Company for 1200 tons of steel rails. The company has purchased a right-of-way along a portion of the Hagerstown-Cearfoss Turnpike. The new road will extend from Salem Avenue, Hagerstown, and run through Cearfoss and Greencastle to Mercersburg. The rights-of-way between Greencastle and Mercersburg have already been secured, it is announced, and $100,000 has been subscribed for the construction of the road. L. N. Downs, Hagerstown, president. [E. R. J., Sept. 16, '11.]

Boston & Worcester Street Railway, Boston, Mass.—This company has completed a double-track line at Framingham Center.

Berkshire Street Railway, Pittsfield, Mass.—This company placed in operation on Sept. 26 its extension between Canaan and Great Barrington.

Gogebic & Iron County Railway & Light Company, Marquette, Mich.—This company will begin work at once on an extension between Bessemer and Marquette.

Yazoo Valley Electric Railway, Light & Power Company, Yazoo City, Miss.—This company advises that it is as yet only in the preliminary stage. It proposes to build an electric railway between Yazoo City and Canton. H. Wise, Yazoo City, is interested. [E. R. J., Sept. 23, '11.]

North Missouri Central Railway, Mexico, Mo.—It is reported that this company has been reorganized and arrangements made whereby P. M. Johnson, St. Elmo, will build this line between Jefferson City and Columbia. This is part of a plan to build a 63-mile electric railway between Jefferson City and Mexico via Columbia, and a branch line from Columbia to Moberly, a distance of about 39 miles. [E. R. J., June 17, '11.]

Buffalo & Lake Erie Traction Company, Buffalo, N. Y.—Work will now proceed with double tracking the East Sixth Street branch east of Buffalo. Right-of-way has been secured.

Union Railway, New York City, N. Y.—The Public Service Commission has approved the terms of the franchise granted by the Board of Estimate recently to the Union Railway for an extension southerly on Broadway from 230th Street, crossing Spuyten Duyvil Creek, and down to 225th Street, just north of the ship canal.

Syracuse (N. Y.) Rapid Transit Railway.—Arrangements have been made by this company to begin work at once on the reconstruction of its tracks in North Salina Street, Syracuse, with new concrete foundations, new ties and rails. The company will make several other improvements of its lines in Syracuse.

Fargo & Moorehead Street Railway, Fargo, N. D.—It is reported that this line will be extended to Dilworth by the H. M. Byllesby Company.

Cadiz (Ohio) Traction Company.—The plans of the proposed electric line at Cadiz, it is said, are to begin with the section of road between Cadiz and Dennison and eventually build eastward to the Ohio River with Mingo Junction as the terminal, and westward via Coshocton to either Newark or Zanesville, for the purpose of connecting with the Indiana, Columbus & Eastern Traction Company, Cincinnati, whose present eastern terminal is Zanesville. At Mingo they can connect with the Steubenville lines through to both Pittsburgh and Wheeling. Robert P. Scott, Cadiz, is interested. [E. R. J., Sept. 9, '11.]

People's Electric Railway, Muskogee, Okla.—This company has placed in operation its interurban line between Muskogee and Fort Gibson. Edison storage battery cars are used.

Oregon Electric Railway, Portland, Ore.—Grading has been begun by this company on its extension between Salem and Albany.

West Penn Railways, Pittsburgh, Pa.—The grading of this company's extension from Vance's Mills to Phillips has been completed. In a few weeks the company plans to be operating to Phillips, which is 2 miles from Vance's Mill.

Sunbury & Selinsgrove Street Railway, Sunbury, Pa.—This company has awarded a contract to the Eyre-Shoemaker Company to construct its extension from Front Street, Sunbury, to a point above Packer's Island, where it will cross the river on a bridge to be built and enter Northumberland. Arrangements have been made and work will be begun at once at the Northumberland end of the line.

Columbia, S. C.—The Columbia Electric Street Railway, Light & Power Company has asked the City Council for a franchise to change and extend some of its tracks in Columbia.

Chattanooga Railway & Light Company, Chattanooga, Tenn.—A contract was awarded to the Noll Construction Company, Chattanooga, by this company for raising its tracks on Rossville Avenue and for the grading of Rossville Avenue between East End Avenue and the city limits of Chattanooga.

Ft. Worth (Tex.) Southern Traction Company.—This company has filed a deed of trust to the New England Trust Company covering the right-of-way from Ft. Worth to Cleburne. The mortgage was made to secure an issue of bonds to the amount of $1,000,000, the proceeds of which will be used to build an electric railway between Ft. Worth and Cleburne, via Everman, Burleston and Joshua. C. H. Clifford is interested. [E. R. J., Sept. 30, '11.]

Nooksack Valley Traction Company, Bellingham, Wash.—Work on the construction of this line will soon be begun. The first section to be built will be between Bellingham and Blaine. Bids have been asked for this work. In addition to this a contract has been entered into with the Northwest Canada Electric Company for a supply of power from the plant at Slave Lake. It is reported that the entire bond issue of this company has been disposed of by London capitalists. The line will connect Bellingham, Sumas, Ferndale, Lynden and Blaine. S. Alsop, Bellingham, is interested. [E. R. J., Aug. 12, '11.]

Seattle, Wash.—R. H. Thomson, city engineer, and A. L. Valantine, superintendent of Public Utilities, are reported to have been instructed by the Board of Public Works to prepare plans and specifications for all necessary roadway, overhead construction, rolling stock, equipment and apparatus for the construction of a municipal railway costing $800,000 and running between Seattle and Renton. Bids for the work are expected to be called for some time in October. [E. R. J., Sept. 23, '11.]

Fairmont & Clarksburg Traction Company, Fairmont, W. Va.—It is reported that this company has placed in operation its 7-mile extension to Mount Clare. This is part of the proposed 25-mile extension to Weston.

SHOPS AND BUILDINGS

Capital Traction Company, Washington, D. C.—Plans have been completed by this company to reconstruct its carhouse in Washington, D. C., at P and Water Streets, Southwest.

Philadelphia & Wilmington Traction Company, Wilmington, Del.—Plans are being prepared by this company for the construction of a club room for its employees at its offices in Chester. The addition will be 22 ft. x 30 ft.

Kentucky Traction & Terminal Company, Lexington, Ky.—This company has awarded a contract to Fred J. Rump, Versailles, for the construction of a new passenger station and freight house in Versailles, on Lexington Street, near Main Street. The structure will be of brick construction, and will include a substation.

Frederick (Md.) Railroad.—This company is building a new carhouse and passenger depot at Frederick.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—This company will build an additional shop building at Twenty-sixth Street and Lake Street, in Omaha. The structure will be of brick construction, one story high, 24 ft. x 140 ft.

Piedmont Traction Company, Charlotte, N. C.—This company has awarded to Fred A. Jones, Charlotte, a contract for the construction of combination passenger and freight depots at Lowell and at Mount Holly and a freight depot in Charlotte, which will be a two-story building 240 ft. long, of white brick, with a tile roof. Plans are by Hook & Rogers, Charlotte.

Interurban Railway & Terminal Company, Cincinnati, Ohio.—This company's carhouse, located at California, Ohio, and sixteen cars were destroyed by fire on Sept. 23.

Seattle, Renton & Southern Railway, Seattle, Wash.—A new one-story substation will be built by this company on Rainier Avenue in Seattle.

POWER HOUSES AND SUBSTATIONS

Savannah (Ga.) Electric Company.—This company is increasing the capacity of its Indian Street power plant. Two 490-hp Sterling boilers, one 500-kw belt-driven generator, one 75-kw exciter and necessary switching and metering apparatus will be installed.

Chicago, Ottawa & Peoria Railway, La Salle, Ill.—This company will increase the capacity of its power plant and place a portable substation on the eastern division.

Kentucky Traction & Terminal Company, Lexington, Ky.—This company has awarded a contract to Fred J. Rump, Versailles, for the construction of a new substation in Versailles. [E. R. J., Sept. 16, '11.]

Gogebic & Iron County Railway & Light Company, Marquette, Mich.—This company will build a hydroelectric plant at Saxon, on the Montreal River, which will supply energy to its properties in Marquette and environs.

Northampton Traction Company, Easton, Pa.—This company has arranged to purchase its power of the Eastern Pennsylvania Power Company.

Manufactures & Supplies

ROLLING STOCK

Northampton (Mass.) Street Railway has ordered a snow plow from the Wason Manufacturing Company.

Union Railway, New York, N. Y., has ordered two long-cab snow sweepers from The J. G. Brill Company.

Union Electric Company, Dubuque, Ia., has ordered one McGuire-Cummings long-broom, steel-underframe snow sweeper.

Ottawa (Ont.) Electric Railway has ordered six Brill 27-FE-1 trucks from The J. G. Brill Company through the Ottawa Car Company.

Ft. Smith Light & Traction Company, Ft. Smith, Ark., has ordered seven Brill 21-E trucks without wheels from the American Car Company.

Dayton & Troy Electric Railway, Dayton, Ohio, has ordered two type HL control equipments from the Westinghouse Electric & Manufacturing Company.

Chicago (Ill.) City Railway has ordered three McGuire-Cummings single-truck, steel-underframe, long-broom snow sweepers from the McGuire-Cummings Manufacturing Company.

Bluestone Traction Company, Bluefield, W. Va., has ordered one double equipment of No. 101-B-2 motors and type K-10-A control from the Westinghouse Electric & Manufacturing Company.

Raymond & South Bend Railway, Raymond, Wash., has ordered three 20-ft. closed motor-car bodies mounted on Brill 21-E trucks from the G. C. Kuhlman Car Company, through Sanderson & Porter, New York.

Oakland & Antioch Railway, San Francisco, Cal., has ordered four quadruple equipments of No. 321 motors and control, one quadruple equipment of No. 332-E motors and control, and one locomotive equipped with four No. 308-B-6 motors and control from the Westinghouse Electric & Manufacturing Company.

TRADE NOTES

Wagner Electric Manufacturing Company, St. Louis, Mo., has filed a certificate of an increase in its capital stock from $1,200,000 to $1,500,000.

C. A. Wood Preserver Company, St. Louis, Mo., has received orders within the last ten day for over 1000 barrels of its wood-preserving compound.

Pay-as-You-Enter Car Corporation, New York, N. Y., has declared the regular quarterly dividend of 1¾ per cent, payable to stockholders of record Oct. 15 through the Standard Trust Company of New York.

American Bureau of Inspection and Tests, Chicago, Ill., has appointed E. C. McMillan manager of the company, with office at Pittsburgh, Pa., to succeed George W. Greene, resigned. Mr. McMillan was formerly mechanical engineer of the company.

T. H. Symington Company, Baltimore, Md., announces the resignation of W. A. Garrett, vice-president, who is to re-enter railroad service. Mr. Garrett was formerly chief executive officer of the Seaboard Air Line. The company has appointed J. A. Sauer manager of its New York office to succeed C. S. Arthur, who has resigned to become connected with the Wales Adding Machine Company, Atlanta, Ga. Mr. Sauer was formerly secretary to the vice-president of the company.

C. J. Nash, who has been with the Westinghouse Air Brake Company, Pittsburgh, Pa., as special representative in the draft-gear department for the past year, has resigned to engage in the railway supply business, where he will make a specialty of draft-gear attachments. Mr. Nash was mechanical engineer for the Pullman Company, Chicago, in charge of the contract car construction and the estimating department, for sixteen years. In 1905 he was superintendent of the wood-car department and in charge of the steel passenger-car department of the Standard Steel Car Company, Pittsburgh, Pa. He was then appointed chief mechanical engineer of the W. H. Miner Company, Chicago, which position he held until he went with the Westinghouse Air Brake Company.

Knox, Heskett & Company, Chicago, Ill., is the new name of the Knox Engineering Company, Chicago, Ill. The stockholders of the Knox Engineering Company at a meeting held Oct. 5 authorized the name of the company to be changed and the capital stock increased to $100,000. R. M. Heskett has held the position of vice-president since the organization of the Knox Engineering Company in 1902. Mr. Heskett is a graduate of the Armour Institute of Technology, and previous to his connection with the Knox Engineering Company has had a general experience in the operating and construction field. As vice-president of the Knox Engineering Company he has been prominently identified with the operations which this company has carried on during the last ten years. The increase in capital stock is demanded by the growing scope of the firm's business.

ADVERTISING LITERATURE

W. N. Matthews & Brother, St. Louis, Mo., have issued an illustrated advertising post card, describing and giving prices of sleet cutters.

Warren Webster & Company, Camden, N. J., have issued an illustrated folder describing typical installations of heating and air-purifying systems.

A. D. Joslin Manufacturing Company, Chicago, Ill., has issued Catalog No. 1, which describes and illustrates the various models of the Cosmo dating stamp manufactured by the company.

Railway Roller Bearing Company, Syracuse, N. Y., has published a 34-page catalog in which are described and illustrated Rollway journal boxes, car wheels, center plates, motor frame heads and motor bearings for railway purposes which the company manufactures.

Bayonet Trolley Harp Company, Springfield, Ohio, has issued a fifty-four-page catalog which describes and illustrates the various types of trolley bases, harps, wheels and sheet cutters which the company manufactures. For the convenience of the buyer the different parts of the devices

Wheeler Condenser & Engineering Company, New York, N. Y., has issued Bulletin No. 103, which is a new illustrated edition of its bulletin on the Wheeler-Edwards air pump for operation in connection with surface condensers handling both air and condensed steam.

Crocker-Wheeler Company, Ampere, N. J., has published a booklet describing its new design of indication motors. These motors have magnetic bridges and the booklet shows how these bridges and other features add to the operating characteristics and mechanical durability of the motors.

Under-Feed Stoker Company of America, Chicago, Ill., has issued the September number of *Publicity Magazine,* which describes typical installations of Jones under-feed stokers and their operation. It also contains a map of the world, showing places where Jones stokers are in use.

McGraw-Hill Book Company, New York, N. Y., has issued its first complete catalog of engineering books. Nearly 400 books on all branches of engineering are listed, including twenty-six books on electric railway subjects. Among the new books on electric railways are "Electric Railway Engineering," by C. F. Harding, and "Electric Traction for Trains," by E. P. Burch.

Titanium Alloy Manufacturing Company, Pittsburgh, Pa., has issued a booklet containing two sets of tables and rail profiles relating to the second series of tests by the Baltimore & Ohio Railroad on titanium Bessemer rails and plain open-hearth rails covering 338 days' service in 1910 and 1911. Although containing 36 per cent less carbon, the titanium rails showed 56 per cent greater durability than open-hearth rails. The following is a summary of the tests: Percentage of wear from plain open-hearth rails, average, 0.277; percentage of wear from titanium Bessemer rails treated with 0.15 per cent metallic titanium, average, 0.177; carbon content in plain open-hearth rails, average, 0.47; difference in carbon content in favor of the open-hearth steel, 0.17, or 36 per cent; difference in wear in favor of titanium steel, 56 per cent. In the previous trial on this curve, plain Bessemer rails showed 294 per cent more wear than titanium Bessemer rails.

Electric Railway Journal

DAILY EDITION

Published at the Annual Conventions of the American Electric Railway Association and Its Affiliated Associations

VOL. XXXVIII NEW YORK—OCTOBER 10, 1911.—ATLANTIC CITY No. 15A

PUBLISHED DAILY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK
MILLION-DOLLAR PIER, ATLANTIC CITY

JAMES H. MCGRAW, President; C. E. WHITTLESEY, Secretary.

CHICAGO OFFICE.....Old Colony Building
CLEVELAND OFFICE.....Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.

Copyright, 1911, by McGraw Publishing Company.

TERMS OF SUBSCRIPTION

Subscription including regular weekly issues and special daily editions published from time to time in New York City or elsewhere, postage prepaid:

United States, Cuba and Mexico.....$3.00 a year
Canada ..... 4.50 a year
To all Other Countries..... 6.00 a year
Single Copies..... .10 each

Application made at the Post Office at New York for entry as mail matter of the second class.

Of this issue of the ELECTRIC RAILWAY JOURNAL, DAILY EDITION, 9,500 *copies are printed.*

NEW YORK—OCTOBER 10, 1911.—ATLANTIC CITY

PROGRAM TO-DAY

CONVENTION MEETINGS

9.30 a.m.	Opening Meeting of Accountants' Association, Chalfonte Hotel.
9.30 a.m.	Session of Engineering Association, Marine Hall, Convention Pier.
9.30 a.m.	Session of Transportation & Traffic Association, Greek Temple, Convention Pier.
9.30 a.m.	Session of Claim Agents' Association, Traymore Hotel.
11.00 a.m.	Joint Session of Engineering and Transportation & Traffic Associations, Marine Hall, Convention Pier.
2.00 p.m.	Opening Meeting of American Association, Greek Temple, Convention Pier.
2.00 p.m.	Session of Claim Agents' Association, Traymore Hotel.

ENTERTAINMENT

10.00 a.m.	Obstacle Golf, Lawn of Marlborough-Blenheim Hotel.
11.30 a.m.	Concert by Leps and His Symphony Orchestra, Lobby, Convention Pier.
1.00 p.m.	Get-Together Luncheon, Chevy Chase Room, Marlborough-Blenheim Hotel.
3.00 p.m.	Ladies' Afternoon at Cards, Persian Garden, Convention Pier.
4.00 p.m.	Obstacle Golf, Lawn of Marlborough-Blenheim Hotel.
8.30 p.m.	Manufacturers' Amateur Vaudeville, Marine Hall, Convention Pier.
11.00 p.m.	Informal Dancing, Ballroom, Convention Pier.

The American Papers and Reports

The program of the American Association this year is a particularly attractive one. Practical experience has shown that the conduct of a mid-year meeting by the American Association has in no way diminished the interest in the annual convention. In fact, it has seemed to increase it by keeping active the interest of the members in association work. There has been no program for an annual convention of the association since its organization in 1905 which has been more replete with topics of present interest. Seven addresses are to be presented on topics which are live questions of the day, and those who are to speak on these matters at the convention are very conversant with the subjects which they will discuss. In addition, a number of important committee reports will be rendered. Among them are several which will probably arouse special interest, such as those on insurance and taxation and the report of the committee on determining the proper basis for rates and fares. As usual, the first meeting of the American Association is an open session. This session will be held this afternoon at the Greek Temple, and all are invited. As no other meeting of any association is scheduled for the same time, there should be a large attendance.

Building Up Every-Day Business

Because there is always a temptation for the traffic department to expend a large part of its time and energy in promoting excursions and special traffic, the suggestions on building up steady every-day business contained in the report of the committee on passenger traffic are timely and to the point. The foundation of the successful operation of both city and interurban lines is a steady volume of traffic which can be provided for in advance and depended upon with certainty. The roads which derive a major part of their income from excursion business, extending over only a short season, as a rule are not money-makers. Their earnings are dependent on the vagaries of the weather and the caprices of a fickle public. Moreover, there is a twelve-months' investment charge during the year for a possibly three-months' income. Special traffic movements which require extra men and extra cars with the accompaniment of low rates are seldom profitable, and the chief reason why this class of business is sought after by many companies is that it is comparatively easy and cheap to get. The development of every-day business is slow work, and it often leads far from the confines of the traffic agent's office.

The committee on passenger traffic describes at some length in its report the growth of civic organizations in American cities and the results of their activities in building up communities. This is a line of work in which steam railroads have been especially active, and electric railways can profit by participation in it to an extent far greater than many realize. Analyses of street railway earnings in many of the larger cities in the United States show that the earnings increase approximately as the square of the population. The ratio of increase as applied to interurban lines is more complicated, but it is proper to say that any reasonable efforts expended toward increasing the population of the tributary territory of either an interurban road or a city system are usually repaid by a steady increase in traffic earnings.

The Engineering Program This Year

Delegates to the convention this year will notice one change in the arrangement of the meetings over that followed last year and for several years. This change, as already stated in the Electric Railway Journal, is in the meetings of the Engineering Association. Last year this association held morning sessions on Tuesday, Wednesday and Friday and afternoon sessions on Monday, Tuesday, Wednesday and Friday. The change was based primarily upon the idea that under the conditions existing in Atlantic City, where the meeting hall is some distance away from even the nearest hotels, a recess for the mid-day meal would result in the waste of valuable time and that more work could be accomplished in one long session than in two short ones. We believe that the new plan is a wise one and that this fact will be reflected in a larger attendance than before. We think that the difference will be especially marked when compared with the afternoon meetings in former years. Heretofore all of Thursday has been assigned to an inspection of the exhibits, but thy may now be inspected by the engineers on the afternoons of every day. The net result of the change is no diminution of the time to eb devoted to discussions and an actual increase in the time available for inspection of the exhibits, because no time will be lost as in the past starting the afternoon sessions by waiting for the delegates' return from the different hotels

Convention Committee Reports

Several very desirable improvements have been introduced this year in the method of compiling the committee reports. Attention is directed to these features because it is believed that they mark a step forward in the methods available for obtaining the fullest value from committee work.

This year the roster of forty-seven committees contains the names of 325 individuals, and these committees have furnished excellent material which, in printed form, occupies more than 1075 pages and includes approximately 650,000 words. This is an increase of nearly 65 per cent over the total number of pages in the committee reports of last year. The work of preparing these reports for the printer and the supervision of their publication has been an immense task, which has been handled by Secretary Donecker in a most commendable way. The reports are notably free from typographical errors, and the subject-matter has been correlated and is presented in excellent form.

Features in the reports this year which it is expected will be much appreciated are the inclusion in some of bibliographies on the subjects discussed and the presentation at the beginning of the report of the roll call of each committee meeting or the vote of each committee member on the subjects considered. Thus, in the report of the joint committee on accounting will be found an extensive bibliography of books and of articles which have been published in the technical press and general magazines on the subject of efficiency engineering. Similarly the joint committee on block signals has in course of preparation a most elaborate index of articles on electric railway signaling. These indices and bibliographies represent a considerable amount of creditable research work on the part of the committee members, and the publication of the roll call of committee meetings shows to the associations at large how representative are the committee reports, and will give the association executives a basis on which to judge the seriousness of committee members.

The use of the letter ballot for approval or disapproval of recommendations of committees is new in the electric railway associations, but has been found to be acceptable by other large technical bodies. If the proposed rules of procedure for the work of the future standardization committee of the Engineering Association are accepted substantially in their present form that association will have considerable use for the letter ballot. Other associations would do well to consider its adoption seriously, and particularly is this true of the Transportation & Traffic Association. The putting into general effect of codes of standard train rules for city and interurban operation is probably the most important operating question before any of the associations, and a more comprehensive means than a convention vote should be employed to determine the acceptance of a standard code of rules. The letter ballot probably is the best means available and will serve to secure the attention of those roads which ordinarily do not earnestly mix in convention work.

The city rules committee this year presents with its report a tabulation of the opinions of the member companies on the various rules, and a growing interest in association affairs is noted. Out of 294 companies operating city lines, the committee obtained responses from about 150 companies, which is a fairly good representation based on past letters of inquiry or data sheets sent out to the companies, but is not so large a number of replies as the importance of the subject of rules warrants.

The effectiveness of the Transportation & Traffic Association was increased this year by the advance work done by the executive committee. Previous to the announcement of the memberships of the committees which prepared the reports to be presented to this association the executive committee laid down certain plans of action along which each committee was instructed to work. The result was that at the first meeting of each committee actual work on the subject in hand was begun, while in former years it has been necessary for a committee to devote a good share of the first session to planning its work.

The Exhibit

The phrase "Bigger, better, brighter than ever" may be a trite one, but it is applied with justice to this year's magnificent showing of electric railway materials. This exhibit is something more than a current record of progress in the electric railway industry, important as that may be. It is a proof of the broad-minded spirit of co-operation that annually animates the American manufacturers of electric railway apparatus to assemble such a display for the benefit of the industry at large. It is this spirit that has made the exhibit a really indispensable feature of every convention. From year to year the manufacturers have gladly spent larger and larger sums to make their displays more interesting and instructive. In former times most of the exhibits were confined merely to models or samples; to-day the makers of even the bulkiest equipment erect full-size operating outfits wherever possible. Only those who have visited the convention pier on the days immediately preceding the meetings can realize the task of erecting rapidly such comprehensive exhibits for the sake of a five day showing.

In this year's exhibit the track engineer will find everything in his field, from the most elaborate examples of special work to the smallest detail of bonding; the line engineer, from an installed catenary system to the test section of a tubular pole; the power engineer, from an erected boiler room furnace to the steam meter, and the car engineer, from the complete vehicle in operation to a piece of headlining. In short, the several branches of the industry are so well represented that every specialist must find much to interest him in his particular line.

The displays of improved electric control and braking apparatus, various types of signal systems, current checking instruments and fare collection devices are naturally in the foreground this year in view of the special interest which electric railway men are now taking in these matters. It is fortunate that the present convention pier is available for such a comprehensive exhibit, both because of its convenience and because of the familiarity of last year's delegates with the general arrangements.

Conventionalities

Look out for Herman Piffletiff.

The rolling chair gathers no frost.

The cheerful, beneficent smile of Al Green is like oil upon the troubled waters.

The High water mark of salesmanship in the electric railway industry is conspicuous on the Boardwalk.

Uncle Charles Peirce and Cousin Jim Shaw, of New England, got into an altercation on the Boardwalk on Sunday morning because they hadn't seen each other for a long time.

Col. and Mrs. J. Harrison Steedman and Mrs. D. R. Calhoun were among the arrivals on the special train from St. Louis.

E. O. Ackerman, engineer, maintenance of way, Columbus Railway & Light Company, boarded the St. Louis special at Columbus and came through to Atlantic City.

M. M. Lloyd, master mechanic of the East St. Louis & Suburban Railroad, was a passenger on the special train from St. Louis.

No, Cuthbert. The red ribbons do not mean that this is a socialist convention, although the manufacturers modestly admit that they are strong believers in the Brotherhood of Man.

Those in attendance at the convention who are not associate members of the association should inquire of ex-President James F. Shaw, chairman of the committee on associate membership, or of any one of the members of this committee. They will learn something to their advantage.

G. H. Atkin this year attends the Railway Signal Association meeting at Colorado Springs. This is the first time in ten years that "the Admiral" has missed getting up a pool on the arriving time of the Chicago special train at the convention city.

After an absence of three years from the convention, the many friends of James H. Denton, formerly with the Allis-Chalmers Company, are glad to see him back again—this time in the capacity of representing his own firm, James H. Denton & Company, New York.

That no doubt now exists as to who has won the American League pennant is certain, because Messrs. F. W. Brooks, E. J. Burdick and A. D. B. Van Zandt felt safe last week in leaving Detroit and Michigan for a business trip East and for their regular attendance at the convention.

Thanks to the untiring efforts of Chairman McConnaughy of the exhibit committee, the Engineering Association has been provided with a satisfactory meeting hall which was made to order. The leather-bottom chairs will be appreciated by those members who come early and stay late.

The Public Service Railway not only has sent a large delegation of officers to the convention, but it has also contributed the services of Messrs. Gray, Du Bois, Glaccum, Boylan, Oelschlager, Kinlin and Cummerford, who are assisting at the registration desk of the American Association.

The first bride and groom to arrive at this convention were Bertram Berry and Mrs. Berry. Mrs. Berry has started her convention career right by becoming a full-fledged hand at exhibit work. She presides most gracefully over certain operations in the exhibit of the Heywood Brothers & Wakefield Company.

J. R. Ellicott, ex-president of the Manufacturers' Association, recently laid aside political burdens which he has borne for a number of years. Ever since the organization of the village of Grand-View-on-Hudson, which nestles under the brows of the Palisades, Mr. Ellicott has been president of it. Last week he resigned the office, much to the regret and in spite of the protests and tears of his fellow citizens.

Chairman McConnaughy was laboring under grave apprehension on Sunday morning, because he was building a Turkish room in the exhibit of his company, the Dearborn Drug & Chemical Works, and the decorations were being hung by Italians. He very much feared that when the Italians awoke to the fact that the decorations were Turkish there would be trouble.

The Public Service Railway of New Jersey expects to have about fifty delegates present at different times throughout convention week. An advance guard composed of R. E. Danforth, general manager, N. W. Bolen, superintendent of transportation, and H. A. Benedict, mechanical engineer, were on the Pier Sunday to inspect the exhibits before the rush.

E. F. Schneider, manager of the Cleveland, Southwestern & Columbus Railway, coaxed Mrs. Schneider to come to the convention and she accepted on condition that she might be permitted to do a little sight-seeing. He promised and up to Sunday she had seen one big department store in Philadelphia, the Camden Ferry, 60 miles of New Jersey right-of-way and 10 miles of boardwalk.

The many friends of W. A. Dutton will be sorry to learn that he has resigned on account of ill health as secretary and treasurer of the Van Dorn & Dutton Company, Cleveland, Ohio, after 24 years' service. For the present Mr. Dutton will make his home in the South. His absence from this convention has led to many inquiries, as this is the first meeting that he has missed since his connection with the electric railway business.

The past-presidents of the American Electric Railway Manufacturers' Association are the recipients at this convention of congratulations over the handsome gold badges with which they have just been presented by the Manufacturers' Association. The badge consists of a name plate to which is attached a link bearing the dates during which the recipient served as president of the Manufacturers' Association, and appended to this link is a medallion. The latter is a base-relief showing Industry seated on an anvil and holding a blacksmith's hammer. Representations of a gear, an electric car and factory buildings give appropriate significance of the industry represented by the Manufacturers' Association. Those who have received badges of this kind in the order in which they have served are D. N. Brady, James H. McGraw and Josph R. Ellicott.

W. L. Conwell, president of the Transportation Utilities Company, has not hitherto been looked upon as an amphibious automobilist, but from the experience he encountered on Saturday en route to Atlantic City he knows something of how an automobilist feels when he is in the water with his machine. Mr. Conwell, accompanied by J. J. Sinclair of the Westinghouse Electric & Manufacturing Company, W. S. Humes and T. Dunbar, Jr., of the Transportation Utilities Company, and Butler Keyes and W. R. Hamilton, of the Ellcon Company, had left Lakewood after luncheon and turned out to pass a vehicle coming from the opposite direction, when suddenly the road, which was sandy and soft, gave way beneath them. Mr. Conwell was at the steering wheel and in spite of his best endeavors the car went with the insecure road, toppled over and landed in the waters of Lake Carasaljo. Fortunately none of the occupants of the car was seriously injured. Mr. Conwell, the last member of the party to reach Atlantic City, came in Sunday afternoon and was the object of many hearty congratulations upon his fortunate escape.

SOCIAL EVENTS TO-DAY

A varied program of entertainment has been provided for to-day. In the morning Leps' orchestra will give a concert in the lobby on the Pier. An afternoon of cards will amuse the ladies after luncheon, and in the evening the annual vaudeville performance will be given in Marine Hall on the Pier to be followed by informal dancing at 11 o'clock in the ballroom.

MORNING CONCERT

The concert by Leps and his orchestra will begin at 11.30. A program of selections of modern composers has been arranged, including the following numbers:

(1) Overture, "Raymond" .....Thomas
(2) Waltz, "Tales from the Vienna Woods" ....Strauss
(3) Fantaisie on Themes from "The Mikado"..Sullivan
(4) March of the Toys, from "Babes in Toyland" Herbert
(5) Selections from "Lampa" .....Herold

LADIES' CARD PARTY

The ladies' card party will be given in the Persian Garden in the lobby on the Pier at 3.30. Players will have their choice of bridge whist, euchre and five hundred. Arrangements have been made for from 150 to 160 guests and as the prizes are very attractive it is hoped that at least that number of ladies will be tempted to take part. Eight prizes will be given for the eight highest scores for each game, and as the respective prizes for each game are exactly alike, the choice of games rather than of the prizes will determine each player's selection for the afternoon. Progression will be followed in all games and all the rules of each game will be printed on the score cards. In order to facilitate the play and progression opponents will record each other's scores instead of having the scores punched by members of the committee in charge as in previous years. The tables will be covered with white linen, and bonbons and light refreshments will be provided.

VAUDEVILLE PERFORMANCE

At 8.30 in the evening the annual Manufacturers' amateur vaudeville will be given in Marine Hall on the Pier. In accordance with the plan adopted this year of holding all of the convention entertainments on the Pier a complete theatre equipment with stage, footlights, drop curtain, scenery and all other accessories has been installed in Marine Hall especially for this one performance. An exceptionally clever and talented aggregation of amateur talent has been secured, including the University of Pennsylvania Glee Club, by the courtesy of the U. S. Metal & Manufacturing Company; the University of Pennsylvania Mandolin Club, by courtesy of the Allis-Chalmers Company, and the University of Pennsylvania Banjo Club, by courtesy of the Westinghouse Companies. These clubs will give three of the numbers on the program. E. F. Wickwire, of the Ohio Brass Company, who rendered that touching ballad "He Must Feel Funny Inside" at the vaudeville show last year, has consented to give an imitation of himself in the part of a Dutchman talking to his shadow. Obadiah Oatcake, impersonated by Ernest Wright through the courtesy of the Galena-Signal Oil Company, will talk about "An Up-State Delegate." The General Electric stars, A. L. Atkinson and J. P. Thompson, have carefully rehearsed a sketch entitled "Sons of Rest" for the occasion. Instrumental music will be furnished by Lep's orchestra and vocal music by the Pre-payment Car Sales Company's "Nickel-Pickers' Quartet."

Come early and wear your badge.

BUREAU OF RAILWAY INFORMATION

George E. Armstrong, manager American Railway Guide Company, has established a bureau of railway information at the right hand of the stairway in the main lobby. The exact location is known as space 10, and here Mr. Armstrong is prepared to answer all inquiries regarding steam railway train service to any part of the country and to make parlor car and Pullman car reservations for the homeward trip of any or all convention delegates. These courtesies are extended gratuitously by Mr. Armstrong and the company which he represents.

RECEPTION TO ASSOCIATION OFFICERS

The annual reception to the officers of the American Electric Railway Association and affiliated associations was held in the ballroom on the Convention Pier last evening. It was the real opening of the social side of the convention, although all day long new arrivals were greeting old friends as they came to the Pier to register. At 9 o'clock the orchestra under the leadership of Wassili Leps began a musical program which entertained the guests as they were arriving. Miss Charlotte Guernsey, dramatic soprano of the Philadelphia-Chicago Opera Company, was the soloist and rendered selections from "Faust" and "La Tosca." While the orchestra was playing the officers of the different associations and their wives were assembling in the booths around the hall. The officers of the American and Manufacturers' Association assembled in the adjoining booths of the Dearborn Drug & Chemical Company and The J. G. Brill Company, the Engineering Association officers in the booth of the Pennsylvania Steel Company, the Transportation & Traffic Association officers in the booth of William Wharton, Jr., & Company and the Accountants' and Claim Agents' Association officers in the booth of the General Electric Company.

Promptly at 10 o'clock the officers and their wives were escorted to their positions in the receiving line where they greeted the large assemblage of guests. Those in the receiving line included A. W. Brady and Mrs. Brady, T. N. McCarter, Gen. Geo. H. Harries and Mrs. Harries, H C. Donecker and Mrs. Donecker, W. H. Forse, Jr., and Mrs. Forse, H. E. Weeks and Mrs. Weeks, W. J. Harvie and Mrs. Harvie, E. O. Akarman, Martin Schreiber, Norman Litchfield, E. J. Burdick, C. B. Voynow, H. V. Drown and Mrs. Drown, H. K. Bennett and Mrs. Bennett, C. A. Avant and Mrs. Avant, B. B. Davis, James R. Pratt, M. Spillane and Mrs. Spillane, H. C. Page and Mrs. Page, J. N. Shannahan and Mrs. Shannahan, C. D. Emmons, J. V. Sullivan, Charles C. Castle and Mrs. Castle, Cornell S. Hawley, Edwin H. Baker, H. C. Evans, Scott H. Blewett and Mrs. Blewett, J. R. Ellicott, A. H. Sisson, H. C. Ebert, W. H. Heulings, Jr., and Mrs. Heulings, J. W. Porter and Mrs. Porter, and James H. McGraw.

At 10.30 informal dancing began.

ROLLER CHAIRS

The free use of roller chairs will be extended to all wearers of the official convention badge. The chairs will be stationed at the Convention Pier, Marlborough-Blenheim and Chalfonte Hotels, for use between the hours of 9 a. m. and 7 p. m., October 10 to 13, inclusive, and from 8 p. m. to 10 p. m. between hotels and the Pier only on Tuesday and Thursday evenings. Any Reed or Shill chairs may be had after these hours for direct runs from the Convention Pier to hotels at a nominal charge of 25 cents per person. In order to relieve the members of the chair committee from the arduous labors of previous years, five men, furnished by the chair owners, have been employed to look after loading the chairs at the Chalfonte, the Marlborough-Blenheim and the Pier. These men will be on duty at all times and will hear all complaints and report to the chairman of the committee. The men will wear the black and red ribbon of the entertainment committee for identification.

THE ST. LOUIS SPECIAL TRAIN

The special train from St. Louis which left there at 12:25 p. m. Saturday arrived at Atlantic City at 3 p. m. Sunday. The trip was pleasant and without special event, the train carrying in all ninety passengers. The service was excellent all the way through. Arthur S. Partridge, as master of transportation for the association, looked out for the comfort and convenience of passengers in his usual highly capable manner, and the train was in charge of C. C. Curtice, district passenger agent of the Pennsylvania Railroad Company at St. Louis. The train steadily accumulated additional passengers at Terre Haute, Indianapolis, Columbus, Dayton and other stations. Among the passengers were Arthur W. Brady, president Indiana Union Traction Company and president of the American Electric Railway Association; Mrs. Brady and Masters George W. and Arthur A. Brady; Richard McCulloch, of the United Railways Company of St. Louis, which company was also represented by Bruce Cameron and J. E. Burgess, with Mrs. Burgess; M. O'Brien and Mrs. O'Brien; James G. Robertson and Mrs. Robertson. Other passengers were C. E. Morgan, general manager Indianapolis, Crawfordsville & Western Traction Company; T. F. Grover, general manager Terre Haute, Indianapolis & Eastern Traction Company, and Mrs. Grover; Scott S. Crane, general manager Altoona & Logan Valley Traction Company, and Mrs. Crane; E. J. Pratt, general superintendent and purchasing agent Southwest Missouri Railway Company; C. T. Hewitt, superintendent East St. Louis & Suburban Railway, and Mrs. Hewitt, and a number of manufacturers, among whom were S. W. Crawford, of the Moore-Jones Brass & Metal Company, and Mrs. Crawford; James Paton, of the National Brake & Electric Company; Nic LeGrand, of the St. Louis Car Company, and Harold J. Wrape, of the American Carbon & Battery Company. Outside of the dining car the chief method of recreation on the train seemed to be found in games of cards. Several of the ladies on the train, discovering a few gentlemen engaged in a card game in which men are presumed to be particularly skilful, challenged the gentlemen to a trial of skill with some real money as forfeits, and the best information indicates that all of the gentlemen lost. The trip was voted by everybody on the train an eminent success.

TRAMWAYS AND THE "COMMON GOOD" IN GREAT BRITAIN

The practice of charging the surplus or deficit made by the municipal tramway systems in Great Britain to the "Common Good" is sometimes misunderstood in America, where the "Common Good" is supposed to be synonymous with the city treasury. A paper presented at the meeting of the Municipal Tramways Association in Glasgow, Sept. 27-29, by Walter Nelson, sub-convener of the Glasgow Corporation Tramways committee, gives a history of the "Common Good" in Glasgow and shows the wide distinction between that fund and other property or funds of the city. The "Common Good" in Glasgow dates from the twelfth century and seems to have had its origin in the lands owned then by the community. The money received from sales or rentals of this real estate was credited to the account, and the expenditures have included the maintenance of the buildings on this property and the salaries of certain city or burgh officials.

At present all of the city churches, nine in number, and their sites, with the exception of the Glasgow Cathedral, are the property of the city and form part of the assets of the "Common Good." The pew rents are credited to this fund and the fund is responsible for the church expenses. Last year the expenditures for these churches exceeded the receipts by about $20,000. The "Common Good" also defrays a certain proportion of the school and law expenses and other city charges. The chief asset of the "Common Good" in Glasgow at present is the tramway system, whose surplus is paid to its treasury. Up to last year no funds either from the tramways department or from other income received from the "Common Good" were used directly for the relief of taxes in Glasgow. Last year the Town Council decided to defray from the fund the park tax, amounting to 2d. per £1, and paid to the park department about £44,000. This year a motion to repeat this payment was defeated and the 2d. park tax has been re-imposed.

A CONTRIBUTION TO THE CONSCIENCE FUND

The following letter from a conscience-stricken ex-conductor was received recently by George H. Lyne, superintendent Henderson (Ky.) Traction Company:

"Indianapolis, Ind.
"Sep. 5. 1911.

"Mr. George Lynn

"Dear Sir: I don't know whether or not you remember me when I run on your cars a short while last Autum was a year ago. But that does not matter whether or no I know I let some of my friends ride one night without paying for their ride. I never come out and nock down or stoled any of your change that I knew anything about but I borrowed something like 40 or 50c one time in making some change but aim to put every coper back in the box. So I will send you 30c. I am shure that will cover all expenses. Ther is coming a great judgement day when ever thing will be made known whether we think so or not if the Bible be true. Are you getting ready for that time? That is the reason I am sending this small amount of change. I never call myself stealing the money or nothing like that. I had plenty of chance to have nock down several rides as to that matter. but I guess it was something about as mean to let my friends ride without paying. I shure God was not pleased with that way of doing are the Lord would not have brought it up before me and condemed me about the mater. It means more than most people think to be a christian. I hop you will think about that if you have not Where will you spen eternity. "Yours truly,

"Postscript.

"Man looketh at the outward apperance but God looketh on the Heart. I know that was not according to your rules to let my friends ride or to borrow any of your money at any time if I was short on financial affairs. Pardon me for not settling sooner."

SOCIAL GATHERING OF THE CLAIM AGENTS

The "get-together" meeting of the Claim Agents' Association was held at the Traymore Hotel at 2 o'clock on Monday afternoon. About fifty members were in attendance. President Drown made a short address in which he pointed out the benefits of good fellowship at the convention. He also assigned a number of veteran attendante to guide the new members. James R. Pratt, assistant general manager United Railways & Electric Company of Baltimore, gave a brief talk on the desirability of having the parent association install a general publicity bureau at the association headquarters to gather and disseminate data on the prevention of accidents to the general public, school children and employees, particularly with a view toward helping the railways to install accident-prevention equipment.

Charles B. Hardin, claim agent United Railways of St. Louis, was heartily in accord with Mr. Pratt's suggestions. H. K. Bennett, claim agent Fitchburg & Leominster Street Railway, also favored them, incidentally mentioning the beneficial results of educating the public and employees as obtained on his own system. President Drown requested prompt attendance at the convention meetings.

THE BADGES THIS YEAR

The design selected for the badges this year suggests, like those of last year, the atmosphere of the sea. At the center is an American shield on which are superimposed the flags of Canada and Mexico, typifying the international character of the membership of the association. On each side of the shield are two mermaids and at the top of the badge is a front-end view of an electric car. The lettering on the badge carries the new name of the association, American Electric Railway Association, for the first time.

The colors of the ribbons attached to the badge are the same as last year. For the convenience of those who are attending the convention this year for the first time, and for others who have forgotten exactly the significance of the different colors, their meaning will be published. Delegates to the American Association wear marine blue; Accountants' Association, orange; Engineering Association, brown; Claim Agents' Association, green; Transportation & Traffic Association, gray; Manufacturers' Association, red; guests, light blue; ladies, white; associate members, purple; members of finance, entertainment and exhibit committees of the Manufacturers' Association, dark blue and red stripe.

The numbers on the badges correspond to numbers which are printed in the list of delegates in attendance at the convention. Three lists will be published, each showing the registration to the date on which the list goes to press. The first list went to press last night and will be available this morning at the secretary's office, at the hotels and at the booth of the Electric Railway Journal. The second will contain the registration up to to-night and will be distributed in Atlantic City at the same places to-morrow morning. The third list will contain the registration up to Thursday night and will be available Friday morning.

THE CHICAGO SPECIAL

The Chicago Pennsylvania special arrived at Atlantic City about 10.30 yesterday morning after a very pleasant trip. This train, which left Chicago at 12 o'clock noon Sunday, consisted of nine sleeping cars, two diners, a buffet parlor car, a parlor observation car, a baggage car and two large locomotives. It came through on time at each scheduled point, and the accommodations were excellent in every detail. E. K. Bixby had personal supervision of the train.

There were 160 passengers on the train. Of this number about thirty were ladies and fifty were operating railway men from points as far west as Kansas City and Salt Lake City. During the trip frequent comments were made regarding the representative personnel, which included many of the presidents, general managers and heads of departments of the leading railways of the Central Western States. The entertainment committee chairman, A. H. Sisson, aided in making everyone comfortable en route. Through the courtesy of Lyon & Healy, Chicago, a victrola was furnished with a selected list of records. This was placed in the observation car, where continuous musicales were held.

The exciting event of the trip was the pool made on the time the train would cross the Delaware River. The first prize, $50, was won by W. C. Sparks; second prize, $30, by George Kippenberger; third prize, $20, by S. P. McGough; fourth prize, $7, by T. E. Rust; booby prize, $2, by A. H. Sisson.

YESTERDAY'S CONCERTS

The concerts given yesterday morning and afternoon in the lobby of the Convention Pier by the symphony orchestra of Wassili Leps were a delightful feature of the opening day. This organization of talented musicians has been engaged for the entire week by the entertainment committee and will furnish the music at all of the social affairs of the convention. The numbers on the morning program included Mendelssohn's "Spring Song" and selections from Verdi's "Il Trovatore." In the afternoon the fantaisie from "Faust" and the "Beautiful Blue Danube" waltz were generously applauded by the appreciative audience. The lobby promises to be the most popular spot on the Pier during the hours when the orchestra is playing.

GENERAL HARRIES RESIGNS FROM THE WASHINGTON RAILWAY & ELECTRIC COMPANY

Gen. George H. Harries, vice-president and general manager of the Washington Railway & Electric Company, Washington, D. C., and second vice-president of the American Electric Railway Association, will resign his position with the Washington company to become connected with H. M. Byllesby & Company, Chicago, Ill., engineers and managers of public utilities. He will reside in Chicago. General Harries is a national figure in the electric railway and lighting field and has always taken a great interest in association matters. He is a native of Wales, but he has served his adopted country well and long. While yet a lad he toured the Canadian Northwest and spent many active years on the plains and in the mining regions. His Western life made him so familiar with the traits of the Indians that President Harrison appointed him a member of the Sioux Commission in 1891.



Gen. George H. Harries.

Before the late Spanish war General Harries was commissioned by President McKinley to the command of the brigade of the National Guard at Washington, and during the war he was in command of a regiment of infantry from the District of Columbia. He still takes an active interest and part in the work of the regular army and for a number of years has had charge in the War Department of the military defences of Washington.

General Harries' first connection of note with the railway industry was as president of the Metropolitan Railroad, Washington, to which office he was elected in 1896. Returning from the Spanish war, he devoted his attention to lighting and traction work, and in January, 1900, became a member of the board of directors of the newly organized Washington Traction Company, a tentative aggregation of railway and electric light corporations. Six months later he became vice-president of the organization now known as the Washington Railway & Electric Company, which controls the Potomac Electric Power Company, the Great Falls Power Company and the street railway systems in Washington. General Harries, besides being second vice-president of the American Electric Railway Association, is chairman of its federal relations committee and a member of its public relations committee. He is also treasurer of the National Electric Light Association, and last month was elected president of the Association of Edison Illuminating Companies, of which for the past two years he has been vice-president. In addition, General Harries has been a member of the Washington Board of Trade for the past two years and was vice-president of that body for one year. He is also a member of the Washington Society of Engineers and the Illuminating Engineering Society and an associate member of the American Institute of Electrical Engineers.

ADDRESSOF PRESIDENT HARVIE OF THE ENGINEERING ASSOCIATION

It is a very great pleasure indeed to be privileged to preside at a series of meetings which give promise of so much benefit as these composing our ninth convention. We are happy to welcome our friends both in this and in the allied associations, and we are especially glad to extend this welcome to those who have recently become interested in our work and who have come here to assist us in it.

While this meeting was originally intended to convene in the Middle West, yet I do not find that the value of this year's work has been lessened by the necessity of again meeting in the East.

We separated last year with a large amount of work before us, and your executive committee found itself confronted with the old problem of too much work for the time available and number of committees at hand, only in a more exaggerated form than ever before. Several ways and means were discussed, all of which called for more time and more committees, or less work. As a partial solution the work for the year was laid out promptly, the number of committee members on standing committees was increased from six to nine, and several special committees were appointed. From this point on the work was in the hands of the various committees, and the advance papers leave no doubt as to the results accomplished by our committees.

Among the subjects treated this year are several important ones which have been very thoroughly threshed out and which are laid before you in definite and complete form. Such treatment as these particular subjects have received at the hands of the committees is exactly what should be accomplished by an association such as this, and we cannot but feel that some concrete good has come from a study which has for its result practical and workable recommendations.

The excellent treatment of the subject of block signaling for electric railway service cannot fail to appeal to you as a thorough study of a subject which is just now uppermost in the thought of those identified with high-speed electric railway operation. The close relations which have existed between this association and the other allied associations have this year been further developed by the work of this joint committee, which has done exhaustive work in conjunction with the Transportation & Traffic Association. Many of the subjects which should be taken up by any one of our allied associations require representation from some other association, in order to receive the breadth of study required, and it augurs well for the future of all the associations that this inter-relation is growing noticeably closer and more co-operative each year.

The "Question Box" is a problem which will come before you for action. Many of our members felt that its usefulness in its present form was diminishing, and on sending out inquiries it developed that less than half of our membership desired to have it discontinued, but a large portion were in favor of retaining it and making it better. In an endeavor to accomplish this a "Question Box" committee of three members was appointed to undertake an improvement. The "Question Box" has long since passed the point of being a one-man proposition, and a free discussion and an expression from you as to its status would, I am sure, be appreciated.

Another matter which should be thoroughly discussed and settled at this meeting is that of the rules of procedure for adopting standards, which you have before you. It was intended that this committee should develop a systematic method of handling standardization work, in order to assist your executive committee this year. The importance of its report, however, led us to decide to give it the publicity which would come from presenting it on the floor for discussion and approval.

There are two matters to which I wish especially to call your attention. One is the matter of standards, which has been touched upon by each of our presidents since the old standardization committee was formed. We have succeeded this year in putting those recommendations of our committee on standards which have been approved in convention before the American Association for final approval in the manner in which your executive committee was instructed at the last convention, namely, in letter ballot form. These ballots were sent out through the secretary of the American Association, asking for the signature of the executive official of each company on the letter ballot. This plan, in connection with our method in this association, reduces to a minimum the opportunity for criticism with regard to a too hasty adoption of standards or recommended practice, which it is always necessary to guard against in an association like ours. By comparison with the usual number of replies received in answer to questions sent out, the number of ballots cast was very satisfactory, although many companies did not vote at all. However, this is a most important matter and another year should result in a much larger number of ballots cast.

We should remember that we, as engineers, have a duty to perform in this matter, and while we must realize that all apparatus and methods cannot be standardized, yet a great many can be standardized to the ultimate advantage of the railway companies. Those standards which it is possible to use economically we should use our best endeavor to have adopted in each of our respective departments, or we had best discontinue our investigations.

A matter which seems to me to be a very important one is the institution this year of work jointly with technical associations other than those covering the electric railway field, notably the American Society for Testing Materials, the American Railway Engineering Association and the National Electric Light Association, with all of which we have interests in common in some branch of our work. Our committees have worked this year in conjunction with committees of each of the above mentioned societies, and we have, I believe, profited by the interchange of ideas. The co-operative spirit we are meeting on every hand is very gratifying and will be mutually beneficial also, to the same degree that it is co-operative. The value of the broader viewpoint to be obtained by the joint investigation of subjects which are of mutual interest can hardly be over-estimated.

I have drawn your attention to a few of the most important things that the association has had before it this year, and I want to impress upon you at this time the fact that the field of work opening before us is increasing so rapidly in scope that our largest problem is how to keep far enough in the lead to have our association of value to its members. The electric railway industry is becoming constantly more and more diversified, and we must be even more active and more progressive accordingly. Your officers and executive committee have endeavored to expend their efforts in making the work of the 1911 convention add its proper portion of progress, but there is need of still more systematic progress in order that the Engineering Association may be properly representative of a business which has shown such remarkable growth and which has come to be so important a factor in our communities.

I could not close these remarks without calling attention to the hearty co-operation and effective effort displayed on the part of the working committees. Thirteen committees have been working, and on these committees sixty-five engineers have served, all of them whole-heartedly. These committees have produced for our use some 600 pages of valuable material, or nearly twice the amount produced last year. It is fitting, I think, that I extend to these gentlemen at this time, on behalf of your executive committee, as well as of the association at large, our appreciation of their activities. The members of these committees are all busy men, and the result of this year's work indicates clearly that

a very considerable amount of energy and time has been given by our committee members in order that we may profit by their efforts and that this association may be the clearing house, as it were, through which the electric railway industry may reach its fullest development.

ADDRESS OF PRESIDENT PAGE OF THE TRANSPORTATION & TRAFFIC ASSOCIATION

The Transportation & Traffic Association is a young child, yet I feel that it has shown strength and character that will put the association in the front ranks of the associations affiliated with the American Electric Railway Association.

The association started its work early this year. The executive committee meeting was held in November, and the make-up of the committees was entirely completed at that time. I desire to emphasize the desirability of keeping to this standard, inasmuch as it affords the committees several additional months in which to carry on the work assigned.

This year there was appointed a new committee on freight and express accounting jointly with the Accountants' Association, and a committee on block signaling jointly with the Engineering Association. The close relationship between affiliated associations which joint committees of this kind bring about is invaluable, and undoubtedly many matters will come up in the future which will require joint action of this kind.

Following out instructions of the convention, the executive committee this year adopted the plan of rather definitely fixing the lines of investigation for the different committees. This is important and exceedingly helpful to the committees, inasmuch as it gives these committees bases upon which to start their work. The work done by the different committees has been very thorough.

The signal committee has developed its subject in an elementary way and brought it up to date. The necessity for this is obvious, as it is a comparatively new subject for electric railway operators. The labors of the committee are well worth the thanks of everybody engaged in electric railway work.

The committee on interurban rules has spent a large amount of time in getting up these rules. The fact that its members represent operating conditions from coast to coast, and that the report made by the committee is the consensus of opinion of the combined membership of the committee, is important. There is no doubt that the fact that they feel that the amended code is one that will fit itself to the conditions prevailing on a large majority of the railroads justifies the support of the operating properties of the country. The Street Railway Association of the State of New York has unanimously approved the report of the interurban rules committee this year.

The committee on city rules has developed a most complete report, and I trust that the members will discuss this report fully. I wish at this time personally to compliment the committee on the very complete and intelligent work that it has done.

The schedules and time-table committee has developed studies of conditions prevailing on interurban lines, and submits recommendations for the construction of working timetables, one of the most important elements in economical operation and a safety factor in this branch of railway work. The definitions given in the report should do much to establish consistency in the use of the various terms peculiar to our business.

The committee on fares and transfers last year submitted a very valuable report. There was not time, however, to give it the discussion which it deserved. The committee this year, in addition to giving to our members a study of practice with regard to the general subject of fare collection and registration, is anxious that the definite recommendations proposed in 1910 be taken up and criticised. The work of this committee was extended during the present year to include subjects relating to all kinds of fares. Heretofore the topics treated have been those relating to transfers only. One of the matters discussed by the committee in the report to this convention is that of interurban practice. This has not up to this time been touched upon by our association, and it certainly should develop discussion of much value to those interested in interurban lines.

The conclusions and recommendations of the committee on express and freight traffic, and also the tabulations submitted, should be studied carefully and free discussion developed. Undoubtedly there are great possibilities for the future, but it is important that our members be fully informed and in position to take advantage of early experiences so as to guard against mistakes. Naturally, the companies should be in a position to know whether the business is being conducted without loss. It is to provide proper means of doing this that the joint committee on express and freight accounting was appointed this year. The report submitted should have your careful consideration.

The committee on passenger traffic presents a report touching, among other things, upon the development of civic organizations. This was suggested at the last convention as a topic that might be investigated with profit to the members. The development brings out much interesting information as to the part taken by electric railways in civic advancement.

We have also been favored this year with a paper on multiple-unit operation. The increasing service on city lines and movement in congested districts makes this subject one of most timely interest. The paper, with the discussion which has been arranged for, should give to those present much information of considerable value, not alone from the operating standpoint, but as regards the mechanical difficulties in the development of train operation on city lines.

I wish to extend a welcome to associate members of the Transportation & Traffic Association, and invite you to enter freely into the discussions. Operating men by becoming members and telling the electric railway side of the story can do much in the development of our business. I trust and hope that the Transportation & Traffic Association will soon show as large an associate membership as our affiliated Engineering Association.

I wish to thank the member companies for their cooperation in furnishing data and permitting committee members to devote so much time to the work.

The Manufacturers' Association have gathered together a wonderful exhibit, and I trust the delegates will devote as much time as possible to inspecting the new devices shown.

I urge the delegates to be prompt in attending all of the meetings, and to come prepared to discuss the various papers and matters presented. On Tuesday afternoon at 2 o'clock the American Association will have an open meeting at which all members are invited to be present.

The Transportation & Traffic Association represents one of the most important branches of the industry, and we, as operating men, are duty bound to give the association our very best efforts. While, as a rule, we are very busy, we certainly should devote some time to the good of the cause, and especially at the convention. We should attend the meetings and enter into the discussions.

The Evansville, Henderson & Owensburg Traction Company plans to ferry its cars across the Ohio River en route from Evansville, Ind., to Henderson, Ky. The ferryboat which will be used will be 130 ft. long with twin screws and engines of 120 hp. It will carry two 50-ft. interurban cars across the Ohio River, which is 1600 ft. wide, in five minutes. Sliding cradles will be constructed so as to permit the cars to be run on and off the ferryboat at any stage of the river.

REPORT OF THE SECRETARY-TREASURER OF THE TRANSPORTATION & TRAFFIC ASSOCIATION

In submitting his report your secretary-treasurer will touch briefly upon a few items of interest and show particularly a statement of expenditures during the year just closed.

It will be noticed that a considerable increase is shown in operating expenses, which is mainly attributable to the formation of new committees, namely, the joint committee on

GEOGRAPHICAL DISTRIBUTION OF COMMITTEEMEN	
Alabama	1
Arkansas	1
California	1
Colorado	1
Connecticut	1
Dist. of Columbia	1
Illinois	7
Indiana	4
Iowa	1
Maine	1
Maryland	4
Massachusetts	6
Missouri	3
New Jersey	4
New York	9
Ohio	4
Oregon	1
Pennsylvania	1
Texas	1
Virginia	2
Washington	1
West Virginia	1
Canada	1
Total	57

block signals for electric railways and the joint committee on express and freight accounting, to the increased number of committee meetings held during the year and the greater period of time consumed by such meetings. There is no question however, that due diligence has been exercised by all concerned to keep these expenses at a minimum consistent with the proper development of the work in hand, and in considering the matter we should bear in mind the geographical location of the members of the various committees and the necessary time and expense in going to and from convenient meeting points.

With regard to the geographical distribution of committee membership it is interesting to note that the membership is in keeping with the geographical distribution of member companies. It is important that this be maintained and the Transportation & Traffic Association is to be congratulated that it has been able to work out the committee membership

EXPENSES FOR THE FISCAL YEAR ENDED SEPT. 30, 1911	
Executive committee	$392.24
Committee on interurban rules	668.03
Committee on express and freight traffic	173.70
Committee on city rules	18.16
Committee on passenger traffic	156.60
Committee on training of transportation employees	74.23
Committee on construction of schedules and time-tables	266.94
Committee on fares and transfers	28.20
Joint committee on block signaling for electric railways	62.05
Joint committee on express and freight accounting	78.77
Proceedings	2,135.63
Miscellaneous	25.45
Total	$4,080.00

so advantageously. It has much to do with obtaining the best results and the working out of recommendations of standard methods, practice and plans that will comprehend the industry as a whole.

When possible, your secretary has endeavored to attend the meetings of the different committees. This would appear to be desirable in order that the association headquarters may be in position to render all assistance within its power. In the compilation of data and in research work the headquarters can often save considerable time to the committee members, and it is also likely that in many cases data useful to the committees are already on file. If the secretary is present at the meetings he can in such cases inform the committeemen to this effect, and if the meetings are held in the headquarters office, the information is, of course, immediately available. It is also well to call attention to the fact that a large percentage of committee meetings have been held in the headquarters office. Where the make-up of the committees, from the standpoint of geography will permit it seems highly desirable that the facilities of the main office be utilized in this way.

Your secretary would also call attention to the increase in the number of pages of printed matter. Last year your association distributed in advance 154 pages in the form of committee reports and papers. This year the total shows 254 pages without considering the material in the reports of the joint committees on block signals and express and freight accounting; adding this material would make a grand total of 360 pages, or adding one half of the pages in these two last-mentioned reports as perhaps the number which should be credited to this association, we have a total of about 300 pages.

A matter which is of growing importance is the likelihood that some further procedure beyond a *viva voce* vote at the conventions is desirable in the adoption of standards or recommended practice of this association. It might be advisable to appoint a committee to go into this matter. The Engineering Association has this year adoped a plan by which the American Association, after the recommendations have been favorably passed upon at the convention, submits these recommendations to member companies by letter ballot, thus affording every member company an opportunity to express its approval or otherwise of such recommendations as annual conventions may make. The desirability of obtaining the sentiment of the largest possible proportion of the membership with regard to matters of this kind is obvious.

Another subject that is constantly referred to, and justly so because of its importance in the proper development of the work of your association, is the necessity for full discussion of reports and papers presented here. It is needless to call attention to the fact that the value of the time and energy expended by committee members and others in the preparation of the material which is put before you can never be fully realized without a free expression of thought at these annual meetings. The opportunity to do this is not afforded elsewhere, and it is to be hoped that each one of the delegates present will consider it his personal duty to assist in bringing out the many phases of the different subjects taken up by the busy men who have conscientiously devoted their valuable time to committee work.

There is another matter to which the secretary desires to direct attention, that is the importance of the data sheets and inquiry forms sent out from time to time throughout the year. Sometimes the work along this line may be subjected to adverse criticism. It is, nevertheless, true that these inquiries are necessary essentials to the proper advancement of association work. The forms are made up with a view to requiring the minimum of time to answer, and it is hard to see how the committees can show results unless the data called for are freely given. In addition new committees will undoubtedly be made up from year to year, and, while these may have the benefit of previous investigations, there will be many points upon which enlightenment will be required and which it will be necessary to ask the members to provide. We bespeak for these communications such attention as can be consistently given, keeping in mind that the data are required by operating men appointed to serve your interests by the executive committee of your association and definitely instructed to work along certain lines. Your secretary does not desire that this be construed as a criticism, but merely as an explanation of the facts which make such inquiries necessary and which our busy members in the press of work more immediately important are apt to overlook.

You will recall that at the 1910 convention of the American Association a new plan of associate membership was approved. This made it necessary for these individual members to ally themselves with one of four associations

namely the American, the Engineering, the Claim Agents' or the Transportation & Traffic Association. It is a pleasure to note that during the past year there have been placed upon the rolls as associate members of the Transportation & Traffic Association 175 individuals. Those connected with the transportation, passenger, freight and express, advertising, publicity and other departments of electric railway companies, as well as those gentlemen interested in the operating branches of the business, though not directly connected with electric railway companies, may ally themselves with our association as associate members. New plans for the special benefit of associates will be instituted from time to time by the American Association, but the development of such plans will naturally come only as rapidly as the increased membership will warrant. We have an exceedingly good start this year, but with the field we have to draw upon it seems that there should be as large an individual membership in this association as is enrolled in our affiliated Engineering Association, which to-day has a membership of approximately 850.

As another matter of interest to the members, it might be mentioned here that the association will as soon as possible after the convention issue an index of the proceedings of your association. This will describe in a brief way the main features of committee reports and discussions of each of our annual conventions, and should serve as a book of reference and be helpful in affording an opportunity to acquire ready information upon the many subjects taken up. Information frequently is requested which has already been given in the proceedings in considerable detail, and an index of the kind referred to by summarizing these data would often save considerable time to our member companies and in some degree promote a more general acceptance of the recommendations approved by your organization.

OPENING SESSION OF THE TRANSPORTATION & TRAFFIC ASSOCIATION

The first session of the 1911 convention of the Transportation & Traffic Association was held yesterday afternoon at the Greek Temple. President Page presided. In opening the meeting the president announced that the first business on the program was the presentation of his annual address. This is published on another page.

Secretary Donecker then presented the report of the executive committee, which consisted of the minutes of the meetings of the committee. He then read his report as secretary and treasurer of the association. This report is published elsewhere in this issue.

J. N. Shannahan, New York, said that he thought it proper to call the attention of the members to the splendid work done by the secretary. The results obtained by the association were due in no small degree to the hard and constant efforts of the secretary and he moved that the association should express its appreciation of the secretary's efforts. The motion was seconded by N. W. Bolen, Newark, N. J., and passed unanimously.

Secretary Donecker expressed his appreciation for the vote in a few words in which he said that he had tried to do the best he could, and if it was satisfactory to the association he was well pleased.

Upon motion, the report of the executive committee and of the secretary and treasurer were accepted by the association.

President Page then announced the appointment of a committee on resolutions. It consisted of E. F. Schneider, J. J. Johnson and J. Stanley Moore.

J. N. Shannahan in behalf of the committee on subjects then read the report of that committee. It stated that as there were nine reports of standing committees to be considered at this convention the committee had thought it best to reduce somewhat the number of papers to be read. The report was accepted and ordered placed on file.

TRAINING OF EMPLOYEES

President Page announced that the committee on the training of employees had been unable to prepare a report of the convention, but he would ask for a discussion on the subject.

C. E. Learned, Boston Elevated Railway, at the request of President Page then presented some very interesting employment statistics of the Boston Elevated Railway showing in detail for the fiscal year ended June 30, 1911, the following: number of men who applied for positions in the train service, number rejected on sight, men who failed in physical examination, men who failed because their references were unsatisfactory, men disqualified temporarily because of physical examination, percentage of resignations during the year, percentage of men discharged during the year, etc. He stated that the company had among its motormen and conductors about 160 who were especially assigned to break in new men. These men receive 10 cents per day for this service in addition to their regular wages. About four weeks are required to break in a man and the cost to the company is between $25 to $30 per man to provide this instruction. Mr. Learned then read the following letter form which is sent to each man as soon as he is accepted in service by the Boston Elevated Railway.

LETTER OF ADVICE TO NEWLY APPOINTED CONDUCTORS AND MOTORMEN IN BOSTON

"You are entering upon a public service in which it is necessary to be punctual, civil, diligent and loyal.

"Punctual, that cars may be started and run at regular times known to the public.

"Civil, that the service may be made attractive, patronage encouraged, and cause for complaint avoided.

"Diligent, that your own interests may be protected and you may be qualified for advancement and that the company may find you reliable and ready for work.

"Loyal, that you may make a correct and honest return of all money received, and that you may be careful and zealous to protect the company's property and interests, and take a just pride in the service in which you are engaged.

"You must bear in mind that in a public service you are constantly called upon to exercise great patience, forbearance and self-control. Politeness and courtesy will be required of all employees in their dealings with the public.

"Conductors and motormen are representatives of the company. In one sense, they are the company when on duty. They cannot do that which is not legal and proper for the company to do, and they must do all that is legally and properly required of the company to do, as far as applied to the treatment of persons on the cars, and others who use the streets in common with the company. The reputation of the management to a large extent depends upon their civility, honesty and good judgment, together with their ability to get along with all kinds of people.

"Their duties are fully set forth in the rule book of the company, the division superintendent's list notices, and general orders which are issued from time to time. No person can expect to give satisfaction in whatever position employed unless he knows what is required of him. In order to know what is required of them as conductors or motormen, they must thoroughly and perfectly know the rules and regulations.

"You have passed your examination and are now placed on probation for sixty days, at the end of which time, or sooner if your work is entirely satisfactory, you will receive full appointment. You should understand that the permanence of this full appointment depends entirely upon the quality of your work, and the quality of your work, to a large extent, is governed by your knowledge of the rules and your efficiency in carrying the rules into effect. Ignorance of the rules or indifference to them cannot be

excused, for it is the duty of a good management to detect and remove from the service all men who are incompetent, inefficient or dishonest, in order that the competent and honest men may be encouraged and protected, and thereby the public be properly served.

"It must not be thought that because you have acquired sufficient information to pass your examination there is nothing more to be learned—rather, you should understand that you have learned only enough to warrant your being appointed on trial, and what you learn, and the improvement shown in your work during your term of probation, will determine whether or not you are to be permanently appointed.

"All conductors and motormen remaining in service at the end of one year from the date of employment may be called upon to spend not more than two days at their own cost in re-instruction and examination on their knowledge of rules and duties.

"Motormen breaking in during the winter months in divisions where there are no cars equipped with rheostats will be required in the spring to spend at least one day as learners for instruction on a rheostat car.

"It is the desire of the management of this company to make its car service superior to that of any other company. This cannot be done without the co-operation of the conductors and motormen. Their loyal and hearty support of the management will give them a feeling of justifiable pride in the service to which they belong, and can but conduce to the good of the employee and of the company. Nothing tends more to secure the respect of the public than personal neatness, and this will be required of every employee.

"With the commencement of your service you are beginning to make a record—one which is under constant observation by the public, the stockholders, the inspectors, superintendents and other officials of the company, and this record will always be taken into consideration in forming an opinion as to the efficiency of your service for either discharge, promotion, or annual reward for good service. It depends entirely upon you to make this record a creditable one.

[Signed] "C. S. Sergeant, Vice-president."

Mr. Learned, in continuing, said that all of the men accepted on the Boston Elevated Railway were handed this circular so that they could understand thoroughly what was expected of them. The new men were provided with a coat as part of their uniform at the beginning of their period of probation. For this coat they make a deposit, which is returned by the company at the close of the service. A full uniform was not required until after the probation period. While the men were breaking in, they received at least $1 a day; that is, they were guaranteed that amount and might earn more.

L. H. Palmer, Metropolitan Street Railway, New York, said that there were practically four divisions of the subject of training of transportation employees: First, the selection of the men; second, their preliminary training; third, their training for the first few weeks after they were appointed; and fourth, the regular training which continues to a greater or less extent so long as they remain in the service. The Metropolitan Street Railway advertised in several papers continuously for men and it brought good results. Notices were posted in all carhouses asking employees to bring in men who were capable and whom they thought would make good employees. The company kept a record of the sources from which employees were obtained, and of the number of men secured through the advertisements in the different papers. The company's employment office was open during one or two nights each week so that men employed in other vocations could visit it and discuss matters without losing time.

Motormen were put to work breaking in just as soon as they passed the appointment department and had taken the test in the school and while their applications were being investigated. Conductors, however, were not put on cars until after their applications had been passed. In the preliminary training emphasis was put on the question of getting the men to think, study and reason. In the preliminary training it was wise to impress upon the road instructors the necessity for treating the men considerately. The instructor should make a man feel that he is taking a personal interest in him and would be glad to help him. It tends to hold the men in service.

Mr. Palmer said his company had a chief instructor in charge and one man in the school constantly breaking in the new men and explaining things to men who are sent to the school as a matter of discipline. Also four road instructors were employed. In the conduct of the school practical or homely illustrations were used. All the men were tested particularly as to the range of vision. After a man has been through the school he studies the rules, is broken in on dummy controllers and sent out on the road under an instructor, and his time valued there according to his adaptability and previous experience.

Continuing, Mr. Palmer said that a talk of an hour and a half on accidents was given periodically to the new men. They were also reinstructed in regard to the car equipment; were drilled on how to stop a runaway car and drilled on controller manipulation. After a man had gone through the school he was assigned to a position, and the division foreman then discussed with him the special conditions of that particular division. The division foreman also went over the principal rules with the new man and handed him a letter of instruction very similar to that used in Boston. This letter had to be signed by the man as proof that he had read it. During his first two months of service he was required to attend a meeting of the division office every week. Events which had occurred during the past week which were not right were discussed. A new man was also required to stop a car when the car was running at four different speeds and then to get out and measure the distance which the car ran before stopping. These tests were designed to impress upon the man the facts as to the distance required to make a stop and had proved very important, especially in accident cases. Every six months the general foreman gave to all of the men on the system a talk. This was usually in the spring and fall so that the men could be reminded of the conditions caused by the weather at those times of the year. Representatives of the legal department also addressed all men and sat with the general foreman when he administered discipline. In fact there was a close co-operation on the road between the legal department and the operating department.

N. W. Bolen, superintendent of transportation Public Service Railway, said that his methods were practically the same as those of Mr. Palmer. [The instruction system of the Public Service Railway was fully described in this year's Convention Section.] For several years past the company had endeavored to have the subordinate officials come into close contact with the platform men and treat them as fellow-employees; that is, reason with them and encourage them rather than deal out arbitrary discipline.

In reply to a question from Mr. Allen, Mr. Palmer said that the men were paid regular platform time when attending talks on accident prevention.

PASSENGER TRAFFIC

After some further discussion on the training of transportation men President Page said that the report of the committee on passenger traffic would be presented. This report is printed elsewhere.

Charles R. Gowen, passenger agent Oneida Railway, discussed excursion business, chartered cars and his company's methods of advertising. He also said that it was essential that companies which operated parks should maintain them in neat condition.

L. D. Mathes, manager Union Electric Company, Dubuque,

spoke of the desirability of fostering the building up of manufacturing plants along the lines, especially if the company did a lighting and power business. He also thought that it was a good thing for the manager of a public service corporation to take an active part in civic association work.

J. Stanley Moore, of the Beebe syndicate of Syracuse, emphasized the importance of upbuilding everyday business, especially for roads in the Northern States, as the summer was short. There was an active chamber of commerce in Syracuse, which attracted industries to the city. Continuing, Mr. Moore said he thought that every company should not only extend financial assistance to such civic organizations, but that the officials of the railway company should take a direct personal interest in them and assist them in their work. One manager with whom he was acquainted took an active part in the civic association in his city, was chairman of its convention entertainment committee, and was instrumental in bringing conventions and other gatherings to that city. This created business for the community as well as for the street railway. Such an organization had recently been formed in Syracuse and was known as the Syracuse Convention Bureau. The company went quite extensively into the matter of advertising, and whenever it made a change in its timetable the fact was noted. It also saw to it that any timetable printed in any publication was corrected when a change was made. The company did not employ an industrial agent, but it did have a passenger agent. Part of the duty of this official was to get into close touch with the needs of the public, and in the opinion of the speaker it was advisable to have such an official.

The meeting then adjourned.

OPENING SESSION OF THE ENGINEERING ASSOCIATION

The Engineering Association began its sessions yesterday afternoon in Marine Hall. President Harvie called the association to order at 2.30 p. m. and then presented his address as president of the association. This address is published elsewhere in this issue.

Secretary Litchfield then presented the report of the executive committee, which included the minutes of the meeting of the executive committee and the following supplementary remarks:

REPORT OF EXECUTIVE COMMITTEE

"A letter ballot was sent to member companies asking for an expression of opinion as to the standards approved by the 1910 convention of the Engineering Association. The vote was as follows:

"(1) Adoption of high T-rail for heaviest service as recommended practice. Yes, 136. No, 18. Blank, 21.

"(2) Adoption of high T-rail for light service as recommended practice. Yes, 133. No, 20. Blank, 22.

"(3) Adoption of No. 0000 grooved trolley wire as standard. Yes, 119. No, 29. Blank, 27.

"(4) Adoption of copper wire table as standard. Yes, 119. No, 5. Blank, 51.

"The 1910 convention also approved of the submission to letter ballot for adoption as recommended practice of the section of T-rail for shallow paving which was submitted in the reports of the committee on way matters for 1909 and 1910. Inasmuch as this rail section has since become the subject of proposed revision by the American Railway Engineering Association, it was not deemed advisable to present this section in the letter ballot at the present time, and the executive committee recommends that the matter be referred to the incoming committee on way matters for further consideration.

"A committee appointed by the president has prepared a set of rules of procedure for the adoption of standards, and it was felt that these rules were of such importance that they should be submitted to the association as a whole for consideration. They are therefore included in the advanced papers for this year's convention.

"A circular letter was sent out to members asking an expression of opinion as to the desirability of continuing the Question Box. The result of the vote was 113 affirmative and 114 negative. Many of the replies advocating the continuance of the Question Box were very strong. On account of this fact the executive committee decided that this feature of the convention program should be continued. The preparation of the Question Box this year was put in the hands of a special committee.

"Arrangements have been made during the year with the American Society for Testing Materials for co-operation between that society and the Engineering Association. The following sub-committees have been appointed to act with committees of the American Society for Testing Materials in the following matters: Heat-treated axles, joint sub-committee of the committees on equipment and heavy electric traction; rolled-steel wheels and specifications for wrought iron, joint sub-committee of the committee on equipment; steel in rails, sub-committee of the committee on way matters."

SECRETARY AND TREASURER'S REPORT

Secretary Litchfield then presented the report of the secretary and treasurer. It stated that for the year ended Sept. 30, 1911, there had been expended on account of the Engineering Association the following amounts:

On vouchers duly approved by the president and secretary	$3,294
By the secretary of the American Association	3,365
Total	$6,659

Mr. Litchfield then gave a list of the purposes for which this expenditure was made. Of the total amount $3,173 was for the publication of the 1910 proceedings.

EDUCATION OF ENGINEERING APPRENTICES

Walter H. Evans presented the report of the committee on education of engineering apprentices. He said that the committee had attempted to cover the practical education of the apprentices in the shops and to standardize the system so as to enable an apprentice who passed through the apprenticeship course in any given shop where the system was in vogue to carry on his work as a journeyman fully as well in any other shop. The schedules which were provided, of course, were not recommended as being absolutely standard, but rather as suggestions which the members of the association could discuss. The code of apprenticeship rules was similar to the codes which had been adopted by the steam railroad association.

The electric railway industry had been almost entirely dependent upon men trained and educated in other lines of work, and frequently those who had been trained in electric railway shops had been very indifferently trained. Most of the boys taken into the shops had not developed any intelligent notion of what they wanted to do, and the young men started work principally with a view of having employment, rather than with the object of learning the business. It was true that some of these boys sometimes developed into bright good men, and eventually got to be successful in the business, but their success was not what it should be. If a young man at the start could follow a specified apprenticeship course, so that in the end he would know the business from beginning to end, he would be capable of continuing the work with the company with which he started, or he would be fortified to go out over the country to Denver or to New York City and take hold of a railroad job in a thorough, intelligent and practical manner.

Few realized what poor mechanics were employed in some industries. Frequently men in middle life who had been absolute failures along their line, and who simply wanted a job, started in with shopwork much as they would with a pick and shovel. Eventually some of them developed so that they understood something about the business.

But few men learned after they were twenty-one as much as they could learn from the time they were seventeen

up to twenty-one—in that developing age when we absorb everything like a sponge—of all the essentials and details of this business. Four or five good live young American boys would work rings around all the old men who simply applied for a job.

Edwin D. Dreyfus, commercial engineer Westinghouse Machine Company, Pittsburgh, submitted a written discussion which was read by the secretary. Among other things Mr. Dreyfus said:

"With the growing importance of the engineering considerations and vast detail work of our railway and industrial institutions, there develops a need, and therefore a demand, for training recruits to fill the new and responsible positions constantly created through expansion.

"The courses prescribed in this report are, in many respects, quite similar to those adopted by the large manufacturing companies for their trade apprentices. The engineering apprentices, who are principally drawn from the technical schools, are of course governed differently. There is one phase which, as a general rule, does not receive sufficient attention which bears mention, and that is, the student apprentice should in some way come in contact with the official work of the organization before the completion of his term of apprenticeship in the shops. In our practice we have endeavored to do this, and it is believed it goes far toward crystallizing in the student's mind the intrinsic value of shop experience. On his return to the shop, after having spent from one to four months (preferably the longer period) in the office, he has a better grasp of the work, and accordingly makes greater progress.

"In the shop the student receives experience in testing and assembling of steam turbines, gas engines, condensers, etc. In the office he has an opportunity to analyze tests and weigh results, and to acquire an appreciation of the details of construction and their utility. With a liberal policy toward the apprentice, it is found that it broadens largely his conception of engineering problems; and the results achieved by this method are borne out by the success of men graduating from this course and entering upon power house work with operating companies."

Mr. Dreyfus appended to his letter a copy of the rules governing the engineering apprenticeship system of the Westinghouse Machine Company.

W. H. Adams, Metropolitan Street Railway, New York City, said that he appreciated the necessity of having young men educated in the manner outlined in the report. The electric railways were constantly in need of foremen, inspectors, or men to fill positions where the general knowledge acquired in the branches of this character would be of great value. He believed that probably there would have to be outlined a course to suit particular conditions.. It would be very desirable in order to familiarize the apprentice at the start with the necessity of keeping track of the forms and the necessary details of the office end as well as the various storerooms and departments. The suggestion made by Mr. Dreyfus that when an apprentice had completed his course then he could be put in touch with the organization force of the department was also good. His company had no course of this character at the present time, but would probably start one in the near future.

Paul Winsor, Boston Elevated Railway Company, said that the Boston, his company, had no regular course; he hoped that the company would establish such a course at an early date. It had a good many apprentices, some of them in the car shops, and some in the power shops, but had no regular course. Besides these boys, they had five technical students whom the American Electric Railway Association had arranged for. That was a trial course of only two or three months. They also had ten young men from the Young Men's Christian Association of Boston, working in teams or pairs of two each. They had a week's schooling and then a week's work, and that had worked out very well.

Charles Hewitt, Philadelphia Rapid Transit Company, asked why this course should be confined entirely to the shops. While he realized that the details of car equipment and shop work were much more important than any other part of the mechanical or electrical work connected with the street railways, at the same time it seemed to him that the young mechanic should have this course rounded out, by some portion of the time being devoted to power-house work. This was particularly true with companies using high-tension, alternating distribution. He might also have some knowledge of line work and the distribution system. The broader the grasp that he got of power generation and the distribution, the more valuable would be his services in the other lines.

Fred G. Simmons, Milwaukee Electric Railway & Light Company, discussed the report outside of the strictly shop and rolling equipment work. The time was ripe when something should be done relative to the training of young men in the various lines of street railway engineering. He had gathered a great many ideas as to apprenticeship courses from reading a description of the apprenticeship course of the Atchison, Topeka & Santa Fé Railroad, written by Mr. Going. It was necessary to do more for the apprentice than simply to lay down the hours of study and the details of this course through the shop. This applied more particularly to the larger organizations. Provision should be made for a certain amount of classroom study in connection with the other parts of the apprenticeship course. The young men secured as apprentices had a comparatively limited education. The Santa Fé system only provided the equivalent of a sixth-grade education, but that was supplemented during the apprentice's term by regular classes, which the apprentice attended during working hours, and during the time they were in attendance in the classes they were paid their regular wages, so that there was no excuse for lack of interest on the part of the apprentice, which might be the case if the apprentice was asked to attend these classes after working hours, when he would rather be occupied with matters of recreation. These classes exerted a certain amount of moral influence on the boys.

F. J. Doyle, Schenectady Railway Company, thought it would be a good thing for the apprentice to enter the various departments and gain some knowledge of the operation of each.

Farley Osgood, Public Service Electric Company, Newark, N. J., heartily indorsed the views of the speakers who advocated a theoretical education in connection with the practical education. He had had considerable experience with apprentices, or cadet-engineers. His experience had been that unless they were given the theoretical training they cannot be advanced beyond a certain point. They did not know how to think about their new work. A theoretical training, to prepare them for the practical training which they received in the shops, was absolutely essential if the men were going to make a success. The class work must be arranged for in conjunction with the practical work during the time for which the apprentice is paid by the company, and not in his own hours, when he is not serving it. The committee's plan as he understood it eliminated from the course boys who had had any technical training. Many boys from the manual training schools, of seventeen or eighteen years of age, were ready to take up such a course as the committee had outlined, and they were ambitious to earn something and be on their way toward their life's work. Why not admit these boys?

Charles Hewitt said that for a year or two past his company had been giving preference to the manual training school boys, for the reason that they had the groundwork to comprehend the training which was given them, and they made a much better class of apprentices.

E. J. Burdick, Detroit United Railway, said his company fully appreciated the apprenticeship course, and was following it quite closely, although not exactly along the lines

suggested by the committee. He had found it an excellent idea to secure young men from the Young Men's Christian Association who had taken the mechanical and electrical courses, or young men who had ambition to take the mechanical or electrical courses in the night schools. These boys were generally made of the right kind of timber, and they did very well. In furtherance of the plans to educate apprentices the company had established a circulating technical library, and encouraged the men to read these books. The library consisted of about 300 volumes, and there were always at least one-third of these books circulated and being read by the apprentices.

President Harvie asked the committee if it contemplated applying the educational course to take in the power department and also the way department.

Walter H. Evans said that the committee felt that it was the equipment end which seemed to be most in need of first attention. The committee was trying to keep away from a technical graduate course and to take care of the fellows who are on the job day and night; the fellows who go down the road at any hour of the day or night, irrespective of weather conditions, and fix up a car, and are satisfied to work at the prevailing rate of pay for this class of work.

William Roberts, Northern Ohio Traction & Light Company, said that he had had some very pleasant experiences the last few years with the young men who had come into the employ of his company. There were many young men who mapped out a course for themselves and sought the aid of various educational agencies in helping them to acquire knowledge. Something ought to be said in favor of the correspondence schools for young men. He had a number of young men who were studying in their own time, and he thought that was the best way to develop the men. Some of them were working every night until midnight. While he appreciated the value of manual training schools and the opportunities given to young men through the Young Men's Christian Association, he thought some appreciation should be shown of the work which the correspondence schools of the country were doing for young men. They were developing young men of splendid talent, full of ambition, who were securing a good education.

Farley Osgood said that the Public Service Corporation took none other than college graduates in the power transmission department. Men who did not have a college education lacked the theory and were not capable of holding a supervisor's position or an assistant division chief's position. The technical man usually made good, as he had the technical and the theoretical training to start on. No special time was stated in the apprenticeship courses. A man was changed from one class of work to another when he perfected himself in his work, or if a man showed lack of interest in what he was doing he was changed if it was thought that he possessed merit. A young man just from college did not really know what occupation in life he would follow. He was no good to anyone until he had had three or four years' practical work. For this reason the management did not hesitate to shift the apprentices around from one occupation to another when it was apparent they were losing interest in the work in which they were engaged. Oftentimes such a change worked remarkably and made a good man of the apprentice, whereas under other conditions he might have been a failure.

The telephone companies had a students' course for a number of years, but did not have a regular students' course at this time. In the telephone method of education the men were given work which covered various periods in all branches of the service, and they were generally trained. During this general training, as a rule, they developed a capacity for some specialty, and if they did this they were particularly developed along the special lines for which they displayed aptitude.

William Roberts said his experience had been diametrically opposite. In the last year or two he had had young men come to him who were technical graduates. The man who would be the most useful in the end was the man who by hard work educated himself and who showed by his attention to business and his hard work and his ambition that he wanted to rise and needed a helping hand.

Paul Winsor said that in Boston there was every opportunity for a young man to learn the technical side of engineering, but they had nothing to train the mechanic. They have had a good many apprentices in the various departments who were not working under any organized system. Monthly meetings had been started with these men, which were taken charge of by the men in charge of the motor repairs. The pit men were also invited to go to these apprentice meetings, and many of them went. Thirty or forty people attended these meetings, including the apprentices.

Walter H. Evans in closing the discussion pointed out that the course was not for technical engineers but for the education of mechanics. The education of apprentice engineers was an entirely different field from the one the committee attempted to provide for. He was not willing to agree with Mr. Osgood that there was any particular dearth of engineer apprentices or engineers, but there was serious trouble in obtaining efficient mechanics. The course outlined was intended to take care of the boys who not from choice, but from rigid necessity, were compelled to go to work when they were seventeen years old. The object was to develop those boys into good, thorough-going mechanics, and to provide a regular system so that the boys would know and the foreman would know the routine that the young men were to follow.

Very early in his experience he had charge of a shop with about twenty-five apprentices. Many of those boys were now holding good positions all over the country. It was with keen satisfaction that he looked back and realized that he had done something to advance the interests of those young men. On the Indiana Union Traction Company he had five apprentices, three from the rolling stock department and two from the power house, and it was very encouraging to notice the alacrity and interest which those young men developed. In his department he had twenty-five applicants, some of them nearly forty years old. In one place where he took charge he found a bright young man who had been winding fields of the same kind for three years. When asked why he was doing this work all this time the man replied that he had never been given an opportunity for any other work. Almost immediately he developed into one of the best men in the shops when he was given an opportunity.

When an apprentice developed into a laggard it was a good method to move the next one ahead of him, and if that did not spur him up it was time to get rid of him. Usually it spurred him up and he developed rapidly after that. He wanted to point out that the report of this committee did not in any way conflict with the report of the committee on education of the American Association, although the line of work which the committee of the American Association was attempting to do would fit in very nicely with the work outlined by this committee. The apprentices would naturally be interested in the correspondence or academic features which the American Association has attempted to outline.

POWER DISTRIBUTION

A. F. Hovey, Interborough Rapid Transit Company, New York City, presented the report of the committee on power distribution. Referring to the specifications for three-conductor cables under the heading of "inspection and record of tests," he called attention to the fact that it was necessary for the manufacturer to notify the contractor on the completion of the order of cable unless expressly agreed to the contrary.

Blanks had been left under the heading of cable protection in manholes because there was such a great deviation in covering cables that it was impossible to meet

everybody's ideas, and the method of applying the asbestos and the other coverings was left open.

The joint report on specifications for overhead crossings of electric light and power lines was very important. Farley Osgood, member of the committee representing the National Electric Light Association, and R. D. Coombs, representing the committee on electricity of the American Engineering Railway Association, had been invited to discuss this part of the report.

E. N. Lake, Board of Supervising Engineers, Chicago Traction, called attention to the conductivity of annealed copper wire required by the specifications for cables, which was 98.5 per cent. This was a very reasonable percentage in view of the fact that in a great many tests the conductivity will run 100 and 101 per cent. Arsenic affected the conductivity particularly. He thought there would be some difficulty on the part of the manufacturers in supplying a compound that would be soft and plastic at all seasons of the year.

Under the heading of tests for potential stress in cables the application between each conductor and all the others connected to the lead sheath involved two applications of the potential stresses between the conductors and one application of the potential stresses between the conductors and the sheath. The application between each conductor and sheath and the other two conductors successively would involve two applications of the potential stress between individual conductors and also two applications of the stresses between individual conductors and the sheath, which would to be a more logical application of the tests. With regard to the requirement that the cable must not show any weakening of its insulation or any other injury under this test, the question might arise as to what would be a showing of injury to the cable under the potential stress. As to the amount of potential used in the potential test in the three-conductor cable, 6250 volts was required for a three-conductor cable, while for a single-conductor cable 5,000 volts was used. The speaker asked why the higher voltage was not satisfactory even though the cable was to be used for a lower working potential.

With reference to the insulation tests of 30 per cent Para rubber the value given in the specification for 5/32-in. insulation was 420 megohms per mile. This corresponded to the specification drawn up by the Rubber-Covered Wire Engineers' Association. He asked whether there had been found any objection on the part of the manufacturers to materially increasing that resistance.

A. F. Hovey said the committee thought that was a sufficient test. It coincided with the specifications of several operating companies, and it also coincided with certain manufacturers' specifications.

G. W. Palmer, Bay State Street Railway, Boston, said it was very easy to obtain a considerably higher test than was specified, and there would be no objection on the part of any manufacturers to furnishing such a test. But to make a cable to stand this higher test involved a tighter wrapping of the paper and a harder and less flexible cable. A cable which would stand at least the test which was prescribed was more apt to be flexible in continual service than one which was tightly wrapped and would give a higher insulation test. Any cable which would satisfy this test had sufficient insulation to meet all requirements.

E. N. Lake said that so far as the paper cable was concerned 50 megohms per mile was perfectly satisfactory. Such insulation would stand the pulling and handling under cold weather conditions much better than cables which had an insulation resistance of 100 megohms. His question was in regard to the 30 per cent Para rubber specification, whether it was desirable to give those qualities and whether the manufacturers would make a corresponding increase in price.

Mr. Hovey, Okonite Company, said that the experts of his company thought it was highly desirable to increase the megohm test to at least double the value specified. The Railway Signal Association had this matter under consideration, and its committee has recommended that the megohm test be increased to practically double. He was of the opinion that the manufacturers would not increase the price.

Referring to the physical test, he recommended that the potential stresses be made 1000 lb, per square inch, instead of 800 lb. The compound which would comply with the 30 per cent Para specification would stand 1000 lb. per inch and still have a margin of safety. He also recommended that the breaking test be made 10 in. instead of 9 in. The last pargraph under "Physical Test" should be left out, as there was no reason why a thick piece of rubber should not stretch as far as a thin piece of rubber. Under "Chemical Tests" he thought it was desirable to have a specific gravity test added, for the reason that a manufacturer might use a light filler, and therefore make his compound more bulky; and as the insulation is measured by the thickness, a certain bulk would cover more length and wire, and consequently there would be less rubber per foot, and therefore a less effective and lower insulation.

The speaker thought that the vulcanizing should always be done before the compound was covered with tape or braid, and that the test should be made before the tape or braiding was put on, as a new tape might cover a defective test or cover up a place which would be detected if the compound had been left bare. The time specified should be 36 hours, instead of 20 or 24 hours. Referring to the table giving insulation thickness in inches, he thought there was nothing to be gained by testing at such a high voltage as required, and that there was danger of injuring the insulation and causing an injury which would not be detected. He would recommend that this test be left off, or a lower voltage used. It was possible to injure rubber insulation and not cause a breakdown which would be detected at that time, but later it would be developed.

E. N. Lake took issue with the representative of the Okonite Company with regard to the question of immersion. Ordinary braid used for holding the compound in position while it was being vulcanized had been shown by test to break down after two hours' immersion; that is, after two hours there would be no difference in insulation resistance with and without braiding. From the standpoint of the engineer, and taking the practical side of it in the factory into consideration, 20 hours would be the standard which he would recommend.

William Roberts appealed to the members present for some information on the construction and erection of concrete poles. The committee had found since the report had been printed that a large amount of erection and construction of concrete poles had been going on. One city which had extensively entered into this type of construction was Toronto. It was a very interesting field just now in long distance transmission work.

R. D. Coombs, New York, said that the cost of concrete poles depends altogether on the class of line and the location and whether there is time to utilize all the possible economies. Where a pole line had to be constructed, stock material bought, twice as many men and twice as many forms used as were absolutely necessary to erect it, and so far from a track or beaten path that derrick cars could not be used, it would be an expensive construction. Where the line was equivalent in type and strength to the ordinary transmission line of say twelve wires at the maximum, the line could be built at comparatively low cost. Its first cost would exceed that of a wood line, but its long life would effect an economy. The argument of some engineers was that within a few years, if the price of wood continued to increase, concrete poles would be economical; but they were not so at the present time. The Toronto installation of which Mr. Roberts spoke was the largest and cheapest installation actually constructed thus far. The poles

were small and very light, and were used for distribution, not for transmission purposes. They were made in a casting yard, with rows of forms, over which ran a traveling carriage bearing the concrete. The erection of concrete poles, if the location is not unusual, was the same as the erection of wooden poles. A gang which could erect a large number of wooden poles could erect about the same number of concrete poles. If the concrete pols were in a bad location it cost a good deal to stand them up, because they were heavier.

Mr. Roberts asked Mr. Coombs if he was prepared to indorse the figures cited in the report as to the cost and erection of reinforced concrete poles.

Mr. Coombs thought the figures were entirely too low. About one year ago he erected thirty-one poles carrying twelve wires on the ordinary spacing. These poles cost about $10 apiece to make. They were comparable with a good chestnut pole of about the same size and perhaps a little bigger diameter. Two poles would cost a great deal to make; 200 poles would cost much less per pole; the cost for material will be about the same, but the forming and superintendence and the working of two poles runs to a very high factor; so that he thought that a cost of $3 or $4 per pole at the present time was an exaggeration.

L. P. Crecelius, Cleveland Railway Company, said that eighteen months ago that company had made forty-three concrete poles which had been placed in pretty severe service. After a year's trial the company decided to build more. It was now making 500 poles, of which 200 had been installed. The pole was essentially different from that mentioned by the previous speaker, because in a transmission line a pole did not have such a transverse strain as a trolley pole, which required stronger reinforcement. The poles cost to make about $10.71 each. There was no greater difficulty in erecting them than with an ordinary tubular pole. The pole was a fine looking structure in the street, much better than a steel pole. The pole had a top pull of about 1500 lb. or 1800 lb., and was 28 feet long. Compared with the ordinary 7-6-5 standard tubular pole, its cost was in the ratio of $10.71 to $16.38 delivered. The method of attaching the span wire and the feed wires was exactly the same as with a tubular pole. Malleable iron was used for the cross-arms and collars for the strain insulators. The pole weighed about 2200 lb., and contained eight twisted-steel reinforced bars. The pole was octagonal in shape and tapered from 10 in. at the butt to 5.5 in. at the top. On the tension side and starting 6 ft. from the ground, slight cracks had appeared and went through the nearest reinforcement, so that the pole was only in the experimental stage. Its life could not yet be determined. The pole was to be used in replacing old wooden poles in outlying districts and not in place of steel poles.

Harry Barker, *Engineering News*, asked if any of the delegates present who had used reinforced concrete poles had any information to give on the matter of the electrolytic destruction of these poles. He said that where reinforced concrete was subject to direct current there was apt to be a destruction which arose in two ways. With a large current of 5 amp. to 10 amp. may come localized thermal effects which take place within a few hours; with a smaller current of a fraction of an ampere, flowing for 35 or 40 days, the same result was accomplished, but the trouble was more apt to be found in cities and was not due to the leakage current. With trolley poles of reinforced concrete there might be enough leakage in wet weather to allow 4 amp. or 5 amp. to pass from the iron through the concrete to the ground, and in that case in a single day some cracking of the concrete away from the reinforcing might be expected. Defective insulation in some of the poles, enough to allow a fraction of an ampere to pass continually for several months, might also lead to disintegration. When the bonding between the concrete and the reinforcement was gone at the base, a small top pull might overturn the pole.

Farley Osgood said that he believed that the proper bonding of the reinforcement of the concrete would take care of the difficulty which the last speaker mentioned. It could be done just as the steel work on a reinforced concrete building is bonded. He called attention to the fact that many railroad companies did a lighting business also, and in many cases combination poles were used. The enthusiasm for concrete poles would be somewhat checked when considering carrying lighting circuits on the same poles, because the lighting circuits carried over 2400 volts, on primary circuits, and it was dangerous for linemen to work on concrete poles carrying such voltages, with the wires alive, which they had to do. That point could not be overlooked in the joint use of poles.

G. W. Palmer said he had not had any experience in the use of concrete poles, but from his experience in the use of wood and iron poles they were open to the objection of electrolysis depreciation. It would require but a comparatively small amount of current, such as could get down an iron pole, to set up such oxidation in the reinforcement as to result in the cracking of the bond between the concrete and the reinforcement. He would expect these troubles to develop in the use of concrete poles for the ordinary side pole construction.

R. D. Coombs asked whether electrolytic action was likely to occur in view of the fact that the reinforcement was continuous from the top of the pole down into the ground. Would not the current go out at the bottom of the pole? The conditions, no doubt, were different in the use of concrete poles for trolley work in the city and in the transmission field, but it was a fact that reinforced concrete poles had been used for transmission lines abroad for ten years on high tension work. There was a pole line near Niagara Falls which had been in use for five years, which had given satisfactory service.

Harry Barker said that the effect of electrolysis on reinforced concrete had been developed largely in laboratory studies. There had been some attempts at field tests, but they had not amounted to much. With alternating current, such as is carried on transmission lines, the evidence was all negative. He had some tests under way that would not develop anything for three or four years. If they did not show any cracking within that length of time it would be more certain that alternating current has little effect. The destruction came where the current left the iron for the concrete. In the case of a trolley pole, where the base was buried from 4 ft. to 6 ft. beneath the level of the tracks, any leakage current would leave the pole at or near the ground line for the rail, allowing the current in that way to pass from the iron to the concrete, which might result in a rupture of the bond close to the ground line. If there was a sufficient conductivity between the reinforcement brought out at the bottom of the pole, that might prevent electrolysis. In the case of some reinforced concrete buildings where incipient trouble had been suspected an attempt had been made to prevent further destruction by carrying the bonding of the reinforcement through the building. Apparently that had served its purpose. Another thing which might have to be done in the case of reinforced concrete poles was to provide a membrane of waterproofing and insulating material, such as felt soaked with asphaltum, etc., with a good thickness of asphalt on top, where the pole was buried in the ground, so that the pole would be insulated thoroughly from ground water.

William Roberts did not think there could be any effect of electrolysis if the reinforcing were bonded to the rail, but the great trouble would be the danger of working on the pole, because there might be a leak in the insulators. It might be all right in dry weather, but after a rainstorm there might be some displacement of the reinforcement so that a current of high potential would overcome the resistance and break through and be very dangerous for anyone engaged in working on the pole. The matter of electrolysis

could be taken care of by a direct return through to the reinforcement of the pole. It was difficult to make a reinforced concrete pole absolutely safe from electrolysis.

A. F. Hovey, in closing the discussion, said that the question of conductivity was considered thoroughly by the power distribution committee last year, and the committee this year made the same recommendation. In regard to the compound spoken of by Mr. Lake it might be difficult to get a compound that would keep sufficiently soft and plastic at all seasons of the year. His company had not had any trouble in obtaining a compound that would stand under any temperature and still remain soft. His specification stated that the purchaser must be allowed to install the cable in ducts anywhere between 0 and 100 deg. Fahr., and that necessitated a soft compound. The first specification upon which action was desired by the committee was the specification for high-tension, three-conductor, paper-insulated, lead-covered cables.

Martin Schreiber, Public Service Railway, Newark, moved the adoption of the specifications. The motion was carried.

The specifications for single-conductor, paper-insulated, lead-covered cable for 1,200 volts were accepted and referred to the committee on standards.

The next question taken up for action was the specification for 30 per cent Para rubber compound.

G. W. Palmer answered the objection to the provision that the insulation test should be made before the application of any outer covering by saying that it was found that if it was specified that the test should be made before the application of any outer covering whatever it would shut out a number of good makes of wire. In some of the methods of manufacture of smaller sizes of wire an outer covering of tape or braid was necessary to hold the thin layer of rubber on to vulcanize it, and if that was not allowed it would shut out a number of good makes of wire. As to the suggestion that the test of 800 lbs. should be increased to 1000 lb. the committee found a number of samples of 30 per cent Para rubber which afforded very good insulation and otherwise met the requirements, but would not stand a 1000-lb. test.

H. H. Adams said that the question of 30 per cent Para rubber compound was one which affected the equipment commitee. A good deal of the wire included in the sizes specified was used on cars. He moved that this specification be referred back to the committee, to be taken up in conjunction with the committee on equipment, to be reported on at the next convention. The motion was carried.

The recommendation for standard grooved trolley wire in sizes other than No. 0000 was approved and passed to the committee on standards. The specifications for No. 00 round, hard-drawn copper trolley wire were also approved and sent to the committee on standards.

The specifications for overhead crossings of electric light and power transmission lines were approved and recommended to the committee on standards for adoption as a standard. The subject of concrete, latticed and tubular poles was referred back to the executive committee for further consideration.

The meeting then adjourned.

The Pantasote Company, New York, N. Y., shows at space 301 a section of a car illustrating the application of agasote headlining. The headlining shows a light blue, smooth finish. Although on the market in the United States for only about three years, agasote is now frequently specified for subway surface and elevated car headlinings. It is a board of homogeneous waterproof material of great density and tensile strength. There are also shown car seats upholstered with pantasote. The pantasote and agasote representatives are John M. High, William A. Lake, Allan S. Barrows.

COMMUNICATION

RAIL CORRUGATION

GOLDSCHMIDT THERMIT COMPANY

New York, October 4, 1911.

To the Editors:

I was much interested in the editorial comment on my theory of rail corrugation which was published in Electric Railway Journal of Sept. 30, 1911, but it seems that you have overlooked some important points in the theory, which led you to draw erroneous conclusions.

Considering first the statement that "if corrugation was dependent entirely upon the size of the area of contact and its position on the head of the rail it would follow that all rails of the same section held on the same foundation by the same attachments and subjected to the same traffic would develop corrugation to an equal extent," while this may be true in so far as the premises upon which it is based are true, I endeavored to show both by the text and sketches in my article that in track laid with rails of the same section held on the same kind of foundation by the same type of attachment and under the same traffic conditions both the size and location of the contact area are materially changed by numerous apparently unimportant details in laying track and that rails with heads similar to those of the usual girder type are affected to a much greater degree than is the case with T-rails or rails with a rounded head.

The effect of such a slight change as the elevation of the outside edge of the base of the rail ¼ in. was shown both for girder rails and for T-rails, as was also the effect of various track and wheel gages. It would not be difficult to point out causes for many such differences in track laid with the same material. Further, the theory does not "presuppose that the load on T-rails or on those which develop corrugation is normally at the center of the rail and that on girder rails which develop corrugation at the side of the head." What the theory does presuppose is that where corrugations occur the point of maximum intensity of pressure approaches sufficiently near the edge of the rail to reduce the elastic limit of the steel from its cubical value to its linear value, a quite different thing. Nor is it claimed that corrugation will appear on all track laid with rails having flat heads if the relation of the tread of the wheel to the rail surface is such as to make contact across the entire head at all times, as it is obvious that the intensity of pressure will not only be reduced but that the point of intensity of pressure will not fall near the edge of the rail, the different parts of the head taking the load in inverse ratio to the power of resistance.

If rails with flat heads could be laid and maintained at all times so that the point of maximum intensity of pressure between wheels and rail fell at some distance from the edge of the rail, corrugation would not be produced except under conditions noted in the statement of the theory. Further, as has already been stated, if the rails were free to adjust themselves under pressure, the shape of the head would not be of so much significance, and the chief claim made for the rounded head is that there can be a considerable variation of the relation between the wheel and rail without altering materially either the size of the contact area or its location, which was clearly shown by the sketches in my article.

G. E. Pellissier,
Superintendent.

Maybe we will be running electric railways in the air and over the water some day. A visitor at the McQuay-Norris Manufacturing Company's booth was looking for packing rings for a hydro-aeroplane. He was an aviator.

REPORT OF THE COMMITTEE ON PASSENGER TRAFFIC*

BY L. D. PELLISSIER, CHAIRMAN; F. G. BUFFE, FRANK CAUM, E. C. HATHAWAY, J. E. GIBSON, T. A. CROSS

During the year the general subject of "every-day" business was investigated, including a study of methods and results of civic organizations. A considerable fund of information has been collected touching on civic organizations, newspaper advertising, advertising costs, the employment and duties of industrial and passenger agents, commutation rates, etc., which will be found on file in the secretary's office arranged in convenient reference form.

CIVIC ORGANIZATIONS

Data furnished by member companies reveal the impressive strength of civic pride among the citizens of American cities. It shows, too, that much of the effective work has been done by organizations in the very small communities. Information has been collected from companies operating in about 100 cities with populations ranging from a minimum of 4400 to a maximum of more than 2,000,000, and in every one of the cities and towns there is a civic organization of some sort.

These civic bodies are active in a variety of ways. Many of them have paid secretaries who devote their entire time to the work, while others carry out extensive programs by means of committees. Considerable traveling is done by officers, personal appeals to convention bodies are made and a great deal of magazine advertising is carried on. In many cases free factory sites are donated or bonuses paid, in other cases factory owners are permitted to extend payments over a period of years. Attention is also given to freight rates. With few exceptions the companies co-operate with the civic organizations, though sometimes through officials as individuals only, and in many instances, in addition to dues, substantial financial assistance is given. A great many of the companies call particular attention to the very active interest taken, and not infrequently their officials are leaders in the work as shown by the fact that two companies report an executive official as president of the civic board, another one of its officers as vice-president, and still another its general manager as a member of the executive committee of the civic organization. By far the greater portion of the efforts of such bodies is along lines which directly and, if successful, advantageously affect the "everyday" business of the electric railway companies. The committee suggests that the member companies individually consider their respective civic organizations with a view to such active co-operation and support as the objects and plans of such bodies seem to warrant.

NEWSPAPER ADVERTISING

The committee requested information on the general practice of the members in regard to newspaper advertising.

The following table shows the extent and character of newspaper advertising:

	None	General advertising	Schedules	Changes in schedules
City lines only	25	23	9	2
City and interurban lines	7	12	5	0
Interurban lines only	2	9	2	1
Total	34	44	16	3
How paid for:				
Cash			44	companies
Mileage			11	"
Cash and mileage			8	"

Twenty-two companies report that they carry permanent or special advertising affecting public relations in newspapers. Some few additional companies carry such advertisements inside cars, others in company periodicals, while one uses a talking sign. Fifty companies do no advertising of this character. Additions, improvements and extensions of lines, equipment and service are best treated in reading notices and editorials and natural attractions along the routes should be described in legitimate advertising space. Advertising on the fronts of cars should be confined to attractions controlled by the railway company and other events of general interest.

INDUSTRIAL AGENTS AND PASSENGER AGENTS

None of the companies responding have employed agents who devote their entire time to the development of industrial affairs along the line of road. Some effort to bring about the location of factories, etc., has been made by officials of the various companies, and one line reports the location of four grain elevators, tile works and a sawmill, as the result of these efforts. Twenty-eight companies do employ and fifty-nine do not employ passenger agents. Of those companies maintaining passenger departments eighteen operate interurban or city and interurban lines, and of the fifty-nine which do not maintain them twenty-two operate interurban or city and interurban lines.

DISTRIBUTION OF FOLDERS AND PRINTED MATTER

The replies to the inquiry as to the methods and cost of distributing advertising matter showed the following information:

Distribution	No. of companies	Cost per 1000 folders
In cars only	1	....
In stations only	1	....
In cars and local delivery	1	$5 00
In stations and local hotels	2	60
In local hotels by agents	2	....
In cars and through distributing agency to state hotels	2	8 33
In cars, hotels, houses, etc., and mail to territory served	2	22 00
In cars and through trainmen and boatmen	1	50
In stations and towns by agents	1	3 50
Inspectors hand to passengers	1	....
Mail and house to house	1	1 00
Local	10	....
State	4	1 00
State and adjoining states	2	....
Country-wide	1	10 00
Chamber of commerce	1	....

With regard to permitting outside agencies to prepare traffic circulars free of cost to the railway company, such agents to reimburse themselves through advertisements, forty-four companies state that they do not permit this, while twelve say that they do. As to whether the savings effected in this way provide a real economy, fifteen companies claim that they do not consider that it does, and five state that such savings are worth while. One of the principal reasons advanced by the companies opposed to the plan is that the time-tables are not kept up to date. The plan of permitting outside agencies to prepare circulars of this kind free of cost to the railway companies is unsatisfactory, because it tends to impair the value of the publicity which the company desires to obtain and the saving effected does not justify the adoption of the plan.

COMMUTATION RATES

The replies received show that twenty-five companies operating interurban lines issue commutation rates and nineteen companies do not; that thirteen companies believe such rates to be profitable in themselves, and ten companies consider them unprofitable. Eight companies feel that commutation rates induce sufficient regular riding to make them a source of profit and nine companies state that such rates are not responsible for any substantial increase in regular business.

MISCELLANEOUS

The extent to which the members have taken up the matter of a company magazine is limited. Out of one hundred responses only five companies report that they issue such a publication and two state that they have in the past issued a book of this kind but have discontinued the publication of same.

The stimulus to traffic on interurban lines through merchants paying fares of customers, providing transportation

*Abstract of report read before the American Electric Railway Transportation & Traffic Association, Atlantic City, N. J., October 9-13, 1911.

to and from terminals, free delivery of packages, etc., and the benefits accruing to the railways from such plans was investigated. The merchants in seven localities pay the fares of their patrons (under certain conditions as to amount of purchases); in six localities they pay both fares and express or freight charges. In one instance the merchants operate a special car which has proved very successful; in another case the merchants operated a special car which was withdrawn because it was not profitable. In several other cases merchants adopted plans of this nature during so-called merchants' weeks, with results, however, that have not been altogether successful. As to the benefits to be derived from co-operation of this kind, seven companies state that the results have been satisfactory, and five declare otherwise.

Among the ideas expressed regarding the development of "all-the-year-round" business are the following: Movements to bring about intercourse between social organizations of different cities and communities, theatre parties, advertising trolley trips on backs of transfers, co-operation and interchange of passengers with an independent steamboat company operating between termini of interurban road, follow-up work in connection with proposed excursions, and the advertisement of special attractions by means of banners on the outside of cars.

The committee wishes to sound a note of warning against the introduction of low-rate tickets as a means of developing "every-day" business, and to suggest that before offering inducements of this kind all companies give the subject long and serious consideration from every point of view as a matter which is likely to be far-reaching in its effects and, eventually, detrimental in results.

REPORT OF THE COMMITTEE ON EDUCATION OF ENGINEERING APPRENTICES*

BY WALTER H. EVANS, CHAIRMAN; W. G. GOVE, H. A. BENEDICT

The work assigned to this committee pertains to the practical training of engineering apprentices, with particular reference to the mechanical and electrical trades employed in and around the various shops and car stations. It was considered advisable at this time to confine investigation to that class of engineering apprentices which will be employed in the maintenance of electric railway equipment in the rolling stock department. The manner of maintaining electric railway equipment in our shops and repair stations differs very considerably from that employed in other character of railroad or manufacturing work. Therefore it would appear particularly desirable to develop a class of mechanics especially fitted by training and experience to properly take care of electric railway equipment.

There has never before been a time when a greater necessity existed for the proper training and drilling of young American boys along the line of mechanical trades. It would appear that a great amount of valuable material is now being wasted because of the lack of drilling and instruction at the proper age. This is especially true in the electric railway business, which offers an especially inviting field for young men to prepare themselves not only for present requirements but for the future as well.

A "Code of Apprenticeship Rules," taken from that adopted by a similar association a number of years ago, is submitted as a general recommendation and opinion which might be investigated and adopted, with such changes or revisions as would seem to be necessary.

It is expected that this code will apply to all classes of apprentices for the various trades employed in electric railway general shops. Where the shops are sufficiently extensive and the work is sufficiently segregated, it will no doubt be desirable to employ apprentices in each trade with a view to developing the highest character of mechanics.

The committee calls particular attention to the development and training of mechanics for the purpose of maintaining electric railway rolling stock equipment. These tradesmen would be designed as "electric car mechanics." Your committee would, therefore, submit the following schedule as a recommended forty-eight months' course of training in developing a thorough electric car mechanic, but with the distinct understanding that it is to be flexible as regards both the term of service to be spent on each item, and also, in the whole course, the qualities and capacity of the individual boy.

ELECTRIC CAR MECHANIC APPRENTICESHIP COURSE

(1.) Start in the toolroom, storeroom, or messenger in the shop office, to become acquainted with the use of small tools, and familiar with the name and character of material, tools, reports, forms, etc. Here he should also develop a legible hand and make satisfactory reports. Time—four months.

(2.) Helping on general machine shop work, small tools, drilling machines, shaper and small lathes—six months.

(3.) Blacksmith shop, three months as helper, three months on small fire on general work—six months.

(4.) Machine shop, general instruction in machine work, milling machines, axle lathes, boring mills, larger lathe work, etc., and better class of bench work—six months.

(5.) Coach shop, car trimmings, light coach repairs, glass fitting, etc.—four months.

(6.) Pipe shop, pipe fitting and air brake apparatus—four months.

(7.) Armature and field winding and repairs—six months.

(8.) Gang work, overhauling and repairing trucks and motors—six months.

(9.) Control apparatus repairs, wiring, wiring diagrams, drawings and general testing work—six months.

It is recommended that in case apprentices are taken for any regular trade some definite schedule be developed covering the full apprenticeship course. It is recommended that apprentices should preferably begin when seventeen years of age. The practice in a number of localities provides a scale of wages for apprentices with rates per hour according to the following plan:

First year, 10 cents; second year, 12½ cents; third year, 15 cents; fourth year, 17½ cents.

Where the policy of the company will permit and the custom prevailing in the localities justifies, it is recommended that some inducement be held out to the apprentice to complete the full course and receive his "certificate of apprenticeship." This is desirable, both from the viewpoint of the employing company and that of the apprentice himself.

At this time some effort is being made along this line by a committee on education of the American Electric Railway Association, and a number of special apprentices have been selected from different companies throughout the country who will receive special instructions in shops, power houses and substations. It is understood that the result of this experiment will be the subject of a report of that committee to the main association at this convention.

It would appear that the character of training and the policy pursued by the committee on education of the American Association is necessarily of an academic or correspondence school plan, and consequently would not appear to conflict in any way with the recommendations of your committee, but, on the other hand, would be supplementary and possibly helpful to the plan which we recommend.

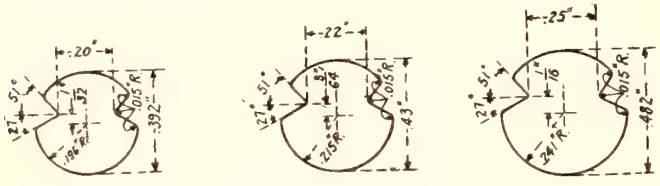
Your committee recommends that a committee on the education of engineering apprentices be continued for at least another year, and that the membership of this committee be increased in order that the country may be better represented from a geographical standpoint.

*Abstract of report read before the American Electric Railway Engineering Association, Atlantic City, N. J., Oct. 9-13, 1911.

REPORT OF THE COMMITTEE ON POWER DISTRIBUTION*

BY A. F. HOVEY, CHAIRMAN; G. W. PALMER, VICE-CHAIRMAN; S. L. FOSTER, E. J. DUNNE, WILLIAM ROBERTS, A. S. RICHEY, S. D. SPRONG, C. R. HARTE

The committee has revised the specifications for overhead crossings and electric transmission lines since the report presented last year, and these now represent the joint report of the committees of the American Railway Engineering Association, the National Electric Light Association and the American Institute of Electrical Engineers, and have since been adopted in a joint report by the committee on high tension wire crossings of the Association of Railway Telegraph Superintendents. The joint report as presented was accepted by the National Electric Light Association at its 1911 convention.



Power Distribution—Recommended Trolley Wire Sections

At a meeting held on March 9, the chairman assigned certain topics to the several sub-committees. These reports were discussed at meetings on May 17 and 18 and are now presented for approval.

A sub-committee on line material standardization, with a view to making interchangeable as many of the units of construction as possible, was appointed, but it was unable to present a report.

The committee wishes to report that outline drafts of specifications for the joint use of poles, specifications for overhead crossings of trolley contact wires over railway tracks and specifications for overhead crossings of foreign wires with electric railway wires have been prepared with great precision and detail and have been tentatively adopted by our committee. It has been decided that the Engineering Association should get in touch with various other associations and prepare a joint report to be submitted for adoption by our association. We have been unable to bring about such joint action in time for the convention this year and suggest that such action be taken up by the 1912 committee on power distribution.

Taking up the different subjects in detail, your committee begs to submit the following:

Section No. 1.—(a) Specifications for high tension, three conductor, paper insulated, lead covered cables. (b) Specifications for single conductor, paper insulated, lead covered cable for 1,200 volts. (c) Specifications for 30 per cent Para rubber compound.

[These specifications are too comprehensive for inclusion here.—Editors.]

Section No. 2.—(a) Recommendations for standard grooved trolley wire in sizes other than No. 0000. (b) A paper on concrete, latticed and tubular poles. (c) Definitions of cable and strand. (d) Specifications for No. 00 round hard-drawn copper trolley wire.

Section No. 3.—Specifications for overhead crossings of electric light and power transmission lines.

SUBDIVISION (a).—RECOMMENDATION FOR STANDARD GROOVED TROLLEY WIRE IN SIZES OTHER THAN NO. 0000

The 1910 committee on standards, after recommending that the section of No. 0000 grooved trolley wire, as recommended by the 1909 committee on power distribution, be adopted as standard, recommends that the committee on power distribution consider the design of standard sections of other sizes of grooved trolley wire, all to have, if possible, the same contour of groove, so that the same hanger, or ear, could be used for all sizes. We find that the manufacturers have adopted as standard sections No. 00 and No. 000 grooved trolley wire, as shown. These sections are known as the "American standard" and have the same contour of groove as that of the No. 0000 which was adopted as standard by this Association in 1910. We know of at least one manufacturing concern which makes a hanger, or ear, which can be used with all sizes of grooved trolley wire. The only difference between other sizes of grooved trolley wire, as apparent in the illustration, is that the appendix is larger in the different sizes, the groove remaining the same.

SUBDIVISION (b).—CONCRETE, LATTICED AND TUBULAR POLES

Your committee in presenting the following paper on "Concrete, Latticed and Tubular Poles" recognizes that the concrete pole is now becoming better understood both as to construction and placing.

Concrete has been used in cases of emergency for reinforcing wooden poles, and tubular poles may also be protected by concrete or cement foundations that will give them great stability.

The committee is indebted to Gillette's Hand Book for the pole cost and construction data, which are here presented in tabular form. For sake of comparison, the cost of cedar poles has been added to the table; these costs include poles, unloading, dressing, gaining, roofing, boring, hauling and setting.

The Fort Wayne & Wabash Valley Traction Company has made reinforced concrete trolley poles and transmission line poles, the cost of which was as follows in 1906:

The trolley poles are 32 ft. long, 8 ft. of which is below the ground level. The pole is 10 in. square at the ground level and 6 in. at the top, and is reinforced with 8 twisted ⅜ in. steel rods. It contains 22½ cu. ft. of 1:3:3 gravel concrete, and 122 lb. of steel, weighs 3,300 lb., and costs $7.50 at the gravel pit. The transmission pole is 42 ft. long, 8 ft. being underground. It is 12 in. square at the ground level and 6 in. at the top, and is reinforced with eight twisted steel bars (½ in.), four of which are 32 ft. long and four are 42 ft. long. It contains 29 cu. ft. concrete, 242 lb. reinforcing bars and 21 lb. of steps, weighs 4,400 lb. and costs $13.

TABLE A—COMPARATIVE COST OF REINFORCED CONCRETE AND CEDAR POLES

Concrete Poles									Cedar Poles—Cost			
Length Ft.	Top In.	Bottom In.	Size steel In.	Cubic ft. conc.	Cost of steel	Cost of conc.	Cost of bind W.	Labor	Total cost	Top In.	F. O. B. cars	Labor	Total
25	6	10	1 4	16	$1 57½	$2 24	$1 20	$1 70	$6 71½	7	$2 60	$1 50	$4 10
30	6	11	3 8	21	2 29	2 94	1 20	2 20	8 63	7	6 25	2 00	8 25
35	6	12	1/2	26	3 91½	3 64	1 20	2 70	11 45½	7	8 75	2 40	11 15
40	7	15	5/8	36	6 31	5 04	1 50	4 20	17 05	8	12 00	3 50	15 50
45	7	16	7 8	43	8 56	6 02	1 50	5 70	21 78	8	17 20	5 00	22 20
50	7	17	7 8	50	9 50	7 00	1 80	7 20	25 50	8	20 20	6 50	26 70
55	7	18	1	56	13 34	7 84	1 80	8 95	31 93	8	24 80	8 50	33 30
60	7	19	1	61	14 56	8 54	1 80	11 70	36 60	8	29 75	10 00	39 75

COMPARATIVE STRENGTH TESTS OF CONCRETE AND CEDAR POLES

In 1906 two forms of reinforced concrete poles were tested in comparison with two 30-ft. selected cedar poles for G. A. Cellar, superintendent of telegraph, Pennsylvania Lines West

*Abstract of report read before the American Electric Railway Engineering Association, Atlantic City, N. J., Oct. 9 to 13.

of Pittsbugh. The concrete poles were made and the tests conducted by Mr. Robert A. Cummings, of Pittsburgh, Pa. Both poles were 8 in. in diameter at the top and 13 in. in diameter at the base, and both poles were molded hollow, with shells from 1¾ in. to 3 in. thick, for about two-thirds of their height and solid for the rest of the height. One pole was octagonal in section and one was square in section with chamfered corners. Each pole weighed approximately 3,500 lb. Both poles were designed to carry 50 wires each coated with ice enough to make it 1 in. in diameter, and to resist a wind load of 30 lb. per square foot. The poles were assumed to stand 100 ft. apart and were made 30 ft. high. These conditions are approximately equivalent to a concentrated load of 1,000 lb. applied near the top of the pole. The reinforcement for both poles consisted of a peripheral ring of eight 24-ft. bars of round steel and alternately ¾ in. and ⅝ in. in diameter. Wooden blocks were molded into the poles for attaching clips and braces and through holes cored for cross-arm bolts. Both the wooden and the concrete poles were set approximately 5 ft. in 3-ft. by 3-ft. by 5-ft. concrete bases. The tests showed deflections at the top before breakage of 25 in. (load 3,150 lb.) for octagonal concrete, 39 in. (load 3,690 lb.) for square concrete and 66 in. and 47 in. (loads 3,494 lb. and 2,530 lb. respectively) for wooden poles.

The report of this committee includes an abstract from a paper by George Gibbs, entitled "The New York Tunnel Extension of the Pennsylvania Railroad," describing a concrete pole line built by this road across the Hackensack Meadows. This article was presented in the Electric Railway Journal for June 10, 1911, page 1014.

SUBDIVISION (*c*).—DEFINITIONS OF "CABLE" AND "STRAND"

The committee offers the following definitions as representing the terms "cable" and "strand" as they are commonly used by the electric railway operating engineer:

A cable, from an electrical standpoint, may be defined either as one stranded conductor, or a group of conductors, either solid or stranded, assembled as a mechanical unit.

Note: This definition would exclude a solid wire insulated and lead covered, which is now commonly called a cable. The trolley wire, for instance, would fall under this definition, which is manifestly improper.

A conductor is either a solid wire or group of wires assembled symmetrically as a unit.

A strand is an individual wire of a group of symmetrically assembled wires which form a conductor.

Your committee has taken up the matter of a standard stranding table for all sizes of cable, and is awaiting the standards committee of the American Institute of Electrical Engineers, which is to draft during this year a standard table for stranding. We have, however, added a stranding table to our 1,200 volts and high-tension cable specifications for sizes generally used on this type of cable.

SPECIFICATIONS

The report of this committee contains detail specifications for No. 00 round-drawn hard copper trolley wire, specifications for overhead crossings of electric light and power lines which present the general requirements and conditions surrounding location, clearance, conductors, loads, factors of safety, insulation, materials, including structural steel foundations and working unit stresses for structural steel rivets, pins, bolts and wires and cables of standard sizes.

Appendix A of the report includes a table showing the strength and loading characteristics of steel wire stranded and galvanized; also for copper, aluminum and high-strength steel.

Appendix B presents tables and curves giving the sags at which conductors should be strung in order that when loaded with specified requirement of ½ in. of ice and a wind load of 8 lb. per square foot of projected area at zero Fahr., the tension in the conductors will not exceed the allowable value of one-half the ultimate strength of the conductors.

Appendix C is a set of specifications for galvanizing iron and steel.

Appendix D presents pole formulæ including determination of the strength of a pole, a consideration of forces acting transversely on a pole and the moment at the ground due to wind pressure on the wires, which formulæ are illustrated by examples. The report concludes with Appendix E, containing a list of the committees on overhead line construction, power distribution, high tension and electricity of the National Electrical and Railway Associations.

WESTINGHOUSE TRACTION BRAKE COMPANY EXHIBIT

The Westinghouse Traction Brake Company has on exhibit a rack demonstrating ten cars of electro-pneumatic brakes as applied to all subway cars of the Interborough Rapid Transit Company, New York. With this equipment the safety and capacity of the subway was greatly increased. This equipment is considered to be the most flexible, most easily controlled and most powerful braking apparatus ever installed in electric traction service. It comprises a complete automatic brake with many new features and with electric control superimposed. Thus all the power of compressed air is assured with a rapidity obtainable only with electrical transmission. In connection with this rack are two illuminated charts, electrically operated, which show graphically by curves comparative stops made by two trains, one having the old automatic brake equipment, the other the new electro-pneumatic brake equipment. The latter shows greater flexibility, reduction in time required to make stop and shortening of the stopping distance by one-half. Both service and emergency stops are demonstrated by these illuminated charts.

A rack demonstrating five cars of AMM brake equipment, electrically operated air signal system, also with the combined automatic and straight air feature, is included in this exhibit. The features of the AMM brake equipment are quick service, quick recharge, graduated release, high pressure emergency and high speed brake features for one to five-car train service.

The air signal system provides means for signaling motormen from any part of car or train, assuring instantaneous response of whistles and absolute precision as to the number or length of blasts. This apparatus is for trains of any length.

A two-car rack demonstrates the SME brake equipment, which is a straight air brake with emergency feature for single car and intermittent trailer car service. A display of electric compressor governors to meet various conditions of electric traction service is also included.

OBSTACLE GOLF

The golf committee has provided an ingenious and picturesque obstacle golf course on the lawn between the Marlborough and Blenheim hotels. The course consists of nine holes and is bunkered to please the eye and harrow the soul of the novice, and will give the expert plenty of food for thought. Mr. Fassett, of Albany, was on the course at the break of day with W. E. Berry. Everyone who has ever played golf, or hasn't, is expected to play and members of the golf committee will be on the course in attendance during the hours prescribed, when clubs and balls will be provided.

All ladies and gentlemen wearing the convention official badge are cordially invited to contest for the prizes offered by the committee for the lowest score. Nate Garland, costumed in flannel trousers and blue coat, is himself an attraction on the course.

THE GENERAL ELECTRIC EXHIBIT

The General Electric Company's exhibit is in building No. 1, spaces Nos. 25-38. One of the most interesting features is a GE-203 self-ventilating commutating-pole railway motor. This is a box-frame motor of exceptionally light weight due to the use of high-grade materials and refinements in design. It is rated 40 hp on 500 volts and 50 hp on 600 volts. It weighs only 2100 lb. complete—750 lb. less than other standard motors of the same capacity. The GE-201 motor is of like design, but is rated at 50 hp on 500 volts and 60 hp on 600 volts. The GE-219 motor is a standard split-frame commutating-pole type of motor rated at 40 hp on 500 volts and 50 hp on 600 volts. The GE-217 motor is a 50 hp, 600-1200-volt box-frame type of motor with commutating poles. It is insulated for operation two in series on 1200-volt circuits.

The CP-27 portable air compressor set for use in power houses, railway shops, etc., is shown in operation. A Sprague General Electric type M control equipment, designed for the control of four 60-hp motors, is also exhibited in operation. A novel feature is the mounting of contactor, overload relay and reverser in one box.

The straight-air brake equipment shown has a CP-27 air compressor, quick-service valve, one SF-4 slide type of motorman's valve on one end, and one type 3, form G, lift type of motorman's valve on the other end of the equipment; also the new type ML air compressor governor which operates like the MC form B governor. This new governor has levers made from steel punchings sherardized to prevent corrosion.

The controllers include the K-35, which is standard for the control of four 50-hp motors, and the similar K-44, recently designed for four 100-hp motors. These controllers have magnetic blowouts on each finger. The commutator grooving machine exhibited can be either motor-driven or belt-driven. It is quickly adjustable for any type of railway motor armature. The exhibit of gears and pinions includes forged solid gears, either armorized or oil-tempered, which are now available for the first time. A recording and indicating steam flow meter in actual operation measures the output of the boilers on the pier. Many railway supplies are mounted on boards, such as rail bonds, sherardized line material, circuit breakers, fuse boxes, etc. A salt-water spray test demonstrates the non-corrosive character of sherardized metal. Other exhibits embrace a luminous arc headlight; transformer oil dryer and purifier which removes water, solid matter, slime, etc., from transformer oil; ozonator in operation for deodorizing and sterilizing the air of waiting rooms, office buildings, halls, etc.; d.c. aluminum-cell lightning arresters for both 600-volt and 1200-volt circuits; mercury-arc rectifier, oscillating fan type motor, and standard 35-kw high-pressure turbine unit in operation.

There will also be exhibited on the Mississippi Avenue track a 70-ft. gas-electric car, equipped with a 200-hp gasoline engine driving a direct-connected generator which furnishes current for two No. 205 (100-hp) standard railway motors. This car will develop a speed of 60 m. p. h. on a level track. It is particularly adapted for the temporary equipment of street railway extensions, as it may be equipped with overhead trolley and run directly into a city terminal as an electric car. Several cars are being operated in this manner by the Minneapolis, St. Paul, Rochester & Dubuque Railroad.

WESTERN ELECTRIC COMPANY'S EXHIBIT

The Western Electric Company, which occupies booth No. 240, shows a complete line of telephone train-dispatching equipment and electric railway supplies. The telephone equipment consists of a complete train-dispatching circuit in operation, all types of telephones, selectors, transmitters and receivers, drainage and repeating coils, the new No. 62-A interrupter and a "Blue Bell" battery, designed especially for electric railway service. A new transmitter arm, known as the "Rotophone," is exhibited for the first time. The supply section of the exhibit contains a full line of overhead line material, electrose third-rail insulators, Shelby seamless steel trolley poles, Kalamazoo trolley wheels and harps, M-B trolley harps, M-B sand-boxes, etc. The company is represented by F. D. Killion, M. A. Oberlander, E. D. Hinman, J. C. Enders, R. H. Harper, J. C. Maxon, G. K. Heyer, R. F. Spamer, C. V. Jellison and H. F. Miller, of New York; J. L. Ludwig, A. L. Hallstrom, J. R. Stroud, L. C. Coller and G. Sigg, of Philadelphia; W. R. Lyall, of Boston; H. C. Owen, of Pittsburgh; J. F. Davis, of Chicago, and C. E. Robertson, of St. Louis.

H. W. JOHNS-MANVILLE COMPANY'S EXHIBIT

Among the many J-M railway products exhibited by the H. W. Johns-Manville Company the following are especially worthy of note:

J-M fiber conduit, which is manufactured in two styles, known as the bell joint and straight joint type, together with a line of fittings consisting of elbows, tees, crosses, junction boxes, etc. This material is being largely used for underground systems of distribution in preference to tile or stone conduit. Its dielectric strength is very high and it provides a protecting medium against electrolysis. It also protects the cable sheath from abrasion in pulling through the ducts. The joints can be made watertight and gasproof.

Some interesting specimens of J-M Transite ebony asbestos wood are also displayed. This material is employed for switchboard panel, high-tension switch tops, air switch and fuse bases, for barriers, etc. Samples of J-M Transite asbestos wood for fireproofing cars and power houses, etc., are also shown.

"Noark" car fuse boxes in various sizes occupy a prominent place in the exhibition, and a complete line of "Noark" National Electrical Code standard protective devices such as fuses, cutouts, service switches and fuse boxes are also well represented. A soldering paste called "Solder-all," which combines solder and a non-corrosive flux contained in a collapsible tube, was also shown along with J-M friction tapes and splicing compounds.

RAPID CONSTRUCTION OF LARGE CARS

On Sept. 20 the St. Louis Car Company delivered to the Illinois Traction System twelve large interurban cars, the order for which cars, including trucks, had been placed but eighty-four working days previous. The character of the workmanship on these rapidly built cars is shown by one of them which is on exhibition on the Boardwalk at the corner of the Convention Pier. The new cars conform to the standard body design of the Illinois Traction System. The bodies are 57 ft. long and 9 ft. 6 in. wide over sheathing. The height from bottom of sill to top of roof is 9 ft. 5 in. and the truck-center distance is 32 ft. 3 in. The cars are equipped with the Illinois Traction System standard high knuckle and M. C. B. type coupler mounted radially under a heavy end-sill construction, which carries a section of the Hedley anticlimber. End doors provide for train operation. The cars are not equipped with motors, but are of such design that motors can be applied when required. They are intended for long-distance interurban trailer service on the lines in Illinois. The complete weight of a fully equipped car with trucks but without motors is 72,000 lb. and the requirements of the M. C. B. Association are met in the grabhandles, sill steps, etc. The bodies have arch roofs and are provided with automatic ventilators. The exhibition at Atlantic City of one of these new cars by the St. Louis Car Company was made possible through the courtesy of H. E. Chubbuck, vice-president executive of the Illinois Traction System.

Among the Exhibits

Flood & Conklin, Newark, N. J., have taken space 258-260 to show the Simplex system of varnishes and surfacers. The representatives are H. J. Kuhn and L. A. Williams.

* * *

Those who are interested in high tension d. c. traction should visit the Ohio Brass Company's quarters, where the 1500-volt catenary equipment of the Piedmont Traction Company is displayed.

* * *

The Tool Steel Gear & Pinion Company is exhibiting quite a novelty in "Grandpa," the first forged rolled gear commercially marketed for traction purposes. It also has a number of gears and pinions with very extraordinary mileage records. This is the company's first exhibit at the convention.

* * *

Flood Concrete Tie Company, Bridgeport, Conn., exhibits for the first time. It is showing reinforced concrete ties for steam and electric railway service and insulated concrete ties. The method of fastening the rail to these ties is also shown by various ingenious devices. Represented by John H. Flood, L. E. Youngs and Webster W. Dorrs.

* * *

American Mason Safety Tread Company, Boston, Mass., is using space 401, Building 3, to exhibit Mason safety treads of all types for rolling stock, subway and elevated stairs and platforms, power and passenger stations. Sectional samples of Karbolith flooring in various colors are also displayed. Representatives are Henry C. King and L. H. Myrick.

* * *

The Golden-Anderson Valve Specialty Company, Pittsburgh, Pa., has received an order from the United States Steel Corporation for 970 cushioned triple-acting and non-return valves for its power stations. This is believed to be the largest requisition for valves ever placed with a single manufacturer at one time. The order was given only after a most searching test of the several designs on the market.

* * *

Archbold-Brady Company, Syracuse, N. Y., is distributing at its space 402 a handsomely illustrated bulletin which shows applications of its steel transmission structures and catenary bridges on several prominent installations. These include poles, towers and bridges for the Hoosac Tunnel single-phase electrification of the Boston & Maine Railroad and catenary bridges for the Beebe syndicate's interurban lines in Central New York.

* * *

Joseph Dixon Crucible Company, Jersey City, N. J., has an elaborate exhibit of its various products in space 19, Building 1, consisting of graphite wood grease, silica-graphite paint, graphite lubricants of all kinds, crucibles, graphite dynamo and motor brushes, belt dressings and Dixon pencils. Some excellent photographs of steel structures preserved by Dixon silica-graphite paint are also displayed. Represented by L. H. Snyder, H. W. Chase and J. M. Willetts.

* * *

The Taylor stoker can be seen in operation at booths Nos. 53-55. This is a complete installation, including undergrate draft fan and engine, brickwork, air ducts, piping, etc., just as it would appear in a power plant. The engine, which with this type of stoker drives both fan and stoker mechanism, operates the stoker rams, but it is not necessary to operate the fan, as there is no feeding of coal. The absence of coal, ashes and the intense heat accompanying actual operation permits a thorough examination of the stoker.

The National Tube Company is showing at spaces 354-357 the Shelby cold-drawn seamless steel trolley pole. In making this pole no heat is applied during the processes of manufacture after the first cold drawing. Its strength is therefore uniform throughout, as it would not be if heat was used in tapering the end of the pole. This pole was made to meet the present requirements of high-speed service, which demand a trolley pole which will not fail while moving through a wide angle of varying positions.

* * *

Consolidated Car Fender Company, Providence, R. I., has spaces 276, 278 for a demonstrating exhibit of "Providence" fenders and wheel guards. The wheel guards can be operated in one or all of three ways, by the foot of the motorman, by apron or by an automatic attachment to the air brake. The last-named device operates automatically when the air brakes are applied in an emergency, the wheel guard dropping as soon as the air pressure reaches or exceeds a certain point. The company also shows miniatures of the Campbell snow broom and Narragansett steel lockers. Representatives are A. J. Thornley, general manager, and George Hollingsworth.

* * *

D & W Fuse Company, Providence, R. I., is using space 236 for an exhibit of inclosed fuses and cut-outs for 250-volt, 600-volt and 2500-volt circuits, including fuse and service switch boxes, entrance railway and transformer and junction cut-outs. In addition to the fuse line will be found a variety of sizes of deltabeston magnet wire, in round, flat and square sections; also delta-tape delto-sheeting varnishes and compounds. Field and armature coils are also displayed, together with a line of magnetic chucks, both flat and rotary types, for planers, grinding and milling machines. Representatives are W. S. Sisson, H. F. MacGuyer and H. P Hinds.

* * *

Goldschmidt Thermit Company, New York, N. Y., has an interesting exhibit which embraces a moving picture outfit illustrating the various steps in the thermit welding of locomotive frames and rail welding. These views prove the quickness and simplicity of the thermit system. The exhibit is complete with the materials and appliances for welding rails, including crucibles, thermit, molds, patterns, preheating appliances, rail grinder, metals and alloys produced free from carbon by the thermit process. Materials for welding tubes and pipes and samples of all kinds of welding with thermit are also shown. The company is represented by its general manager, William C. Cuntz; L. Heynemann, G. E. Pellissier, H. S. Mann and J. G. McCarty.

* * *

The Ohmer Fare Register Company is exhibiting at booth No. 200 its new combination turnstile and register, which has an auxiliary indicator to enable the passenger to see the amount of fare paid by him. A second novelty is the "Rapid Transit" operating equipment, which registers any one of six classes of fare as fast as a one-fare machine could be operated. A third exhibit is a detail and total cash register for city work, which totalizes and prints separately in dollars and cents each class of fare, and also prints a detail record of the ticket collections. A fourth exhibit is a stop or station indicator and accident-prevention device for interurban cars to indicate the next approaching stop to the passengers. This machine records the meeting points, the train numbers, trip number and time. The record is made by the motorman from his cab. It is believed that the performance of some physical act after the passing of each stop or meeting point will prove an incentive toward reducing the liability to head-on collisions. The company is also showing a register for registering and recording sixty different classes of fare.

Walter Chur, of the American Railway Supply Company, New York, N. Y., in space 403, has a neatly arranged exhibit of cap and breast badges for trolley employees, buttons, checks and other products manufactured by the company.

* * *

Le Valley Vitae Carbon Brush Company, New York, N. Y., has a full line of carbon brushes in space 208 with James H. Denton & Company. The company is represented by its general manager, M. W. Robertson, J. H. Denton and J. E. Coonan.

* * *

Ellcon Company, New York, N. Y., is displaying in space 333, Building 3, Ellcon conduit fittings, metal car signs and racks, air brake and control circuit interlocks and automatic overload stop for electric controllers. Represented by W. R. Hamilton and Butler Keys.

* * *

H. K. B. Manufacturing Company, Newark, N. J., located at space 803C, Aquarium Court, is a newcomer at the convention. Charles F. Beers, secretary and treasurer of the company, is showing in operation a model of an automatic centrifugal journal oiler, a method of journal lubrication not now in use.

* * *

G. Drouvé Company, Bridgeport, Conn., has space 170, Aquarium Court, where it is exhibiting Anti-Pluvius puttyless skylights for repair shops and carhouses, and working full-size straight-push sash operating devices for controlling long lines of sash from one point. William V. Dee is representing the company.

* * *

A notable part of the exhibit of the Whipple Supply Company, New York, is a large framed schedule of the number of railways which have equipped some or all of their cars with the Hedley anti-chamber. There are forty-nine roads and a total of 5719 cars. Besides the anti-chamber displayed in the booth of this company, are Universal safety treads and tool steel gears and pinions. The company is represented by A. L. Whipple and H. F. Stevenson.

* * *

James H. Denton & Company, New York, N. Y., has space 208, Building 2, where it is displaying a well-arranged exhibit of carbon brushes, commutators, armature and field coils, steel castings, commutator truing devices, and C-A wood-preserver. The Hartford-Blanchard valve-grinding machine is an especially interesting part of the exhibit to engineers who know the difficulty of grinding air brake valves. The company is represented by J. H. Denton and J. E. Coonan.

* * *

W. J. Jeandron, New York, N. Y., sole agent for the United States of the well-known Le Carbone brushes, is showing them at space 220, Building 2. In neat cases characteristic of French workmanship are displayed every type of carbon brush that can be used in the electrical arts. It is stated that, although only four years on the market in the United States, 60 per cent of the entire electric railway mileage of the country is operated with Le Carbone brushes. W. J. Jeandron and Halsey Stein are present at the convention.

* * *

Albert & J. M. Anderson Manufacturing Company, Boston, Mass., has an interesting exhibit, including an improved 6000-amp. 250-volt d.c. remote-control switch, a full line of Aetna insulating line material, trolley bases, harps and whistles, and switches of various description for 600-volt railway service. The overhead crossings and frogs of malleable iron show the latest design in this class of work. The company is represented by its president, J. M. Anderson; sales manager, George B. Crane; Ernst Woltman, New York; W. W. Hincher, Chicago; J. F. Stout, Boston; A. H. Burns, Philadelphia; K. L. Curtis, Boston.

* * *

Badger Fire Extinguisher Company, Boston, Mass., has brought something new in the shape of a fire extinguisher of one-quart capacity. This size is especially applicable to electric cars, as well as repair shops, carhouses, power houses and substations. The extinguisher is filled with carbon tetra-chloride, a volatile liquid which kills incipient fires. There is also exhibited a 40-gal. chemical engine for shops, carhouses and other buildings, a 40-gal. truck type chemical engine for outside use, a 3-gal. hand chemical extinguisher for general use, also a 1½-gal. hand chemical fire extinguisher. The company is represented by Charles R. Edwards and A. E. Stone.

* * *

Blake Signal & Manufacturing Company, Boston, Mass., has a working exhibit of its standard signal apparatus, consisting of dispatching office equipment and five signals. Three of these signals are d. c. electric railway type and two of the signals are a. c. electric railway and steam railway type. One of the latter type is mounted on a new standard steel pole with fittings. This pole shows the below-ground foundation and arrangement for keeping it rigid. It illustrates the installation which was made during the past year on the lines of the Illinois Traction System. There are also shown the various low-voltage telephone and telegraph wiring specialties, soldering flux, etc., manufactured by the company. The company is represented by its president, E. J. Burke; vice-president, C. C. Blake, and G. H. McFee.

* * *

Automatic Ventilator Company, New York, N. Y., is in space 226, Marine Hall, where it is exhibiting all types of its automatic car ventilators. Demonstrations of how the ventilator operates in service are made. For this purpose a full-sized model, representing a section of the clerestory of a car with two sets of automatic ventilators in the deck sash, is shown. An electric fan at one end of the model throws air along the side to simulate conditions in a moving car, and to show the intake and exhaust principle of automatic ventilation. Tests and demonstrations with an anemometer, lighted tapers, pieces of paper, silk, etc., are also made inside of the model to illustrate the principles of the ventilator. Demonstrating models are displayed to show how the smoke and foul air can be exhausted from a moving car. The ventilators can be installed on any type of roof now in service. Representatives present are George H. Ford, W. J. Flemming, Jr., Leonard J. Hibbard, Frank A. Barbey and E. V. Smith, of Eccles & Smith, San Francisco.

* * *

The American Automatic Switch Company, New York, N. Y., is exhibiting at space 220 a track circuit counting signal and the new type-15 electric track switch. The track circuit counting signal counts a certain number of cars into a block as they enter the block and counts them out again as they leave the block. The signal is novel, in that no contactors are used on the trolley wire and the counting in and all functions of safety are accomplished by gravity. Breaking of wires or grounds cannot give the clear signal at the wrong time. The signal is for operation on either the light signal or the semaphore type similar to those now being installed on the lines of the Public Service Railway and those in use on the Long Island Railroad. The type-15 electric track switch is the new design which entirely eliminates the relay box. It has a contactor which allows the trolley wheel to run on the wire, thus making a very smooth riding path for the trolley wheel. No wood is used in the construction of the contactor, thereby eliminating any danger of burning the contactor from arcing. Represented by Roy Collins, R. Sanger, D. Polderman, H. A. Goode.

Johns-Pratt Company, Hartford, Conn., is represented at the convention by its president, E. B. Hatch.

* * *

C. W. Hunt Company, New York, N. Y., has an interesting exhibit at spaces 150-156 of industrial tracks and cars, valves, coal and ash handling machinery, bucket conveyors, and photographs of power plants equipped with its machinery. Represented by J. Day Flack, Joseph P. Maxwell and Andrew J. Summers.

* * *

Jenkins Brothers, New York, N. Y., have an exhibit of varied interest in spaces 134-136, consisting of high-pressure steel globe and gate valves, brass and iron valves for power houses and all styles of packing for steam joints. Water gages and other power house specialties are also shown. The representatives are W. S. Corcoran, Frank Martin and C. B. Yardley, Jr.

* * *

Bonney-Vehslage Tool Company, New York, N. Y., has a neat exhibit in Machinery Hall consisting of a case in which are shown forty-five styles of ticket punches, each punch with a different die. Both male and female dies are made of carbon steel. A sleet cutter which can be applied without tools and operates automatically is also shown. The representatives are E. C. Vehslage and Frank Kennedy.

* * *

Electric Railway Improvement Company, Cleveland, Ohio, has spaces 386, 388, 389 for working demonstrations of its electric welding system. Sample welded rail bonds are also exhibited in large number, showing the application of this method to different types of rail sections, rail weights and bonds. Representatives are E. E. Schmid, Gerald Howatt, C. D. Shoup, W. E. Huber.

* * *

Hunter Illuminated Car Sign Company, Flushing, N. Y., is at space 44, where it is exhibiting a partial model of a car equipped with the various types of illuminated signs which it manufactures. A contract has recently been signed by this company with the Boston Elevated Railway to equip its entire system in Boston with Hunter illuminated signs. The same thing is true of Philadelphia, Pa., and Detroit, Mich. The president of the company, Lytle J. Hunter, and its superintendent, Harry Reisiger, are at the convention.

* * *

Van Dorn & Dutton Company, Cleveland, Ohio, has space 132, where it is exhibiting electrically operated drills and reamers for both a. c. and d. c. circuits; all sizes of solid and split railway motor gears and pinions; automobile gears, cam and pump gears, worms and sectors for steering devices, miter gears, racks, ratchet gears, rawhide and fiber gears, etc. Representatives are Fred Zulauf, assistant sales manager; A. K. Baxter, sales department; G. Neubecker, gear department.

* * *

Lord Manufacturing Company, New York, is showing a working model of the Spencer air-purifying system, which eliminates sand, dust and dirt from air before it enters the air-brake piping. All of the other electric railway specialties manufactured by this company are also on exhibition, such as Earll retrievers and catchers, the con-tro-la-tor, Shaw lightning arrester, M. V. G. lightning arresters and Luminator flaming-arc lamps for series lighting. The company is represented by W. R. Garton, A. V. Arnold, G. Lehmann and G. M. Spencer.

* * *

The J. G. Brill Company, Philadelphia, Pa., has commenced delivery of thirty all-steel cars for the Market Street elevated subway system of Philadelphia, Pa. The cars are about 50 ft. over all and are mounted on Brill No. 27 M.C.B.-3 trucks. Delivery of the cars began and will be completed within the early delivery date which was specified in the contract. This order shows the prominent part that the Brill Company is taking in steel car work. The body of the all-steel gas-electric car which the General Electric Company is showing along the Boardwalk is one of four similar cars built by the Wason plant of The J. G. Brill Company.

* * *

J. J. McCabe, New York, N. Y., has on exhibition and in operation in Machinery Hall his "2-in-1" double-spindle lathe, designed for street railway repair shops. This machine is unique in its range of usefulness, for it will handle advantageously anything that comes along, large or small. Mr. McCabe is showing the lathe in operation turning and truing up old car wheels with a triple-geared 48-in. swing which is geared 72 to 1. The lathe is interchangeable to a 26-in. back-geared lathe. On this size axles are finished, commutators bored out, armatures trued up, piston-rings faced, etc. In fact, this one lathe can do almost any class electric railway repair work necessary. On Monday the large size lathe was in operation. On Tuesday the small size lathe will be in use, the large size again on Wednesday, etc. All parts of this lathe are interchangeable. The staff of salesmen at the exhibit includes Harry P. McCabe, Frank Sheeran, George L. Bennett and others. The machinists demonstrating the lathe in operation are Fred Kompass and W. Priestley.

* * *

Railway Roller Bearing Company, Syracuse, N. Y., is exhibiting at spaces 113-115, Machinery Hall, roller-bearing journal boxes of various sizes from Baldwin electric locomotive journals, Brill and other standard truck journals to light storage battery car journals; also a Rollway car wheel operating on a fixed axle similar to those installed on double truck Beach-Edison storage battery cars. There are also exhibited Rollway bearing detachable hubs; G-E 216 railway motor equipped with Rollway bearing frame heads; Rollway bearing journal boxes which have been operated for continuous service for two years on the cars of the Philadelphia Rapid Transit Company; Rollway bearing parts, end shields, etc. During the past month orders were received from Paris, France, for Rollway journals; also for Rollway frame heads for the French Thomson-Houston railway motors. Rollway journal boxes are also being made for preliminary installation on London surface cars. An order has also been secured from the Chicago & Northwestern Railway for Rollway journals for electric train service. Represented by James N. Vandegrift, R. H. Carhart, John Hulbert, H. L. Aberdeen.

* * *

Whitmore Manufacturing Company, Cleveland, Ohio, is attracting attention to its exhibit at spaces 162-164-164A by means of an elaborate electric sign which represents a gear and pinion operated by a flasher so that a vivid representation of motion is produced. The exhibit includes gears and pinions which have been in active service on city and interurban lines. Among these is a gear and pinion from the Schenectady (N. Y.) Railway which is on exhibit this year for the third time, having been shown at Denver two years ago and Atlantic City last year. In each case it was returned after the convention and placed in service again. The total mileage to date is 142,825 miles, and the period of active service two years, nine months and twenty-four days. The pitch line on the pinion is still preserved. There is also a gear and pinion from the Spokane & Inland Empire Railroad, showing a mileage of 194,700 miles and in service three years, one month and twenty-six days. The company is represented by S. W. Whitmore, William Beaser, Jr., and Henry Stuckenholt. R. R. Herzog, of Whitmore Products Sales Company, Chicago, Western distributor for the Whitmore products is also present.

Pressed Prism Plate Glass Company, Pittsburgh, Pa., has an exhibit in space 191, of its ornamental and plate glass for rolling stock equipment. This is the first national electric railway convention at which this company has exhibited. Representatives are A. O. Brown, L. R. Waterman.

* * *

W. H. Coe Manufacturing Company, Providence, R. I., is demonstrating gilding wheels; ribbon gold and silver leaf made in widths from 1-16 in. to 5 in.; bronzing powders and Hibrush bronzing liquid, at space 181. Benjamin A. Smith, Eastern representative, is in charge.

* * *

Cheatham Electric Switching Device Company, Louisville, Ky., is using spaces 157 to 163 for a showing of its automatic track switch for electric railways. The company is represented by J. A. Stewart, president; Elmer S. Olmsted, vice-president and electrical engineer, and Samuel Bowman, general agent.

* * *

The Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., has space 345, where it is again exhibiting its dispatchers' selective signal system for railways. Two large installations of this apparatus have just been made. The iron-clad and portable railway telephones are still in evidence, as are the well-known magneto telephones and switchboards, portable test sets and loud-ringing extension bells.

* * *

Taylor Stoker Company, Providence, R. I., displays at spaces 153, 155, a two-retort stoker, one No. 9 Multivane fan and a No. 66 vertical steam engine, which are connected together and in operation. The stoker pressure regulator is made by the Mason Regulator Company and the firebrick is special high-temperature brick from the Harbison-Walker Company. Two demonstrations of the workings of the stoker will be given each day. Representatives, M. Alpern, J. F. Mallory, W. I. Bowden.

* * *

Samson Cordage Works, Boston, Mass., have a handsome exhibit of Samson spot trolley cord and Samson signal cord at space 313. The central feature is a large green and gilt board, displaying flat coils of various colors and sizes of cord used for trolley and signal cord. The booth also contains a pile of full coils of different kinds of cord, and a table with samples, circulars, souvenir pencils, etc. Represented by F. J. Coakley, secretary; R. G. Whiting, W. G. Webb, W. G. Woodworth

* * *

Dayton Fare Recorder Company, Dayton, Ohio, is exhibiting in spaces 280, 281 full-size car sections showing the regular double-end pay-as-you-enter equipment and the single-end prepayment type complete with operating equipments of fare recorders, register rods and auxiliary devices. This fare recorder produces an audited trip sheet. Will I. Ohmer, president, and A. G. Mitten, vice-president and general manager, are in attendance with a corps of demonstrators. The company also has a full working equipment in Brill car No. 1911, on the Boardwalk.

* * *

Lord Electric Company, New York, N. Y., is showing a working model of the Spencer air purifying system which eliminates sand, dust and dirt from air before it enters the air brake piping. All of the other electric railway specialties manufactured by this company are also on exhibition such as Earll retrievers and catchers, the con-tro-la-tor, Shaw lightning arrester, M V. G. lighning arresters and Luminator flaming arc lamps for series lighting. The company is represented by W. R. Garton, A. V. Arnold, G. Lehmann and G. M. Spencer.

The Universal Lubricating Company (TULC), Cleveland, Ohio, has space 167, Aquarium Court, where it is showing various forms of "Tulc" lubricant and waste. No. 2-H is the plain, solidified oil for impregnating or renewing No. 2-WW, the company's wool waste for bearings with small feed slots, and No. 2 yarn for bearings with large feed slots. This lubricant is serviceable at all temperatures, as it withstands 340 deg. Fahr. without melting and 40 deg. Fahr. below zero without hardening. Representatives present are Charles H. Clark, president; S. W. Scofield, secretary and treasurer; T. U. Franklin, general sales manager.

* * *

United States Electric Signal Company, West Newton, Mass., has spaces 157 to 163 in Machinery Hall, where it is showing interurban semaphore signals operated by a track relay; the G-1 type of non-counting signal as installed on the Public Service Railway's system; the K and K-2 counting signals, some of which are also in operation on the Public Service system; a spacing signal for double-track lines, or where cars are operated in one direction only; crossing signal with semaphore attachment and illuminated sign, the semaphore being an indication for the motorman and the light an indication for the passengers. Representatives are John J. Ruddick, Roland F. Gammons, second; W. W. Harrington, J. W. Putnam, E. S. Olmsted, James Rier.

* * *

National Brake Company, Buffalo, N. Y., has space 262, 264, and is calling special attention to the improved Peacock brake, exhibited for the first time. About 120 of this new model are already in use on the lines of the Rhode Island Company, Providence, R. I. The exhibit includes a hand brake for steam cars, as recently installed on the Lackawanna Railroad, which was one of the first companies to adopt this type of brake. The last dining and chair cars built by the Pullman Company for the Atchison, Topeka & Santa Fé Railway are equipped with Peacock brakes. The Brill sample car shown on the Boardwalk is also equipped with Peacock brakes. Representatives are F. D. Miller, president; W. D. Brewster, secretary, and Thomas C. Boyce.

* * *

General Railway Signal Company, Rochester, N. Y., has space 420, where it is showing a working model illustrating its absolute-permissive system of automatic block signals. The miniature signals used are in circuit with full-size G. R. S. universal signals, Model 2A, a. c. direct-connected mechanism, and Model 2A, a. c. base of mast. The company is also showing devices such as reactance bonds, semaphores, relays, light signal, switch box, signal transformers, switch indicators, etc. The company is further exhibiting its selective system, which can be used in connection with either automatic signal systems or train-dispatching systems. G. D. Morgan, vice-president; H. M. Sperry, sales manager; W K. Howe, chief engineer; M. F. Geer, sales engineer; W. J. Plogstead, resident engineer; Richard C. Leake, engineer and in charge of the exhibit.

* * *

Ellcon Company, New York, N Y., is exhibiting at its space 333 the "Ellcon current governor" for car controllers. This consists of an electrically operated pawl which engages a ratchet wheel on the controller drum shaft. The action of this pawl is governed by the current flowing in the motor leads. A series limit switch is placed in circuit which closes when the current reaches a predetermined value. The closing of this switch energizes a small controller coil, which in turn operates the pawl and locks the controller. As the speed of the motor increases and the current is reduced, the limit switch opens and the controller is at once released through the de-energizing of the small coil. Thus automatic acceleration is accomplished for multiple control without the complication of interlocks and intricate wiring circuits.

List of Exhibits

Allis-Chalmers Company, Milwaukee, Wis., spaces 21-23, Building 1. Steam turbine model, straight and automatic air-brake equipment, 40-hp and 50-hp standard railway motors, 60-hp interpole railway motor, S-3 and S-4 controllers, 150-kva self-cooled transformer, portable air compressor, section of brake cylinder showing Acco expander ring, sectional engineers' valve, sectional governor, repair parts for compressors and air-brake equipment, photographs of various apparatus and installations. Represented by F. S. Sly, C. A. Tupper, M. C. Miller, J. W. Gardner, I. L. Dimm, J. T. Cunningham, H. W. Cheney, J. W. Murray, J. C. Lynch, F. C. Randall, St. John Chilton.

American Abrasive Metals Company, New York, space 437. Car steps with treads, floor plates, fire resistance surfaces, solid stair treads. Represented by H. W. Mowery, J. P. Warfle.

American Brake Company, St. Louis, Mo., spaces 20-24, jointly with the Westinghouse Air Brake Company. American automatic slack adjuster. Represented by E. L. Adreon, R. E. Adreon.

American Brake Shoe & Foundry Company, Mahwah, N. J., space 302. Brake shoes and brake heads. Represented by W. G. Pearce, W. S. McGowan, J. B. Terbell, F. W. Sargent, J. S. Thompson, E. B. Smith. F, L. Coolidge, R. M. Brower, E. L. Janes, W. L. Boyer, G. R. Law, R. E. Holt, A. H. Elliot, L. R. Dewey, T. Seaman, J. G. Tawse.

American Mason Safety Tread Company, Boston, Mass., space 401. Safety treads, Karbolith flooring. Represented by Henry C. King, L. H. Myrick.

American Railway Supply Company, New York, N. Y., space 403. Cap and breast badges for trolley employees, buttons, souvenirs, etc. Represented by Walter Chur.

American Steel & Wire Company, Chicago, spaces 358-361. Rail bonds and appliances for installing electrical wires and cables; right-of-way fencing, concrete reinforcement. Represented by George A. Cragin, C. S. Knight, Jr., F. A. Keyes, R. K. Sheppard, B. H. Ryder, J. H. Ashby, C. S. Sturdevant.

Anderson, Albert & J. M., Manufacturing Company, Boston, Mass., space 221. Aetna insulation line material, trolley bases, harps and wheels, switches specially adapted for 600-volt railway work, 4000-amp remote control switch, etc. Represented by Ernst Woltman, A. H. Burns, W. W. Hincher, J. F. Stout, G. B. Crane, J. M. Anderson.

Anglo-American Varnish Company, Newark, N. J., space 186. Represented by William Marshall.

Archbold-Brady Company, Syracuse, N. Y., space 402, Building 3. Model of catenary bridge and transmission line structure, photographs, catalogs, etc., of catenary and transmission construction. Represented by W. K. Archbold, R. L. Allen.

Atlas Railway Supply Company, Chicago, Ill. Atlas rail joints, compromise joints, special joints and one-piece joints, tie-plates and braces. Represented by J. G. McMichael, Daniel Thomson.

Automatic Ventilator Company, New York, N. Y., space 226, Marine Hall. Demonstrating models and samples of the "Automatic" car ventilator. Represented by George H. Ford, W. J. Fleming, Jr., Leonard J. Hibbard, Frank A. Barbey, E. V. Smith (Eccles & Smith Company).

Badger Fire Extinguisher Company, Boston, Mass., space 183, Auditorium Court. Forty-gallon chemical engine with Underwriters' Laboratories inspection labels for carhouses, repair shops and buildings; 40-gal. truck-type chemical engines for outdoor use, yards, parks, etc.; 3-gal. hand chemical fire extinguisher for all buildings; 1½-gal. hand chemical fire extinguisher for cars, boats, etc.; a new fire extinguisher, one quart capacity, using carbon tetrachloride for power houses, cars and around all electrical works. Represented by Charles R. Edwards, A. E. Stone.

Baldwin Locomotive Works, Philadelphia, Pa., spaces 105, 107, 109, 111. Motor truck for Greenville, Spartanburg & Anderson Railway; trailer truck for the Boston Elevated Railway and one maximum-traction motor truck for the Richmond & Henrico Electric Railway. Represented by S. A. Bullock, Wallace R. Lee, W. B. Keys.

Bayonet Trolley Harp Company, Springfield, Ohio, space 271, Building 2. Bayonet trolley bases, trolley harps, trolley wheels, sleet cutters. Represented by R. A. Garlough, C. S. Olinger.

Blake Signal & Manufacturing Company, Boston, Mass., space 228-230, Building 2. Dispatcher's selective semaphore signals, wiring specialties, soldering flux. Represented by E. J. Burke, C. C. Blake, G. H. McFee.

Brill Company, The J. G., Philadelphia, Pa., spaces 1, 3, 5, 7, 9. Brill semi-convertible prepayment car mounted on No. 39-E single-motor trucks, No. 39-E single-motor truck in operation on testing platform; No. 27-M.C.B.-3 truck, for Boston Elevated Railway Company for Cambridge tunnel service; No. 27-GE-1 truck, for the Chicago Railways Company; No. 27-M.C.B.-1 truck for light interurban service; No. 21-E single trucks. City and interurban car seats; fare boxes for prepayment fare collection systems; seating materials, springs, half-ball brake hangers and other patented specialties. Represented by J. W. Rawle, W. H. Heulings, Jr., A. N. Hargrove, R. B. Liddell, W. S. Adams, S. T. Bole, G. M. Haskell, J. E. Brill, L. A. Kling, F. B. Sullivan and S. M. Wilson—all of The J. G. Brill Company; Geo. H. Tontrup, F. W. Brill and E. Bronenkamp, American Car Company; D. B. Dean and H. E. Smith, of the G. C. Kuhlman Car Company; Henry Pearson, A. H. Pease and C. F. Rice, of the Wason Manufacturing Company; S. K. Colby, of Pierson, Roeding & Co.; F. L. Markham, Southern representative.

Bryan & Gaskill, Newbern, N. C., space 407, Building 3. Car windows and unjammable sash holders. Represented by James A. Bryan and E. T. Gaskill.

Cambria Steel Company, Johnstown, Pa., spaces 321-323. Coffin process and heat-treated axles, 100 per cent joints, Morrison guard rails, wire products, rails. Represented by J. Leonard Replogle, G. E. Thackray, M. G. Baker, H. P. Hubbell, Andrew Morrison, H. L. Waterman, E. F. Kenney, W. S. Ottinger.

Carnegie Steel Company, Pittsburgh, Pa., spaces 354 to 365, Building 3. Schoen and Slick wheels, rolled steel car wheels, Slick rolled steel gear blanks, forged and heat treated axles, miscellaneous rolled sections, steel sheet piling, special welding and threading steel; pair of rolled steel wheels mounted on axles, steel hoops for slack barrel cooperage, Duquesne rail joints, steel cross ties, section of track showing steel cross ties in concrete construction, vanadium steel axles, springs and bars (a machine for making service test on vanadium steel springs is shown in space 183); spikes, track-bolts and screw spikes. Represented by Waldo E. Berry, Fred C. Deming, Park Hutchinson, W. I. Parry, L. C. Bihler, John W. Dix, I. W. Jenks, W. P. Siebert, L. H. Bowman, C. B. Friday, L. P. Lincoln, H. P. Tiemann, W. G. Clyde, G. F. Goddard, L. C. Lustenberger, N. B. Trist, Robert Coe, N. M. Hench, Norman McLeod, T. W. Williams, L. W. Conroy, J. C. C. Holding, H. W. Maxson, V. S. Yarnall.

Cheatham Electric Switching Device Company, Louisville, Ky., spaces 157-163. Cheatham electric switching devices for operating electric railway track switches automatically. Represented by J. Adger Stewart, E. S. Olmsted, Samuel Bowman.

Chicago Pneumatic Tool Company, Chicago, Ill., spaces 100-104. Portable electric track drills, grinders and spike drivers, pneumatic hammers, drills. Represented by Thomas Aldcorn, C. B. Coates, G. A. Barden, Edward Aplin, F. S. Eggleston, J. W. Smith.

Chicago Varnish Company, Chicago, spaces 425, 426, Building 3. Ce-Ve painting and varnishing process. Represented by George S. Bigelow, A. C. Morgan, G. G. Porter, F. L. Olds, R. K. Buckman, F. N. Gundrum.

Chicago Railway Equipment Company, Chicago, space 438, Building 3. Brake beams, side bearings.

Cleveland Frog & Crossing Company, Cleveland, Ohio, space 166. Tongue switches, mates, frogs, crossings, split switches, switch stands, Kerwin portable crossover and other kinds of steam and electric railway special work. Represented by G. C. Lucas, Geo. Stanton, L. G. Parker, Geo. A. Arnold, Jr., Geo. Peabody, S. Balkwill, Wm. Schmitt.

W. H. Coe Manufacturing Company, Providence, R. I., space 181. Gilding wheels, ribbon gold and silver leaf, bronzing powders and Hilbrush bronzing liquid. Represented by Benjamin A. Smith.

Columbia Machine & Malleable Iron Company, Brooklyn, N. Y., space 185, Aquarium Court. Pressed-steel gear cases, pinion puller, bronze axle and armature bearings, ratchet brake handles, car trimmings, controller handles, truck forgings, trolley wheels. Represented by W. R Kerschner, James Grady, John Kress, Jr., M. F. Ziegler.

Consolidated Car Fender Company, Providence, R. I., spaces 276, 278. Providence car fender and Providence wheel guard. Represented by A. J. Thornley, George Hollingsworth.

Consolidated Car-Heating Company, Albany, N. Y., spaces 376, 377, 378, 379. All-steel panel, truss-plank and cross-seat heaters; heat deflectors; switches and fuse boxes; thermostat for controlling heaters; buzzer system; battery-charging relay system and resistance tubes; door devices; air brake governor; car signal system; ventilating stove. Represented by Cornell S. Hawley, James F. McElroy, W. S. Hammond, Jr., Thomas Farmer, Jr., C. C. Nuckols, H. L. Hawley, Morgan F. McDonough.

Cooper Heater Company, Carlisle, Pa., and Dayton, Ohio, space 223, Building 2. Pressed steel hot-water car heaters. Represented by W. L. Blackwell.

Crouse-Hinds Company, Syracuse, N. Y., space 216, Building 2. Arc and incandescent headlights, condulets, "Harpoon" guy anchors, "Adjustarods," multiple brake switches. Represented by A. F. Hills, F. M. Hawkins, D. C. Gidley, Frank Buchanan, E. G. Smith, M. J. Kiefer.

Curtain Supply Company, Chicago, Ill., spaces 380-382. Curtain fixtures, "Rex" all-metal roller, "Rex" steel sash balance. Represented by W. H. Forsyth, R. F. Hayes, S. W. Midgley.

The Cutter Company, Philadelphia, space 174. Remote-control circuit breakers on exhibition, motor operated, electro-pneumatic, magnetic operated; also reverse current and time-limit circuit breakers. Represented by F. E. Beasley and T. B. Eastburn.

D & W Fuse Company, Providence, R. I., space 236. Inclosed fuses, cut-outs and fuse and service switch boxes, entrance, railway and transformer junction cut-outs; Deltabeston magnet wire, insulating materials for coils, namely, Delta tape, Delta sheeting, varnish and compounds; completed field and armature coils; magnetic chucks, for planers, grinding and milling machines, Represented by W. S. Sisson, H. F. MacGuyer, H. P. Hinds.

Dayton Fare Recorder Company, Dayton, Ohio, spaces 280-281. Dayton fare recorders and operating mechanisms adapted for different types prepayment cars. Represented by Will I. Ohmer, A. G. Mitten, T. G. Whistler, J. E. McAllister, E. H. Scholey.

James H. Denton & Company, New York, space 208, Building 2. Carbon brushes, commutators, armature coils, field coils, steel castings, Hartford-Blanchard valve grinding machine, commutator truing device and C-A-Wood-Preserver. Represented by J. H. Denton, J. E. Coonan, M. W. Robertson, H. H. Gerhard.

Dearborn Drug & Chemical Works, Chicago, Ill., booths 5-7, Building 1. Attractive reception booth. Represented by Robert W. Carr, Grant W. Spear, H. G. McConnaughy.

Detroit Steel Products Company, Detroit, Mich., space 168. "Detroit-Fenestra" solid steel window sash, Critall casement windows. Represented by M. A. Beltaire, Jr.

Joseph Dixon Crucible Company, Jersey City, N. J., space 19, Building 1. Graphite wood grease, silica-graphite paint, graphite lubricants of all kinds, crucibles, pencils, belt dressings, graphite dynamo and motor brushes. Represented by L. H. Snyder, H. W. Chase, J. M. Willitts.

G. Drouvé Company, Bridgeport, Conn., space 170, Aquarium Court. Anti-Pluvius puttyless steel constructed skylight for carhouses and Straight-Push sash operator for controlling long lines of sash from one point. Represented by William V. Dee.

Duff Manufacturing Company, Pittsburgh, spaces 431, 432. Barrett track and car jacks, Barrett armature lifts, Duff ball-bearing screw jacks and Duff-Bethlehem hydraulic jacks. Represented by E. A. Johnson, F. O. Graham, T. A. McGinley.

Eclipse Railway Supply Company, Cleveland, Ohio, spaces 265, 267. Eclipse fender, Acme fender, Eclipse multiple wheelguard. Represented by Joseph Foster, Jr., Ross Forward.

O. M. Edwards Company, Syracuse, N. Y., spaces 325, 327, 329, 331. Window fixtures, metal trap-doors, all-metal shade rollers, steel filing devices and office furniture. Represented by O. M. Edwards, E. W. Edwards, second, Edward F. Chaffee, G. G. Norris, W. E. LeBrun, T. P. O'Brian, C. H. Rockwell, W. C. Bradbury.

Electric Railway Equipment Company, Cincinnati, Ohio, space 419. Overhead line material, tubular poles, pole fittings, electric lighting poles, boulevard posts, mining material, catenary material. Represented by A. L. Johnston, J. G. Kipp, William A. McCallum.

Electric Railway Improvement Company, Cleveland, Ohio, spaces 386, 388, 389, Building 3. Electric weld rail bonding car, electric weld rail bonds. Represented by E. E. Schmid, W. E. Huber, G. Howatt.

Electric Railway Journal, spaces 2-6, Building 1. (See under McGraw Publishing Company.)

Electric Service Supplies Company, Philadelphia, Pa., space 311. Prepayment car models, "Protected" rail bonds, Automotoneer, Garton-Daniels lightning arresters, Lyon reinforced-steel gear cases, Keystone overhead material, Keystone pneumatic gong ringer, sander, whistles and valves; Keystone block signals, Keystone highway crossing signal, Keystone flag-station signal, track drills, trolley catchers and retrievers, and many other specialties. Represented by Charles J. Mayer, J. W. Porter, A. H. Englund, J. V. E. Titus, Max A. Berg, H. G. Lewis, E. R. Mason, T. W. Casey, H. Murdock, M. Earl, T. Hinckle, W. Hamer, W. A. Cockley, W. A. Armstrong, Jr., J. R. McFarlin, F. C. Peck, F. A. Strail, J. G. Duncan, R. D. Brown, G. Miller, R. Montgomery.

Electric Traction Weekly, Chicago, space 3. Represented by H. J. Kenfield, G. R. Blodgett, G. S. Davis, W. J. Field.

Ellcon Company, New York, N. Y., space 333, Building 3. Ellcon conduit fittings, metal car signs and racks, air brake and control circuit interlocks, automatic overload stop for electric controllers. Represented by W. R. Hamilton, Butler Keys.

Emery Pneumatic Lubricator Company, St. Louis, Mo., space 219. Pneumatic lubricators and lubricants for traction air brake equipment. Represented by E. A. Emery, N. J. McAloney, Alexander Steiner.

Eureka Tempered Copper Company, North East, Pa., space 268, Building 2. Journal bearings, commutators, trolley wheels, line material. Represented by O. C. Hirtzel, T. E. Lynn, Fred. Rundell, C. D. Videtto.

Flood & Conklin Company, Newark, N. J., spaces 258-260. Varnishes and surfacers of the Simplex system. Represented by H. J. Kuhn, L. A. Williams.

Flood Concrete Tie Company, Bridgeport, Conn., space 169, Aquarium Court. Reinforced concrete railroad ties and insulated ties of same construction, all equipped with different improved fastenings. Represented by John H. Flood, L. E. Youngs, Webster W. Dorr.

Forsyth Brothers Company, Chicago, Ill., spaces 342-344. Pressed-steel doors, brass and steel window sash, weather strips, sash locks; pressed-steel step ladder, carlines, posts, unit-section side formations, deck sash operating devices, including ratchets, models of draft gear, buffing device, drawbar centering device. Represented by A. H. Sisson, William M. Wampler.

Ford & Johnson Company, Michigan City, Ind., booth 269, Building 2. Car seats.

Galena Signal Oil Company, Franklin, Pa., spaces 39-42. Reception and rest room. Represented by C. C. Steinbrenner, George A. Barnes, R. C. Smith, E. H. Baker, E. G. Beatty, R. H. Craig, L. J. Drake, Jr., A. O. Fletcher, J. C. Glair, A. Green, F. A. Guild, E. M. Hedley, W. H. Lee, H. C. Mason, W. A. McWhorter, C. L. Richards, George J. Smith, J. E. Southwell, W. O. Stieff, L. R. Speare, C. E. Schauffler, C. A. Record, D. A. J. Sullivan, W. A. Love, F. R. Stakelum, C. H. Thomas, A. M. Wilson, W. A. Trubee.

General Electric Company, Schenectady, N. Y., spaces 25 to 38, Building 1. Railway motors, air compressors, Sprague-General Electric Type-M control equipment, straight air brake equipment, controllers, commutator grooving machine, gears and pinions, steam and air flow meters, railway supplies, headlights, transformer oil dryer and purifier, ozonator, lightning arresters, Curtis turbine, gas-electric motor car, battery truck crane. Represented by J. G. Barry, F. H. Gale, F. E. Case, W. G. Carey, E. D. Priest, E. P. Waller, G. L. Schermerhorn, G. H. Hill, E. H. Anderson, C. E. Barry, H. N. Ransom, W. B. Potter, G. R. Parker, J. Stanton, R. E. Wooley, L. W. Shugg, C. Fair, H. L. Monroe, J. W. Buell, C. Dorticos, H. C. Marsh, W. A. Woolford, W. J. Clark, S. W. Trawick, C. B. Kayes, H. G. Grier, G. D. Rosenthal, A. H. Russell, A. V. Thompson, C. C. Peirce, E. H. Ginn, Ralph Moore, W. O. Kellogg, W. H. Sigourney.

General Railway Signal Company, Rochester, N. Y., space 420. Absolute permissive block system, showing a working track model with full-sized signals (semaphore and light type) controlled by continuous track circuits and operated by train movements; G. R. S. telephone se-

lector system for train dispatching and selective signaling, showing dispatcher and substation equipment, also signals controlled by dispatcher; model 2-A a. c. direct-connected signals; model 2-A a. c. base of mast signals; light signals (day and night indications); universal polyphase relays; universal switch indicators; universal wall-type polyphase relay; single reactance bond; universal signal transformers; universal switch box; views of important a. c. signaling installations. Represented by W. W. Salmon, G. H. Groce, W. K. Howe, H. M. Sperry, M. F. Geer, W. J. Plogsted, R. C. Leake.

Globe Ticket Company, Philadelphia, Pa., space 279, Building 2. Tickets, books, transfers, cash fare receipts, punches, ticket destroyers. Represented by W. C. Pope. P. C. Snow, R. C. Osman, E. Elliott.

Goldschmidt Thermit Company, New York, N. Y., spaces 212, 214, 69, 171. Materials and appliances for welding rails by the Thermit process, including crucibles, Thermit molds, patterns, preheating appliances, rail grinder, etc.; metals and alloys produced free from carbon by the Thermit process; materials for welding tubes and pipes; process also illustrated by means of moving pictures, showing all steps in the operation of welding broken locomotive frames and welding rails. Represented by William C. Cuntz, L. Heynemann, G. E. Pellissier, H. S. Mann, J. G. McCarty.

Gold Car Heating & Lighting Company, New York, N. Y., space 217. Quick-detachable ventilated core electric heaters, vacuum compound coil electric heaters and Cyclone ventilators. Represented by Edward E. Gold, E. B. Wilson, J. M. Stayman, F. H. Smith, F. Cahill.

Griffin Wheel Company, Chicago, spaces 138, 140, Machinery Hall. F. C. S. chilled-iron car wheels. Represented by C. K. Knickerbocker, C. P. Dennett, A. A. Hale.

Guenther Publishing Company, New York, N. Y., space 8, Building 1. Display of copies of the *Financial World*, a weekly publication issued in the interest of individual investors which particularly features the possibilities of electric railways and public utilities for attractive investments. The *Public Utility Review* is published annually. Represented by Lewis Guenther, William Durnagle, John D. Lane.

H. K. B. Manufacturing Company, Newark, N. J., space 803-C, Aquarium Court. Model of automatic centrifugal journal oiler in operation. Represented by Charles F. Beers.

The Heany Company, New York, space 418. Heany fireproof wire, armature and field coils, Heany lamps, asbestos tapes. Represented by F. A. Duff, F. A. R. Hoffeditz, R. K. Dana.

Hale & Kilburn Company, Philadelphia, Pa., spaces 421-424. Walkover seats in iron and pressed steel designs; steel interior finish, steel sash, steel doors, steel seats, fittings, etc.; canvas-lined rattan seat covering. Represented by Victor von Schlegell, Raymond H. Pilson, A. F. Old, F. C. Edson, C. W. Laskay.

Hess-Bright Manufacturing Company, Philadelphia, Pa., spaces 146, 148. Ball-bearings for railway main journals and motor armatures. Represented by W. L. Batt, E. W. Rubencame.

Heywood Brothers & Wakefield Company, Wakefield, Mass., spaces 439-440. Universal car seats. Represented by Bertram Berry.

Holland Trolley Supply Company, Cleveland, Ohio, space 414. Holland ball-bearing trolley base, anti-friction pin plates, mine trolley base for electric locomotives, trolley harps, Potts mine trolley harp, trolley wheels, mine trolley wheels, Potts mine roof drill, trolley protectors, sleet cutters, Archer swivel trolley harp. Represented by H. W. Cole.

Home Rubber Company, Trenton, N. J., space 274. Black sheet packing N. B. O., red sheet packing, diagonal packing for high and low pressure, hydraulic packings, tubular gaskets, automobile tires. Represented by W. J. B. Stokes, A. R. Foley.

C. W. Hunt Company, New York, spaces 150, 152, 154, 156. Industrial tracks and cars, valves, models of coal and ash handling machinery, bucket conveyor, photographs of power plants equipped with Hunt machinery. Represented by J. Day Flack, Joseph P. Maxwell, Andrew J. Summers.

Hunter Illuminated Car Sign Company, Flushing, N. Y., space 44. Destination car signs. Represented by Lytle J. Hunter, Harry Reisiger.

Interlocking Nut & Bolt Company, Pittsburgh, Pa., space 179. The Clark nut lock. Represented by R. A. Clark.

Indianapolis Brass Company, Indianapolis, Ind., space 210. Overhead trolley material, car equipment specialties, motormen's mirrors, pole sleeves, line suspensions, line hardware, linemen's tools, high speed switch, removable register handles. Represented by James H. Drew.

International Register Company, Chicago, Ill., spaces 201, 203, 205, Building 2. New International coin register mounted on bulkhead of pay-as-you-enter car, coin register mounted on control stand of pay-within car, new G-7 International single registers, standard R-7 and R-5 registers, car fittings, Heeren enamel badges, International ticket punches, waterproof trolley cord and bronze wire center bell cord. Represented by A. H. Woodward, John Benham.

Jeandron, W. J., New York, N. Y., space 220, Building 2; "Le Carbone" carbon brushes. Represented by W. J. Jeandron, Halsey Steins.

Jenkins Brothers, New York, Philadelphia, spaces 134-136. Steel globe and gate valve for high pressures, brass and iron valves for power houses, and packing for steam joints; water gages and other power house accessories. Rppresented by W. S. Corcoran, Frank Martin, C. B. Yardley, Jr.

Johns-Manville Company, H. W., New York, N. Y., spaces 237, 239, 241. J-M fibre conduit for underground work; J-M Linolite system of lighting; overhead trolley and transmission line fittings; J-M Transite ebony asbestos wood and J-M Transite asbestos wood; "Noark" car fuse boxes and "Noark" N.E.C.S. protective devices, such as fuses, cutouts, service switches, etc., Solderall soldering paste; J-M friction tapes and splicing compounds. Represented by J. W. Perry, H. M. Slauson, Wm. D. Ligon, J. H. McManus, H. M. Voorhis, C. W. Schultz, H. M. Frantz, George A. Saylor, R. R. Braggins, Daniel Fitts, E. B. Hatch, W. R. Seigle.

Johnson Coin Counting Machine Company, New York, spaces 261, 263. Johnson coin counting machines and registering fare boxes. Represented by C. H. Birdsall, W. P. Butler, S. F. Champion, Jr., J. M. Johnson.

Kerwin Machine Company, Detroit, Mich., booths 183-A and 183-B. Kerwin-Detroit rail grinder. Practical demonstrations of methods employed in grinding out high joints, low and battered joints and corrugations. Represented by James J. Kerwin and W. W. Clark.

Lobdell Car Wheel Company, Wilmington, Del., space 253, Building 2. Steel and chilled iron car wheels, chilled iron plungers for boiler feed pumps. Represented by F. A. Lex, Joseph Stuart, Geo. C. Lobdell, third.

Long Company, E. G., New York, N. Y., space 251. Reception room. Represented by E. H. Mays, Frank Van Anden.

Lord Manufacturing Company, New York, space 418. Earll retrievers and catchers, Shaw lightning arresters, laminated rail bonds, Spencer air-purifying system, Bradshaw skids, con-tro-la-tors, M. V. G. arresters, luminator arc lamps, duo-contact fingers, disk and drive hydrogrounds, ground plates. Represented by W. R. Garton, A. V. Arnold.

Lorain Steel Company, Johnstown, Pa., spaces 348, 353, Building 3. Special track work, girder and high T-rails, electrically welded joints. Represented by James M. Brown, F. J. Drake, S. P. S. Ellis, H. C. Evans, E. M. Fry, A. L. George, F. Glenton, Jr., Wm. W. Kingston, H. F. A. Kleinschmidt, Wm. Lynam, J. H. MacCarroll, S. P. McGough, Edward Ott, Geo. W. Reese, H. C. Stiff, A. L. Verner.

Lubricating Metal Company, New York, space 187, Aquarium Court. "No Heet" babbitt metal and die cast bearings. Represented by T. H. Soule, W. E. Warren.

McCabe, J. J., New York, N. Y., spaces 127, 129, 131, Machinery Hall. "New style" 2-in-1 double spindle motor-driven lathe with 26-in. and 48-in. swing. Triple-geared swing lathe in operation. Street railway repair shops lathe for work of all classes. Represented by J. J. McCabe, H. P. McCabe, Frank Sheeran, Geo. L. Bennett, W. Priestley, Fred Kompass.

McCord Manufacturing Company, Chicago, space 330, Building 3. Universal car window fixtures. Represented by B. S. McClellan and R. N. Kennington.

McConway & Torley Company, Pittsburgh, Pa., spaces 310, 312, 314. Janney radial coupler equipment. Represented by S. C. Mason, I. H. Milliken, H. C. Buhoup.

McGraw Publishing Company, New York, spaces 2-6, Building 1. Electric Railway Journal, Convention Souvenir Number and four Convention Daily issues; Electric Railway Dictionary; Electric Railway Manual (Red Book); McGraw Electrical Directory, Electric Railway

Edition; *Electrical World; Engineering Record* Represented by James H. McGraw, Hugh M. Wilson, Joseph A. Kucera, Henry W. Blake, L. E. Gould, Rodney Hitt, F. Nicholas, Walter Jackson, Harold W. McGraw, George MacMurray, Frank Armeit, F. C. Wells, C. B. Merritt, J. J. Rockwell, C. A. Babtiste, W. K. Beard, C. T. Walker, E. J. Hunt, P. T. Coburn, J. B. Malette, Miss Josephine Phelps, Miss Jennie Johnson, L. S. Louer, S. T. Henry, I. H. Holbrook.

McGuire-Cummings Manufacturing Company, Chicago, Ill., space 272. Represented by John J. Cummings, M. T. Kirschke, Jr.

McQuay-Norris Manufacturing Company, St. Louis, Mo., space 308. "Leak-proof" piston-head packing rings for engines, pumps and compressors. Represented by W. K. Norris, E. H. Hill.

Massachusetts Chemical Company, Walpole, Mass., space 234. Rubber and liquid insulating materials. Represented by L. O. Duclos, A. E. Duclos, E. W. Furbush.

Matthews-Davis Tool Company, St. Louis, space 119, Machinery Hall. Davis expansion car-wheel boring tools and Davis expansion boring tools for general machine-shop work. Represented by Claude L. Matthews and J. W. McKeen.

Matthews & Brothers, W. N., St. Louis, space 119, Machinery Hall. Matthews money-saving specialties, Matthews fuse switch, Matthews hold-fast lamp guards, Matthews boltless guy clamps, Matthews easy lamp changers, Matthews two-bolt guy clamps, a new trolley frog and Matthews "O. K." sleet cutters. Represented by Claude L. Matthews.

May & Turner Company, Atlanta, Ga., space 413, Building 3. Burroughs' railway nut lock. Represented by O. B. Burroughs, Sterling G. Turner, Samuel C. Watkins.

Midvale Steel Company, Nicetown, Philadelphia, Pa., spaces 433, 434, 435, 436. Two rolled steel wheels (unmounted), one pair rolled steel wheels mounted on axle (Boston & Northern Railway standard), two built-up wheels (unmounted), two heat-treated axles, one pair rolled steel wheels mounted on axle showing mileage made in service on Market Street Elevated Railway, Philadelphia. Represented by H. M. Deemer, W. S. Edger, T. W. Illingworth, Charles Tietze, James Thompson, Stuart Hazlewood, Morgan D. Hayes.

Nachod Signal Company, Philadelphia, Pa., space 142, Machinery Hall. One set Nachod automatic signals, Type LD for electric railways, connected up for operation on a miniature track. Directional and non-directional trolley contractors, main relay, directional relay, spare and repair parts. Represented by Carl P. Nachod, F. W. Kulicke.

National Brake Company, Buffalo, N. Y., spaces 262, 264. Aluminum models of the C. A. and B-5 types of Peacock brakes, aluminum model of the Ackley adjustable brake, two new types of brakes, the improved Peacock brake and a steam railroad brake. Represented by Frank D. Miller, W. D. Brewster, Thomas C. Boyce.

National Brake & Electric Company, Milwaukee, Wis., spaces 120-128, Machinery Hall. City and interurban air-brake equipments, 600-volt and 1200-volt d.c. compressors and governors, sectional compressors, governors and engineers' valves; portable motor-driven air-compressor outfits, as well as portable gas-driven compressor outfit; combined motor-driven portable air-compressor and vacuum pump outfit; motor-driven "3VS" 100 cu. ft. air compressor complete with automatic controlling devices; belt-driven air compressors; air-brake and compressor parts; samples of steel castings. Represented by R. P. Tell, C. N. Leet, W. J. Richards, Robert Long, C. P. Billings, W. H. Beattys, James Paton, W. H. Goble, W. M. Bisel, J. J. Nef, W. D. Glenn, B. S. Aikman, George C. Anthon.

National Carbon Company, Cleveland, Ohio, spaces 176 to 178. High-grade carbon products for street railway motors, stationary motors and generators, carbon brushes for miscellaneous uses and results of service tests, miscellaneous carbon products. Represented by F. D. Kathe, O. T. Weaver, H. A. Worman, A. E. Carrier, B. Dyer, W. B. Brady, E. H. Martindale, J. E. Hauser, D. D. Dickey.

National Lead Company, New York, spaces 317-319. Phœnix babbitt metal, heavy pressure metal, anti-friction metal, bearing metal, Sterling journal metal, bar solder, wire solder. Represented by J. B. Mendenhall, Wm. A. Dail, E. A. de Campi.

National Lock Washer Company, Newark, N. J., spaces 320, 322, Building 3. Car curtains, curtain fixtures, sash locks, sash balances, National lock washers with models of same, separate fixtures, etc. Represented by F. B. Archibald, R. B. Brown, W. C. Dodd, J. H. Horn, D. H. Hoyt.

National Surety Company, New York, space 173.

National Tube Company, Pittsburgh, Pa., spaces 354-357. Shelby trolley poles, National tubular street poles, pipe of various kinds, Shelby seamless and Spellerized steel boiler tubes, cast and malleable iron fittings, valves and cocks, Kewanee specialties, also, seamless steel table top, consisting of thousands of pieces of various shapes of seamless steel tubing. Represented by L. F. Hamilton, J. G. Bateman, W. S. Bitting, B. F. Bart, J. E. Flemming, P. C. Patterson.

Nelson Valve Company, Philadelphia, Pa., spaces 123-125, Machinery Hall. Bronze and iron gate, globe and angle valves, iron body globe and angle valves, blow-off valves, steel gate valves and steel globe valves for superheated steam and steel fittings, electrically operated gate valve. Represented by Carlisle Mason, Russell Bonnell, W. J. Spencer, R. E. Thomas.

New York Air Brake Company, New York, spaces 229-231. Ten-car train electro-pneumatic air-brake equipment for electrically-operated trains. Represented by W. T. Henry, N. A. Campbell, C. E. Leach, J. D. Cartin, H. E. Whittaker, B. J. Minier.

New York Switch & Crossing Company, Hoboken, N. J., spaces 248, 250, 252, Building 2. Anti-straddle solid manganese tongue switch and mate, 9-in. rail hard-center combination tongue switch, T-rail hard-center anti-straddle tongue switch, hard-center mate, frog and crossing with all the modern girder rail sections. Represented by W. C. Wood, H. R. Sherman, A. W. Kennedy, Wm. Weller, John Madge.

Niles Car & Manufacturing Company, Niles and Cleveland, Ohio, space 273, Building 2, Marine Hall. Convention office headquarters only. Represented by F. C. Robbins, J. A. Hanna, A. W. Schall.

Nuttall Company, R. D., Pittsburgh, Pa., spaces 147-149. Gears, pinions, trolley bases, trolley poles, harps and wheels, flexible couplings, special machine gears, gear-cutting machine in operation. Represented by F. A. Estep, Charles N. Wood, J. S. Monroe, G. E. Watts, T. M. Cluley, R. M. Kerschner, F. M. Erb, W. H. Thompson.

Ohio Brass Company, Mansfield, Ohio, spaces 242-247. Rail bonds. Demonstrations in applying all-wire rail bonds by thermo bonding process: new overhead line material, malleable iron frogs and crossovers with renewable bronze tips, locking hanger, tight-lock ear; extruded ear, etc.; M. C. B. type and regular type of Tomlinson couplers, air sander equipment, whistles and whistle valves, all in operation; also special type of Tomlinson coupler for Boston Elevated Railway, which automatically couples both cars and air hose; representative line of O-B high-tension pin suspension and type insulators; wall and roof bushings, busbar insulators; suspension clamps, tower eyes, strain and catenary insulators, etc. Represented by twenty men from main and branch offices, sales and engineering departments.

Ohmer Fare Register Company, Dayton, Ohio, spaces 200-206. Sixty-fare register; fare register, push and pull operation; register with time feature and for four classes of fares; fare register, fourteen fares; six-fare register; one-fare register; two-fare time feature register with total adder; four-fare, cash adder, ticket and transfer register; six-fare register; rapid transit equipment for prepayment cars; station indicator and accident prevention device; turnstile register combination. Represented by John F. Ohmer, J. H. Stedman, J. C Liggett, C. V. Funk, C. W. Ketteman, W. H. Nelson.

Pantasote Company, New York, space 301. Pantasote and agasote. Represented by John M. High, William A. Lake, Allan S. Barrows.

Par Sil Metal Company, Lansdale, Pa., space 275, Building 2. Flower brush holders, air brake and controller handles, carbon bronze bearings, trolley wheels, line ears. Represented by David B. Flower, Fred. W. Roth.

J. W. Paxson Company, Philadelphia, Pa., space 249, Building 2. Steel wire frog and switch brooms, wire brushes, wire and rattan brooms. Represented by John S. Gilbert.

Pennsylvania Steel Company, Steelton, Pa., and Maryland Steel Company, Sparrows Point, Md., spaces 12, 14, 16, 18. Switches, mates, frogs, crossing pieces, switch stands and steel products for street railway track work; built up "Manard" hard centre and solid "Manard" construction. Represented by H. F. Martin, Richard Peters, T. C. Voorhees, John C. Jay, Jr., R. W. Gillespie, J. B. Smiley, R. Smith, Chas. S. Clark, T. Blagdon, Jr., H. G. Barbee, N. E. Salsich, S. H. Smith, E. E. Goodwillie, R. E. Belknap, D. Allen, J. T. Hennessey, J. G. Miller, R. C. Hoffman, Jr., H. M. Foster, J. T. Hill, G. S. Vickery, W. H. Henderson, C. A. Langdon, C. A. Alden.

Perfectol Company, Philadelphia, Pa., space 43. Perfectol car cleaner, an oil emulsion cleaner for car woodwork. Represented by Henry Roever, James McD. Holtzinger.

Philadelphia Holding Company, Philadelphia, spaces 332-4-6, Building 3. Halsey radial truck. Represented by J. R. Dickey, James T. Halsey, J. T. Sill.

Pittsburgh Steel Company, Pittsburgh, Pa., spaces 222, 224, Building 2. Mechanical and boiler tubes, trolley poles, Standard railroad fencing, wire nails, fence staples and galvanized barbed wire. Represented by E. S. Lewis, H. C. Woodside, J. A. Voelker.

Poole Brothers, Chicago, Ill., space 315. Railway tickets, folders, advertising booklets. Represented by S. K. Poole, R. W. Hunter.

Positive Clutch & Pulley Works, Buffalo, N. Y., spaces 262, 264. Positive combined jaw and friction clutch models. Represented by S. A. Benedict.

Prepayment Car Sales Company, New York, space 311, Building 3. Full-size model of prepayment car. Represented by Thomas W. Casey, David Murdock, A. H. Englund.

Pressed Prism Plate Glass Company, Chicago, space 191. Special ornamental glass designs for railway cars. Represented by A. O. Brown and L. R. Waterman.

Pyrene Manufacturing Company, New York, N. Y., space 165. Pyrene fire extinguishers, Pyrene liquid. Represented by H. T. Porter, G. H. Peterson, H. C. Futch, C. E. Ware.

Rail Joint Company, New York, N. Y., space 180, Aquarium Court Arcade. Continuous, Weber and Wolhaupter standard joints, Continuous and Weber girder and high T-rail points, Continuous and Weber insulated joints, Continuous frog and switch and compromise joints. Represented by W. E. Clark, E. A. Condit, Jr., W. A. Chapman, H. C. Holloway, R. R. Seward, R. W. Smith, G. W. Smith, J. C. Barr.

Railway Age Gazette, New York, spaces 408, 410. Represented by C. R. Mills.

Railway Improvement Company, New York, N. Y., spaces 335, 337, 339. Coasting time recorders, current time clocks, car meters. Represented by Frank Hedley, Rufus L. MacDuffie, A. J. Pizzini, W. O. Wade, George B. Campion, Garrit S. Cannon, Harry F. Keegan.

Railway Motor Car Corporation, Philadelphia, Pa., space 412, Building 3. Reception parlor only. Represented by W. E. Harrington, E. J. Lawless.

Railway Roller Bearing Company, Syracuse, N. Y., spaces 113, 115, Machinery Hall. Rollway bearing journal boxes for Baldwin, Brill and other standard trucks, Rollway bearing car wheel, Rollway bearing GE-216 railway motor, Rollway bearing induction motor, Rollway center plates. Represented by James N. Vandegrift, Raymond H. Carhart, John W. Hulburt, H. L. Aberdein.

Railway Track-Work Company, Philadelphia, Pa., spaces 156, 158, 160, Machinery Hall. Rail-grinding machines for removing corrugation and grinding hammered and depressed joints. Represented by William D. Gherky, William B. Goodall.

Railway & Industrial Engineering Company, Pittsburgh, Pa., space 328. Horn-type disconnecting and protective apparatus, commutator slotting tool. Represented by A. W. Burke, B. W. Kerr.

Ramapo Iron Works, Hilburn, N. Y., space 400. Automatic safety switch stands and manganese special work, especially for private right-of-way on interurban lines. Represented by Arthur Gemunder, George E. Haring, Wellington B. Lee, James B. Strong.

Recording Register & Fare Box Company, New Haven, Conn., space 130, Machinery Hall. Fare registers, fare boxes, trolley wheels, punches and other railway supplies. Represented by Frank B. Kennedy, M. DeForest Yates, O. W. Uthoff.

Roebling's Sons Company, John A., Trenton, N. J., spaces 225-227, Building 2. Wire rope and fittings, bare and insulated wire and cables. Represented by A. B. Conover, U. G. Tingley, M. R. Cockey, G. R. Swan, A. V. Errickson.

Rooke Automatic Register Company, Providence, R. I., space 346, Building 3. Rooke automatic register. Represented by George F. Rooke, W. A. Williamson.

Root Spring Scraper Company, Kalamazoo, Mich., space 411. Root No. 2 special scraper, No. 3 heavy car scraper, No. 5 snow scraper, pneumatic snow scraper. Represented by F. N. Root.

Samson Cordage Works, Boston, Mass., space 313. Trolley cord, bell and register cord. Represented by F. J. Coakley, R. G. Whiting, W. G. Webb, W. G. Woodworth.

Schütte & Koerting Company, Philadelphia, Pa., space 151, Machinery Hall. Koerting double tube injectors, steam jet blowers, exhausters, syphons, spray nozzles and condensers; Schütte hard bronze valves, engine stops, non-return valves, precision gate valves, emergency with pilot valve, turbine trip throttle valves, free exhaust valves and hydraulic valves, balanced valves, torpedo oil burner and film heaters. Represented by J. J. Gessleman, H. Bacon, Paul Knauf.

Sherwin-Williams Company, Cleveland, Ohio, space 20, Building 1. Passenger coach finishes, street car and railway varnishes, insulating varnishes, rattan seat enamel, concrete finishes, paint and varnish specialties. Represented by E. M. Williams, H. E. Billau, F. A. Elmquist, W. S. Hannon.

Peter Smith Heater Company, Detroit, Mich., spaces 254, 256. Hot-water heaters; forced ventilation hot-air heaters. Represented by Daniel W. Smith, Elmer J. Smith, Harry S. Williams, Walter E. Hinmon.

Speer Carbon Company, St. Marys, Pa., space 255, Building 2. Carbon brushes. Represented by J. S. Speer, G. P. Fryling.

Standard Coupler Company, New York, N. Y., spaces 324-326. Shim slack adjuster. Represented by George A. Post, E. H. Walker, C. D. Jenks, George A. Post, Jr., W. H. Sauvage.

Standard Leather Packing Company, Boston, Mass., space 409, Annex. Pair of car wheels to demonstrate packing. Represented by W. A. Farnsworth, P. H. Wilhelm.

Standard Motor Truck Company, Pittsburgh, Pa., spaces 209, 211, 213, 215. No. 0-36 light weight maximum traction city and suburban double truck with one-wear forged steel wheels; No. 0-50 outside-hung motor city and suburban double truck with forged steel wheels; No. C-50 light weight pressed steel side frame city and suburban double truck for high speed service with forged steel wheels; one C-55 high speed double truck designed especially for Boston Elevated Railway with forged steel wheels; No. C-60 high speed "Interborough" double truck with forged steel wheels designed for Pittsburgh, Harmony, Butler & New Castle Railway; No. C-80 pressed steel side frame double truck with forged steel wheels for 100,000 capacity cars and trunk line service. Represented by R. L. Gordon, A. W. Field, W. G. Cory, G. N. Boyd, W. G. Price.

Standard Paint Company, New York, N. Y., space 277. P. & B. insulating varnishes, compounds and tape. Represented by Charles E. Smith, Harold E. Lavelle.

Standard Roller Bearing Company, Philadelphia, Pa., space 106, 108, Building 1. Car journal roller bearings, anti-friction bearings (ball and roller) of every description. Represented by T. F. Salter, J. G. Cooley, L. M. Watkin, Jr.

Standard Underground Cable Company, Pittsburgh, Pa., space 282, Building 2. Lead-covered and armored power cables, bare and insulated wires, Colonial copper clad wire, trolley wire, Davis open air and station terminals, manhole junction boxes, cable jointing materials. Represented by A. A. Anderson, J. H. Lytle, Pittsburgh; H. P. Kimball, New York; T. E. Hughes, S. S. Warner, Philadelphia; F. C. Cosby, Boston.

Star Brass Works, Kalamazoo, Mich., space 341, Building 3. "Kalamazoo" trolley wheels and harps. Represented by O. P. Johnson.

Steel Tie Specialty Company, Cleveland, Ohio, space 189, Aquarium Court. Kohlmeyer clips for fastening steel rails to steel ties. Represented by M. F. Kane.

Sterling Varnish Company, Pittsburgh, Pa., spaces 429, 430, Building 3. Have no display. Represented by Henry C. Todd, Alvin S. King, W. F. Hebard.

Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., space 345. Dispatcher's signal system; railway, mine and rural mine telephone, iron-clad magnetos and jack boxes, loud ringing signal bells, connecting poles and magneto switchboard. Represented by J. O. Oliver, M. S. Van Vleet, E. P. Ellis.

Symington Company, T. H., Baltimore, Md., spaces 427, 428. Journal boxes, journal box dust guards, ball-bearing center plates, roller side bearings. Represented by J. F. Symington, W. W. Rosser, C. J. Symington, T. C. de Rosset, A. H. Weston.

Taylor Electric Truck Company, Troy, N. Y., spaces 110-118. M. C. B. quadruple high-speed truck, M. C. B. triple truck, L. B. double truck for pressed steel cars, improved S. B. swing motion truck, E. H. single truck for large single truck cars, elliptic springs and coil springs; several kinds of T. M. C. steel-tired wheels. Represented by John Taylor, Walter E. Taylor, C. H. Dodge, Chicago; Thomas Thornes.

The Taylor Stoker Company, Providence, R. I., spaces 153-155. Built-up stoker. Represented by M. Alperu, J. F. Mallory and W. I. Bowden.

Tool Steel Gear & Pinion Company, Cincinnati, Ohio, space 363, Annex. Gears and pinions, specially hardened and toughened. Represented by C. E. Sawtelle, Leroy Brooks, Jr., S. I. Wailes.

Transportation Utilities Company, New York, N. Y., spaces 374, 375, Building 3. Steel subway door, Acme vestibule curtain and revolving shield, weatherproof window outfit, Acme vestibule diaphragms, Perfection sash balance and screen, metallic steel sheathing, National steel trap door with grab handles, National steel trap door without fittings, National standard roofing, "Chanarch" galvanized metal flooring, Eclipse deck sash ratchet, "Flexolith" composition flooring, "Tuco" friction curtain fixture, Resisto insulation, "Tuco" rack fixture, Liner elapsed time calculator, miscellaneous curtain parts. Represented by W. L. Conwell, R. M. Campbell, H. S. Humes, Thos. Dunbar.

Trolley Supply Company, Canton, Ohio, space 207. Peerless No. 10 roller bearing trolley base, Star roller bearing trolley base, Knutson No. 5 trolley retriever, Knutson No. 2 trolley retriever, Ideal trolley catcher, Peerless Jr. headlight, semaphore headlight, Peerless check valve for air compressor. Represented by J. E. McLain, Jos. Hollis, Irving Fulmer.

Union Switch & Signal Company, Swissvale, Pa., space 300. Light and semaphore signals for steam and electric roads, staff instruments, alternating-current track circuit apparatus, models showing different schemes of signaling for trolley roads, alternating-current signaling relays, indicators, etc. Represented by L. F. Howard, H. W. Griffin, H. A. Wallace, T. H. Patenall, E. R. Coe, J. W. White, H. S. Beakes.

United States Electric Signal Company, West Newton, Mass., spaces 157, 159, 161, 163, Machinery Hall. Interurban signals, block signals, recording block signals, spacing signals, highway crossing signals. Represented by John J. Ruddick, Roland F. Gammons, II, William W. Harrington, J. Warren Putnam, James Rier, E. S. Olmsted,

U. S. Metal & Manufacturing Company, New York, N. Y., space 186. Represented by B. A. Hegeman, Jr., C. C. Castle, J. J. Ross, H. A. Hegeman.

U. S. Wood Preserving Company, New York, N. Y., space 303-D. Wood paving blocks. Represented by Alexander Reed, G. O. Strother.

Under-Feed Stoker Company of America, Chicago, Ill., spaces 404, 406. Reception room only. Represented by C. S. Crowell, D. Hunter, Jr., W. T. Jordon.

Universal Audit Company, New York, N. Y., space 415. Charts showing an analysis of a standard and complete commercial organization, booklets on economics, administration and efficiency. Represented by H. F. Stimpson, Frank G. Shinn.

Universal Lubricating Company, Cleveland, Ohio, space 167. Tulc No. 2 WW, solidified oil and waste impregnated; Tulc No. 2 yarn, solidified oil and yarn impregnated; Tulc No. 2 H, plain solidified oil; Tulc No. 2 VH, plain solidified oil for grease cups. Represented by Chas. H. Clark, Sherman W. Scofield, T. U. Franklin.

Universal Safety Tread Company, Boston, Mass., space 387. Safety treads for car steps, stations and platforms. Represented by F. W. Langford, A. E. Langford.

Universal Trolley Wheel Company, East Berlin, Conn., space 343. Trolley wheels, harps, contact springs completed and in sections. Represented by L. J. Tetlow, L. H. Kendall, Henry Bancroft.

W. T. Van Dorn Company, Chicago, Ill., spaces 175, 177. One each No. 39 and No. 40 M.C.B. drawbars complete with draft gear and anchor casting, one standard M.C.B. coupling, one No. 19 Van Dorn coupler with draft gear, two No. 250 Van Dorn coupling with draft gear, one No. 21½ head with complete draft gear, two No. 27 couplings, one No. 41 M.C.B. drawbar complete with draft gear and anchor casting. Represented by W. T. Van Dorn, H. E. Van Dorn.

Van Dorn & Dutton Company, Cleveland, Ohio, space 132, Machinery Hall. Railway motor gears and pinions; armature and field coils; commutators; "Hard Service" portable drills and reamers. Represented by F. H. Zulauf, A. K. Baxter, G. N. Neubecker.

Watson-Stillman Company, New York, spaces 338, 340. No. 4 girder rail bender, 30-ton laboratory press, 35-ton hydraulic rail bond compressor, Universal beam punch, telescopic motor lift, several types of hydraulic jacks, section of 30-ton Watson-Stillman jack, 1-in. two stage twin volute turbine pump in operation. Represented by Edwin A. Stillman, Major Geo. Gillon, Frank Clark.

Western Electric Company, New York, N. Y., space 240. Telephone train-dispatching equipment; electric railway supplies; train-dispatching circuits; selectors; transmitters and receivers; drainage and repeating coils; interrupter; Blue Bell battery; Rotophone; overhead railway material; Electrose third-rail insulators; Shelby seamless steel trolley poles; Kalamazoo trolley wheels and harps; M-B sand boxes, M-B trolley harps, etc.; Hollland Trolley Supply Company's retrievers and catchers; Ackley and Peacock brakes; Benjamin lighting specialties; Cameron commutators; Crouse-Hinds headlights; Schwarze railroad crossing gong; Pyrene fire extinguishers; Thomas high-tension insulators; Electroline; Samson spot cord and conductors' punches. Represented by F. D. Killion, M. A. Oberlander, E. D. Hinman, J. C. Enders, R. H. Harper, J. C. Maxon, G. K. Heyer, R. F. Spamer, C. V. Jellison, H. F. Miller, New York; J. L. Ludwig, A. L. Hallstrom, J. R. Stroud, L. C. Coller, G. Sigg, W. R. Lyall, H. C. Owen, J. F. Davis, C. E. Robertson.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., spaces 22-24, and odd numbers 133 to 143, Building 1. Railway motors, induction motors, K-type controllers and unit switch control circuit breakers, relays, overhead line material, lightning arresters and repair parts. Represented by E. M. Herr, L. A. Osborne, C. A. Terry, H. P. Davis, S. L. Nicholson, C. S. Cook, J. C. McQuiston, M. B. Lambert, J. W. Busch, A. A. Brown, E. P. Dillon, George Ewing, L. N. Reed, C. W. Register, H. C. Stier, F. N. Kollock, Thomas Cooper, S. J. Keese, T. J. McGill, C. I. Young, G. B. Griffin, C. H. Davis, H. L. Garbutt, F. C. Stieler, W. R. Scott, D. L. Beaulieu, H. C. DeCamp, F. C. Hornstein, G. S. Vail, J. E. Garrahan, T. F. McKenna, H. Beardsley, J. R. Cox, T. C. Eayrs, J. C. Kyle, J. G. Miles, H. A Faber, N. W. Storer, C. Renshaw, J. L. Davis, R. E. Hellman, W. Schaake, R. L. Wilson, P. H. Smith and N. S. Braden.

Westinghouse Lamp Company, Bloomfield, N. J., spaces 22-24 and 133-143. Railway incandescent lamps. Represented by Walter Cary and B. F. Fisher, Jr.

Westinghouse Machine Company, East Pittsburgh, Pa., spaces 22-24 and odd numbers 133 to 143, Building 1. Several turbines of the impulse re-entry type. Represented by E. H. Sniffin, L. L. Brinsmade, H. P. Childs, L. C. Bullington and H. Van Blarcom.

Westinghouse Traction Brake Company, Wilmerding, Pa., spaces 22-24 and odd numbers 133 to 143. Electro-pneumatic brake, A. M. M. automatic brake, S. M. E. brake equipment, electric compressor governors. Represented by John F. Miller, A. L. Humphrey, W. S. Bartholomew, E. L. Adreon, E. A. Craig, J. R. Ellicott, W. V. Turner, George H. Martin, P. H. Donovan, Arthur Johnson, C. H. Beck, S. D. Hutchins, C. J. Olmstead, C. P. Carr.

Whitmore Manufacturing Company, Cleveland, Ohio, and Whitmore Product Sales Company, Chicago, Ill., spaces 162,-164-A. Gears and pinions with mileage records. Represented by S. W. Whitmore, William Beaser, Jr., Henry Stuckenholt, R. R. Hertzog.

William Wharton, Jr., & Company, Philadelphia, Pa., spaces 13, 15, 17. Switches, mates and frogs of manganese steel construction, new and used; spring boxes, models, blue prints and pictures of the company's work. Represented by Victor Angerer, L. R. Ashhurst, Jr., R. C. McCloy, H. F. McDermott, Geo. R. Lyman, W. McLain, Arthur S. Partridge, Edwin V. Smith.

Wilson Remover Company, New York, space 43. Paint and varnish removers. Represented by J. MacNaull Wilson and J. Whitney Wilson.

Wheel Truing Brake Shoe Company, Detroit, Mich., space 347. Abrasive brake shoe. Represented by J. M. Griffin, H. Hart.

Whipple Supply Company, New York, spaces 384-385. Anti-climbers, gears and pinions, Universal safety treads. Represented by A. L. Whipple, H. F. Stevenson.

Wilson Trolley Catcher Company, Boston, Mass., space 503. Trolley catchers and retrievers, electric railway signals. Represented by Charles N. Wood, W. M. Chapman, Bert Wilson.

Wonham, Sanger & Bates, New York, N. Y., spaces 218-220. "H. B." life guard, C. H. ampere-hour meters for traction operation, Trotter accelerometers, American Automatic Switch Company's devices, automatic counting in-and-out block signal. Represented by Roy Collins, R. Sanger, F. Wonham, D. Polderman, H. A. Goode and E. Sharp, London, England.

Electric Railway Journal

DAILY EDITION

Published at the Annual Conventions of the American Electric Railway Association and Its Affiliated Associations

VOL. XXXVIII NEW YORK—OCTOBER 11, 1911.—ATLANTIC CITY No. 15B

PUBLISHED DAILY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK
MILLION-DOLLAR PIER, ATLANTIC CITY

JAMES H. MCGRAW, President; C. E. WHITTLESEY, Secretary.

CHICAGO OFFICE.....Old Colony Building
CLEVELAND OFFICE.....Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.

Copyright, 1911, by McGraw Publishing Company.

TERMS OF SUBSCRIPTION

Subscription including regular weekly issues and special daily editions published from time to time in New York City or elsewhere, postage prepaid:

United States, Cuba and Mexico.....$3.00 a year
Canada ..... 4.50 a year
To all Other Countries..... 6.00 a year
Single Copies..... .10 each

Application made at the Post Office at New York for entry as mail matter of the second class.

Of this issue of the ELECTRIC RAILWAY JOURNAL, DAILY EDITION, 9,500 *copies are printed.*

NEW YORK—OCTOBER 11, 1911.—ATLANTIC CITY

PROGRAM TO-DAY

CONVENTION MEETINGS

9.30 a.m.	Joint Session of Accountants' and Engineering Associations, Marine Hall, Convention Pier.
9.30 a.m.	Session of Transportation & Traffic Association, Greek Temple, Convention Pier.
9.30 a.m.	Session of Claim Agents' Association, Traymore Hotel.
11.30 a.m.	Session of Engineering Association, Marine Hall, Convention Pier.
11.30 a.m.	Joint Session of Accountants' and Transportation & Traffic Associations, Greek Temple, Convention Pier.
2.00 p.m.	Executive Session of American Electric Railway Association, Greek Temple, Convention Pier.
2.00 p.m.	Closing Session of Claim Agents' Association, Traymore Hotel.

SOCIAL EVENTS

10.00 a.m.	Obstacle Golf, Lawn of Marlborough-Blenheim Hotel.
11.30 a.m.	Concert by Leps and His Symphony Orchestra, Lobby, Convention Pier.
1.45 p.m.	Ladies' Afternoon, Atlantic City Country Club.
4.00 p.m.	Obstacle Golf, Lawn of Marlborough-Blenheim Hotel.
8.30 p.m.	Second Annual Indoor Athletic Carnival and Smoker, Marine Hall, Convention Pier.
11.00 p.m.	Informal Dancing, Ballroom, Convention Pier.

ddress of President Brady

The address of President Brady at the opening meeting of the American Association yesterday was a comprehensive discussion of the activities of the association and the status of the industry. We recommend its careful perusal to all who did not have the pleasure of listening to it yesterday, and those who were present at the meeting will undoubtedly wish to review in printed form the remarks of the president. The association is shown by him to be in a very prosperous condition, not only as regards membership and finance, but, what is much more important, as regards helpfulness to the industry and activity in the technical development and improvement of the art. The center of this work during the year is of course at the association headquarters in New York, whose facilities for the service of members are constantly becoming better through the continued gathering of data. The prosperous condition of the association does not have a counterpart in the status of the industry as a whole. It is to this condition and to the possible remedies that Mr. Brady directed attention in the latter part of his address. In unmistakable language he attributes it to lack of knowledge of the real conditions on the part of the public, and advocates publicity as the remedy—this publicity to be carried on not only systematically but by all. With this recommendation, which was also made by other speakers at the meeting, we feel confident the opinions of the leading companies will coincide. Such a plan would involve violations of some railway traditions, but the time has arrived, if indeed it has not passed, when these traditions should be forgotten and the new order of things accepted. In such work a larger membership would be most helpful, in fact almost necessary, and the concluding portions of Mr. Brady's address outlined a suggested method by which such an increase certainly seems attainable. This subject will be one of the important matters to be taken up by the incoming executive committee.

End Connections and Automatic Stops

Two of the three subjects presented yesterday in the report of the committee on heavy electric traction are of interest to nearly all large interurban roads. These subjects are the end connections on cars and the location of automatic train stops. The location and clearances for third-rail working conductors, which were also considered by the committee, affect the practice of only a few member companies outside of the metropolitan districts. Standard locations for end connections on cars have been considered by the Central Electric Railway Association, which has approved recommended locations for headlights, train-lighting cables and other end fittings. The heavy electric traction committee is of the opinion that it would not be feasible at this time to standardize fully the location of all electrical end connections on cars. Hence, in its report, it recommends that for the present a certain definite space at the ends of cars should be reserved for the electrical connections and that the determination of the exact arrangement and location of the different jumper sockets, brackets, etc., within this space should be postponed until further developments take place. In the Central States, however, there is an immediate need for standardizing the location of

headlight hangers and connections, and the location of lighting jumpers, because of the rapid extension of two-car train operation on the longer interurban lines. So far as these interurban roads are concerned the locations which have been approved by the Central Electric Railway Association appear to be satisfactory, and pending the time when the heavy electric traction lines can reach a definite conclusion as to their requirements, these locations might well be adopted by the Engineering Association as recommended practice.

The location of clearance lines for automatic stops which is recommended by the committee on heavy electric traction is adapted for use only on road-beds that are fully protected from trespass by the public. On most of the cross-country interurban lines on which block signals will be installed during the next few years it would be impracticable to have automatic train stops in the middle of the track. Two Western roads, the Washington Water Power Company at Spokane, Wash., and the Key Route at Oakland, Cal., have recently installed automatic stops in connection with their block signaling, but both employ a trip arm placed above the roof of the car. This location is probably the most suitable for interurban roads. The block signal committee next year might properly consider this subject and formulate certain requirements for automatic stops which would tend to encourage the use by interurban roads of automatic stop apparatus mounted somewhere within a limited space near the top of the car body.

Work of the Block Signal Committee

Electric railway engineers and managers will find in the report of the joint committee on block signals a large amount of valuable information. In compiling the report the committee realized that the electric railway associations had never before had available for reference a comprehensive description of the theory and practice of block signaling for electric railways. Hence, in planning its year's work, the committee decided to include not only the historic and statistical phases of the subject but also definitions and descriptions of the essential parts of each signaling system which is in practical use to-day for protection of trains.

The committee, which was chosen from the Engineering and Transportation & Traffic Associations, was unhampered by any precedents. The purport of its instructions was that the committee should present to the associations a résumé of the present status of electric railway signaling. A report 124 pages in length testifies to the thoroughness with which the committee fulfilled its assignment. The plan followed was to summarize briefly the history of electric railway signaling, then to present the principles of control for the different types of signal systems adaptable to electric railway service, and then to supplement these technical data with illustrated descriptions of signal apparatus now in service on electric railways.

While this report is the most complete on the subject that has ever been published, block signal apparatus, in so far as electric railways are concerned, has developed so rapidly within the past few years and gives prospect of such frequent changes during the next few years that future committees need have little fear of a lack of suitable materials for succeeding reports.

A feature of this year's report is the tabulated information secured from member companies about their existing signal installations. It was expected that these replies would be of considerable value to the committee in summarizing the present status of electric railway block signal installations, but unfortunately there were only fifty which were sufficiently adequate for use in the report. This number is so small that we do not consider a summary of them to be a full exhibition of the extent of signaling at present on electric railway lines. Moreover, the answers in many instances show that varying interpretations were put on the committee's inquiries. Thus the committee asked for the maximum service braking distance observed in the different classes of service, but the replies vary so widely that definite conclusions cannot be drawn. Nine roads report the use of automatic block signals with continuous track circuits, and the average length of block varies from 400 ft. to 15,840 ft. But two roads report the use of automatic signals controlled by short track circuits, while only twenty roads report the use of automatic signals with trolley contact devices. Obviously this number includes only a small portion of the roads which have been equipped with signals of this type. Practically every large interurban system and a great number of the smaller systems use at least a few blocks controlled by trolley contacts, and it is understood that during the last year the sale of this form of signal has greatly increased. Dispatchers' signals are reported in use by but six roads, with lengths of blocks varying from 3,000 ft. to 13,200 ft. This type of signal apparatus, which greatly increases the dispatchers' control of trains and has been found a valuable means for facilitating train movement, has met with widespread approval and is in much greater use than the data sheets indicate. Of the miscellaneous types of signals reported, the hand-operative block is very largely in the majority.

The newness of automatic signaling in electric railway work is indicated by column 19 of the data sheet. With the exception of some of the metropolitan transportation lines on which automatic blocking systems are employed, few electric railways report having used automatic signals for more than five years. Column 23 of the data sheet really contains the most valuable information regarding signaling that is included in the résumé of the replies. The question asked was, "In your experience, has the use of block signals aided or retarded the movement of trains?" With but three exceptions every road replied that the signals had aided the handling of trains. This answers the question so frequently raised in connection with automatic block signals. Two of the three exceptions also indorse signaling because the roads say that while their signals have retarded traffic they have increased the safety of travel, and this of course is the chief desideratum of signaling.

Accounting for Small Companies

The paper by Mr. Gault outlining an accounting system for small electric railway companies, which was presented yesterday before the Accountants' Association, is a contribution of especial value to properties of short mileage and low gross earnings. It gives a general summary of the accounting methods that may be adopted. While many of the details of the complete system described are similar to those that are in use by other companies, there are minor points of difference that are of interest. Attention may be called to the statement that a reserve fund for damage claims should be deposited in a separate bank account. This is a practice that is to be recommended. The classification of amusement park accounts might be referred to the committee on a standard classification of accounts and form of report for consideration of its applicability to other properties in similar positions. Of course, the operation of amusement parks is one that is properly outside of real railway operation, notwithstanding that it is an enterprise in which many companies are engaged. Other companies have ferryboats, toll roads, summer encampments or other similar operations, which might also be considered to advantage if the classification committee intends to take up outside operations of this character. Papers of this kind touching on the problems of small companies are of the utmost value, whether the subject discussed be of interest to the manager, the accountant or the engineer. The smaller companies seldom can afford to employ competent experts to work out these problems for them, and it is from just such helpful suggestions as are contained in this paper that a large majority of the member companies derive their greatest benefit from association work.

Conventionalities

Herman Piffletiff is Dutch.

Don't get Boardwalkitis.

A note of thanks is due the weather man.

The pretty green hedge is to look at, not to walk through.

Charlie Chapin has donated one dozen National League baseballs for the game Wednesday evening.

J. J. Morse and F. O. Grayson, of the St. Louis Car Wheel Company, were included in the party on the special convention train from St. Louis.

A lady's badge, bearing number 3771, has been lost. It belongs to Mrs. Robert F. Carr, who can be found at space 7, Dearborn Drug & Chemical Works.

Frank Hedley, veranda golf champion of the United States, was out early upon the obstacle golf course at practice, resplendent in his new outing suit.

A small oval Masonic pin has been found on the Convention Pier. The owner can secure his property by calling at the booth of the Electric Railway Journal.

Ray D. Lillibridge, of New York, technical advertising specialist, is at the Marlborough-Blenheim with Mrs. Lillibridge. He says he is here purely for recreation.

The present is to be distinctly a brides' convention. Newlyweds in many of the booths are receiving congratulations. Ask Messrs. Roswell, Farnum, Hayes and Bertram Berry. Business suffers very little from lack of attention.

A visitor at Atlantic City who had never seen a street railway convention in the process of making dropped the remark on Thursday of last week that the exhibits on the Pier presented the appearance of a conglomeration of unforeseen difficulties.

W. C. Burdick, assistant engineer of the Falk Company, Milwaukee, Wis., has been appointed manager of the special work department of this company, succeeding W. F. Carr, who resigned on account of poor health. Mr. Burdick is registered at the Dennis.

Two young Indianians named Morgan and Clark—not J. P. and Champ, but C. E. and L. J.—skipped gingerly from hotel to hotel early Monday morning challenging the world at large and anyone in particular to a game of pool. When it comes to pool they clean 'em up like the Gold Dust kids.

Several of the passengers on the St. Louis special train to the convention advised Nic LeGrand to keep after that "six bits" which he felt Mr. Paton should pay him, but the wiser heads intimated to Mr. LeGrand that inasmuch as Mr. Paton was a canny Scot, he might as well save himself the trouble.

H. A. Goode is at the convention fresh from a trip to the Coast. He reports a good time in San Francisco. J. M. Yount and Thomas Finigan of the United Railroads showed him the difference between San Francisco and New York. He bargained to reverse the process while they are in the East attending the convention.

Very favorable comment was expressed in regard to the preparedness of the exhibits at the opening of the convention and many delegates who visited the Pier yesterday morning remarked on the fact that they did not hear even the sound of a hammer. This condition is certainly very creditable to the exhibit committee of the Manufacturers' Association. It is also worthy of notice that the area occupied by the exhibits this year is greater than at any previous convention, either of this or of any other national association.

Walter H. Evans, chairman of the committee on engineering apprentices, which presented its interesting report to the Engineering Association Monday afternoon, recently resigned his position as superintendent of motive power of the Indiana Union Traction Company, Anderson, Ind. Mr. Evans will be succeeded at Anderson by R. M. Hemming, formerly general manager of the Ohio & Southern Traction Company, Columbus, Ohio. Both of these men are deeply interested in the work of the Central Electric Railway Association.

The great educational value of the exhibits to be seen on the Pier, and the businesslike methods pursued in installing them, were matters of general comment among those who very early in the convention week took the opportunity to give even a cursory examination to the display. It is a matter of general comment that if many of the directors of electric railway properties, bankers interested in their welfare and the efficiency of their management, could visit the convention and study the exhibits, the results would be of a decidedly beneficial character, both to visitors and exhibitors.

H. R. Harper, electrical engineer of the city of Melbourne, Australia, who is making a short trip through the United States on his way from London to his home, hopes to visit the convention. The lighting and power system in Melbourne is owned by the municipality and is under the engineering charge of Mr. Harper, but he is also interested in railways, as the city government is again seriously considering the electrification of its suburban system of railroads. This is the property on which a report was rendered about three years ago by C. H. Merz, of London. It comprises about 300 miles of track.

Have you seen him—a tall, lean, lank man of the newlywed brand? He is lost somewhere among the many allurements of the Boardwalk. He was last seen holding hands with his three-day bride in a limousine wheel chair, and his devotion to her was common gossip among the guests at the Marlborough-Blenheim. The lifesavers along the beach report no evidence of his whereabouts even though their vigilance has not ceased day or night. He is E. H. Martindale, brush expert of the National Carbon Company of Cleveland, which has an exhibit on the south side of the Million Dollar Pier just opposite the sea lions. It is said that Marty is as attentive to his business and work as he evidently is to his charming bride.

A tale is being told of a cruel practical joke recently played at the expense of one of the prominent supply men at this convention. The victim has the reputation of being one of the best dressed men on Broadway. His sartorial taste excited the envy of his many friends in the supply and railway field, who decided that if they could not equal him in fine raiment they might at least make a contribution to his wardrobe. Soon after, they learned by chance that the unsuspecting object of their machinations was planning a week-end visit at the country home of one of his acquaintances, not far from New York. Realizing that he would need a choice selection of clothing in that fashionable resort, they proceeded to fit him out. One contributed a somewhat used Tuxedo suit of ancient cut, another a variety of under habiliments which showed signs of wear but were neatly darned and patched, another brought a selection of socks with gorgeous checks, and so on. A few cravats of impossible colors completed the list. These gifts were packed in a cheap imitation leather trunk, which was marked with the name of the victim of the joke and was sent by express to the house which he expected to visit two days before he was to arrive there. To complete the diabolical plot a letter was sent in his name to his expected hosts saying that his trunk had been forwarded in advance and asking them to unpack it. The sequel has not been told.

Many of the ladies are affecting walking canes. Some of the leaders among the ladies of the convention intend that this shall be a feature of all complete Boardwalk toilets.

The members of the committee on schedules and time-tables are planning to present Secretary Donecker of the Transportation & Traffic Association with a loving cup as a token of their appreciation of his services as secretary of the committee during the past year.

A. H. Ford, president of the Birmingham (Ala.) Railway, Light & Power Company, is the only representative of his company in attendance this year. The other officers had to stay at home and handle a State Fair crowd this week. Mr. Ford is accompanied by Mrs. Ford, who is experiencing the delights of her first convention.

Earnest Sharp, director of Chamberlain & Hookham, Birmingham, England, is at the convention in the interest of Chamberlain & Hookham ampere-hour meter for rolling stock equipment, handled in the United States by Wonham, Sanger & Bates. Mr. Sharp is an encyclopedia on meters, having equipped 85 per cent. of all the electric cars in Great Britain and Ireland.

The many friends of L. T. Ebbson, who attended the conventions some years ago as a representative of the General Electric Company, will be glad to learn that he has been promoted recently by the Metropolitan Street Railway of Kansas City from the position of traveling inspector to the position of supervisor of rolling stock. Mr. Ebbson has been connected with the Chicago Railways and with the New York Central electrification in New York City since he left the General Electric Company.

J. H. MacAdams, manager of the Exeter, Hampton & Amesbury Street Railway, Hampton, N. H., is being congratulated on his narrow escape from death by electric shock last July. While using the telephone in his home the telephone wires became crossed with a 13,200-volt transmission line of the Rockingham County Light & Power Company, and he received the full voltage through one hand, which was resting on the transmitter, and the other hand, which was against the wall. The shock continued until the circuit-breakers opened in the power house at Portsmouth. Mr. MacAdams was terribly burned and was unconscious for several days, but he has recovered sufficiently to permit his coming to Atlantic City for the convention.

C. B. Vorse, consulting engineer British Columbia Electric Railway, of Vancouver, is one of the Pacific Coast delegates and confirms the reports which have been published of the tremendous development now in progress in the Canadian Far West, particularly about Vancouver. The rapid increase in the value of real estate in this region, as a result of the influx of settlers, has brought many fortunes almost overnight. One motorman on the British Columbia Electric Railway, for instance, is worth $150,000, owing to a fortunate investment in real estate a few years ago, but he still remains with the company from habit rather than from necessity. Another example of the rapid increase of property values is furnished by one site which was for sale a few years ago for $65,000 and recently changed hands at $5,000,000. According to Mr. Vorse, if the present rate of increase in population in Vancouver continues, the city will possess 500,000 inhabitants in 1920. The British Columbia Electric Railway Company is keeping pace with the development of the city, and last year laid 100 miles of track. Its plans for the future are extensive and include expenditures during the next few years of something like $20,000,000. Mr. Vorse's visit East is partly for the purpose of studying the latest methods of track construction for use on the system of the British Columbia Electric Railway.

SOCIAL EVENTS TO-DAY

This morning at 11:30 Leps and his symphony orchestra will give another delightful concert. In the afternoon from 1:45 to 5 p. m. the Atlantic City Country Club will be the centre of attraction for the ladies. In the evening at 8:30 the monster indoor athletic carnival and smoker will take place in Marine Hall on the Convention Pier.

MORNING CONCERT

The program of the orchestra concert, which will be given in the lobby on the Convention Pier, will include the following numbers:

1. Overture, "Merry Wives of Windsor".....Nicolai
2. (a) Evening Star from "Tannhäuser".....Wagner
   (b) Pilgrims' Chorus from "Tannhäuser" ..Strauss
3. Waltz, "Wine, Woman and Song".....Wagner
4. Fantaisie from "Carmen".....Bizet
5. Coronation March.....Meyerbeer

LADIES' AFTERNOON AT THE COUNTRY CLUB

The privileges of the Atlantic City Country Club have been extended to all of the ladies of the convention for this afternoon. The entertainment committee has arranged a clock golf competition, cards, music, tennis and tea and refreshments. Handsome prizes will be given to the winners in the clock golf contest and in card games. The golf contest will be held on the clock golf green in front of the clubhouse.

The Atlantic City Country Club has an attractive home at Northfield, which is about six miles from Atlantic City on the mainland. A sufficient number of private touring cars have been secured to take all of the guests to and from the club. These automobiles will leave the Marlborough-Blenheim and the Chalfonte hotels promptly at 1:45. The club can also be reached by the Shore Fast Line cars.

ATHLETIC CARNIVAL AND SMOKER

The athletic carnival, which will take place to-night in Marine Hall on the Convention Pier at 8:30, promises to be the greatest success of convention week. The program consists of four events. Event No. 1 will be a game of indoor baseball between teams representing the American Electric Railway Association and the Manufacturers' Association, which will be captained respectively by Presidents Brady and Castle. Event No. 2 will be a lifelike imitation of the Vanderbilt cup race with the Sauerkraut King and the Pride of Ireland at the wheels of the contesting cars. The speed limit is off. The third event on the program will be a push-ball contest between teams representing the Engineering Association and the peddlers. The last event will be a trial of strength between all of the railway men that can be crowded on the floor and the supply men. The ladies are especially invited to witness these trials of strength and tests of skill. They will be presented with attractive souvenirs. The gentlemen will be permitted to smoke until the referee decides that the air can be cut with a knife.

Elmer J. Smith, of the Peter Smith Heater Company, is here with his big 90-hp Oldsmobile. He drove the car through from Buffalo, making the trip in record-breaking time.

Charles N. Black, third vice-president American Electric Railway Association, will be unable to be present at this convention. President Taft is to visit San Francisco this week and to present an address at the Stadium, Golden Gate Park, on October 14. As this will mean considerable extra traffic for the United Railroads, and as Mr. Black is a member of the reception committee, he could not well leave. The United Railroads, however, are well represented at this convention by Thomas Finnigan, purchasing agent, and J. M. Yount, master mechanic, both of whom have attended many former conventions of the association in previous years.

IN A PERSIAN GARDEN

Surrounded by green hedges in a cozy inclosure in the center of the lobby of the Pier 120 ladies enjoyed an afternoon at cards yesterday. At eight tables the game was five-hundred, while at fourteen tables bridge was played, and at the remaining eight tables euchre was the choice. All of the games were progressive, the winners moving and the losers pivoting. At 4.30 play stopped and the scores were counted.

The winners at bridge were: First, Mrs. G. H. Hill; second, Mrs. W. E. Davis; third, Mrs. Merriman; fourth, Mrs. C. D. Emmons; fifth, Mrs. W. R. Lee; sixth, Mrs. Denning.

The winners at euchre were: First, Mrs. Haefeker; second, Mrs. W. E. Harrington; third, Mrs. W. R. Kerschner; fourth, Mrs. O'Brien; fifth, Mrs. Burgess; sixth, Mrs. W. J. Harvie.

The winners at five-hundred were: First, Mrs. Crawford; second, Mrs. Emory; third, Mrs. H. H. Adams; fouth, Mrs. Babcock; fifth, Mrs. Slocum; sixth, Mrs. Gennet.

The corresponding prizes for all three games were the same. The first prizes were silver water-pitchers; second prizes, silver combination vegetable dishes; third prizes, filigree silver pie dishes; fourth prizes, invalids' silver tea sets; fifth prizes, German art silver jewelry boxes; sixth prizes, German art silver tea caddies.

During the play the ladies were served with punch and dishes of bon-bons were on all the tables. The prizes were all given out in twenty minutes after play stopped. Only one tie score was made and the two ladies drew cards for the choice of prizes.

ROASTS BY THE PEDDLERS

(Printed at the Request of the Broadway Club)

Commish Dahl, of Cleveland, is sojourning in our midst. He is a pretty nice fellow for all that. If you doubt this conventional statement ask Dwight, Kuhlman's gentlemanly representative. He bought us a drink day before yesterday and we know, don't we, Dwight?

It is rumored that Old Bill Wood is a farmer. At any rate, he has a large crop. Did you get it from Tom Lymington out at Elk Ridge last Saturday week?

E. Peck and wife are visiting the convention this week. He says Atlantic City makes him think of Schenee because it's so different. Ed. runs a railroad (electric) up in New York State in the Second District, don't you, Ed.?

The rumor that young Harries has a new job is confirmed. Welcome, Gen., to the ranks of the pedlers, the army of the unemployed.

There must be lots of special work going, for Kid Evans was seen to-day on the Boardwalk with a new lid on. It looks fine, Harry. Don't believe all that the knockers try to tell you.

Charlie Castle is exhibiting with great pride a large red apple which he says his wife raised from a plate of apple sauce. Charlie is our W. K. Pres.

Have you noticed how much Pop Sisson is getting to look like another celebrity? It's all right, Pop, only look out for the copyright law.

Rumor has it that Neddie Lawless was making a loud noise on the Boardwalk last night. This is groundless. It was Jimmy Rutherford's golf hat talking to itself. Good boy, Jimmy, you are a fine little rose buyer if your hat is talkative.

Clarence Laskay is suffering from a disabled left mit. Says he was stung—by a spider.

Harry Adams has a game knee, the first on the list of cripples. Kid Evans has strained his conscience, rendering it improbable that he will last through the second game to-night.

THE MANUFACTURERS' VAUDEVILLE

Last night was a gala occasion on the Pier. The Manufacturers' Amateur Vaudeville, which was the drawing card, was presented with an all-star cast, a fine orchestra and a perfect stage setting. Long before the orchestra began the overture, "Poet and Peasant," the seats in Marine Hall were filled with an expectant audience. Boxes had been built to the right and left of the stage in which seats were reserved for the association officers and their ladies.

The headliners at Keith's or Hammerstein's had nothing on acts which R. M. Campbell, master of ceremonies and stage manager, had provided. Old favorites and new met with an equally enthusiastic reception. E. F. Wickwire, by courtesy of the Ohio Brass Company, talked a little Dutch and interspersed some dialect songs in his inimitable style. At last Herman Piffletiff was discovered. A. L. Atkinson and J. P. Thompson, by courtesy of the General Electric Company, put one over with a skit entitled "Sons of Rest," which was an imitation of two peddlers waiting for an order.

Obidiah Oatcake, a delegate to the convention from somewhere up state near Franklin, Pa., poured oil upon the troubled waters and lubricated his voice with a few songs. (His real name is Ernest Wright.) Robert T. Haines and a capable supporting company presented a playlet by George Broadhurst entitled "The Coward." There was generous applause when the Pantasote curtain went down on this act to the accompaniment of a shower of American Beauty brake shoes.

Perhaps the most enjoyable feature of the evening's program was the delightful music furnished by the University of Pennsylvania Glee, Mandolin and Banjo Clubs, which were down for three numbers, through the courtesy of the U. S. Metal & Manufacturing Company, Allis-Chalmers Company and the Westinghouse Companies. Each of these big organizations did stunts in mid-season form and came in for numerous encores. The Mandolin Club tore off a "Madame Sherry" medley and a Consolation Rag that was not too bad, while the Banjo Club played a stirring march, and in addition gave a banjo-piano duet. The Glee Club made a big hit with its clever limericks. One of them ran:

"A man from slow-town named Kruger,
Where they all take their high-balls with sugar,
Where you all pay-within
And your wifey gets thin
Holding straps so the men-folks won't hug her."

Four members of the Glee Club disguised as conductors told in song how they loved Casey, not Casey Jones, but Casey T. W. The combination of "Pickle Nickers" and "Piffletiff" was a big success.

At the last minute the committee was forced to announce that Bill Conwell and his troupe of diving sea lions would be unable to appear as the dew was not heavy enough to float the hydrobile out on the Pier. No money was refunded at the box office on this account however.

Thomas A. Edison has arrived home after a two months' automobile tour of Europe. Mr. Edison had seen a large part of Europe and was greatly impressed with the progress of the old countries. The automobile was used almost exclusively, and in the 2,000 miles that Mr. Edison motored he visited, in turn, France, Switzerland and Germany. He said that while he admired the energy and enterprise of the French and the Germans, he came back more than ever convinced that America is still the world leader in human endeavor. Mr. Edison is reported to have said: "I noted progress everywhere, but Germany is leading. I also noted that a lot of the machinery they are using was manufactured in America. I had an opportunity to visit many of the great electrical and manufacturing plants in the cities I visited.

PRESIDENT BRADY'S ADDRESS TO THE AMERICAN ASSOCIATION

To-day, for the thirtieth time, our association meets in annual convention, but the organization which in 1882 was the American Street Railway Association, and became in 1905 the American Street & Interurban Railway Association, now ends its first year as the American Electric Railway Association. This final change of name makes eminently proper a brief reference to the amazing development which the association has witnessed in the industry which it represents. The track mileage of the street railways of the United States, estimated at approximately 3000 miles in 1882, and grown to an amount slightly more than 8000 miles by 1890, now exceeds, in the case of various kinds of railways, 41,000 miles, an increase of more than 1200 per cent, with over 4000 additional miles under construction. The gross annual income, estimated at approximately $35,000,000 in 1882, now exceeds $500,000,000. The annual operating expenses, estimated for the earlier period at less than $25,000,000, now approximate $300,000,000. The number of employees, estimated in 1882 at less than 35,000, now exceeds 250,000. The number of passengers annually carried, estimated in 1882 at 1,212,000,000, is now 10,000,000,000. Most wonderful of all, practically every one of the ninety thousand and odd cars now in operation has for its motive power a force absolutely unused and unknown for the purpose in 1882. Few industries have manifested so great a power of growth. None has added more to the welfare, comfort and convenience of our people during the same period of time.

In this drama of progress, continuing for almost a third of a century, our association has played an honorable and useful part. The growth of the association itself is evidence of this. Embracing within its membership at the outset seventy-eight out of a total of four hundred and fifteen companies, it now bears on its rolls three hundred and seventy companies. While these constitute only a little more than one-third of the total number of electric railways within the United States, Canada and Mexico, in their mileage they include about seventy per cent of the total electric railway mileage, and in earning power represent over seventy-five per cent of the total earning power of all electric railway companies within the countries named. These companies operate street railways, elevated railways, underground railways, underwater railways, interurban railways and partially electrified steam railways. Furthermore, these companies are so widely scattered as to afford ample representation to practically every major governmental division within the jurisdictional limits of the organization. The association is, therefore, not only free from sectionalism, but is broadly representative of the electric railway industry throughout the entire territory coming within its scope.

Such a report of progress is cause for gratification, and compels the conclusion that an organization having a membership composed of so large and influential a proportion of the industry can and should accomplish results of high value in the electric railway field.

ASSOCIATION ACTIVITIES

Permit me to review briefly the work of the association during the past year. The four affiliated associations have given active attention to the various branches of electric railway operation falling within their respective fields. Their officers and committees have devoted much valuable time to the duties imposed upon them, and are entitled to the thanks of the association for their labors and to commendation for what they have accomplished. Noteworthy in the record of the Accountants' Association is its continued co-operation with the Interstate Commerce Commission in answering all questions propounded to the commission touching matters of electric railway accounting. No question so propounded is answered until it has been considered by both a committee from the Accountants' Association and representatives of the commission. It is gratifying to note that the committee and the commission's repsentatives have finally agreed upon the answers to be made to all questions except those falling within one narrowly limited class, where fundamental differences appear to exist. The importance of this work to all electric railway companies, whether subject to federal regulation or not, and whether members of this association or not, is clear. Through such co-operation the dangers arising from the adoption of hastily formed, impracticable and erroneous theories are minimized, and a consistent code of wise and workable rules of accounting, having persuasive authority with governmental bodies everywhere, is being constructed. Matters of account connected with the National Association of Railroad Commissioners have also received the attention of the Accountants' Association. The Accountants' Association has also, through a committee, undertaken a study of the life of the physical property of electric railways. The work of this committee has progressed sufficiently to make it clear that there will finally be gathered a collection of data upon this intricate subject exceeding in value any heretofore brought together.

CO-OPERATIVE WORK

The Transportation & Traffic Association and the Accountants' Association have co-operated, through a joint committee, in the preparation of a standard method for the compilation of the expenses of freight and express traffic. The work of this committee will be presented to the two affiliated associations for their approval at this convention. The growing importance of the subject makes this report most timely. It should be remarked that the spirit of co-operation between associations, manifested by the appointment of this joint committee, is constantly growing more pronounced, thus insuring the production of results adapted to the conditions of all affected departments of electric railway operation. Another instance is found in the elaborate and pioneer report on block signals for electric railways by a joint committee from the Engineering Association and the Transportation & Traffic Association. An instance of the co-operative benefits arising from association work, although not an instance of co-operation between affiliated associations, is found in the fact that the Claim Agents' Association reports frequent instances of aid being given by one company to another in connection with the investigation and settlement of claims as the result of the close relationship of claim agents brought about through that association. It is also reported by this association that the advantages of the General Index Bureau in the detection of fraudulent claims are extensive, and justify continued support.

INTERURBAN RULES AND STANDARDIZATION

Turning again to the individual work of the affiliated associations, reference should be made to the report of the committee on interurban rules from the Transportation & Traffic Association. This report may fairly be said to be now the resultant of the best experience in interurban operating conditions from coast to coast. The code agreed on by this committee bears the distinction of having been already adopted by the New York Street Railway Association. The results of other good work of the Transportation & Traffic Association will be found in the reports of the committee on city rules and the committee on schedules and timetables. The Engineering Association, besides a continuation of its excellent work in the direction of standardization, has this year, for the first time, undertaken to co-operate in matters of common interest with other technical associations, such as the National Electric Light Association, the American Railway Engineering Association and the American Society for Testing Materials. In this way it is believed that the dangers arising from the adoption of dif-

ferent methods and conclusions in reference to the same matter by organizations approaching the subject from different viewpoints will largely be done away with. The Engineering Association has also, through its committee on way matters, developed a set of rules for the government of the maintenance of way department. Through its committee on buildings and structures, a valuable report is presented, dealing with various matters of importance, among which is that of fire protection of power houses and terminals, including open yards. The matter of specifications for overhead crossings of electric light and power transmission lines and that of clearances for third-rail working conductors have also received consideration by this association.

PROGRAMS OF ASSOCIATIONS

Your especial attention is called to the excellent programs arranged by the affiliated associations, and your attendance at the meetings at which these programs will be presented is urged. This association is engaged in serious work for the betterment of the electric railway industry, and to the attainment of that end your participation in these meetings is necessary. In this connection, reference should be made to the exhibit which has been prepared by the allied Manufacturers' Association. This exhibit represents much thought, time and pains, as well as the expenditure of much money, all for the purpose of bringing before us everything new and worthy of note in electric railway apparatus and materials. The magnitude of the enterprise is shown by the fact that the space occupied this year is 76,000 sq. ft. This exhibit is to be regarded as one of the most valuable educational features of the convention, and a careful inspection of it during the hours available for that purpose is urged as one of the means of deriving the utmost benefit from the convention.

WORK AT ASSOCIATION HEADQUARTERS

Passing to the work of the American Association itself, the constantly increasing demands upon the office in New York afford proof not only of greater activity upon the part of both parent and affiliated associations, but also of enlarged usefulness to member companies. The volume of business transacted during the past twelve months has been greater than in any previous year. To take a single item—the advance reports and papers of the various associations to be presented at this convention show an increase of about fifty per cent over those of last year, thereby entailing much additional work upon the office, through which all this matter must pass, frequently more than once. Particularly worthy of note are the constantly increasing requests addressed to the association for practical data in all branches of electric railway affairs. Some of these requests have involved much labor, in several instances even extending to the compilation of information relating to the practice of foreign companies. These inquiries frequently make it necessary to call on member companies for data. Such applications to member companies are made only when necessary to return a satisfactory response to the inquiring company, and every endeavor is made to reduce the amount of information requested to a minimum. As the basic idea of association work is co-operation, it is hoped that member companies will recognize the necessities of the case and the intention of the association to ask for no needless information and will give prompt attention to the answering of data sheets when received. In this connection reference should be made to the fact that permanent files of information in respect to important subjects are gradually being gathered in the office of the association and will become more complete from year to year. These files of information not only enlarge the amount and scope of information which may be furnished and make the same immediately accessible, but also tend to reduce the number of calls upon member companies.

At this point the fact may properly be recorded that the entire force at the office of the association is entitled to commendation for its careful attention to the business intrusted to it, and that to H. C. Donecker, secretary-treasurer of the association, are due especial praise and thanks for his loyal, energetic and intelligent interest in and attention to the affairs of the association.

MEMBERSHIP AND FINANCE

That membership conditions and finances are in a sound and healthy condition will appear from the report of the secretary-treasurer, which will be presented at this meeting. The addition during the year of forty companies to the roll of active members and of about 150 names to the roll of associate membership speaks for itself of the work of your committees on active and associate membership.

INSURANCE

There is no single act of the association during the past year more worthy of note than the action taken upon the recommendations of the committee on insurance. These recommendations for some years have been to the effect that the association should organize a bureau of insurance, which should perform services having for their general objects the securing of more definite and full information with respect to the cost of insurance to member companies and to the insurance companies themselves, the prevention of fires, the reduction of the cost of insurance and the betterment of fire protection and insurance conditions generally. After careful deliberations on the part of your officers and executive committee, it was decided that the time for action had arrived, and Mr. Henry N. Staats, of Cleveland, was chosen as the expert of the association in charge of the bureau, under the general direction of the committee on insurance. By the arrangement made, the expense of the bureau to the association treasury will consist only of the cost of added clerical work, if any, printing, postage, and other incidental expenses, while a fixed scale of compensation is provided at which any company may avail itself of the special services of the bureau. The appointment was not made until June of the present year, but it is believed that the report of the committee will afford ample evidence of the wisdom of the action taken. There is no other direction in which wisely guided efforts on the part of the association should be capable of accomplishing greater practical results to the electric railway companies within its membership. The industry for years treated the burden of insurance as one imposed by a superior power, which could neither be shifted nor lessened. The basis upon which premiums were computed was unknown, as were also the results to the insurance companies. The compilation of statistics in 1907 and 1908 by your committee on fire insurance under the lead of the present chairman, showing that of the total premiums paid during a period of about eight years only about thirty-eight per cent had been returned to the companies in the way of compensation for losses, was the first displacement of guesswork by knowledge. This was followed by wide-spread reductions in rates on the part of the insurance companies, affording a striking example of the beneficial results possible from association work. There is no reason why still further valuable results should not be accomplished in the future, both in the way of reduced cost to electric railway companies of their insurance, and, what is of yet greater importance, the prevention of fires. The need of activity by the association to meet recent proposed action by the insurance companies upon the subject of ratings will doubtless appear from the report of the committee. I recommend that member companies give full support to the new undertaking of the association in order that the possibility of securing the benefits anticipated therefrom may be fairly tried and determined.

EDUCATION

A word should be said concerning the work of the committee on education. This committee has from time to time

recommended putting into effect an educational system for the training of young men in electric railway service. Steps were taken this year, with the co-operation of five member companies, to try out experimentally the recommendations of the committee. The results will be shown by the report, which, being founded on actual experience, should be of more than usual interest.

PUBLIC RELATIONS AND WELFARE WORK

In connection with the work of the committee on public relations, your attention is called to a compilation of the laws of the various states upon the subject of public regulation by commission or otherwise which has been prepared and is practically ready for issuance. It is believed that this compilation will be found of permanent value to member companies. The expectation is that the information therein contained will be kept current from year to year.

In connection with the work of the committee on public welfare, a bulletin covering mutual benefit associations and other forms of welfare work was issued during the year. This bulletin contains in convenient form a large amount of information not heretofore accessible, and will doubtless be the subject of frequent reference by member companies on this timely and important matter.

TAXATION AND FEDERAL RELATIONS

Much and valuable work has been done by the committee on taxation, the committee on compensation for the carrying of United States mail, the committee on federal relations, and the newly appointed committee on fares, as will appear from their reports which will be made to the meeting. Note should be made in connection with the work of the committee on federal relations that the associaion has undertaken to keep member companies advised of the more important features of proposed federal legislation relating to electric railway companies. Many of the member companies are engaged in interstate commerce and therefore directly subject to federal legislation. Moreover, the enactments of the federal congress are likely to serve as the models for similar legislation by other legislative bodies. Hence it has seemed that every member company has a greater or less interest in every enactment of Congress relating to electric railway carriers. There being no other convenient source of information, it has appeared to be the duty of the association to keep its members advised of the more important proposed federal legislation affecting the industry, in order that members might, if they should see fit, communicate with their representatives in Congress or take other suitable measures to avoid the dangers of improper legislation arising from ignorance, misconception or misinformation.

LOCATION OF CONVENTION

The selection of the place for holding the present convention presented one of the perplexing problems of the year. Doubtless when the convention of a year ago was adjourned practically all present supposed that the next convention would be held at some point in the central West. Such was the expectation of your officers and the decision of your executive committee. Committees from the American Association and the Manufacturers' Association visited a number of Western cities, including Chicago, St. Paul, Minneapolis and St. Louis, and carefully canvassed the facilities of other cities asking to be considered. It was finally concluded by the joint committee that insufficient hotel accommodations, convention quarters and exhibit space precluded the possibility of holding the convention this year at any of the cities mentioned except Chicago, which was therefore provisionally selected as the location. On a reassembling of the committee at Chicago to make final arrangements it was found that the information previously secured from a supposedly authoritative source to the effect that the Coliseum building could be had for the convention was incorrect, and that that building had in fact a number of months before been engaged for practically the entire period from the middle of September to the middle of November. No other convention or exhibit hall of sufficient size being available, and other cities properly located being unavailable this year for the reasons stated, the plan of holding this year's convention in the West was reluctantly abandoned, and Atlantic City was finally chosen at the best Eastern point. Since arrangements were made to hold the convention in Atlantic City a new suggestion has been made on behalf of Saratoga which may lead to that place being shortly available as a point for the holding of a convention of the magnitude of ours. This suggestion is free from the objectionable features of the proposition which was considered by the association a year ago. Proposed additional facilities should remove some objections found to exist this year in Western cities other than Chicago. It should, however, be borne in mind that the growth of the association renders it increasingly difficult from year to year to find a city having to the necessary extent all those accommodations which the meetings, exhibits and delegates require.

REGULATION BY COMMISSION

During the past year nothing novel or extraordinary has arisen in the general relations between the electric railway industry and the public. Perhaps the most noteworthy development during this period is found in the extension of the idea of regulation by commission. Among the states which have newly adopted this method of regulation in its most modern form, Ohio and Connecticut are conspicuous. Even in conservative Massachusetts, whose pioneer railroad commission, though weak in legal power, has yet been mighty in strength, the newer ideas were vigorously urged before the legislature, and the attempt was made to confer on its commission practically all the powers of compulsion possessed by any of the later commissions. In the words of one of its long honored and leading citizens, the attempt was "in conformity with the tendency of modern thought, which recognizes no force in existence except the constable's staff, supported by the bayonet of the soldier, and regards appeal to reason as an archaic proposition," to substitute "for intelligence and reason the physical forces of the Commonwealth." These various measures, enacted or urged, taken with others of the past few years, demonstrate that the atmosphere is now charged with the commission idea. Many students of the subject believe that the final step has been taken and that this system of regulation is the method which will be permanently followed. However this may be, it is unfortunately true that in few of the states has this system been adopted as the result of a well-conceived and carefully thought-out plan of procedure. It is universally conceded that power to regulate public service corporations resides in the legislative branch of government, and it is undoubtedly true that from the standpoint of both the regulator and the regulated it should be possible to secure wiser regulation through a properly constituted commission, having opportunity and facilities to investigate before acting, than through the legislature itself. This is the theoretical view, but practical results do not always coincide with theory. Those wno appoint commissioners are not all equally wise or equally unaffected by the demands of partisan obligation, or equally unaffected by the demands of partisan politics. Then, too, commissioners differ. Some are fairer, wiser, better informed, more thorough, more careful in reaching a conclusion than are others. Some, too, take a higher view of their functions and duties than do others. The only true theory is that a commission in all matters of dispute should hold itself strictly impartial, should take no important step without full investigation and hearing, and should reach its conclusions absolutely unbiased by any extraneous considerations. It is safe to say that the commission form of regulation will fail unless in the appointment of the commissioners the ideal is pursued of selecting men who are fair-minded, experienced in affairs, well informed as to the business which they are to regulate, and, above all, thoroughly

imbued with a sense of their solemn duty as arbiters to decide all matters impartially and without bias, whether the result be pleasing or the contrary to public or corporation. Again, another proven weakness in the commission form of regulation is found in the inability exhibited in some cases to discriminate between regulation and management. If authority exists to cross this line, the result of its exercise would be harmful, and even disastrous, to both public and corporation. When the State, through legislature, commission or otherwise, has enforced the duty which the law imposes on every public service corporation to furnish to the public reasonably good and adequate service of the kind dealt in at fair, reasonable and undiscriminative rates, it should not undertake, and, I submit, has no right to undertake, to go farther and supervise and control the internal affairs of that corporation. To do so means the substitution of irresponsibility for responsibility. It would constitute an unwarranted invasion of the right of property. Such interferences were undoubtedly in the mind of the Supreme Court of the United States when it said only three years ago, in speaking of measures of railroad regulation, that "in no proper sense is the public general manager."

Another difficulty with the commission form of regulation is that in the past it has generally consisted of a mixture of regulation by legislature and regulation by commission. In other words, it has not, in fact, been regulation by commission. A conspicuous instance arose in Wisconsin not long ago when the conclusion of the railroad commission of that State, formed, after a thorough investigation, that two and one-half cents per mile was a fair and reasonable rate of fare for the railroads in that State, was repudiated by the legislature, which limited the rate to two cents. There are other instances. Now it is apparent that if the legislature will observe the conclusions of a commission only so long as they conform to the preconceived conceptions of the legislature, no great impartiality can be hoped from a commission in serious cases. The fear of being overruled, and in a sense discredited, by the legislature, its creator, must constantly prejudice the commission mind. In short, so many weaknesses have been developed in the latest forms of commission regulation that the case for their permanency and finality must be regarded as still in the early stages of the trial. The serious consequences which flow from regulatory measures of an improper character render it highly important that the public entertain correct views on this subject.

The most serious question in relation to our industry before the public mind at the present time is perhaps that of the permissible rate of return on investments in public service utilities. By putting the question in this form it is not intended to admit that the rate of return upon these investments can be in fact directly limited. It is submitted that the fact is exactly the contrary. The rate of return may be, and frequently is, a factor, and often a controlling factor, in determining whether questioned rates are reasonable or unreasonable. Surely it is the law that a public service corporation cannot charge a rate unreasonably high, or otherwise unfair, merely because without so doing it cannot earn a fair return, or any return, on its investment. If this be so, the conclusion is inevitable that if the rates of such a corporation are fair, reasonable and undiscriminative, and its service is reasonably good and adequate, the corporation has discharged its full duty to the public, and the return from such rates cannot, under the guarantees of the United States constitution, and of most, if not all, of the state constitutions, be reduced by a lowering of rates, or otherwise. The view stated is, however, not the prevailing one, and in particular is not the one held by legislatures and commissions. The view current in these bodies is that plenary power exists in the legislature, and, if properly delegated, in a commission, to lower rates and exact enlarged service in any direction, subject to no condition save that such reductions and such exactions cannot be carried to the point where the loss of revenue or addition to expense thereby caused would so reduce the return as to amount in effect to a confiscation of the property. But public power and public interest are not the same. What one permits the other often condemns. There is, however, a widely disseminated belief that the rate of return on public service utility investments not only can be but should be limited, and that the limitation should approach the point of the ordinary interest rate, or less. There is no doctrine more energetically preached than this by some of the prominent would-be leaders in public opinion of the present day. In those cases where this belief is sincerely entertained as a proposition of general application to public service businesses, it can be termed nothing but a delusion. It adds another to the many examples shown by the pages of history where a hasty generalization founded on false or insufficient premises is made the rule of action in matters of high concern. This belief can be due to nothing but a misconception of the real facts. It can have for its basis no other view than that public service businesses differ from other businesses in being practically free from risk, and offering a substantially assured source of income.

CAUSES OF THE POPULAR BELIEF

How has such a view been created? Certain prominent cases of immense returns, actual or apparent, from electric railways and other public service utilities, have done much to foster it. The sensational articles with which so many periodicals have teemed during recent years have greatly aided in its formation. More than all else, perhaps, the natural proneness of humankind to see nothing that is not open and apparent to their eyes has helped. The millions of our patrons are seen, and their payments into our treasuries are known. The cost of the service we render to each is unseen and unknown. The burdens of daily operation and maintenance, the struggle to meet the losses arising from obsolescence and depreciation, the strain to keep pace with public demands due to the growth of population or to the desire for the latest refinement in the art of transportation—these are unrecognized. The differences between properties are unappreciated. The case of the old established property, with an earning power demonstrated through many years, both good and bad, into which capital for improvements and extensions flows almost of its own momentum, is not regarded as widely different from the untried property with no history, or but a short one, behind it, with little margin between income and outage, with a future of doubt or distrust.

THE CAPITALIZATION QUESTION

Generally coupled with the doctrine that returns should be limited to a minimum is the claim that the capitalizations upon which this modest return is to be permitted should be reduced to an amount which represents the actual present replacement value of the plant furnishing the service. In other words, it is insisted that the entire burden of all losses that have arisen in the conduct of a utility shall be borne by its owners. The reason for the loss is unimportant in the minds of the proponents of this proposition. The men who installed the original horse car lines in our great cities should have foreseen that cable power would shortly offer a better means of propulsion, while those who introduced the cable car in place of the horse car ought deservedly to have been mulcted in the loss of their property because they knew not of the quick coming of electric traction. So, likewise, the pioneers in electric railway construction should have waited for the full development of the industry before they laid their rails, built their power plants, or equipped their cars, unless they were ready to bear the loss of all investments made obsolete by advances in the art or by public demands impossible to anticipate.

What could more quickly blight the growth and development of the electric railway properties of a country than to have such doctrines as these prevail? What could sooner end the promotion of new enterprises which would extend the blessings of cheap and rapid transportation into new fields? To us the mere statement of these doctrines carries refutation. Yet many hundreds of thousands of our fellow citizens hold views like these, or closely akin to them.

I have thus dwelt on these phases of our relations to the public because they clearly indicate the path which a large part of the labors of the association should follow in the immediate future. The work of economically and efficiently operating and maintaining the properties with which we are connected is important, but economy and efficiency will little avail if the doctrines indicated are to prevail. Whether they shall win or not depends on public opinion, which is nothing but the resultant of the opinions of the individuals who compose the public. Whether that opinion shall be right or wrong, fair or unfair, depends upon whether the opinions of those individuals are right or wrong, fair or unfair. During many years the practice of public service corporations was to observe silence as to all their affairs. There is little cause for wonder that as a result of this practice, taken in connection with some cases of serious corporate abuse, the public became imbued with suspicion and distrust. Prejudices and misconceptions were formed against which we must now contend. The temporary judgment of the people is often wrong. Our systems of government are founded on the theory that the people rule and that their final judgment is right. Surely, therefore, it is the part of wisdom to lay our case fully and fairly before the tribunal to which we must appeal. Nay, more, it is essential to us that we do this. The results of error in fundamental matters such as those referred to cannot be calculated. We can be certain of nothing save that they will be calamitous to all. We therefore have no choice. We must demonstrate to the people the fallacies which underlie these doctrines. But let us not underestimate the difficulties of our position. We have no spicy story to tell. We cannot drive out sensationalism by still greater sensationalism. No one will pay for the privilege of reading our arguments. Our tale is one of sober fact. It will not be listened to by everyone. The heedless will turn from it; the prejudiced will close their ears. Our appeal will attract only the man who is ready to stop and think. It must be addressed to his reason and his sense of justice. By its fairness it must commend itself to him.

In the warfare which must thus be waged against the forces of error this association should play a leading part. It is the sole representative on a broad scale of the entire electric railway industry. It should assume leadership. The various state and district associations, which have been doing splendid practical work during the past year, should co-operate. The affiliated associations and the allied Manufacturers' Association should each do its share. Every associate member should do his. But how shall the desired end be obtained? you will ask. How shall actual results be accomplished? How shall we avoid merely beating the wind or lashing the water? It is apparent that our activities must be organized and concentrated. Our membership, active and associate, must be aided in gathering and marshaling the facts and arguments on which we rely. Every member must be impressed with a sense of personal duty, as well as interest, to present our position frankly, fairly and forcibly as occasion may offer through personal argument, as well as through the press and other recognized means of publicity. Here is a field in which the smaller companies and those associated with them can do most valuable and effective work for the good of the whole industry. They are generally in closer personal touch with their public than are the larger companies with theirs. They are more likely to be regarded as component parts of the communities wherein they operate. They will be listened to with less distrust. Their words will take deeper root. They are more widely scattered and hence cover a broader field. It is of especial importance that they undertake this work. Beyond this an extension of the activities of the association itself is necessary. A new field must be entered. As a potent agency in accomplishing our aims, I earnestly recommend that the association issue at stated intervals to its members, active and associate, a publication having as a chief end the presentation of facts and arguments which refute the false doctrines we fear. Details have no place here, but permit me to add that such a publication could well be adapted to circulation beyond our membership and to quotation in the lay press.

Furthermore, the association must wage a vigorous campaign to increase its membership, both active and associate. Greater membership means greater usefulness. The issuance of the publication recommended would be of great importance in such a campaign. One important phase of that publication would be the distribution of practical information through the question box method and otherwise, as well as the keeping of members in closer touch with all association work. The interest of members in the aim and work of the association is essential to the attainment of those ends and the effectiveness of that work. Such a publication would exercise a powerful influence in stimulating the needed interest. Another means of increasing this interest is one that has been found to operate successfully in the case of another association engaged in kindred work, and the adoption of this has been strongly urged by prominent members of our own association. This is the company section plan, by which a company may, if it so desire, form a section of association members among its own forces. Such a section would be expected to study and discuss the various practical branches of that particular company's affairs, being aided therein by the association's proceedings, publications and bulletins. The advocates of this plan assert that thereby a more intelligent and personal interest in company business is fostered, employees are prepared for greater usefulness and the deadening rut of machine-like labor is avoided. I recommend that this plan be given careful consideration, with a view to the adoption of it, if the conclusion be favorable.

CHANGES IN ORGANIZATION

There is perhaps no way in which the campaign to form just and correct public opinion can be better forwarded than through work of the allied Manufacturers' Association. The interest of the members of the association is our interest, and yet they are sufficiently removed from us and in touch with other lines of business to occupy in public estimation a more impartial position than ours. Measures have been discussed during the year to amalgamate with our associate membership the personal membership of that association, and these measures are still under consideration by a joint committee representing the two associations. The precise form in which such amalgamation may be agreed on by the committee, if it shall arrive at an agreement, is comparatively unimportant, but that the two associations shall come into closer relations with each other is not unimportant. On the contrary, this is a matter of the highest importance to the welfare of the industry to forward, which is the prime object of both associations. This association will be blind to its opportunities if it shall not enlist the hearty aid and co-operation of the Manufacturers' Association, not only in the generous way in which it has been shown in the past, but also by a closer relationship which will insure intelligent and harmonious efforts to a common end. I commend this matter to the earnest attention of the incoming executive committee.

CONCLUSION

Gentlemen of the convention, a year has now elapsed since you honored me with the presidency of this association.

During that time the officers, committees and members of this, the affiliated and allied associations, as well as the forces of the technical press, have liberally and energetically aided in advancing the interests of the association, and to them I desire to express my sincere thanks and appreciation. My conviction grows stronger as the year closes that, while the past of this association has been highly honorable and useful, the work of the future is of still greater concern and value. The possibilities are vast. Remember that we play a part in that general division of industry which more than any other perhaps has advanced the cause of civilization throughout all the centuries past—that division which has to do with the breaking down of the barriers to the intercommunication of mankind. We serve one of the strongest needs of human beings in this day, and our industry is, therefore, founded on the solid rock. Our duty is to see that the structure built thereon is worthy of the foundation.

TUESDAY AFTERNOON SESSION OF AMERICAN ASSOCIATION

The opening session of the American Electric Railway Association was called to order yesterday afternoon at 2.30 by President Brady. There was a large attendance. The first order of business was the presentation by the president of his annual address. This is published elsewhere in this issue. At its conclusion Mr. Brady received long applause.

The report of the executive committee was then read. It consisted of the minutes of the meetings held during the year. Following the report of the executive committee was the report of the secretary and treasurer. It appears in abstract elsewhere and included a list of the members and associate members of the association. Secretary Donecker announced while reading his report that since its publication in printed form the number of companies which had joined the association this year had increased from thirty-seven to forty, makng the total active membership 373.

The secretary then read the report of the committee on subjects, which was represented by the papers and reports to be read at the meeting. The reports of the committees on membership, which followed, called attention to the work of these committees during the year—work which was shown by the increased number of members.

PUBLIC RELATIONS

The report of the committee on public relations, which was brief, was then read by the secretary. It suggested the selection of some one experienced in publicity work to prepare articles on different phases of electric railway operation and the making public of these articles. After the conclusion of the reading of this report the president announced that the subject was open for discussion.

James H. McGraw, Electric Railway Journal, then spoke. First he quoted a paragraph from the address presented by Patrick Calhoun, president United Railroads of San Francisco, at the 1910 convention of the American Electric Railway Association, in which Mr. Calhoun said: "No men, not even those engaged in public life, come in such close contact with the people of the cities of this country as those who manage their daily transportation. From this contact we learn an important fact—the utter indifference of the general public to what may be termed the private side of street railroading."

Continuing, Mr. McGraw said in part:

"Let us ask the question 'Who is responsible for this utter indifference? How can the public understand the railway and its problems if no one tells the story?' Some few companies, to be sure, are doing effective publicity work, but many attempts on this subject are so feeble as to be pathetic. Much has been said and written on the subject of public relations, but the industry as a whole does not realize the possibilities of molding public sentiment so that there shall be co-operation instead of antagonism toward the purposes of the companies. Only a few understand the art of publicity or its effect on the public mind. Are we really studying it as a big problem or are we simply indifferent, or not thinking about it at all? We all admit the great power of the public press. The companies that have created the machinery for affording publicity regarding their affairs are reaping the benefits of this policy. I believe for the larger companies a definite policy of publicity and a specially organized department, with a capable head to handle this feature of their operations, are as necessary as a general manager. Years ago the Pennsylvania Railroad realized the necessity of meeting the situation in this way and acted upon it to the everlasting benefit of that company. Many other large corporations have followed this example and some of the important electric railway and light companies are securing similar benefits from effective publicity work. But why should not this be done in a stronger and more concerted way? Why should not the railway manager take his rightful place in the community as a man and a citizen? Does it follow that because he is the manager of the railway and the railway is corporation-owned that he is not a real, true-blue citizen interested in the best welfare of the community in which he lives? Why should not the manager hold public office, or at least belong to and take an active part in, the work of the chamber of commerce, board of trade and other civic organizations which have for their objects the betterment of local conditions?

"Suppose we make up our minds to let 'bygones be bygones' and that the public, which after all is fair, concludes to hold the same attitude toward us. Electric railways are absolutely essential to the well-being and comfort of the communities. The properties have been developed so rapidly and wonderfully from the horse or mule cars of twenty or twenty-five years ago that it is almost impossible to realize that this evolution has taken place in so short a space of time. But, notwithstanding the great progress in railway construction and operation, we appear to have gone from bad to worse in our relations with the public. The public relations side of the business has been neglected and the deadening results of this are apparent on every side. Therefore, I say it is time to have a fresh start in this end of the business. Consider what attitude the railways invite, what attitude they are fairly entitled to have the public hold. The railway is helpless without the public, but so is the public helpless without the railway. There should be co-operation, a recognition of problems that affect the one as much as the other and a frank agreement to work together for the undoubted best interests of all concerned.

"As a fundamental consideration, publicity should be real and not fancied. Newspaper men are human and have sympathies. They like to be treated frankly and trusted. They are the principal representatives of the public with whom the railway officials come in contact. They reach more people among the passengers than can be reached in any other direct way. If, when they come to the railway office on legitimate business, they are compelled to wait an unreasonable time for an audience and are not treated courteously, they resent it. If they are shown that the railway has nothing to conceal, that it is glad to assist them in any legitimate inquiry and that officials are willing to see them at all possible times, they will naturally assume a more friendly attitude.

"Real publicity of financial matters has not been practised by many electric railways. The companies should take the initiative in this matter and not wait for the public to lay down a new policy. Statements should be issued in sufficient detail to show the principal classes of expenses. Such statements should permit the public to calculate how much is being spent on maintenance in order that it may be shown

whether the property is well maintained out of earnings. They should show the proportion of taxes paid in order that the public may realize that whatever is paid is a charge that has to be met from the earnings of the company from fares.

"The companies should analyze their capitalization. In the past the capital accounts have borne some expenses that are indefensible and other expenses that should be defended to the last ditch. The public should recognize the validity of outstanding securities issued in accordance with the law. While this is the logical position of the companies, there is more that can be done. A valuation of the property should be made by every company in order that the officials may know what actual assets are owned. This valuation, of course, should not be of the purely physical items, but should include the many classes of intangible values which represent actual cash investment that should be retained in the capitalization. If, after a valuation, items are found that should not be kept permanently in the capital accounts, they should be written off by degrees. If this policy is adopted it will strengthen materially the position of the companies. While outstanding securities issued should receive full public recognition, the companies, after the experiences of the past, should live up to the highest standards of finance in all future issues of stocks and bonds.

"Again, many questions of operating problems can be treated publicly through the newspapers or otherwise to the everlasting benefit of the companies and the instruction of the public. If the companies have a difficult problem in routing so as to accommodate the rush-hour traffic, or in meeting reasonable transfer needs while preventing abuse of the transfer privilege, the public should know the facts. Why should not the operating officials as well as the presidents and the boards of directors be authorized to speak for their companies on all questions of public policy? If the public makes a complaint it is much better to give a prompt and reasonable answer and to attempt to remedy the grievance at once than to write that the matter has been referred to the proper department for investigation and—what may frequently happen to be the case—permit a long delay to intervene before the complaint is answered. The companies should open the door to the public and welcome legitimate complaints, because they frequently disclose a source of friction which can be remedied easily. It should be made easy for the public to do business at the railway office. If the principal officials are not accessible there should be competent subordinates who can take such action at once as will turn a dissatisfied passenger into a satisfied patron of the company.

"If a railway is a semi-public institution, it is also a semi-private business enterprise, and the two interests have to meet at a halfway point where they can co-operate and accomplish the best results. It goes without saying that adequate and efficient service is necessary. But what is reasonable to give on one line is unreasonable on another line. The public should be told this fact. Only so much service can be provided, and if passengers have speed in travel they do not always get seats or the utmost comfort. If they get seats and plenty of comfort they cannot always have speed. The steam railways do not give parlor-car and limited accommodations without extra payment, and street railways cannot do it, either. It is unfortunate that electric railways are still suffering from the sins of the past and the feeling that the public holds in many communities because of old cases of overcapitalization, poor equipment or shiftless management. The corporations are berated by demagogues because it is their stock in trade to follow that policy; by politicians who want to increase their public following; and by the public, largely because of ignorance of the facts. The public has been misled by perverted statements. Overcapitalization and inefficient service in some places have given color to the charges of the opposition. Yellow journals and muckrakers have magnified these situations and enlarged upon them in a most brutal way. The voice of the alarmist and demagogue is still abroad in the land and many of the railways have been silent and failed to make their side of the case plain to the public.

"The silence has been misconstrued and the public has been led to believe that in some instances the railway corporations did not dare to reply. We must remember the will of the people in this country is sovereign; public sentiment can be molded toward the right and the protection of property as well as in the opposite direction.

"When we consider all the facts from a broad point of view, we assert, and the public should agree with us, that the street railway has been the agency which has accomplished more for this country in the settlement of outlying districts than has been done in any other important country of the world. Many of you, I think, will agree that the railways have been too liberal with their extensions. In the future, extensions should be financed on a business basis. Either they will pay and therefore should be constructed, or they will be a burden on the system for years and should not be constructed. It would not be better for the communities if extensions were restricted, but it probably would be better for many of the companies.

"The time has passed for concessions in fares and for any concessions in transfers that do not absolutely have to be made to furnish the public the accommodations to which it is reasonably entitled. Where there are state commissions, these bodies are effecting a measure of publicity that is new to many companies. In a large number of states it is no longer a question of whether there shall be a commission, but a question of whether commission regulation will work out satisfactory and acceptable conditions. The companies have the experience and every incentive to be in advance of the commission; to lead them in investigations, and to teach them the facts about the railways. The companies antedated the commissions and should create within themselves conditions that will lead to public commendation, not to more public censure.

"There is talk about the inadequacy of five-cent fares and that this is justified in many cases is indicated by the six-cent fares that have been established in Massachusetts under the authority of the conservative Board of Railroad Commissioners of that State. In many companies, however, there is insufficient knowledge about costs of operation for scientific consideration of this subject. I wish to emphasize before this association the need for a careful analysis of costs in order that the position of the companies may be strengthened in every way. The true costs should include all expenses that should be charged on account of depreciation. It has not been possible for companies to meet all the expenses arising from revolutionary changes in the art without additions to their capital account. It is improbable, however, that any such revolutionary changes will take place in the future, and certainly from this time on adequate provision should be made for the depreciation that accrues each year.

"In all these matters of costs, as well as of capitalization and operation, the remedy is publicity. Every company should have a definite policy, well understood by all the officials and employees, regarding the relations with the public. That policy must be one of frank confidence, and the company and every representative who deals in any way with the public must tell the truth. Every official and employee who thus tells the truth must have the absolute backing of the management. The public must come to learn that the company is telling the truth on all occasions. If that policy is followed public confidence in the management will increase. It pays to deal with the public in this way."

Continuing Mr. McGraw said that he believed that in following the suggestions of the president's address the

association should lead in this important work of public relations. The association had, as shown by the secretary's report, slightly less than 400 member companies. There were more than 1000 operating companies in the United States. Why should the association not have 750 or 800 members? The association was doing a splendid work. The foundation was well laid, but the biggest and broadest work was yet to be done. There were about 12,000 officials and salaried employees of the electric railways of the country, not including any wage earners. Why should not the American Association have 5000 or 6000 associate members instead of 1200, as given in the report of the secretary? About one-half of the associate membership was made up of representatives of the Manufacturers' Association. The speaker believed that every member of the affiliated organizations should become an associate member of the parent organization, as well as all of the members of the Manufacturers' Association and their representatives attending these conventions. The company section idea, of which the president spoke, would be an effective means of increasing the associate membership. The Manufacturers' Association was doing a splendid work and was living up to its present opportunities. The speaker asked, Why not make the opportunity larger and together preach the gospel, all telling the same story in the interests of the great industry which this association represented?

P. S. Arkwright, Georgia Railway & Electric Company, Atlanta, Ga., said that he was connected with a comparatively small company in a Southern community which asked the best service, but was very responsive to any generous or liberal treatment on the part of the street railway company. He took it as a matter of course that a street railway which assumed to perform the service of transportation had to give good service. It had to do so at a reasonable fare and he did not think that the company should expect any particular returns from the public simply because it had furnished good service at a reasonable fare. Owing to the peculiarity of the business, railway companies had many avenues through which to raise the opposition and antagonism of the public. The company met the public under all sorts of conditions and in all sorts of humors. Its business was transacted on a public map, laid down in the streets of the city, before the eyes of the public, which knew every mistake before even the company. The company limited the public on its transfers, as to what time they should be used, as to what place the public should change from one car to another, etc. In the nature of the business the company had to have many rules. It was running public conveyances for the convenience of the general public, and to do so it had to run counter to every separate individual convenience. So the company had many ways to arouse the antagonism of the public. Again the company occupied the public streets and nearly every hour of the day did something that somebody did not like or somebody else did not approve of.

The speaker thought that in cultivating proper relations with the public the company should start out by giving good service, as good as it could reasonably give, keep its tracks in good condition, keep its cars clean and well painted, keep its men as neat and as courteous as possible. But it must not think that when this was done and a fare was charged it was at quits with the public and the public was at quits with the company. He thought that the company had to go beyond that. It had to give the people something more than they had paid for; to treat them as Mr. McGraw had said, always with the utmost courtesy. The company was very close to the people. If a man had a dispute about a transfer, or if a conductor did not stop at one side of the street or the other, the passenger would come to the president of the company and complain about it. The company had to hold itself ready to meet any patron of the company who came in the proper way to register a complaint or speak about the railway business. In that way the company could accomplish good; it could create a liking for a street railway company if it treated the public right, gave it more than it was entitled to, gave it more than it could properly demand, treated it with liberality and generosity.

Mr. Arkwright said that if a company got from the public only what it had the right to demand, there was not a company which could live. It was continually asking favors of the public; it was continually asking the public to put up with conditions the reason for which its managers knew but the public did not know, but which meant public discomfort. The public was crowded in the rush hours. The company knew that this could not be helped, but it was inconvenient and uncomfortable. The company asked for new franchises and for renewals of its franchises; it asked the public not to demand too long a ride or too low a fare. It was always asking favors of the public. Any street railroad company or any other company or individual that expected a favor must grant a favor. It must cultivate a kindly relation, and a railway company must cultivate kindly relations with the public, not alone with words but by acts of generosity and acts of liberality to this public.

The speaker said that whatever the situation might be in the larger cities, in those the size of Atlanta the street railway was the most important industry of the city. It represented the largest industry. It was the largest taxpayer; it had the greatest number of employees; it had the largest gross and net business. It was the first thing that a visitor to the city saw; it was almost possible to judge a town by the kind of street railway it had. The company was the most prominent thing in the city; it was the most prominent citizen in its community, and if it occupied that relation, he thought that relation ought to be sustained. The company ought to contribute within reason to any proper enterprise gotten up for the benefit of the public. His own company invited requests of this kind and always complied with them. In regard to extensions, the street railway could not extend indefinitely, but it ought to make reasonable extensions. It ought to be the cause of the growth of the community and never let it be said that it in any way unreasonably restricted that growth. It should meet demands for increased service before it was compelled to do so by order. It ought to see far enough in advance and endeavor to meet the demand before the demand reached such a point as to mean compulsion. He did not mean unreasonably frequent service, but he meant that the company should keep a little in advance of what the authorities could make it do. Sometimes the company was rubbed the wrong way and unjust demands were made of it. Sometimes these unjust demands prevailed and the company knew it was being treated unjustly. It was hard in human nature not to get sore and sour about such a thing, but the speaker did not think that even under unjust treatment a company should become sour and sore with the public. It might have a fight with the public but never a feud.

EDUCATION

Prof. H. H. Norris, Cornell University, presented the report of the committee on education and called attention to the essential features of the plan which had been tried this year. If a young man had no brain, there was nothing that could be done with him; but assuming that he had a brain he would become a better employee if his brain was stimulated. That was the theory upon which the committee on education had been proceeding for the last four years. This year the committee put its theories to a practical test. It invited five companies conveniently located to co-operate in an actual experiment. Each of these companies was asked to contribute a reasonable sum of money and five young men upon whom the committee could experiment. The results of that experiment were described in the report. The idea was that if a boy was working at

some particular job, no matter how dirty or commonplace that job was, there was more in that job than appeared on the surface. If that boy or young man could be stimulated to go further than the immediate demands of the job, then he was made to undergo a process of self-education. A young man might be turning commutators. He would be a satisfactory employee if he turned off the commutators in a satisfactory manner. However, he was not educating himself by simply smoothing off the commutators. But a commutator was an elegant piece of equipment if it was properly comprehended, so the committee's plan encouraged the young man to study the commutator and see how it is made. The committee believed that the experiment had been reasonably successful and recommended that the experiment be continued another year, and that the number of students enrolled be increased from 25 to 100.

President Brady announced that discussion of the report would be postponed to a later meeting owing to the lateness of the hour. He also announced that the address by William G. McAdoo on the subject of the Hudson & Manhattan Tunnels had been unavoidably delayed until the session of Wednesday afternoon, and the address of Charles L. Henry, president Indianapolis & Cincinnati Traction Company, on the subject of "The Interurban" had been advanced from the session of Wednesday. In introducing Mr. Henry the president said that Mr. Henry was probably the only person connected with the electric railway industry who had the honor of introducing a new word into Webster's dictionary. The word "interurban" owed its origin to Mr. Henry. An abstract of Mr. Henry's address is printed elsewhere.

After the reading of the paper President Brady announced that the discussion of Mr. Henry's paper would be postponed until a later session. He urged all delegates to be present in attendance on Wednesday so that the meeting could begin by 2.30 at the latest. A motion was made and carried that a telegram be sent to W. Caryl Ely conveying the congratulations of the association upon his recovery from his recent illness.

The meeting then adjourned.

ANNUAL REPORT OF THE SECRETARY AND TREASURER OF THE AMERICAN ASSOCIATION*

At the close of the fiscal year 365 companies were enrolled as members, a net increase of fifteen over the number shown on Sept. 30, 1910. The growth, however, is more substantial than this number would indicate, as the total membership was considerably reduced because of a number of consolidations during the year, which brought about a net loss of seven companies. Inasmuch, however, as these consolidated companies are still represented in the membership of the association, it will be seen that there has been an actual increase during the last fiscal year of twenty-two companies. It is also gratifying to note the small number of resignations and the equally satisfactory condition as regards delinquents, which indicates that the interest of the old members has been well maintained.

Associate membership now totals more than 1200, or a net increase of about 12 per cent. The number of withdrawals from this class of membership was sixty-five, which in percentage is considerably lower than that generally obtaining in organizations of a character similar to the American Association. The delinquents, it will be noted, are fewer in number than in 1910.

RECEIPTS AND EXPENSES

The receipts for the year 1910-1911 were $43,353, or a net gain of $3,072 over the year 1909-1910, more than $2,200 of which can be attributed to increases in annual dues of old member companies and dues from new member companies. Expenses have increased $4,214.62, to $40,289. Most of this increase is due to the greater amounts appropriated to the affiliated associations and to the increased cost of printing the annual proceedings, which last year covered 2100 pages, as against 1750 in 1909, or a 20 per cent increase, which in connection with the larger number of volumes distributed is responsible for an added expenditure of approximately $1,200.

The operating expenses of the affiliated associations show an increase of $2,200. The change in the name of the association, necessitating the free exchange of associate membership badges, entailed an outlay of more than $400. It will be seen, therefore, that these three items of extraordinary expense account for $3,800 of the $4,200 excess. The amount paid in salaries is $1,900 more than in 1910. The figures for the two years, however, are not strictly comparable, for the reason that the expenditures for salaries during the past year should be considered in their relation to the total expended for the same item in 1908, or $9,700. This because of the fact that the organization of the headquarters force was then identical with the 1911 and normal arrangement. The office force exactly equals in number that employed in 1908, though in the meantime much work has been added, as may be seen from the consideration of the following comparisons:

For instance, in 1908 there were 262 active member companies; in 1911 there are 365. The associates in the same period have increased from 249 to more than 1200.

GENERAL DATA

The number of committees is now close to 50, as against 34 three years ago, while the individual membership of these committees has grown from 168 to considerably more than 300. Another item is the substantial increase in pages of printed matter distributed in advance of the conventions. In 1908 the association sent to the members 668 pages of such material, while in 1911 the total is approximately 1025. The headquarters also finds itself oftentimes able to assist the committees through the compilation of data and in research work. As the files of the association continue to grow, there will be more frequent opportunities to aid in work of this sort, and naturally these files will also add to the value of the work of your association, inasmuch as it will be better able to provide needed information promptly to the member companies. The data which are continually being added will also be of value in the advancement of such publicity plans as the association may elect to carry on in the future.

* Abstract of report read before the American Electric Railway Association, at Atlantic City, N. J., Oct. 9-13, 1911.

ODD AND EVEN STOPS

The plan of stopping cars only at every other street has been inaugurated for the rush-hour service on two of the lines of the Kansas City Railway & Light Company, and probably will be installed on other city lines. During rush hours signs reading "odd" or "even" are placed on the front vestibules of these cars, thus indicating whether a car will stop at the odd-numbered or even-numbered street. On those streets which run east and west and are named instead of being numbered the company has a sign on the poles at the corners designating in black letters on a white background whether that corner is "odd" or "even." It is well known that a considerable proportion of the schedule time of a car is taken up in loading and unloading passengers, and James E. Gibson, general superintendent, states that while exact figures are not available he is certain that the plan of stopping alternate cars at alternate streets has been of material assistance to the company and has improved the service from the standpoint of the public.

The Ford & Johnson Company is showing in space 209 a light, durable and sanitary, all-steel seat for street and interurban railway cars; also a line of fiber rush and reed furniture for buffet and parlor-car service.

OPENING MEETING OF THE ACCOUNTANTS' ASSOCIATION

President W. H. Forse, Jr., of the Accountants' Association, called the annual meeting to order at the Hotel Chalfonte at 10.15 a. m. yesterday. Mr. Forse then read the annual address of the president, which is published elsewhere in this issue.

H. E. Weeks presented the report of the executive committee and then his report as secretary and treasurer.

E. D. Gault, auditor Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, then read his paper on the subject "Accounting System for a Small Electric Railway."

Before the association proceeded with the discussion of this paper the chairman called on C. N. Duffy, Milwaukee Electric Railway & Light Company, who expressed his pleasure at being present and spoke in reference to the plan for the establishment of company sections. Mr. Duffy said that the National Electric Light Association had developed company sections very successfully. He realized that many officials of member companies, as well as employees who would take an interest in the proceedings, were unable to attend the annual meetings. The real idea of associate membership is that the work of the association shall be brought directly to the companies.

In the company sections the meetings are held monthly, so that the work is brought closer to the individuals than if they attended only the annual gatherings. Mr. Duffy referred to the matter of expenses, which he said would be only slightly, if at all, greater than with the present form of organization, while the benefits would be multiplied many times. In these times much is heard about the education of the public, education and development of employees and welfare methods. The company section would afford abundant opportunities for work along these lines. Through the great development of company sections the membership of the National Electric Light Association had been increased from 3000 to 10,000. Before the Milwaukee Electric Railway & Light Company section of the National Electric Light Association was established in September that company had among its officials five associate members of the organization. When the first meeting of the company section was held 110 members were enrolled. To establish this plan would be the most important thing that the American Electric Railway Association could do. Mr. Duffy urged the members to use their influence to secure the adoption of the plan.

DISCUSSION ON "ACCOUNTING SYSTEM FOR A SMALL ELECTRIC RAILWAY"

The discussion on the paper read by Mr. Gault was opened by Robert N. Wallis, Fitchburg & Leominster Street Railway. Mr. Wallis said that the paper was practically a textbook and spoke of the large number of small companies. According to the 1907 census report, seventy-six companies had gross earnings of over $1,000,000, fifty of between $500,000 and $1,000,000, eighty of between $250,000 and $500,000, 182 of between $100,000 and $250,000, and 551 of less than $100,000. More than two-thirds of the companies, therefore, had annual gross earnings of less than $100,000. The association owed it to the representatives of these companies to assist them in all matters relating to their accounting. By such papers as that read by Mr. Gault help could be given to the small companies.

Mr. Wallis suggested the elimination of some features in order that greater simplicity might be attained. The small road should adopt a system that was suited to the size of its operations. Mr. Wallis knew of a small system which combined the voucher record with the cashbook. There was no reason why a combined record of this nature should not be used. He would suggest the combination of several of the records. The use of the journal might be confined, as stated, very closely to a record of non-cash items. He thought that an accounts-payable ledger was absolutely necessary, even on the smallest property, although personally he liked cards a little better than loose-leaf sheets. The question of vouchers could be simplified a good deal on a small property by the use of the original bill and by sending a simple voucher check. The classification of park accounts suggested by Mr. Gault was complete and might be adopted.

E. L. Kasemeier, Ohio Electric Railway, believed in keeping the accounts of a small road in the same manner as a large road. Not much work would be required to do this on a small road and standard methods would be an advantage.

G. B. Cade, Atlantic Coast Electric Railroad, said that he used the standard classification of accounts and two men in the accounting department did all the work of the department. About 60 per cent of the total receipts were taken in during the four months of the summer season. All the books were closed and the accounts completed inside of two days. He did not keep a detailed job-order system, but kept a record for the purpose of reporting information and could tell the cost of any job.

E. L. Schmock, Cleveland, Painesville & Eastern Railroad, kept a separate ledger for job orders and made the journal entry at the end of the month. If a car was rebuilt to any material extent or a side track, addition to the power house or lighting line should be constructed, a job order would be prepared.

J. N. Joel, Utica & Mohawk Valley Railway, explained the job-order system in use by that company. The road is divided into sections and to each section a number is given. As the work is done by uneducated men, all that the time report shows is the number of the section and the number of hours' work on the job. Payrolls are distributed according to the job-order number and the accounting department furnishes the proper number and name of the construction account. Each order shows the total expended for the month, divided under different headings. The job-order report covers 150 pages each month.

Perry L. King, San Antonio (Tex.) Traction Company, had used the job-order system to great advantage. Expenditures were carried directly into the general ledger and consolidated at the end of the year.

Mr. Kasemeier referred to the use by the Ohio Electric Railway of "a.f.e.'s," or authorizations for expenditures. These are given numbers and charged on the books by numbers. A sheet is kept for each job. This shows the amount authorized, the amount expended to date and the balance unexpended. The amount authorized cannot be exceeded unless additional authority is given. .

W. F. Ham, Washington Railway & Electric Company, spoke of the relative importance of the records affecting construction and operation. No matter how small the company might be, it was very important that the expenditures for construction should be kept in such shape as to afford the necessary information and a permanent record. The time would come when operating records would cease to be of particular importance, except that the general results should be known. But it was essential that a record of cost should be kept in good shape. In many cases where information regarding past costs was desired it was not obtainable, although at some time such information had undoubtedly been in the possession of some previous official of the company. Permanent records should be made for the information of the official who would go over the property at some future time.

Robert Morrison, Jr., Michigan United Railways, agreed fully as to the necessity of having the accounts complete. In the case of his company several properties had been consolidated and nothing was to be found in the records regarding the early costs. Now a complete record was kept. The job-order system was used and a cost analysis sheet made up once a month.

Mr. Cade said he made up every year a detailed permanent record of construction expenditures.

Mr. Morrison thought that it was desirable to keep an accounts-payable ledger. It helped to prevent the duplication of vouchers and was convenient for the purpose of showing expenditures over a certain period.

Will Browne, Utah Light & Railway Company, referred to the desirability of entering bills in the accounts-payable ledger as soon as they reached the office.

F. E. Smith, Chicago Railways, thought that if a road purchased, for instance, from 100 manufacturers there would not be occasion to know how much had been bought from more than two or three.

C. E. Calder, Eastern Pennsylvania Railways, said that the accounts-payable ledger had been very valuable. It enabled the company to refer to former prices and firms with which there had been transactions.

J. H. Neal, Boston Elevated Railway, said that there was great danger of the payment of duplicate bills. He thought that in corporation accounting the accounts-payable ledger was disappearing rapidly and a duplicate of the voucher was taking its place. When bills were entered on a voucher a carbon copy of the voucher was made and filed alphabetically.

F. B. Lasher, New York State Railways, submitted a voucher record sheet that gives some detail, but is a substitute for a voluminous record sheet.

Prof. M. E. Cooley, of the University of Michigan, who is to address the Accountants' Association on Thursday morning on the subject "Overhead Charges," was requested by President Forse to speak to the members and explain his regret at his inability to appear before the association last year as he had expected to do. Professor Cooley said he realized in his own work in connection with valuations of properties that the engineer labored under a serious handicap because of his lack of knowledge of accounts. He wished that he were a thorough accountant. Professor Cooley said that he would be glad to receive suggestions as to the specific character of overhead charges which the members would like to have discussed.

On the motion of H. J. Davies, Cleveland Railway, the privilege of the floor was extended to Professor Cooley.

Report of Committee on Interline Accounting

In the absence of L. T. Hixson, chairman of the committee on interline accounting, the report of this committee was presented by E. L. Schmock. This report is published elsewhere.

Mr. Forse called attention to the last paragraph of the report. A previous report on this subject, made about two years ago, recommended the unit type of waybill. There was a difference of opinion among interurban accountants who had interline business regarding the use of the unit or the blanket waybill and opinions would be a help.

H. S. Swift, Toledo Railways & Light Company, said that some interline billing was done by his company. When the report recommending the use of unit waybills was presented before the association he thought of introducing it in the Toledo company, but found that it would not be acceptable to roads with which an interline business was done. Except where reasons of that character existed, however, he thought that the unit type of waybill would be advantageous.

H. B. Cavanaugh, Cleveland, Southwestern & Columbus Railway, said that the use of the unit waybill made it necessary to carry one for each shipment and increased the number of bills to be handled.

Mr. Morrison said that with his company a great many small shippers required a copy of the waybill. It would be manifestly impossible to have the necessary three copies of a unit waybill made, particularly by other roads concerned in interline shipments.

Mr. Forse said that for companies doing a purely local business he believed it was an advantage to have the expense bill written by the forwarding agent. The unit waybill was an advantage in case wagons were waiting for shipments.

Report of Committee on Car Miles and Car Hours

The report of the committee on car miles and car hours was read by C. N. Lahr, chairman, Northern Ohio Traction & Light Company. This report is published elsewhere in this issue.

Mr. Duffy said that the Milwaukee Electric Railway & Light Company was very much interested in the matter of the application of the car mile or car hour. It seemed to him that the weight of the car, the speed and the character of operation as between city, suburban or interurban, had to be considered. In the Milwaukee operations one operating company owned the suburban and interurban lines and another company the city system. The suburban and interurban cars were operated by the city company inside the city limits. The company had gone very carefully into the question of which would be the better unit for accounting for the operations of the suburban and interurban lines inside the city limits. The wages of conductors and motormen could not be apportioned on the car-mileage basis on account of the varying speeds in the different classes of service. In addition to this question there was the problem of proper division of the Public Service Building terminal and of the administration expense. The car hour was less unsatisfactory than the car mile because of the impracticability of apportioning many expenses. It was entirely proper that some standard should be established, but there were times when varying circumstances had to be taken into account.

Mr. Kasemeier said that the purpose of the committee was to afford a basis that would keep the comparisons fair from year to year.

Mr. Ham said that the Washington company had been confronted by peculiar conditions, and could not keep its car miles in the manner suggested. He thought that the committee might go a step further and show motor-car and trail-car mileage. In the operation of trains on elevated roads and subways trail cars were used and the subject would be dealt with more fully if the committee took up those topics. He would also like to have the committee consider the feasibility of the unit "seat miles." This unit, it appeared to Mr. Ham, eliminated many of the disadvantages of the car mile unit. If there was any practical way of working out a means for the adoption of this unit it ought to be considered. It would be desirable to continue the committee with a request that it amplify its report so as to show separately motor and trail cars and a consideration of the seat-mile unit. Mr. Ham moved that this be done.

Mr. Wallis thought that the seat mile or passenger seat mile had been suggested by Frank J. Sprague about fifteen years ago. He knew of one property which used this unit satisfactorily for comparison of results of operation of different divisions and lines and to show whether single-truck or double-truck cars should be operated on certain lines.

Professor Cooley said that he thought that the subject was worthy of further work by the committee. The car-mile unit became an important item during the Chicago appraisals of 1906. In the valuation of franchises it was finally decided to use the car mile as a basis. This was not wholly satisfactory, but it was the best unit known at that time. The accounts had been kept so that they showed the division of earnings by lines and earnings were distributed in proportion to the car mileage on each section. A car-seat-mile unit might be very useful.

Mr. King suggested consideration of the ton mile as a satisfactory unit.

F. E. Smith, Chicago Railways Company, said that the power-mile had been used by his company.

In view of the discussion on the paper it was suggested,

in accordance with the motion of Mr. Ham, that the committee should be continued and asked to consider the other units suggested.

M. R. Boylan, Public Service Railway, asked whether the committee had found that work-car hours are reported in total car hours and thus used for statistical purposes.

In the ensuing discussion it was brought out that companies showed the total car hours made by work cars, but did not use them in the statistical compilations.

President Forse then announced the appointment of the following committees:

Nominating committee: W. B. Brockway, M. R. Boylan, E. L. Kasemeier, H. B. Cavanaugh, H. M. Grafton.

Resolution committee: F. A. Henly, J. H. Neal, R. N. Wallis, H. D. Vickers, Arthur A. Wilbur.

The association then adjourned. A convention photograph was taken immediately after the adjournment. The members then went to the Marlborough-Blenheim Hotel for the annual "get-together" luncheon.

TUESDAY MORNING SESSION OF CLAIM AGENTS' ASSOCIATION.

The first business meeting of the Claim Agents' Association was held at the Traymore Hotel Tuesday morning. The session was the best attended in the history of the association, over sixty-five members being present. The first order of business was the presidential address by H. V. Drown. Mr. Drown said he had confined his efforts to three main issues, not because there were no other perhaps equally important matters worthy of attention, but because he felt that to have attempted more would have resulted in confusion and lack of accomplishment. His first object had been to encourage a more general and systematic use of the index bureau; his second, to promote a general cooperation among claim men to the end that they might work together and for each other whenever and wherever possible and practicable; his third, to increase the attendance at the conventions. He had received courteous and prompt replies to his various communications on these subjects, and had been greatly encouraged.

He felt that the index bureau was now a fixture, and that it would become proportionately more valuable as the number of claimants' names on file increased. He had hammered so hard on this subject that some might get the impression that he considered this work a sort of panacea for claim department ills. He did not so consider it, but believed the work absolutely essential to a well-conducted claim department. In these strenuous days, when there was so much more to contend with on all sides than in the halcyon days of old, the claim agent who did not use every legitimate means of minimizing his expenditures was losing his grip.

His second object, to encourage co-operation among claim agents, apparently did not need much promoting. He had personally received requests from claim men from all parts of the country to handle work for them in his territory, and he had made many similar requests. The work he had thus assigned had been admirably handled in each case, and at a great saving in railway fares and incidental expenses.

The third object, that of increasing the attendance at the conventions, had been achieved, as was shown by the attendance. It was his hope and belief that those who had come for the first time would find it so well worth while that they would come each year thereafter. Not a delegate or guest should be allowed to go home with the feeling that the good right hand of fellowship had not been extended to him or that he had not had an opportunity to exchange his ideas with his fellow workers. In conclusion Mr. Drown expressed his appreciation of the hearty support given him by the members of the association and the various committees, and said he was especially indebted to B. B. Davis, secretary of the Claim Agents' Association, and H. C. Donecker, secretary of the parent association.

The first papers were on "Trainmen, Their Selection and Method of Instruction in Order to Obtain Complete and Intelligent Accident Reports," by E. P. Welsh, attorney United Railways Company of St. Louis, and A. E. Beck, claim agent British Columbia Electric Railway. In the absence of Mr. Beck, the latter's contribution was read by George Carson, claim agent Seattle Electric Company. There was a general discussion on this topic led by F. W. Johnson, Philadelphia Rapid Transit Company.

AFTERNOON SESSION

The first business of the afternoon session was papers on "The Practical Value of the Index Bureau, with Some Statistics and Illustrations," by H. R. Goshorn, general claim agent Philadelphia Rapid Transit Company, and Cecil G. Rice, superintendent of claim department Pittsburgh Railways. Mr. Rice was present to read his paper, but C. B. Hardin, claim agent United Railways of St. Louis, read the paper of Mr. Goshorn in the latter's absence

Messrs. Hooper and Holmes, of the Hooper-Holmes Bureau, were present. Mr. Hooper made an address on the value of the index bureau in claim agent work on electric railways. After some discussion on this subject a temporary adjournment was taken for the purpose of having the annual photograph made.

Upon reassembling, the first order of business was the papers on "The Prevention of Accidents," which were divided in two parts as follows: (a) "What Can Be Done to Increase the Interest of Employees of All Departments in This Work," (b) "The Best Means of Promoting Greater Caution on the Part of the Platform Men," by E. C. Carpenter, claim adjuster Indiana Union Traction Company, and F. J. Whitehead, secretary and claim agent Washington Railway & Electric Company. In the absence of Mr. Carpenter, the latter's paper was read by Mr. Hardin. After discussion of these topics, a vote of thanks was extended to the authors of the papers of the day.

Upon motion a committee was appointed to draft resolutions of condolence on the death of E. R. Roberts, claim attorney Knoxville Railway & Light Company. These resolutions will be forwarded to Mr. Roberts' widow and to the Knoxville company.

The following gentlemen were appointed as a nominating committee to report Wednesday morning: C. B. Hardin, St. Louis; James R. Pratt, Baltimore; William Tichenor, Indianapolis; George Carson, Seattle, and R. E. McDougall, Utica.

The meeting then adjourned.

OBSTACLE GOLF NOTES.

Some phenomenal scores were made on the obstacle golf links yesterday. Frank Hedley made the first hole in 1 and returned a card of 28, or one under par for the nine holes. W. O. Wood earlier in the day made a score of 30, and the betting was lively that he would win. Excitement ran high after Frank Hedley's first two holes indicated that he was out for a record, and the King of Queens helped out the noise by announcing the score of Mr. Hedley after each hole. The ladies are evincing great interest in the game. Mrs. Frank Donohoe made a 27, and this score is likely to stand as the amateur or even the professional record for the course.

The number of delegates and manufacturers' representatives registered up to 5 p. m. Tuesday almost equaled the registration for the entire week last year. The Manufacturers' Association had given out 1098 badges. The American Association had registered 200 members, Accountants' Association 90, Claim Agents' Association 70, Engineering Association 235, Transportation & Traffic Association 130. In addition to these 125 guests, 60 associate members, and 290 ladies had been registered. The total at the end of the day therefore was about 2300.

MEETING OF THE ENGINEERING ASSOCIATION

The session yesterday morning of the Engineering Association was called to order at 10 o'clock by President Harvie, who reminded the members that the first meeting of the American Association would occur yesterday afternoon, that it was open to all members, and that all those who could attend were urged to do so.

HEAVY ELECTRIC TRACTION

The report of the committee on heavy electric traction was then read by E. R. Hill. This report is published elsewhere in this issue.

The first discussion was on a letter from E. B. Katte, chief engineer electric traction New York Central & Hudson River Railroad. This letter was read by the secretary and follows:

"Again I am prevented from being present at the session of the Electric Railway Engineering Association at which the report of the committee on heavy electric traction will be presented. I am particularly sorry because I wish to urge upon our association the advisability of adopting the third-rail clearance diagram presented by the committee in Fig. 1 of its report. This will be a great step toward standardizing electric traction, and our association will be the first to have adopted a workable third-rail clearance diagram.

"The sub-committee of the committee on electricity of the American Railway Engineering Association has adopted a similar diagram and the report has been sent to the committee for comments, and I have every reason to believe that these will be favorable and that the diagram will be presented to the association at its spring meeting. If at that meeting it could be said that the American Electric Railway Association had adopted the diagram it would not only add strength to the committee's report, but it would show that the electric association was alive and ahead of the times, as it should be in electrical matters.

"Regarding the recommended practice for location of automatic train stops shown on Fig. 2, this location could not be adopted on the New York Central & Hudson River Railroad without very costly changes in steam locomotive equipment, and I doubt very much whether such a location could ever be accepted. However, as recommended for the guidance of companies designing new equipment I can see no objection to it.

"Concerning the specifications for heat-treated carbon steel axles, shafts and similar parts, I would say that there is little need for such a specification in steam railroad or heavy electric traction practice, for the reason that the clearances are not so limited as to require the use of this more expensive steel. However, as a specification for those who need this character of steel I think it acceptable, and it represents a good deal of very hard and conscientious work on the part of those well qualified to pass upon such matters.

"I am looking forward to being present at the convention on Thursday and Friday and will, I hope, be able to participate in the discussions on those days and especially at the session devoted to the committee on standards."

R. C. Currie, New York Central & Hudson River Railroad, thought the clearance diagram in the report particularly valuable and agreed with Mr. Katte that it would be very desirable for the association to adopt such a diagram. He asked why the committee had included a definition of rail bonds in its report and had suggested only two definitions.

Mr. Hill, in replying for the committee, said that these two definitions had been approved by the American Railway Engineering Association (formerly the American Railway Engineering & Maintenance of Way Association), and as these definitions were satisfactory to the committee it had thought it wise to recommend them to the American Electric Railway Association. Similarly the committee of the former ascociation will recommend the clearances of the Electric Railway Engineering Association. Next year it might be proper to suggest eight or ten, or perhaps more, definitions. Mr. Hill thought the definitions of gage very important, as many people think it proper to measure the gage of the third-rail from the gage line of the track to the center of the third-rail, but as third rails vary in width from 2 in. to perhaps 4 in., this was not a very accurate method.

G. W. Palmer, Boston, said that with all due regard to the good intent of the committee on standards the best opportunity for the full and free discussion of the subject was in the convention hall.

Referring to paragraph 10 of the specifications dealing with heat treatment, F. R. Phillips, Pittsburgh, asked what consideration had been given to heat treatment; had it been thoroughly analyzed and had the different makers of axles been consulted?

E. R. Hill, chairman of the committee, said that the subcommitte which had handled this matter in conjunction with the American Society for Testing Materials had endeavored to leave it as broad and open as possible to all manufacturers. The specification simply said that there should be a heat treatment and almost said "according to the standard practice of the various manufacturers." He did not see how it could be changed to let all the manufacturers in and make it more specific. The requirements as to chemical analysis and physical tests were clear and definite for the results wanted. The particular methods and processes of heat treatment were left to the manufacturers.

Secretary Litchfield said he could say absolutely for the committee that the various manufacturers had been consulted. The specification which the engineers of the Interborough Rapid Transit Company drew up about two years ago for heat-treated axles specified directly what the heat treatment should be, but the company had departed from that specification and adopted the one recommended by this committee because the committee had found in consultation with steel makers that it would be practically impossible to get all the physical properties required on one test from each treating plant heat by any heat treatment that was not very thorough. In other words, the specification was telling the manufacturer that he must give the railway a physical and chemical test in say one axle out of twenty. While one might be able to get these physical properties occasionally, the manufacturers would agree that it could not be done as a regular thing on this number of tests, unless there was a greater and definite heat treatment. For the information of those who were not familiar with the proceedings of the American Society for Testing Materials he said that all of their committees on which the Engineering Association was represented by this sub-committee were formed half of manufacturers and half of consumers. This specification was sent out for letter-ballot by all of the members of the Testing Society, and it was adopted as their standard.

F. R. Phillips thought it was possible to get the physical requirements as specified in this report without heat treatment.

Mr. Palmer said that the specification came very near to being drawn upon the proper lines of a specification, whether referring to heat-treated axles or to any other subject. It fought shy, and rightly so, of prescribing any manufacturing processes. The specification simply named the performance which the material under consideration should give and named the tests which would determine whether or not that performance was secure.

Secretary Litchfield asked some makers' representatives to state whether Mr. Phillips was correct in saying that the physical properties prescribed in the specification could be obtained consistently without heat treatment.

H. P. Tieman, Carnegie Steel Company, did not believe that these physical properties could be obtained without heat treatment and very careful heat treatment at that.

George E. Thackery, Cambria Steel Company, agreed with Mr. Tieman that it was ordinarily impossible to obtain the qualities set forth in these specifications without heat treatment. There might, however, be an occasional heat that would almost come within the limits of physical requirements, but this could not be obtained regularly in practice. In addition to giving the physical properties in the test according to specification, the heat treatment went further than that in treating the axle as a whole, so that it was as uniform as possible throughout.

Henry Gulick, Gulick-Henderson Company, referred to the second clause as regards discard. He thought that, since this steel was intended for a very special purpose it should not be a hardship to require its identification. There should be something in these specifications as regarded the checking up or identification of steel. The phosphorus and steel content was given as "not over 0.05 per cent." That surely should be reduced. It should not be over 0.04 per cent for both phosphorus and sulphur. The tensile test should be selected from the location of the wheel fit and not at the direct-cropped end, because that direct-cropped end got a part of the heat, and it was not a fair and true representation of conditions at the point where the axles really break. This test would require an extra axle for each lot to be tested.

D. F. Kenney, Cambria Steel Company, said that the reason for letting phosphorus and sulphur go to 0.05 per cent was that some of the manufacturers make acid steel and some basic steel. The limitation of phosphorus and sulphur under 0.05 per cent would be very much of a hardship in acid steel.

Mr. Tieman said with regard to taking a test around a wheel fit that the directions for making the test were that it should be cut half-way between the center and the outside. The test specimen of an axle, say 5.5-in. at the journal, would be approximately 5 in. long, which would put the center of that specimen 2.5 in. from the center of the axle, whereas measuring it from the side it would be 1.5 in., showing it was further to the end of the axle than it was to the side. He thought this answered the question regarding the treatment at the end rather than further down.

On motion the meeting then adjourned.

JOINT DISCUSSION OF BLOCK SIGNAL REPORT BY ENGINEERING AND T. & T. ASSOCIATIONS

The joint session of the Engineering and Transportation & Traffic Associations was held in the Greek Temple. Presidents Page and Harvie presided.

J. M. Waldron, chairman, and C. D. Emmons, vice-chairman, of the committee on block signals, abstracted the report. Mr. Waldron explained that the committee had not reported on the cost of signal installations or maintenance and that these would be treated in future studies. The two-fold purpose for which signals were installed was the protection of the public and the increase of earning power for a given trackage.

H. S. Balliet, signal engineer New York Central Electric Zone, had carefully studied the paper and complimented the committee very highly on the thoroughness of its work. The subject in hand was among the hardest to be handled because it was new. Mr. Balliet recommended that all the associations interested in signaling work approve as standard the upper quadrant position for semaphore blades, and then if the steam and electric signal men could not agree the steam men could use the upper right-hand quadrant and the electric men the upper left-hand quadrant. The speaker told of his experience with light indications. For open work he would use semaphores. In the Park Avenue tunnel, however, his company operated light signals with success. This tunnel had four tracks and the two outer tracks were quite dark, so that the light signals could easily be read for 2500 ft., the length of two blocks, when illuminated with 3-cp, 55-volt lamps. The center tracks were not so dark and it was difficult on these to locate light signals properly unless they had more powerful lamps and lenses than were used on the dark tracks. Accordingly 8-in. lenses and 16-cp candle-shaped lamps were used. These signals, with light indications only, had been operated successfully since November, 1906, under most exacting conditions. Mr. Balliet thought that the development of signals with light indications was very possible for interurban service. It avoided the use of signal-operating mechanisms and lamp signals required little maintenance. After all, no matter how much was spent for signals, those which were maintained the best gave the best service. Mr. Balliet said that in the appendices A, B, C and G the interurban railway men would find an excellent outline for an up-to-date signal system. The information there was valuable for both transportation men and engineers.

L. E. Gould, Western editor Electric Railway Journal, was requested to speak from the viewpoint of the public. It had been his observation that the patrons of those interurban roads which had signal installations appreciated them very highly. The public felt that the signals had been installed primarily as safeguards and therefore took greater interest in them than would be taken, for example, in a change in the motive-power equipment.

John Roberts, signal engineer New York, Westchester & Boston, said that the greatest hindrance to signaling work had been its cost. The problem of the signal engineer was to give sufficient protection and come within the appropriations.

W. K. Howe, chief engineer General Railway Signal Company, hoped that the interurban roads would adopt some definite system of signaling and not get into the condition existing on the steam roads due to each having required a variety of apparatus designed for a single service. Regarding light signals, Mr. Howe said that much could be done to insure keeping the lamps burning. The arrangement used on the New Haven road was to put one lamp in the focal center of the lens and another behind it. If the first lamp went out, the second lamp was lit automatically. With the second lamp the indication was not so brilliant, but it was sufficient for a signal. This plan was not wasteful, because only one lamp was burned at one time.

G. W. Palmer, Jr., Bay State Street Railway Company, viewed the signal question from the standpoint of the power distribution engineer. Signals primarily were needed by the transportation department, which should outline its requirements fully, and after these had been determined upon it was the duty of the engineer to provide the indications and signal service needed. He felt that light signals were not so good as semaphores. He said that many roads were interested in the first and second recommendations of the committee, that is for signaling on slow single-track service.

C. D. Emmons, Chicago, South Bend & Northern Indiana Railway, expressed the thanks of the signal committee for the assistance given it by the manufacturers.

L. F. Howard, electrical engineer Union Switch & Signal Company, noted with pleasure that the signal problem had been thought worthy of a joint session. He felt that light signals in some cases would prove more satisfactory than semaphores. The usual colonnade poles alongside an interurban track formed a background which was better for displaying a light signal than a semaphore signal in so far as visibility was concerned.

Charles Morrison, signal engineer New York, New Haven & Hartford Railroad, New York, said that the subject of signals should be considered of great importance. He favored the use of semaphores where possible, and believed that a standard design could be had which would be applicable to both suburban and interurban roads. The circuits should be designed very carefully to provide against crossed wires giving a false proceed indication. The par-

ticular design of signal did not affect the question of maintenance. The most expensive and complicated signal system is not any better than the cheapest unless it is properly maintained. The New Haven railroad had adopted the center suspended arm for its entire system as the result of its first installation on the electrified sections where the signals were supported beneath catenary bridges close to the 11,000-volt trolley wires. This form of signal arm has also been used on the direct-current trolley lines with satisfaction. Mr. Morrison described the automatic arrangement for cutting in a second signal lamp when the first had burned out. The signal system on the New Haven road between Woodlawn and Stamford, about 20 route miles, required the capacity of a 130-kw generator for operating the signals, lamps and track circuits. The Harlem branch, a six-track line, now being electrified, would require 100-kw generator for its signaling system.

H. M. Sperry, General Railway Signal Company, asked that a discussion be had on the proper methods for signaling single-track lines. That was a very important problem.

H. W. Griffin held that the continuous track circuit was very necessary and that light signals might be used properly in many instances. The arrangement of single-track signals was very important and had been discussed at considerable length in the committee report.

President Harvie called attention to the value of joint committees on subjects of common interest to the two associations. Mr. Waldron closed the discussion by emphasizing the need for thorough engineering work in connection with signaling practice. A system of signals should be chosen which would not only lend itself to ample protection for present traffic but would be capable of expansion without the necessity for scrapping material originally installed. In discussing light signals the present high-power lenses should not be confused with the old-style colored window glass lens.

The meeting then adjourned.

TUESDAY MEETINGS OF TRANSPORTATION & TRAFFIC ASSOCIATION

President Page called the meeting to order at 10 a.m.

Before the report of the interurban rules was presented I. H. McEwen, Oneida Railway, Utica, made a motion that the report be referred back to the committee; that the membership of the committee be increased to fifteen members, at least three of whom should be members who had had at least one year's experience in operating under the American Railway Association's standard code of rules; that the committee appoint a secretary to be selected by the chairman of the committee, and that the committee should issue advance copies of its report not later than Jan. 1, 1912. In explaining his motion Mr. McEwen said that he did not wish to be understood as intending to be discourteous toward the committee, as he thought that the committee had done a splendid piece of work. He had not seen a copy of the report until about ten days ago, and he had had an opportunity of going over only about eighteen or twenty pages of it. He had found, however, many points on which he could not agree with the conclusions of the committee. He thought that there were many other members who probably had reached the same conclusion, and for this reason he believed it would be unwise for the convention to go on record at this time as approving the report as presented.

At the suggestion of J. N. Shannahan, J. G. White & Company, Mr. McEwen withdrew his motion in order to permit the report to be presented and discussed.

Alexander Shane, Indianapolis, Columbus & Southern Traction Company, then presented the report of the committee. Since the report was printed the committee had received written criticisms from thirty-nine members. These criticisms had been carefully considered by the committee, and in presenting its report the committee wished to make the following changes:

In proposed Rule No. 95, insert Section K of old Rule No. 99. Many companies thought it was very desirable to retain the answer to the signal of a train displaying signals for a following section.

Proposed Rule No. 98 was amended by substituting the bell signals given in old Rule No. 103. These signals corresponded to the signals used in city operation.

Old Rule No. 209, referring to extra trains clearing the time of regular trains, was restored in the code. The committee in its report had eliminated this rule.

Mr. Shane said that the committee had no apology to make in submitting its report. The members of the committee had used their best efforts to present a code of rules of such character that it could be used as a basis for compiling operating rules by member companies. The committee was not unanimous in its conclusions on many points, but the minority members had given way to the majority members on the committee and each of the members had signed the report. He thought that the subject ought now to be brought to a close. There were now and always would be differences of opinion, and he thought that if the committee had to go over the work again it would make some changes.

Charles L. Henry, Indianapolis & Cincinnati Traction Company, said that he did not wish to express any opinion as to the details of the rules as presented, but he wished to mention one point which was uppermost in his mind. At the Denver convention in 1909 a code of rules was adopted by the association. The committee had worked on this code of rules for two years and had made only a few changes which were unimportant in character. He thought the strongest argument in favor of the adoption of the rules was that the committee had found it necessary to make so few changes. In Indiana the interurban roads had been discussing the question of rules with the State Railroad Commission for more than two years, and the code of rules which was finally adopted for use by companies operating in that State was very similar to the code presented by the committee. He anticipated in the near future some action on the question of rules for interurban roads by the Interstate Commerce Commission. He thought that it was most important that the interurban companies should place themselves on record as to what they thought was a proper code of rules. With reference to Mr. McEwen's suggestion that the report be laid over for another year, he thought that the delegates would come to the convention next year no more in readiness to discuss the details of the rules than they were at the present time.

On motion of C. Loomis Allen, Utica & Mohawk Valley Railway, it was decided to discuss the changes in the Denver code which had been recommended by the committee. These changes were considered one by one in the order in which they appeared in the report.

C. D. Emmons, Chicago, South Bend & Northern Indiana Railroad, suggested that old Rule No. 11 be substituted for proposed Rule No. 8, which refers to the responsibility of employees examining cars for defects before taking them out on the road.

F. W. Coen, Lake Shore Electric Railway, pointed out that in the State of Ohio a very rigid employers' liability law was in force which required companies to post notices of this kind in order to escape liability. The rule would be a valuable one in that State.

Alexander Shane said that the committee had been advised on this rule by the best legal talent that could be obtained, and he thought the rule should stay in.

A motion was made to substitute Rule No. 11 in place of proposed Rule No. 8, but it was lost.

C. D. Emmons moved that the original separation of old Rules Nos. 85 and 84, which had been combined into proposed Rule No. 71, be retained. The motion was lost. Mr. Emmons also moved that the words "above or alongside" be replaced by the word "near" in proposed Rule 74. The motion was lost.

Mr. Emmons then moved that in proposed Rule No. 113 the words "in addition" be inserted before the words "a yellow light," so as to provide for both a flag and a lamp at night and avoid any danger during the transition from daylight to darkness. The motion was carried.

Alexander Shane moved that the last clause of old Rule No. 130, which reads "but giving no proceed signal," be added to proposed Rule No. 148. The Indiana Railroad Commission had recommended that this clause be added. The motion was carried.

C. D. Emmons moved that the words "nor without proper signal from the conductor" be added to proposed Rule No. 163. The motion was carried. With reference to proposed Rule No. 158, Mr. Emmons also moved that the words "after executing all train orders" be added to the second sentence. The motion was carried. Mr. Emmons then moved that old Rule No. 361 be substituted for proposed new Rule No. 180, on the ground that it afforded greater safety. The motion was carried.

C. Loomis Allen then presented the following resolution:

"Whereas the standing committee appointed by this association has prepared and reported changes to the standard code of rules governing the operation of electric interurban cars, which code is intended to include such general rules as represent the best and most modern practice in electric railway operation, and

"Whereas this association has duly and carefully considered and amended the same in some particulars, and

"Whereas it is for the interests of the members of this association that the association adopt, approve, promulgate and recommend a code of rules which shall be considered the standard code, except in so far as it may, in specific instances, be necessary to omit, add to or change rules in order to conform to state or municipal laws and regulations or to local conditions.

"Now, therefore, be it resolved, That the rules reported by the committee and as changed, omitted or amended at this meeting be the standard code of rules of this association for the operation of interurban cars until such rules may be duly amended or changed at a meeting of this association, and

"That this association requests its members to adopt this standard code of rules for the operation of interurban cars on their respective railways except in so far as such rules may conflict with state or municipal laws or regulations or be unwise or inapplicable on account of local conditions, and

"That the committee on interurban rules be continued, to report at the next meeting of the association such proposed changes or amendments as may seem wise or necessary."

The resolution was adopted.

A recess of five minutes was then taken while the members of the Engineering Association entered the hall for the joint meeting on "block signals."

FRONT DOOR FARE COLLECTION IN KANSAS CITY

The Metropolitan Street Railway Company of Kansas City decreases the rush-hour loading time of cars in the congested business district by stationing men on the street close to the front ends of the prepayment type cars so that passengers may be admitted through the exits and the fares collected before they enter. This is a system inaugurated some time ago which James E. Gibson, general superintendent, says has proved to be of much advantage to the road. Previous to the adoption of this plan it was found almost impossible to induce people to move up to the front of the cars, and during rush-hour service this inertia of the passengers handicapped the service by limiting the standing load.

ACCOUNTANTS' "GET TOGETHER" LUNCHEON

The annual "get together" luncheon of the Accountants' Association was held yesterday in the Chevy Chase room at the Marlborough-Blenheim Hotel. The practice in previous years has been to have a few informal responses to toasts. This plan was continued this year, but it was amplified by the addition of an informal talk by M. R. Boylan, general auditor of the Public Service Railway of Newark, N. J., on the subject "Prepayment Fare Accounting."

After the cigars had been passed President Forse spoke of the presentation last winter on behalf of the association of a silver cup to W. F. Ham, comptroller of the Washington Railway & Electric Company. This was given in recognition of the valuable services performed by Mr. Ham throughout a number of years for the Accountants' Association. President Forse called on Mr. Ham, who expressed his feeling at the spirit that prompted the present and his appreciation of the act.

Remarks were made at the request of the chairman by H. J. Davies, Robert N. Wallis, F. E. Smith, Elmer M. White, P. S. Young, A. H. Morrow and Prof. M. E. Cooley.

Mr. Boylan in discussing the subject of prepayment fare accounting said in part:

"I want to make one point as emphatic as I can, and that is that there should be no further delay in the completion of a system of prepayment fare accounting which will be at once simple, economical and satisfactory. In my judgment, the railway accountants have no more serious problem confronting them than this, nor can they render any greater service than the preparation of a suitable plan which will be as nearly uniform as local conditions will permit.

"The first requirement to insure a safe delivery to the company of fares collected on prepayment cars is the installation of a satisfactory fare-box. Prepayment cars as equipped with gates, doors and other safety devices have helped to keep down the number of accidents, but without the use of proper fare-boxes they do not return the value which it is intended they should in the way of increasing revenue. While the company is assured of the collection of fares from all passengers it is necessary to adopt suitable means of guaranteeing that full returns be made by the conductor. After experiments which have covered a period of three years, and included about every type of fare-box that has been on the market in that time, I have been convinced that the registering fare-box, supplemented by the use of a register in the car, offers the basis of the most scientific method of accounting yet tried.

"Last year I told of our company's experience with the four compartment locked box, which was in use at that time. We have since tried a single compartment box and find it more satisfactory than the four compartment type. It is more easily handled; it prevents the confusion of returns as between conductors and it simplifies the checking of cash receipts in the accounting department. The value of this latter advantage is that it means a saving in the cost of accounting.

"In the use of single compartment boxes, when a conductor is assigned to a run and receipts for the cash he gets to use as change, he is also given one of the fare-boxes which contains a movable receptacle for cash fares. This box is used by the conductor throughout the entire day. The conductor, at the beginning of his run, deposits an identification slip showing the fare-box number, cash box number, run number, etc., this card being similar to one outlined in the 1910 report. When the conductor is relieved, either temporarily or after finishing his day's work, he removes the fare-box from the car and delivers it to the receiver or clerk at the carhouse. When a conductor has completed his day's work the cash receptacle is removed from the fare-box by the receiver and is replaced with an empty one. The cash receptacles are locked in crates and

forwarded to the cashier, as outlined in the case of four compartment boxes in the 1910 report. On regular runs a conductor receives the same fare box each day. This reduces to a minimum the cost of repairs, as conductors learn to feel a personal responsibility for the care of the box.

"Just as the single compartment box has an advantage over the four compartment box, so has the registering fare box a distinct advantage over the locked box. To begin with, a proper registering fare box would render unnecessary the impounding of a large amount of ready cash to be supplied to conductors in the form of change. On the larger systems this item alone is important. The registering fare box would enable the conductor to get at his receipts for purposes of making change, but not until after the fares had been recorded. The car register would act as a check on the fare box returns and could be utilized for tickets and transfers where they are used.

"Again, with the conductor using up the small change, the making of returns at the end of his run would be simplified, as he would have currency and coins of the larger denominations, rather than nickels and dimes. The counting and handling of this money would not be as expensive as is the locked box system.

"But before registering fare boxes can be generally adopted, it must be demonstrated that they are accurate and reliable. We have encountered trouble of various kinds. The principal objection has been that the boxes become clogged or their operation retarded by mutilated coins or slugs. Progress has been made, and if it has not been as rapid as some of us would like to see, we must admit that there is a valid reason.

"Looking the facts squarely in the face, it would seem that the manufacturers have been handicapped, or, at least, not encouraged, by virtue of the fact that no two street railway systems handle their fare collections in the same manner, and that practically no two systems have agreed, up to the present time, on any one design of fare-box as standard. If any two or more systems accept boxes of the same design, they operate the boxes differently. Some companies insist that a fare box shall be a combined cash register and car register. Others want a fare box simply as a cash register working in conjunction with the register inside of the car. Others use the fare box as a cash register without any register inside of the car. Still others insist on trip registers and registers for three cent fares on boxes. Some want fare boxes equipped with a register for transfers.

"This situation can only result in slower progress in improvements than would be the case if all companies would decide on a standard method of operation. Some one of the foregoing designs is the best for all companies. I believe that the system that we are following, of using the fare box as a cash register and ringing up all fares on the register inside of the car, is the most practical system, and if a discussion of this matter would lead to the adoption of a uniform system, it would tend to more rapid progress in fare box manufacture, and the manufacture of far better fare boxes, as improvements could be made gradually on a standard design."

After the completion of Mr. Boylan's talk on this subject there was a general discussion in which the following participated: J. H. Neal, F. E. Smith, Thomas Kilfoyle, F. Dabney, Robert J. Clark, James Adkins, W. F. Ham, Robert Morrison, Jr., and Will Browne.

During the year 1910, the Zurich (Switzerland) Municipal Railway installed tea sets at its shop and at all carhouses. Tea is provided for its employees without cost. The management states in its annual report that this service has lessened the use of alcoholic liquors among the men. Every carhouse is also provided with two free bathrooms fitted with shower equipments.

CITY TRACK PRACTICES IN GREAT BRITAIN

At the tenth annual conference of the Municipal Tramways Association, held in Glasgow, Sept. 27-29, three reports on way matters were presented by James Grierson, Henry Mattinson and Robert B. Holt, permanent way engineers of the Glasgow, Manchester and Leeds tramways respectively. These reports were comments upon an association data sheet which had been answered by over sixty undertakings. The following is a summary of the three papers.

The British standard rail sections are widely used, but there is a general feeling that the standard of chemical composition should be raised. Mr. Holt suggested that since most, if not all, tramway rails tended to wear convex on the tread, the tread ought to be made convex to begin with, thereby preventing much irregular wear of wheel tires and rails and reducing energy consumption. The only alloy steel used is the Sandberg silicon rail, of which over 30,000 tons have been rolled in England for tramway systems alone. Three systems gave a 33 per cent reduction in wear for this rail as compared with ordinary basic bessemer. While these rails were not free from corrugation markings, the latter did not develop as in ordinary rails. It was recommended that other alloys like chrome, nickel, tungsten and titanium should also be given a trial.

Most companies use solid manganese steel for switches and crossings. Thirty-two companies reported that the wear on manganese steel exposed a honeycomb structure in the castings. One important disadvantage of manganese steel tongues was their tendency to bend more readily than forged steel and to acquire a permanent set because their elastic limit is low.

The authors recommended the adoption of standard switches for specific purposes, such as turnouts, crossovers, junctions and carhouse layouts. Manchester has established standard switches and also prepared templates for all switch parts, so that, for instance, a tongue from any switch is interchangeable with another of the same type. In Glasgow, where the radii of tournouts vary from 30 ft. to 490 ft., there has been no difficulty in satisfying this range of conditions with two sizes only—a 12-ft., 100-ft. radius switch and a 14 ft., 200-ft. radius switch. Many companies now build their sharp curves to template before laying them.

The thermit joint is widely used on the larger systems. In Manchester some 7000 of these joints have been laid within the past five years and the breakage has been less than 3 per cent. In Leeds, where 11,000 joints have been laid within the past eight years, breakages have been reduced from 3 per cent to 0.7 per cent, due to wider experience and better methods of application. It has been found in Leeds that the average conductivity of a thermit welded join is 8.75 per cent lower than the rail itself, thereby showing that while the bonding is not absolutely necessary, it does increase the conductivity. Experiments on welds with 14-in. bonds showed that the conductivity of the joint with the bond is 4.3 per cent better than the rail itself.

The general method of removing corrugation is to employ abrasive blocks, which are fitted into track brakes, or to use grinding machines. Mr. Grierson had found corrugations develop on new track after running for three months. These were removed by scrubbing blocks and did not reappear for four years. He was using motor-driven rotary grinding wheels running at 900 r. p. m. and geared to travel along the rails at 8 ft. per minute.

Mr. Mattison employs the oxy-acetylene blow-pipe for renewing dished or cupped rail. The welding plant was compact and inexpensive, while little disturbance of the roadway was necessary. The new steel is fused into the rail by the blow-pipe, hammered during the process and a slight excess fused in. The surface is then ground and filled even and continuous. Some 100 joints which were renewed in Manchester late in 1910 and early in 1911 are a success.

THE INTERURBAN*

BY CHARLES L. HENRY, PRESIDENT INDIANAPOLIS & CINCINNATI TRACTION COMPANY

The questions incident to transportation have during all ages presented very difficult problems for solution.

In the early days these questions were narrow and more simple in their character. There is no doubt that as soon as man first experienced the desire to get away from home, either for war or in peaceful pursuits, he discovered that transportation upon the waters, both rivers and seas, furnished him with the best opportunity, and this he used for visiting his neighbors, transporting food and other commodities, and spying out new lands. The winds of heaven wafted his ships into foreign seas and the commerce of the nations increased and multiplied to vast proportions.

Until the first decade of the present century, although inventive minds were reaching out for new means of propulsion, only the winds had been harnessed for use. Then, however, steam began to be used in navigation, and its use was so rapidly developed that the present year is to witness a centennial celebration of the opening of the Ohio River to steam navigation.

The use of steam power for navigation upon water soon led inventors in a quest for some mode to use it for transportation upon land. It was not, however, until the year 1830 that they were successful. In that year the first commercial steam railroad was put into operation in England, from Liverpool to Manchester.

The steam railroad transportation field remained unaffected by any suggestion of the use of any other motive power until the year 1883. In September, 1883, there was opened the first practical commercial electric railroad, in the north of Ireland, running from Portrush to the Giants' Causeway, a distance of about eight miles, under the direction of Siemen, the world-renowned electrical engineer. The road was built upon the highway. The electric current was generated by water-power and was delivered to the cars from a third-rail. This third-rail remained in use until about 1897, when the highway commissioners, on account of the numerous accidents caused by the third-rail, ordered its removal and the substitution therefor of the overhead trolley.

No sooner had the first crude apparatus for the propulsion of cars by electricity been put in use than it was seen that electricity was very desirable for the operation of street railroad lines in cities and towns, and it was not long until the horse car and cable car commenced giving way to the electric car. In February, 1888, the first commercial electric street railroad in the United States was put in operation in the city of Richmond, Va., under the direction of Sprague, one of the great American pioneer electrical engineers. The equipment of city lines with electricity increased so rapidly that it was only a few years until no cable car was to be seen and the horse car was almost a thing of the past.

By natural development these electric lines in the cities were gradually extended into the country for suburban purposes, and next came the idea of connecting city with city and the interurban came into existence, distinct and separate from the steam railroad on the one hand and the electric city line on the other. The name given to this new kind of railroad so correctly described it that it has now become worldwide in its application. The first interurban roads were built in northern Ohio, and, curiously enough, the initial letters in the names of the cities connected by one of them, Akron, Bedford and Cleveland, were A, B, C, truly indicating that it was the beginning, as the first letters in the alphabet are to the school child the beginning of his education. The building of these roads increased year by year until all the important cities and towns, especially in this country, have been connected by interurbans.

*Abstract of an address made before the American Electric Railway Association, Atlantic City, N. J., Oct. 9-13, 1911.

GROWTH OF INTERURBANS

At first, both in the building and operation of the interurban, the plans and practices which had been adopted and grown up in the building and operation of the city lines were, very naturally, adopted, and the roads were built upon the country highways as if they were to be in fact only an extension of the city lines. They were limited also exclusively to the carrying of passengers, no provision even being made for the passengers' baggage. The fares were based upon the 5-cent street railroad idea, and whenever a passenger was carried farther than the company thought it ought to carry him for 5 cents the conductor went through the car and collected another 5-cent fare, and this was repeated, section by section, until at the end of his journey the passenger would have paid as many 5-cent fares as the distance traveled was divided up into 5-cent sections. The cars were of light construction, though somewhat heavier and larger than the ordinary city cars; the trucks carried motors of much the same capacity provided for the city cars, and the speed attained was about the same. These interurban cars at once attracted great attention and became very popular with the public, and the patronage with which they were favored was much greater than had been estimated by those instrumental in their building. The cars ran at frequent intervals, which was at once recognized as a great convenience; there was no smoke, as upon the steam railroads, and the stops, both in town and country, were arranged at proper intervals to accommodate the public. The people were attracted to them and their use became at once general.

Soon, however, it became evident that the ideas controlling in the construction, equipment and operation of the first interurbans were too narrow and that they must be widened and broadened in order to make this new means of travel meet the requirements of the public. Private rights-of-way must be secured and the tracks removed from the highways, wherever possible, to avoid interference with and inconvenience from the ordinary highway traffic, otherwise the requisite high speed could not be attained. The cars must be larger and more commodious, provided with all conveniences, including provision for the carrying of heavy baggage. They must be built in such a substantial way as to make them secure for higher speed, which, in turn, required that the electric motor equipment must be increased. The electric current, which at first was furnished by power stations at short distances from each other, or transmitted from a "booster," by means of a feed wire, allowing for the necessary drop in voltage, must be distributed from a central power station over high-tension wires to various substations at which the voltage would be reduced and fed into the trolley wires. A very rapid development ensued, until to-day upon the best interurban railroads of the country are found cars of practically the same size, capacity and construction as the best steam railroad coaches, equipped in some instances with motors of more than 400-hp capacity to the car, running across the country on private rights-of-way, on tracks which compare favorably with the best railroad construction, and making speed equal to the fastest railroad trains, in some instances at a schedule speed, for country running, of approximately 60 miles per hour. Instead of the collection of a 5-cent fare at each 5-cent section, through tickets are sold, good not only over the company's own road but also over connecting lines.

This rapid development and change has from time to time brought the managers of the interurban roads face to face with the most serious problems. The entire situation is changed. In the beginning it was but natural that estimates as to the character and cost of construction, the fixing and

collection of fares and the arrangements for operation should be controlled by the ideas regarding like questions in connection with city lines; but the requirements under the new era of development were entirely different. Expensive equipment for air brakes must take the place of the simple but insufficient hand brake; headlights must be provided, extending the motormen's range of vision at night to a safe distance ahead; the old 40-lb. rail track must be replaced by heavier rails; a perfected telephone system, for the use of the dispatcher, must be developed; the cast-iron wheel must be taken from the trucks, and in place thereof there must be substituted a steel-tired or steel-rolled wheel. These and many other things called for increased expenditures in construction and operation and caused the heads of the managers to roll upon their pillows in sleepless hours of the night. It appeared, and it was in the beginning, sufficient to provide hand-operated signals from one switch to another on a single track, so that a north-bound car could not enter a section while a south-bound car occupied it, even though it occasioned a delay of ten or fifteen minutes in waiting at a siding, and it was not thought out of the way to delay a few minutes to enable a belated farmer, coming across the fields, to reach a stopping point. But the old ways have been completely changed. Bridges of light construction have been and are being replaced by those strong enough to carry an ordinary steam railroad train. Tracks laid with 70-lb. to 90-lb. rail upon standard cross ties are used. Dispatchers are maintained for the operation of the cars, their hours of service being limited by the Interstate Commerce Commission to eight hours per day. The cars themselves are heated by hot-water systems, and even now the legislatures and railroad commissions of the various states are requiring the installation of the block signal system. All this makes the cost of construction and equipment of interurban roads threefold or fourfold what was originally anticipated, and the cost of operation has been very greatly increased. Skill is required in the operation of the cars. Track men are constantly employed in keeping up the tracks; overhead linemen, at high wages, are kept busy all the time.

INCREASED BURDENS

Coupled with and added to this increased cost of construction and operation are many burdens growing out of the changed condition of the public mind. In many towns it is now thought to be the proper thing to object to the running of freight cars along the streets, although the idea has never occurred to prevent the hauling of freight in open wagons over these thoroughfares, or the driving through them of droves of cattle and hogs that may stray upon the adjacent lawns, and are indeed a nuisance. Even in many towns of insignificant size the interurban will no longer be permitted to load and unload baggage, express and freight matter in the public streets, although the baggage wagon, the express wagon, the wagon from the farm or the truck from the store or factory is, without comment, permitted and expected to do this. The interurban, it is urged, must provide waiting rooms, with expensive toilets, baggage rooms, express offices, freight houses, in the heart of the city or town, all at great expense. In some cities and towns—I now recall one of less than 1200 inhabitants—it has been deemed wiser to require the interurban car, that may be carrying three score of passengers, to come to a full stop before crossing one of the principal streets, rather than to ask the cigarette-smoking speed fiend or the simpering thirteen-year-old high-school girl to slow up his or her automobile enough to avoid danger. Notwithstanding that teamsters of all classes and kinds use all parts of the streets without charge or compensation of any kind, the interurban must be required to pave the streets between its tracks and out to the ends of its ties and to maintain this paving at its own expense; waiting-rooms or shelter stations must be constructed at all stopping points in the country; the fare must be limited by statute law to 2 cents per mile, so that a passenger pays no more for his ride upon an interurban car from city to city than a few years ago he paid for the privilege of driving his own horse and buggy over a toll macadam road the same number of miles. A passenger not only rides upon the car at this low rate of fare, but the company must in addition carry free of charge along with him 150 lb. of baggage, and if, perchance, a lady passenger's trunk is lost, although it is carried free, the company receiving not a cent therefor, it must make good in damages the value of the trunk and of all the beautiful dresses contained therein. In some of the states it is an accomplished fact, and in others a threatened one, that the interurban must also pay to an employee who is injured in working for the company the damages sustained by him, even when it is clearly shown that the carelessness and negligence of the employee himself was the sole cause of the injury. Laws of this class alone have been the cause of an increase of from 50 per cent to 100 per cent in the cost of liability insurance.

In the early development of the steam railroads the cost of labor was one-half what it is at the present time. Rights-of-way were given free and donations in addition were made to secure location of the roads. Cross-ties could be secured without any expense beyond the cutting and hauling, the present cost being 80 cents per tie. Rails cost $18 per ton as against $28 at this time, and all other expenditures were likewise lower in amount. Notwithstanding all this the steam railroads were permitted to charge during their early days 4, 5 and in some cases 6 cents per mile for the carrying of passengers, and the charge for the transportation of freight was many times greater than now. Remembering all this, it indeed seems strange that the public should expect the interurban to bear all of this increased cost of construction and operation at a time when the purchasing power of money has decreased one-half, and yet only be permitted to charge 2 cents per mile for the carrying of passengers and the same low freight and express rates as are now charged by the steam railroads after their full development.

The problem for the future before the interurban is indeed great, and to many it would seem that its solution must be similar to the answer which the boy gave in school to the problem in arithmetic stated by mistake on the part of the teacher as follows: "If a frog is in a well 15 ft. deep and jumps up 2 ft. at night and falls back 3 ft. in the daytime how long will it take him to get out?" The boy covered both sides of his slate with figures and then, calling the teacher, said: "You did not say how long the frog has been doing this, but if he has been doing it very long he must be in hell by this time."

However, those engaged in the building and operation of interurban railroads have been and still are undaunted and look into the future without flinching. Understanding as they do that the cost both of construction and operation cannot be materially reduced and that many additional things will arise from time to time to increase this cost, they are looking to the development of the business and the increase of receipts, and the changing of public sentiment by proper educational means, so that the burdens placed upon them by reason of public clamor may be removed to lead them out of the desert and into the promised land.

RELATIONS WITH THE PUBLIC

First of all, it is important that public officials and the public at large shall be made to understand clearly that it is unfair to place burden after burden upon the interurbans. They are, indeed, as they were in the beginning, the people's roads, furnishing them at comparatively insignificant cost with conveniences which they could not otherwise get. This idea must be brought back and strengthened in their minds, and they must be shown that the people cannot have the conveniences furnished by the interurban at such insignificant cost if burden after burden is to be piled

upon the companies, increasing the expense for construction and operation—for, after all, the consumer must pay the cost or the interurban cannot exist. Let the public be educated to the point where it shall be understood that the interurban is not to be a subject of prey on the part of public officials, but is to be favored and helped, to the end that the people may, even at the present reduced passenger fares and freight rates, receive the benefits thereof. Every means should be taken to educate all members of the community to assist in avoiding accidents. They should also be taught that where a person, whether a passenger or not, is injured he should not expect to recover anything from the company unless the company was at fault, and then only what is fair and reasonable compensation for the injury received.

In the matter of taxation they should again be taught the self-evident truth that, although the interurban is owned by a corporation, yet it is not morally honest or economically right that its property should be burdened with a higher tax than other property of the community, and that if any favors are to be shown they should rather be given to these companies which furnish to the people at large such desirable service at such low figures. All these things can be accomplished in large degree, if not entirely, by a proper and persistent plan for the education of the public, and that this shall be done interurban people owe not only to themselves but to the patrons whom they serve. By the means indicated a very material reduction, both in the cost of construction and operation, may be secured.

LONG-DISTANCE FIELD

While in the beginning there was no thought of the interurban entering into the field either for the transportation of freight or express or for long-distance passenger travel, it has become evident that all these fields are fertile for exploitation, both in the interest of the public and for the increased receipts from operation. Even now in some places through travel between large cities has been established and the passenger may purchase a through ticket between the two termini and check his baggage through, notwithstanding that the route of travel may carry him over two or more interurban railroads. The Central Electric Railway Association, composed of electric city and interurban railroads in the States of Indiana, Ohio, parts of Michigan, Pennsylvania and Kentucky, has made very great progress in this regard through its efficiently managed traffic association, and in other parts of the country the interurbans are doing likewise. This kind of interurban travel is being so rapidly developed that it is not too much to expect that in the near future the traveling public will prefer the interurbans for long-distance travel, the same as they have heretofore preferred them for short-distance travel. It is a matter of interest that the Illinois Traction System has put in use sleeping cars equipped with all the conveniences and comparing in every respect with the best Pullmans operated upon the steam railroads. These they are operating to and from the city of St. Louis. When the convenience of long-distance travel upon the interurbans on trains making few stops and running at high speed is added to the convenience of short-distance travel on slower trains making frequent stops it will be readily seen that the management of these roads may expect very largely increased passenger receipts.

EXPRESS AND FREIGHT

The express business, or expedited freight, carried on the passenger cars has been developed to such an extent that it furnishes a very handsome income, which gradually increases as the people get more accustomed to it and therefore dependent upon it. Being permitted to make these shipments on the cars, usually running every hour, the merchants and others are enabled to get extremely quick shipments and deliveries; and, combined with the use of the telephone, in many cases the farmer gets repairs for his machinery in such a short time that while waiting he permits his team to stand in the field without unhitching. Some of the old-line express companies have seen the advantages of interurbans for express business, and on many roads they are carrying business the same as on steam roads. On account of the convenience and popularity of this business it is sure to grow to very large proportions and thus swell the interurban receipts.

As to the handling of freight on freight cars, it may be said that on many roads where it is carried but little beyond the extent of package business the receipts constitute from 10 to 15 per cent of the gross receipts, and on others, where the service has been broadened and extended, the receipts have been very materially increased. What has been learned by experience leads us to believe that, with a proper development of the handling of the freight business, what furnishes now an insignificant proportion of our receipts may be made to furnish a much larger proportion. We may not be able to reach the proportion of freight receipts which the reports of the steam railroads show, but this will not be necessary, for the passenger receipts of the interurbans promise almost certainly to exceed greatly the passenger receipts of the steam roads over the same territory. This extension of the freight business, we well know, cannot be brought about except by extending the facilities for the handling of freight, but if diligent attention is given to the matter, as it certainly will be, it is sure to demonstrate the fact that the increased expenditures occasioned thereby will bring greatly increased returns in the way of receipts.

On one road where the handling of a large amount of grain on a certain section in carload lots was deemed profitable it was found that if the grain was turned over to the steam roads in the cars furnished by the traction company, it was difficult and practically impossible to secure the return of the cars without long delay. The plan was adopted of transferring the grain from the interurban freight car to the steam road freight car at a conveniently constructed elevator, where the roads connect, and it has been found to work with entire satisfaction, the transfer being thus made at very little cost.

The comparatively recent development of the single-phase system and the high-trolley-voltage, direct-current system has greatly cleared the field from doubts as to the ability of interurbans to handle heavy freight, and a careful development and extension of the business are all that is necessary to bring large returns into the treasury of the interurbans.

THE MANAGER'S POSITION

In brief, then, the interurban manager must recognize that the cost of construction and the expense of operation have been and are being increased greatly beyond the expectation of those early in the business, and also that unless the public mind is educated to a different view of matters there are to be very greatly increased burdens added by legislation, national, state and municipal. Then, recognizing all this, he must go forward in the development of interurban business, extending it into the new fields, thus bringing to his company the greatly increased income which is needed. And, with it all, he must aid in educating the public mind along right lines, so that, while doing all it should rightly do, the interurban shall not be broken down and crushed by burdens that should not be placed upon it.

The accomplishments of the past are sufficient guarantees that the interurbans will, in the future even more than in the past, fill the place for which they are so well fitted in the great field of transportation, and that in so doing those who have shown their faith in them will be rewarded by fair returns on the capital invested.

Trolley bases in two styles with detachable pole feature, detachable trolley harps, and trolley wheels of various types and sizes, are being exhibited by the Bayonet Trolley Harp Company, Springfield, Ohio, at space 27.

REPORT OF THE JOINT COMMITTEE ON BLOCK SIGNALS FOR ELECTRIC RAILWAYS*

BY J. M. WALDRON, CHAIRMAN; C. D. EMMONS, VICE-CHAIRMAN; JOHN ROSS, G. H. KELSAY, J. N. SHANNAHAN, J. T. WALLIS

The subjects here reported upon were assigned to committee members, as follows:

1. Instruction from Association
2. Minutes of Meetings
3. Introductory Paragraph on Signals — J. M. Waldron.
4. Historical
5. Résumé of Data Sheets
6. Necessity for Electric Railway Signals—C. D. Emmons.
7. Digest of State and Interstate Commission Rulings and Laws—J. N. Shannahan.
8. Block Signals to be Installed During 1911—John Ross.
9. Conclusions and Recommendations for 1912 Committee —C. D. Emmons.

Appendices.—Abstracts of Descriptions of Apparatus Furnished by Signal Manufacturers—G. H. Kelsay, assisted by L. E. Gould, Western editor of the Electric Railway Journal.

Your committee in preparing the report thought best to collect such data as would be of benefit to the member companies for educational purposes and in this development the committee has at all times been in close touch with the work of the Block Signal & Train Control Board of the Interstate Commerce Commission and with the various committees of the American Railway Signal Association.

THE BLOCK SYSTEM OF RAILROAD OPERATION

The block system of railroad operation reduced to its simplest terms means that each train is forbidden to pass a certain point, forming the entrance to a block, until the last preceding train on the same track has passed beyond a certain point farther on, forming the end of the block. No train enters a block section except and until its motorman sees on the signal post or train order board a "Safety" or "Proceed" signal. Protection from butting collisions on single track lines depends upon the exercise on the part of motor runners and train crews of intelligent and unremitting vigilance in the observance and execution of intricate rules and written orders and on the exercise of the utmost care by the train dispatcher. By far the greater part of the mileage of railways in the United States and Canada is single track, and to this there has been added in the last few years a rapidly increasing mileage of electric interurban roads, which, in their operating conditions, present problems similar in character to those of the single track steam lines, but which from the nature of their traffic make even more imperative adequate means of safeguarding train movements.

According to the most authentic statistics at hand there were on January 1, 1911, block signals in use on 71,268 miles of railroad, of which 17,711 were protected by automatic signals and 53,557 by non-automatic signals, or practically three miles equipped with non-automatic signals to every mile equipped with the automatic or track circuit type.

The interurban railway has lagged behind the steam railway in the matter of signaling and control of cars or train units. It is now becoming apparent, however, that in this branch of operation of interurban roads as now developed the necessity for adequate control is urgent. This is due to the distinctive lines on which interurban railway traffic has been developed, bringing to the front problems of its own differing widely from those encountered on steam railway lines.

The relative necessity for communicating with train crews on electric railways as compared with steam roads cannot be based on track mileage, for the reason that for a given number of miles the electric road will operate three or four times as many train units as the steam road under ordinary conditions, while on holidays and special occasions the electric road traffic will be greatly increased.

EARLY ELECTRIC RAILWAY SIGNALING INEFFECTIVE

The use of some type of protective signals is not new with electric railways, but unfortunately many signals which have been used have not been up to the standard governing steam railway practice either in mechanical construction or reliability of operation.

The application of automatic block signals to electric railways presents no greater difficulties from either the mechanical or electrical standpoint, although there are many important factors entering into the problem which are not inherent in steam railway practice. The traffic is dense in comparison with steam roads and it is carried on comparatively short sections of single track line, with frequent stops, in combination with the operation of through express train units, at certain intervals of the day, without the assistance of station agents or other employees at meeting points or stops, to control the traffic. These factors, together with the increased holiday traffic previously mentioned, require for their control a system of signals designed especially to meet these conditions.

THE NECESSITY FOR ELECTRIC RAILWAY SIGNALS

The safety of the public who are our patrons and from whom we derive the revenue which sustains us provides the first necessity for signals. This developed the early and still much used system of establishing what are commonly known as "hand blocks" whereby a trainman of a car at one siding, by throwing a switch by hand, turns on a light at the next siding, signifying to a car at that point that he intends to proceed to that siding.

After the safety of the passenger is assured, the next necessity for signaling is to get the passenger to his destination as promptly as possible. In keeping the cars moving promptly and properly an obvious result is the increased capacity of a track or system which has been properly signaled. The signaling, while adding to the capacity of a given system, is of great value in reducing the liability to accidents and increasing the confidence of the public.

The requisites of signals on electric railways vary naturally, with many conditions. Each system has its own problem and the keynote of the solution lies in the answer to the question "What is necessary for the protection and safety of the public under the conditions under which we operate?"

DIGEST OF LAWS AND RULINGS

A digest of laws compelling the installation of block signals on electric railways, and of laws conferring the necessary authority upon the various commissions to require electric railways to install block signals, and of the various rulings made by the different commissions on this subject, occupied five pages of this report.

Congress does not appear to have conferred upon the Interstate Commerce Commission any authority to compel either steam or electric railways to install block signals.

The following states have no laws or commission rulings bearing on the subject of block signals: Alabama, Arizona, California, Connecticut, Georgia, Iowa, Kansas, Missouri, Montana, Nebraska, North Dakota, Ohio, Rhode Island, Tennessee, and Virginia. The commissions in Florida and South Carolina have no jurisdiction over electric railways, and in Pennsylvania none in so far as block signaling is concerned. In Maryland, Massachusetts, Minnesota, New York, Nevada, Oklahoma, Oregon and South Dakota the legislature appears to have conferred upon the railroad or public service commissions the authority to require the in-

*Abstract of report read before the American Electric Railway Engineering and Transportation & Traffic Associations, at Atlantic City, N. J., Oct. 9-13, 1911.

stallation of block signals, but in none of these states has any ruling as yet been promulgated requiring such installation. In Wisconsin during the last session of the legislature there was enacted a law which appears to confer upon the railroad commission of that State explicit and definite authority to require railroads to install and operate a block system in such cases as the commission decides that it is necessary so to do in order to render the operation of such railroad reasonably safe.

In Indiana, during the last session of the legislature, a law was enacted by which it is provided that after January 1, 1912, it shall be unlawful for any company owning or operating a line of steam or interurban railroad in Indiana to operate any train or car over such railroad "unless such railroad is equipped with and has in operation an automatic block system or other system approved by the Railroad Commission of Indiana for the control of train or car movements thereon, unless the time therefor be extended by such Railroad Commission."

There have been no rulings of the commission under this act which have any relation to electric railroads. A committee on block signaling has, however, been appointed by the commission from representatives of the interurban companies, with M. H. Hovey, of Madison, Wis., the block signal expert of the commission, also a member.

SIGNALS TO BE INSTALLED DURING 1911

The collection of data concerning block signals that the various electric railway companies contemplate installing during the year 1911 has brought out very forcibly the timeliness and importance of the appointment of a committee for the investigation of this subject.

Among the companies actually putting block signals into use the Illinois Traction System is making the largest installation. This company has already in place and on order 168 Union Switch & Signal Company's style B automatic block signals, to be operated in connection with continuous track circuits, protecting about 150 miles of track. It also has on order 50 Nachod trolley contactor signals, which will be installed on various parts of the system. These will protect about 25 miles of track, making a total of 175 miles of track protected by signals. The Nachod signals will be used where city service is operating over interurban lines and at the entrance to towns.

The Public Service Railway Company of Newark, N. J., already has a system of 160 blocks and this year has placed an order with the United States Electric Signal Company for 121 more, making a total of 281 blocks, and taking care of 81 miles of track.

The Hudson Valley Railway Company is using the trolley contact device of the United States Electric Signal Company and intends protecting this year 5 more miles of track with this company's type K signals, the average length of block being three-fourths of a mile.

The Wheeling (West Va.) Traction Company contemplates protecting 45 miles of track with the trolley contact device. This company is testing four blocks on one line equipped with Nachod signals and one block on another line with the United States signals. If these signals prove satisfactory, all of this company's single track lines will be immediately equipped. The block signals are used only at turnouts.

The Worcester Consolidated Street Railway Company intends protecting about 25 miles of track with the United States Signal Company's type G trolley contact device, using an average length of block of about 2 miles.

The Chattanooga Railway & Light Company intends protecting about 4 miles of track with the Nachod signals. In this case the average length of block is about 3,000 feet.

The Elmira & Seneca Lake Traction Company will add one more block of 2 miles to its present system of United States electric signals.

The Hudson & Manhattan Railroad Company proposes this current year to add to its present system of the Union Switch & Signal Company's automatic electro-pneumatic signals by installing signals at nine locations on about 6,000 feet of track.

The Boston Elevated Railway Company intends increasing its present system of electro-pneumatic signals so as to protect 3 miles of double track.

The Syracuse, Lake Shore & Northern Railroad Company is preparing to install six signals, covering a distance of about 10½ miles of single track, on an extension. These signals will be of the a. c. continuous track circuit type, manufactured by the Union Switch & Signal Company, and similar to twenty-four others at present in use on double track.

The Syracuse, Lake Shore & Northern Railroad Company is preparing to install six signals, covering a distance of about 10½ miles of single track, on an extension. These signals will be of the a. c. continuous track circuit type, manufactured by the Union Switch & Signal Company, and similar to twenty-four others at present in use on double track. This company is also installing on the Rochester, Syracuse & Eastern Railroad nine of the same type of signals, covering a distance of about 16½ miles.

The Boston & Worcester Street Railway Company intends installing this year signals distributed over 31½ miles of main-line double track. The blocks vary in length from 1,400 feet to 3,200 feet and are in most cases independent of each other. The reason for the use of short blocks is that the operating department finds it necessary to operate double headers on close headway. The blocks are located in those places where there is the most danger of collisions due to curves, etc. This company uses the O'Bryan signal.

The Ohio & Southern Traction Company is intending to protect 7½ miles of track with the Stromberg-Carlson dispatchers' signals.

The Oregon Electric Railway is planning to protect seven miles of track with three-position automatic continuous track circuit signals.

The Washington & Rockville Railway Company and the City & Suburban Railway Company, of Washington, D. C., intend protecting 2.84 miles with a controlled manual system of signals of the Ramsey type, made in their own shops.

The General Railway Signal Company is now installing two sample blocks for the Lehigh Valley Transit Company. This company contemplates protecting 60 miles of track this year.

The Waterloo, Cedar Falls & Northern Railway Company expects to protect eight or ten curves this year with block signals, probably of the alternating-current track circuit type.

The Michigan United Railway Company also has been investigating a number of a. c. track circuit signal systems recently but reports that the matter is not sufficiently far advanced to give definite information.

The Cedar Rapids & Iowa City Railway is planning to protect 25 miles of track, but has not determined what system to adopt.

The Roanoke Railway & Light Company is planning to protect 10 miles of track, the system not yet decided upon.

CONCLUSIONS AND RECOMMENDATIONS FOR 1912 COMMITTEE

There can hardly be any question as to the fact that each road presents its own problem, possibilities, requirements and limitations. Manifestly, a small road earning scarcely enough to pay its operating expenses cannot make or hope for any expenditures for signals, yet the road which earns a large revenue per mile of track, with business that at times taxes its capacity to the utmost, must of necessity make large expenditures in the installation, operation and maintenance of signal systems. The signal companies are working to develop signals which will take care of the different phases of this subject as presented by different properties.

Because of this being the first year's work of your committee on signals, and because of the rapid development of new apparatus and methods of signaling at this time, we do not feel it wise now to report any definite conclusions, but recom-

mend that your committee for the year 1912 continue the study of the present and ever-increasing number of signal systems, and, if possible, at the end of that year's work, draw some conclusions and make signaling recommendations for the following classes of roads:

	No. of tracks	Headway in minutes	Speed in m. p. h.
A—	1	5 to 30	20 or less
B—	1	1 to 10	30 or less
C—	1	60 or more	40 to 60
D—	2	5	40 to 60
E—	2	5	40 to 60

*Trains of several sections.

BLOCK SIGNAL SYSTEMS—APPENDIX

The appendix to the signal report is a collection of material largely obtained from the engineers of signal manufacturing companies. This material occupies 106 pages of the report and is illustrated by seventy-five engravings.

Appendix A defines the various systems of blocking and describes and illustrates the continuous track circuit system.

The fundamental principles of control circuits are presented in Appendix B, showing how particular care must be taken in making signal connections to assure that any derangement of apparatus or wires will give a "stop" indication.

Appendix C, occupying eighteen pages of the report, presents by means of illustrations and detail descriptions typical signaling plans for electric railways and shows the common method of diagraming signals on plans. This section of the appendix also includes a critical statement by the Union Switch and Signal Company of signaling with auxiliary indications for reduced speed following movements.

Appendix D is a statement of the General Railway Signal Company favorable to the "absolute permissive" block system.

Appendix E describes light signals as developed for subway and interurban use.

Appendix F describes automatic train stops, referring particularly to those in use on the lines of the Washington Water Power Company at Spokane and the "Key Route" at Oakland, Cal.

Appendix G consists of brief descriptions of the more essential parts of a block signal installation, describing briefly the relays and signal mechanisms.

Appendix H is an illustrated description of the automatic block signal system on the Illinois Traction System written by John Leisenring, signal engineer, for the Electric Railway Journal of June 24, 1911.

Appendix I is a description of the automatic block signals and train stops on the Washington Water Power interurban line, abstracted from an article in the Electric Railway Journal for December 17, 1910, material for which was furnished by R. M. Willson, assistant general manager.

Appendix J describes the Kinsman block system using short track setting sections.

Appendix K describes the Nachod signal system and its trolley contactors.

DISPATCHERS' SIGNAL SYSTEMS

Appendix L is devoted to dispatchers' signal systems and presents illustrations and descriptions of the dispatchers' signals manufactured by the following companies: Blake Signal & Manufacturing Company, General Railway Signal Company, Western Electric Company, Baird Electric Company, Stromberg-Carlson Telephone Manufacturing Company, National Electrical Manufacturing Company and the United States Electric Company. This concludes with an illustrated description of the Simmen dispatching system as manufactured by the Railway Improvement Company, New York, and the Prentice automatic train stop and cab signal which has been the subject of experiments on the Canadian Pacific Railway.

REPORT OF THE COMMITTEE ON CAR MILES AND CAR HOURS*

CHAS. H. LAHR, CHAIRMAN; M. W. GLOVER AND C. S. MITCHELL

A car mile is a mile run, whether it be by a small single-truck city car, an urban or an interurban car of different length or weight. Whatever revenue is collected for this distance constitutes the earnings per car mile and the expense incurred is the operating expense per car mile.

The car mile is used at the present time almost universally as the unit of comparison. In the operation of a traction property its statistics are very valuable as a means of giving information relative to its operating condition or general efficiency, but to stop there is to miss the greatest good of the statistical work. Comparisons of one property with another have always been unsatisfactory and always will be as long as the interests in control are indifferent as to the methods used in compiling these statistics.

It is the opinion of your committee that mileage should be computed for each car operated, even though several cars may be operated in trains and some may be motor cars and some trailers. This mileage should include all mileage run from the time the car leaves the carhouse or terminal until it reaches its regular starting point, and all mileage made during the day's operation and return to the terminal.

DIVISION OF CAR MILES

Car miles should be divided into two classes, namely, revenue miles and non-revenue miles. These may be subdivided as desired. Revenue car miles should be divided into two classes: First, cars used in passenger and chartered car service and, second, cars used in freight, express and mail service. Non-revenue car miles are miles run by cars while being transferred from one point to another for the purpose of repair and transfer; also miles run by cars used in the service of the company, the expense of which is chargeable to the company itself, including work, sand, sprinkling and wrecking cars, snow sweepers and plows.

DIVISION OF CAR HOURS

When car hours are used as a unit of comparison they should be divided into two classes, namely: Revenue and non-revenue. These may be subdivided as desired, but to obtain the best results they should be compiled like car miles, that is, the entire time that the trainmen are in charge of the car from the time of leaving terminal or carhouse until return should be included, and the time of each car operated should be included in the computations, whether such cars are operated in trains or separately. The data for compilation of car miles and car hours should be furnished by the operating department by report of the schedule trips of each line or division for the day. If any additional trips are made or any trips lost the carhouse foreman or dispatcher should report the same.

We believe that many economies can be effected if the management has accurate statistics of the car miles and car hours compiled under the above plan. The lines are closely drawn between the miles run and the hours in service of cars operated for revenue and the miles run and the hours in service of cars operated for non-revenue purposes. The data may be readily segregated in a manner that will permit the cost per car mile and per car hour for various classes of service to be ascertained as may be desired.

It is the opinion of your committee that for comparative purposes the car mile and car hour are not entirely satisfactory as units on account of the different weights and capacity of cars, but with the limited time in which the committee had to prepare its report it was impossible to communicate with the member companies and secure their opinions along this line.

*Abstract of a paper read before the American Electric Railway Accountants' Association, Atlantic City, N. J., Oct. 9-13, 1911.

REPORT OF THE COMMITTEE ON INTERLINE ACCOUNTING*

L. T. HIXSON, CHAIRMAN; IRWIN FULLERTON AND E. L. SCHMOCK

Your committee on interline accounting desires to offer some recommendations which the previous committees have not taken up, as well as to suggest several methods differing somewhat from the recommendations of former committes.

We also desire to submit a system of accounting for interline business which may be of assistance to the accounting officers of a company entering this class of business.

TICKET REPORT AND INTERCHANGEABLE COUPONS

The form of ticket report recommended by the 1909 committee has proved very satisfactory, and the forms as shown herein cover very slight changes.

The bill for coupons accepted should be accompanied by a statement in duplicate giving the book number and the opening and closing number of the coupons.

BAGGAGE REPORT AND FREIGHT ACCOUNTS

Separate reports should be made covering baggage, taking the place of the combined baggage and ticket report.

While the greater number of electric lines have been using the "unit" type way-bill for interline business there seems to be a growing preference for the "blanket" bill. When the blanket bill is used train crews and junction agents have fewer bills to handle and can check freight with greater speed and accuracy. A number of lines also interchange business with steam roads and boat lines and must use blanket bills for such traffic. The blanket way-bill eliminates, to a great extent, the difficulty arising from lost way-bills.

It has been the custom to make settlement for interline business in a variety of ways, thereby causing considerable confusion. One plan should be made compulsory for all interested companies.

RECOMMENDATIONS

Your committee desires, therefore, to make the following recommendations:

Reports of ticket accounts to be made by the selling road not later than the fifteenth day of the following month.

Bill to be rendered by the company accepting interchangeable coupons not later than the fifteenth day of the following month and to be accompanied by a statement showing book numbers and opening and closing numbers of each strip of mileage or coupons.

Report to be made by the company checking baggage to all lines interested. In making corrections on reports from another line use correction blank, inserting the word "baggage" where necessary.

In lieu of the different names and colors of baggage checks generally used we suggest that free checks be white card, designated "free;" revenue checks which are prepaid, red card, designated "prepaid," and checks for revenue or advances to be collected at destination, blue card, marked "collect."

In the audit office settlement of the "blanket" form of way-bill to be used. All bills covering freight received by a company during the month to be reported not later than the fifteenth day of the following month to the company on whose lines the shipments originated, as well as to all intermediate lines over which such shipments were hauled. Reports to be made as follows: Abstracts, division sheets and summary.

In addition to these regular monthly reports the following are used when necessary:

STATEMENT OF DIFFERENCES

Advising the line making the original report of errors in such reports. This form is not used for unreported way-bills.

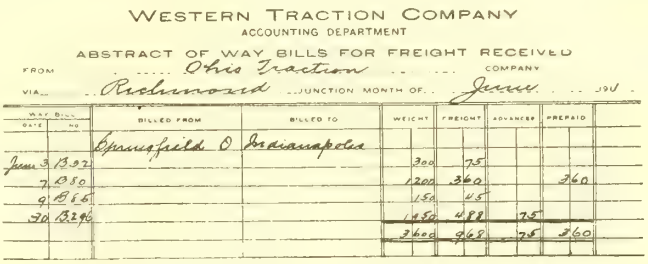
For all items listed on statement of differences, which a company accepts, a correction account is issued and taken into account in the summary the following month.

Accounts should be settled in accordance with reports as rendered and corrections adjusted the following month, except for any large errors or errors caused by carrying footing forward, which should be corrected with advice to the reporting company at once.

Corrections on way-bills should be taken into account in the month they are received and accepted (regardless of the date of the original way-bill) by entry on abstract instead of the correction account, which is used by some companies. These corrections may be noted on the abstract and added or deducted, as the case may be. This method greatly facilitates the adjustment of the account.

PASSING RECORD

All freight passing junction should be entered on this form, which may be used by the auditor to check up billing



WESTERN TRACTION COMPANY
ACCOUNTING DEPARTMENT
ABSTRACT OF WAY BILLS FOR FREIGHT RECEIVED
FROM Ohio Traction COMPANY
VIA Richmond JUNCTION MONTH OF June 191

WAY BILL DATE	WAY BILL NO.	BILLED FROM	BILLED TO	WEIGHT	FREIGHT	ADVANCES	PREPAID
		Springfield O	Indianapolis				
June 3	B 92			300	75		
7	880			1200	360		360
9	B 65			150	45		
10	B 296			1450	488	75	
				3600	968	75	360

Interline Accounting—Way-Bill Abstract

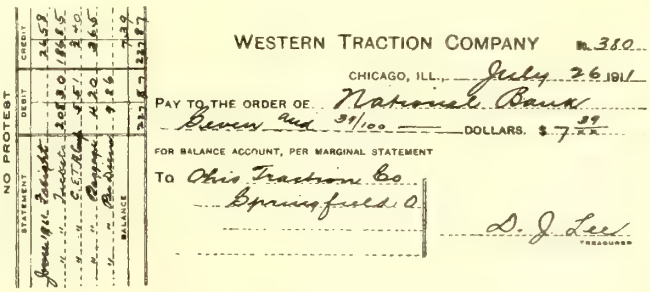
from or to foreign lines. This form is also useful in case of claim in determining the condition of a shipment when delivered to or received from a foreign line.

All unreported way-bills or statements of difference which have not been accepted are carried as "unadjusted accounts." This list may be made in any form, as it is a memorandum for the use of the road making it.

BALANCING LOCAL AND INTERLINE FREIGHT ACCOUNTS

The total interline forwarded by a company, added to the total received, as shown by agents' abstracts, must equal the total interline received by such company added to the total forwarded, as shown by agency abstracts. This balance is made before commencing the regular interline settlement sheet and covers the current month only.

All freight accounts from the various sources are entered on the interline freight settlement sheet and the balances for all agents, as well as each company, are shown. The "unadjusted accounts" totals for the previous month are de-



NO PROTEST
STATEMENT DEBIT CREDIT BALANCE
WESTERN TRACTION COMPANY $ 360
CHICAGO, ILL. July 26 1911
PAY TO THE ORDER OF National Bank
Seven 39/100 DOLLARS. $ 7.39
FOR BALANCE ACCOUNT, PER MARGINAL STATEMENT
TO Ohio Traction Co
Springfield O
D. J. Lee TREASURER

Interline Accounting—Settlement Draft

ducted and totals for the current month are added. If the proper figures have been taken into account the advances received and forwarded will check, and the prepaid received and forwarded will also balance. The amount of foreign roads' proportion of revenue deducted from the total revenue freight column will give the net freight earnings of the company, and this amount, carried to the credit in the "balance" column, will make the total debit and credit footing the same.

*Abstract of paper read before the American Electric Railway Accountants' Association, Atlantic City, N. J., Oct. 9-13, 1911.

There are very few electric lines interchanging equipment to any great extent, and those lines which are interchanging do so principally with steam roads, and follow steam road practice. Therefore, the committee does not wish to offer any suggestions as to handling this class of business.

As soon as all entries have been made for the month, a statement of interline account should be rendered to each road, giving the debits and credits as shown by the company's books in order that duplicate reports may be requested at once, if any should be missing.

All settlements should be made by draft for the balance of the account, including all classes of interline business. Such draft should be made by the creditor company at any

WESTERN TRACTION COMPANY

AUDITOR'S OFFICE

CHICAGO ILL. July 16 1911

STATEMENT OF INTERLINE ACCOUNT WITH

Ohio Traction COMPANY

Springfield, Ohio

MONTH OF June 1911

	DR.	CR
Tickets	208 30	186 85
Baggage	4 20	3 65
C. E. T. A. Coupons	5 51	3 40
Freight		26 58
Per Diem	9 86	
Bal. Due W. Trac. Co.		7 39
	227 87	227 87

Interline Accounting—Monthly Statement

time after the twenty-fifth day of the following month, and should cover the items as set forth in the interline statement.

A condensed form of journal entry will answer the requirements in the majority of cases, but the manner of keeping each company's books differs and this entry would conform of necessity to the regular practice.

CONCLUSION

In conclusion the committee wishes to state that the forms and outline submitted herewith are intended to cover one way of handling interline accounts from the time the ticket or way-bill is issued until the entry is made on the general ledger. While there are other plans which will give the same final results, we are of the opinion that the system recommended is the most satisfactory.

The McConway & Torley Company, of Pittsburgh, Pa., has in its exhibit a full-size Janney radial coupler applied to the framing of a car platform. This coupler is of the same pattern as that used on many thousand steam railroad cars, with arrangement for radial movement to provide for the service requirements on electric interurban cars. The method of attachment is the acme of simplicity. It couples automatically by impact, and can be uncoupled from either side of the car. This company was the originator of the M. C. B. type of coupler, and its reputation in the coupler field is assurance of its ability to cope successfully with the problem of evolving an efficient and practicable device for interurban service. The use of this equipment makes possible the interchange of cars with steam roads. The company's engineering department will be glad to coöperate with railroad officials or car builders in designing equipment for special conditions.

REPORT OF COMMITTEE ON HEAVY ELECTRIC TRACTION*

BY E. R. HILL, CHAIRMAN; E. B. KATTE, VICE-CHAIRMAN; W. S. MURRAY, J. H. DAVIS, HUGH HAZELTON, E. F. GOULD

The committee confined its consideration to the following subjects:

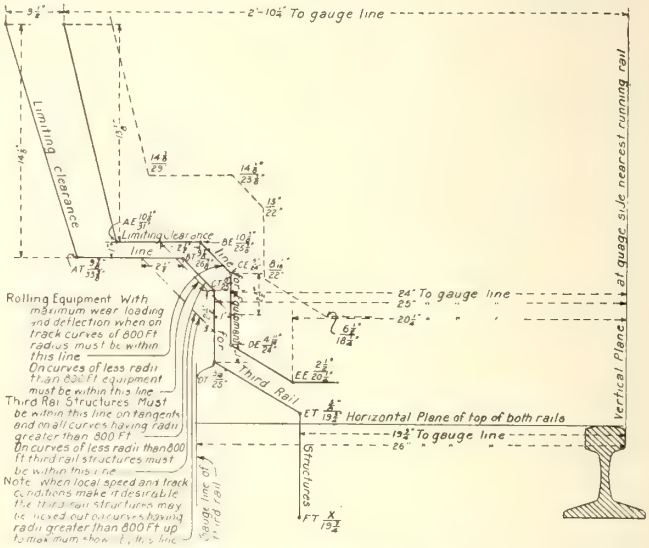
1. The location and clearances for third-rail working conductors.

2. The location of electrical end connections on cars and locomotives.

3. The location of automatic train stops.

THIRD-RAIL LOCATION AND CLEARANCES

Your committee arranged for conferences with representatives of the corresponding committees of the American



Heavy Traction—Limiting Clearance Lines for Third-Rail Structures and Equipment

Railway Association and the American Railway Engineering Association, and as a result has prepared a diagram showing location and clearance lines which we understand will be satisfactory to the committees of those associations.

It has been thought advisable, however, to confine our attention at this time to the establishment of such standard location and clearance lines as affect the relation of the third-rail construction to rolling equipment, and leave for subsequent consideration such standard location and clearance lines as affect the relation of the third rail to permanent way structures. The committee recommends that the committee on heavy electric traction next year take up the question of permanent way construction lines as bearing upon the space required for the installation of third-rail working conductors, with the view to recommending a standard which shall be satisfactory to the committees of the three associations.

The committee recommends that the following standards be adopted by the American Electric Railway Engineering Association:

(1.) The gage line of the third rail to be located not less than 26 in. and not more than 27 in. from the gage line of the track, and the contact surface of the third rail to be not less than 2¾ in. nor more than 3½ in. above the plane of the top of the track rail.

(2.) The clearance lines for third-rail structures and rolling equipments to be as shown in the accompanying diagram.

(3.) Encroachments on normal clearance due to deflection of springs and wear vary with the type of construction used and the practice of the respective roads as regards permissible wear and deflection before repairs and adjust-

*Abstract of report read before the American Electric Railway Engineering Association at Atlantic City, N. J., Oct. 9-13, 1911.

ments are made. For the general guidance of the roads in designing equipment, but not as a standard, therefore, a dotted line is shown on the diagram located 2 in. distant horizontally and 4 in. distant vertically from the limiting clearance line for equipment.

Attention is called to the method of designating the points of the lines in the diagram, as follows:

(*a*) The letter "T" after a letter indicates that the line refers to the third-rail structure.

(*b*) The letter "E" after a letter indicates that the line refers to equipment.

(*c*) The figures after designating letters represent, respectively, the elevation in inches above the plane of track rail when shown above the line, and the distance in inches along the plane of track rails from the nearest gage line of track when shown below the line.

The committee further recommends the adoption of the following terms, which have already been adopted by the American Railway Engineering Association (American Railway Engineering & Maintenance of Way Association):

(1.) Third-rail gage. Distance measured parallel to plane of the top of both running rails, between gage line of running rails and gage line of third rail.

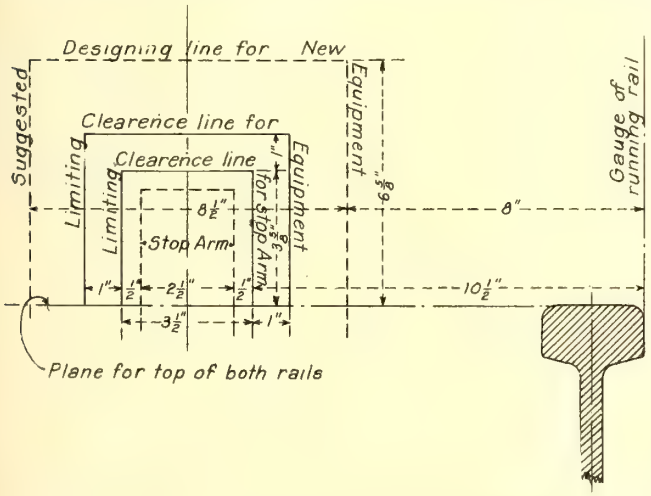
(2.) Bond. A metallic means for connecting two rails to permit of the passage of electric current.

ELECTRICAL END CONNECTIONS ON CARS

Considerable data have been collected with special reference to heavy electric traction on steam railroads. However, as the committee on equipment has also been considering this subject, the data have been turned over to that committee. It is important for all roads to adopt as far as possible the M.C.B. standards for location of mechanical and hose connections, but, in view of the wide variation in practice regarding electrical connections, it will probably be impossible, at least for a considerable time to come, to adopt a definite standard for each type of connection. It would seem feasible, however, to define certain space at the ends of cars, to be used in electric service either at once or at some future time, which space should be reserved for the location of end connections at the time the cars are designed and built.

LOCATION OF AUTOMATIC TRAIN STOPS

The use of automatic train stops actuated in connection with the signal system is coming more and more to be the



Heavy Traction—Recommended Clearance Lines for Automatic Train Stops

practice, especially on electric railways operating in subways and tunnels, and the committee deems it advisable at this time to make certain suggestions regarding the proper location of trip arms along the track and contact devices on cars which may be regarded as "recommended practice," until such time as the use of train stops becomes sufficiently general to justify the adoption of a standard location.

We offer the clearance line shown as defining the space which should be reserved along the track and on the equipment for the use of the train stop. The location is the same as adopted for the station and tunnels of the Pennsylvania Railroad at New York and for the Hudson & Manhattan Railroad Tunnels.

STANDARD AXLE SPECIFICATIONS

A sub-committee was appointed jointly representing the committee on equipment and the committee on heavy electric traction, consisting of J. S. Doyle, superintendent car equipment Interborough Rapid Transit Company; John Lindall, superintendent rolling stock and shops Boston Elevated Railway; Hugh Hazelton, electrical engineer Hudson & Manhattan Railroad. This sub-committee has held several meetings as part of committee A-1 of the American Society for Testing Materials on standard specifications for steel.

As a result there have been drawn up specifications for heat-treated carbon steel axles, shafts and similar parts. These specifications have been sent to all members of the American Society for Testing Materials with a view to adoption as standard of that society.

THE NEW YORK AIR BRAKE COMPANY'S DISPLAY

The New York Air Brake Company has in operation in Marine Hall, spaces 229-231, an electro-pneumatic air-brake equipment for a ten-car train. This equipment has been designed for use on electrically operated trains of any length, being especially adapted for multiple-unit service. The special features of this equipment are simultaneous service, graduated release, maintenance of cylinder pressure against leakage and regardless of piston travel, simplicity of operation and manipulation, service emergency, quick recharge and high pressure emergency. An instantaneous application occurs in both service and emergency when operating electrically.

The brakes may be graduated on or off to any extent, to offer the greatest flexibility of operation obtainable. The brake cylinder pressure is automatically maintained against leakage and regardless of piston travel in both pneumatic and electric operation. An interruption of electric current on one or more cars in the train will not affect prompt application when the brakes on the rest of the train are operated electrically. All electric and pneumatic positions on the motorman's valve are the same, so that in case the electric current fails the pneumatic will immediately apply when the motorman's valve handle is placed in application position, resulting in no loss of time due to the necessity of moving the valve handle to another position. As the lap position is common for both electric and pneumatic operation the brakes will not release should the current be interrupted after the brakes have been applied electrically. This insures a positive brake upon trains from starting when held applied on grades, etc. In the graduated release position the system is completely recharged aften an electric application. Any number of consecutive service applications can be made, after which, if an emergency should arise, the maximum cylinder pressure can be obtained instantaneously. An emergency application can be obtained electrically or pneumatically on all cars after any service application has been made. Only one type of equipment is necessary for all different weights of cars. Should a conductor's valve or track trip be opened an instantaneous emergency application will be produced. An emergency application produces a higher maximum brake cylinder pressure than is obtained in a full service application. The company representatives in attendance are W. T. Henry, N. A. Campbell, C. E. Leach, J. D. Cartin, B. J. Minnier, H. E. Whitaker.

A very extensive line of wire rope and fittings and bare and insulated wire and cables is being exhibited by the John A. Roebling's Sons Company, in space 225-9.

ACCOUNTING SYSTEM FOR A SMALL ELECTRIC RAILWAY*

BY E. D. GAULT, AUDITOR MAHONING & SHENANGO RAILWAY AND LIGHT COMPANY

A great deal depends on the office as well as the equipment provided. The office should be well ventilated and illuminated, as well as large enough to provide ample space for filing away all records. While some companies seem to think that almost any room or set of rooms not needed for other purposes will do for an office, other companies are beginning to provide better accommodations for those employed to keep track of the business transactions of the company.

It is the exception to find all the information gathered by the different departments collected in one place. There should be one place for gathering together all the information relative to the financial and all other records pertaining to the construction and operation of any company, and this should be in the accounting office. All contracts and valuable papers should be filed in this department and when taken for use in any other department a proper record should be made.

The classification of "expenditures for road and equipment" adopted as standard by this association on Oct. 15, 1908, and conforming to the classification prescribed by the Interstate Commerce Commission, should be used. We are also asked the cost of certain buildings, power houses, substations, bridges, etc., especially in arriving at valuations for insurance purposes, and for this reason the cost of each individual job should be kept. Before work is started on a particular job a work order should be prepared giving a description of the work and the estimated cost. This should be approved by the proper officials and sent to the accounting department to receive a distinguishing number. A record should be kept known as "charges to work orders," in loose-leaf form. A description of the work to be done should be written at the head of each sheet, and also the estimated cost together with the work order number given by the accounting department. The sheets are ruled with four columns to the right so that all charges may be segregated as between labor, material and miscellaneous, the last column being used for the total. A report should be made up each month showing all expenditures on each job.

In addition a record should be kept known as "expenditures for road and equipment." This may also be a loose-leaf form and the same form of ruled sheets may be used as those used in the record of work orders. At the head of each sheet should appear the account number and the name of the account. The total of the entries each month will equal the total of the entries "charges to work orders."

A column should be provided in the voucher record headed "expenditures for road and equipment." The total only should be entered in the voucher record under the above heading and the detail with reference to the classification should be entered in the record of "expenditures for road and equipment," while the amounts chargeable to the various work order numbers should be entered in the record of "charges to work orders." If it is desirable, instead of having one column in the voucher record headed, "expenditures for road and equipment" three columns may be used, as follows: I—"Expenditures for roads," II—"Expenditures for equipment," III—"General expenditures." At the end of each month the totals of these columns should be posted to the respective controlling accounts in the general ledger.

Time slips for labor in connection with construction expenditures should be of a different color from those used in connection with operation, and should be sufficiently large to permit a written description of the work.

If it is not desired to keep job costs, the record known as "charges to work orders" may be omitted. It has been the writer's experience, however, that too little attention is paid to job costs. This information is of great assistance in placing insurance valuations, valuations for taxation, etc.

Without job costs, while we may be able to tell the cost of the property as a whole, or any particular class of property indicated by the classification of accounts, we cannot tell the cost of any particular building or of machinery and installation thereof. This is very valuable information, especially if the same officials are in charge of operation and construction, and unless this cost has been kept at the time the work is done we can come no closer than an estimate.

The other books used in connection with the construction accounts and for recording the transactions before operation are the general ledger, general cash book, journal voucher record, trial balance book, etc. These books should be large enough and ruled in such a manner that transactions with reference to operation may be recorded in the same books. This, however, is possible only when the company does its own construction work.

GENERAL LEDGER AND JOURNAL

The general ledger should be a bound book with regular ledger rulings on a good quality of paper and in a substantial binder. The accounts should be arranged systematically so that the balance sheet and statement of the income account may be prepared with minimum labor.

A large number of the accounts are termed "controlling accounts." These are the accounts presented in more detailed form in some subsidiary account.

The journal should be a bound book of the same size and style as the general ledger, except the ruling, which, of course, should be the usual journal ruling. There are certain transactions which cannot be recorded properly through other records, such as giving or receiving of notes, adjustment of general ledger accounts, closing entries, etc. These entries are made in the journal. The entries in the journal are likely to receive special attention in case of an examination of the books, and it is, therefore, quite important that these entries cover all the facts in connection with the transactions.

The tendency of to-day is to shorten work in every manner possible by doing as much posting directly from the books of original entries as can be done. Some companies use what may be called a journal voucher. Other companies have special columns ruled in their voucher record for transactions covered by journal voucher, and all the journal vouchers are entered in the voucher record each month, and the totals of the columns posted to the general ledger account.

The method of entering journal vouchers in the voucher record works out satisfactorily and saves labor as well as space in the general ledger.

CASH BOOK AND TRIAL BALANCE BOOK

The cash book should be a bound book of the same size and style as the journal and general ledger. While with a large property it might be best to have a book ruled with special columns and printed headings, for a small property this has not been found necessary. The system outlined in this paper contemplates the payment of all money by voucher, and, therefore, it is not necessary to have special ruling on the credit side of the cash book. On the debit or receipt side, the total of all cash received would be entered, and the posting would be made directly to the general ledger.

The trial balance should be made up from the general ledger each month. The balance of open accounts should be used rather than the footings. Many good forms of trial balance books may be found carried in stock at almost any good stationery house, and, therefore, it is not necessary

*Abstract of paper read before the American Electric Railway Accountants' Association, Atlantic City, N. J., Oct. 9-13, 1911.

to go to the expense of having a book made. The treasurer's and auditor's monthly reports should be made from the trial balance of the general ledger.

ACCOUNTS PAYABLE LEDGER AND VOUCHER RECORD

Many accountants look at the accounts payable ledger as unnecessary, but many concede that it is a wiser policy to keep a ledger account with each person with whom we do business.

The accounts payable sub-ledger can be utilized to show many valuable points of information, such as voucher number. In checking statements it saves much time in hunting up vouchers or records. I also believe that every company owes sufficient attention to the creditors to keep a separate account with each. Properly handled this acts as a safeguard against duplicate payments. It also gives quick information as to the amount of purchases from any given person during a given period. This ledger should be a loose-leaf ledger and regular stock sheets may be used without any inconvenience. While the accounts payable ledger is not necessary to the operation of the system herein outlined, it has been the writer's experience in the last few years that it has saved more time than it has cost to keep it.

The voucher record should be a bound book with printed headings. The writer's experience with voucher records made up in loose-leaf form has not been as satisfactory as with voucher records made up in bound form.

The following are the principal printed headings of a voucher record for a company using the standard classification of accounts: Voucher number. Name. Paid by. Check number. Amount of voucher. Way and structure. Equipment. Traffic. Conducting transportation. General and miscellaneous. Insurance. Insurance advanced. Taxes. Taxes accrued. Interest on bonds. Interest on bonds accrued. Interest on notes and accounts. Interest on notes and accounts accrued. Dividends on stock. Expenses on real estate not used in operation. Improvements. Railway supplies. Park maintenance. Park operation. Park general. Sundry accounts. Construction.

Several columns should be provided in addition to those with printed headings, so that additional accounts may be added in case this is desired. The voucher record provides the skeleton of consecutive general ledger headings or classification groupings that would appear on the monthly statement or balance sheet, but the "abstract of expenditures" supplies the detail of each classified account.

While it is only necessary to provide one column for construction charges in the voucher record, if it is desired three columns may be provided as follows: I. Road. II. Equipment. III. General expenditures. These columns would carry the total construction expenditures, but the record of "expenditures for road and equipment" described above supplies the detail of each classified account.

ABSTRACT OF EXPENDITURES AND VOUCHERS

The abstract of expenditures is a loose-leaf book with two sets of covers, one for active material and one for a transfer. The sheets are ruled on both sides, with four columns to the right, headed, "labor," "material," "miscellaneous" and "total." The same form may be used as that used for "expenditures for road and equipment," and also the same used for "charges to work orders."

Now it seems to the writer that no one can criticise a record of expenditures for either construction or operation which will take care of expenditures running from hundreds to millions of dollars. The grouping of the sheets is of the same order given in the voucher record. The operating expense statements are made up from this record each month. These statements are provided with columns for labor, material, miscellaneous and total. In this one book you have a complete classification of all your accounts, no matter how many, and you have labor, material and miscellaneous separated. You also have an opportunity of comparing the showing of any one month with any other month of any year. You are enabled to make an analysis of any account for any period without the necessity of hunting up your vouchers. Furthermore, any number of clerks can be utilized in collecting and tabulating information at any one time, as the record is a loose-leaf record and may be separated.

The face of the voucher should show the distribution of the various accounts. When there is any considerable amount of distribution on any one voucher, as in the case of pay-rolls, a separate schedule may be attached giving the distribution.

Each conductor should be provided with a form of report or trip sheet for a record of the movements of his car and fares collected. The essential information that should be shown is the starting time, the direction of each trip, the register readings, car number, register number, conductor's number and motorman's number. Also a column should be provided in which the conductor might indicate the turning point of each trip, for this information is important if the car mileage and car hours are determined from the conductor's trip card.

This trip sheet should be turned in each day together with the cash collected. The next day the trip sheets are checked with the record of the register readings and the extensions are verified.

The cash is deposited by the receiver each day and a duplicate deposit slip properly initialed by the bank is attached to the receiver's daily report, and this together with the tickets, transfers, etc., is sent to the auditing department, where the returns are re-checked and the trip sheets verified. A record is kept with each car showing the number of miles run each day and the total at the end of each month.

Some companies make settlements of damage or personal injuries claims from a special reserve fund, setting aside each month in a separate account a certain percentage of the operating revenues. Payments are made from this account for the settlement of all claims for damages, as well as all expenses. A separate voucher record should be used for payments from this fund, as well as a voucher on different colored paper.

The disbursements may be classified according to the accompanying classification of accounts, which is used by several small lines.

A—Damages.
B—Salaries of claim department employees
C—Salaries of physicians.
D—Attorney's services.
E—Court costs and witness fees.
F—Hospital and medical services.
G—Personal and traveling expenses.
H—Incidental expenses.

PURCHASE ORDERS AND STORES DEPARTMENT

An order should be written for all purchases made by the company, giving complete information as to qualities, terms, prices, etc.

A number of copies should be made of all orders, the original to be mailed or delivered to the parties from whom the material is purchased. The duplicate is sent to the receiving clerk and placed on file to await the receipt of the material; the triplicate is placed on file in the auditing department to await receipt of invoice and the quadruplicate copy is retained by the superintendent.

If the company is sufficiently large to have a purchasing agent whose duty it is to do the buying for all departments, this routine may be somewhat changed, although the general method will be practically the same. From the copies of the orders in the auditing department information may be obtained in respect to obligation incurred, so that finances may be provided in advance. When the goods are received, the receiving clerk checks the items against the copy of the order and returns it to the auditing department. The copy is attached to the invoice as soon as received.

If material is purchased in quantity to be used over a period of several months, it should be charged to "stock ac-

count" until used or taken from the storeroom, when it should be charged to the proper account.

An inventory should be frequently taken to see if the stock called for by the controlling account on the general ledger is actually on hand. Scrap material should be returned to the storekeeper and the proper account credited, while at frequent intervals the scrap should be sold.

PETTY CASH ACCOUNT AND PAY ROLL

Each day's cash receipts should be deposited in the bank in full on the morning following. No disbursements should be made for the usual miscellaneous expenses, in conducting an office, from the cash receipts.

To provide a fund from which to pay the usual miscellaneous expenses in conducting an office, a suitable amount of cash is advanced to the agent or cashier as a petty cash fund, from which all small expenses are paid.

Each employee working by the day makes out a daily time slip showing his name, time he began work and the time off, the total number of hours and a description of the work performed. These time slips are then sent to the foreman, who approves same and sends them to the auditing department, where the total number of hours is checked and the proper account number indicated on the card. They are then entered on the pay-roll sheet and the total amount due each employee computed twice each month.

All salaried men are kept on a separate pay-roll, which is also made up twice each month the same as with other employees. These are paid by a separate voucher.

AMUSEMENT PARK ACCOUNTS

The accompanying classification of expense accounts is in use by two parks situated in different states and meets practically all the requirements of the two companies operating same.

EXPENSES OF AMUSEMENT PARK

Maintenance.
- 1 Buildings
- 2 Grounds.
- 3 —Lake.
- 4 Equipment.
- 5A Miscellaneous.
- 5B—Ball park.

Operation.
- 6 Theatre.
  - A—Attractions.
  - B—Wages.
  - C—Other expenses.
- 7 Dancing pavilion.
- 7½—Skating rink.
- 8 Carousal.
- 9 - Lake.
  - A—Launch
  - B Boats.
  - C—Bathing
- 10—Laundry.
- 11 Police.
- 12 Music.
- 13—Photograph gallery.
- 14—Restaurant and refreshments.
  - A—Meats.
  - B—Groceries.
  - C—Bread and pastry.
- 14—Restaurant and refreshments (Continued).
  - D—Butter and milk.
  - E—Ice cream.
  - F—Confections.
  - G Pop and soda.
  - H—Ice.
  - I —Tobacco and cigars.
  - J—Other supplies.
  - K—Other expenses.
  - L Wages.
- 15— Light and fuel.
- 16 -Miscellaneous.

General.
- 17 —Wages.
  - A—Superintendents.
  - B Storekeepers.
  - C—Excursion agents.
  - D—Other wages.
- 18—Printing and stationery.
- 19—Donations and concessions.
- 20 —Advertising.
- 21—Excursion agents' expenses.
- 22—Miscellaneous expenses.
- 23—Stable expenses.
- 24—Taxes.
- 25—Insurance.

One controlling account is carried in the general ledger for the park receipts, the details of which are carried in an auxiliary ledger or record. The receipts are classified as shown in the accompanying table:

EARNINGS OF AMUSEMENT PARK

Refreshments.
- Restaurant.
- Stand No. 1.
- Stand No. 2.
- Stand No. 3.
- Stand No. 4.
- Stand No. 5.
- Stand No. 6.
- Gum machines.

Amusements.
- Theatre—afternoon.
- Theatre—evening.
- Dancing—afternoon.
- Dancing—evening.
- Roller skating
- Carousal.
- Launch.
- Rowboats.
- Bathing.

Commissions.
- Roller coaster.
- Souvenir.
- Telephone.
- Photographs.
- Old mill.
- Ocean wave.
- Arcade.
- Circle swing.

Checking.
- Dance pavilion.
- Skating rink.
- Stand No. 5.
- Garage.

Admissions.
- Terminal gate.
- Upper gate.
- Lower gate.
- Dam gate.
- Coupons collected.

Three controlling accounts are carried in the general ledger, called "park maintenance," "park operation" and "park general," being the subdivisions into which the park expenses are divided. At the end of the year these accounts are closed and the net amount carried into profit and loss account.

Ticket sellers or cashiers are stationed at convenient intervals on the ground and settlement is made each night by a representative of the accounting or treasury department for the business done during the day. A daily report is made out by the ticket seller or cashier in duplicate and signed by both the cashier and representative of the accounting department each night at the close of business. No payments are made from the daily receipts, which must be deposited in one amount the following day, except in the case of Sunday or holidays. A fund is provided the park superintendent from which petty items may be paid.

UNITS OF COMPARISON

While there is no one unit that seems to meet the requirements of all cases, the car mileage unit is, perhaps, the most largely used, although the car hour unit is also used by a large number of roads.

There is a point where the car mileage is not equal to its test, for in a blockade the car is stopped and, therefore, the mileage is stopped, but the car hours go on. The car mileage unit is the most important unit of the steam roads, as well as the electric railways; however, there are many things that must be taken into consideration when making comparison with this unit, as some cars have double trucks, some have single trucks, some are motor cars hauling a trailer and some are trailer cars.

The car mileage is very valuable to the mechanical department in determining the life of motors, trucks, axles, etc. This information may be compiled from the conductor's trip sheet if a column is provided showing the starting point of each trip.

Another test that is perhaps the most widely known is the ratio the operating expenses bear to the earnings. The Interstate Commerce Commission, as well as certain state commissions, figures the ratio of each account to the total general account, also the ratio of each account to total operating expenses.

The Union Switch & Signal Company, ocupying space 300, is exhibiting signaling appliances of particular interest to interurban electric railroads. Three different arrangements of continuous track circuit automatic block signals are shown by models having moving cars and signals. A fourth working model demonstrates the principle of curve protection. Full-size semaphore and light signals and mechanisms as actually used on railroads are shown in operation as are also track relays, track transformers and impedance bonds. The electric train staff system for single track blocking is also shown in service. In its exhibit the company has aimed to present a practical rather than a theoretical demonstration of signaling systems evolved particularly for interurban traffic. A conspicuous feature of the apparatus exhibits is the full-size specimen of the Union Style B electric semaphore signal, more than 50,000 of which are in service operation throughout the country. The Illinois Traction System has recently installed 175 of these signals on its lines.

The Kerwin Machine Company, Detroit, Mich., has a very interesting working exhibit of the Kerwin-Detroit rail grinder. This grinder is a portable, self-propelled car which operates emery grinders mounted on a sliding carriage. This carriage may be adjusted automatically or by hand to control the position of the emery wheels so they will take from the head of the rail cuts of desired length and depth to obtain a perfectly smooth traction surface. It is used to grind down high and battered joints, cupped rail heads and rail corrugations. The demonstrations are under the supervision of James J. Kerwin.

ADDRESS OF PRESIDENT FORSE TO THE ACCOUNTANTS' ASSOCIATION

It becomes the pleasant duty of your president to review briefly the work of the year that has closed. If in so doing I touch upon that which seems ancient history to some, and discuss matters that are pertinent to all, it will be done because of pardonable enthusiasm for things accomplished by the association as a close-knit working organization with high ideals, throughout the fourteen years of its busy life.

The association, through its committee on standard classification of accounts and form of report, has rendered valuable service to the electric railways of America during the past decade. What was formerly chaos in records and accounts has been succeeded by order and uniformity, and there is now in use a system of electric railway accounting, inaugurated by this association, that has won international recognition. During the past year our association has been represented at the meetings of state and national railroad commissions, when problems affecting the accounting of electric railways were under discussion. The privilege of representation at such meetings and the harmonious spirit which prevails keep us in close touch with developments as they arise and a continuance of this policy is heartily recommended.

A few months ago our attention was directed by interurban railway accountants to correspondence had by them with the Interstate Commerce Commission relating to the matter of destruction of records. Orders have been issued by the commission permitting the steam roads to destroy records and memoranda after preserving them for certain periods of time mentioned in the orders. The commission has stated, in correspondence with some of our interurban member companies, that electric railways shall be governed by Section 20 of the act to regulate commerce, and that the permission given steam road does not apply to electric carriers. A committee of this association has accordingly been appointed to investigate the subject for the purpose of making recommendations to the association and to the commission, relative to the advisability of having orders issued that will modify or place a clear interpretation upon that section of the act which concerns the destruction of records of interstate electric carriers.

While on the subject of interstate carriers it may be well to state that the association has been keenly alive to the development of interstate traffic and the accounting problems of interurban railways during recent years. Its committee on interline accounting will present a report to this convention which treats the subject in a broad, comprehensive manner.

Coincident with the growth of interurban railways there has developed a traffic in the handling of packages and commodities. While not in any sense to be compared with the vast tonnage movements of the steam railways its importance is such as to call for careful study on the part of accountants and operating executives. It is extremely difficult to determine whether or not the rates charged for this class of service are adequate, as there are many items of expense that almost defy segregation as between passenger and freight traffic. Your new committee on freight and express accounting has outlined in its report a plan for a uniform computation of expenses. If some uniform plan is adopted and generally followed it will be an easy matter to compare the operating efficiencies of different properties when the local conditions are fully understood.

The working arrangements between the various affiliated associations whereby matters of common interest are investigated by joint committees result for the good of all. We have had such arrangements during the past year with the Transportation & Traffic Association through the joint committee on freight and express accounting, and with the Engineering Association through a committee which will bring before this convention a very valuable and timely report.

Features of this year's report of the joint committee with engineers which lend added interest are the discussion of scientific management and the extensive list of published books and articles on the subject which the report contains. This is but another evidence of the fact that the association is quickly responsive to the desire for information upon any subject in the field of accountancy.

The exponents of scientific management lay great stress upon the importance of time study, motion study and a full knowledge of existing conditions before radical steps are taken for the purpose of securing greater efficiency. The same doctrine of "be sure you are right, then go ahead" applies to other phases of industrial life as well as to scientific management. For example, electric railway executives and operators have made many individual efforts to secure accurate information regarding the life of railway physical property, in order to ascertain and properly account for the rate of return on investment or the cost of the service. Some of the railway engineering firms have accumulated considerable data, but the desire for knowledge upon this subject is so widespread that your executive committee deemed it advisable to take up the investigation through a special committee of the association. The committee on life of railway physical property has made an excellent beginning upon what promises to be a valuable work and one that will redound to the credit of this association. It will quite likely be found advisable to enlarge the committee by naming one or more engineers to co-operate in the work of the future.

In summing up the work of the year it is no less a pleasure than a duty to mention the help derived through the hearty co-operation of our members in the work of the association. We owe much to those who have served on committees and those who have prepared papers for discussion. Your executive committee has been active in promoting the welfare of the association and your secretary has again arranged an interesting exhibit of blanks and forms for the convention.

We are fully confident that our association will measure up to the opportunities of the coming years and that the accountant will continue to hold an honored place in this, one of the world's greatest industries.

DECISION IN OMAHA BRIDGE CASE

A decision handed down on Oct. 5, 1911, by the Commerce Court at Washington sustained a ruling of the Interstate Commerce Commission that the commission has authority over the operations of electric railways doing an interstate business. The case was brought to the court on appeal from the United States Circuit Court of Appeals by the Omaha & Council Bluffs Railway Company. This company has charged a 10-cent fare from either Omaha, Neb., or Council Bluffs, Ia., across the Missouri River bridge and into the loop district of either city and a 5-cent fare from the loop district to outlying portions of the city. Complaint having been made of the charges of the company, the commission ordered a reduction in the rates. The company denied the right of the commission to regulate interstate electric railway business. The court held that there was nothing in the history of the legislation that marked the passage of the Interstate Commerce Act which indicated an intent on the part of Congress to exclude interstate passenger street railways from the operation of the law. "On the contrary," held the court, "the terms of the act are broad and comprehensive enough to include them." The preliminary history of this case was published on page 1281 of the Electric Railway Journal for Dec. 25, 1909, and on page 1078 of the issue for June 18, 1910.

REPORT OF THE COMMITTEE ON EDUCATION*

BY H. H. NORRIS, CHAIRMAN; J. F. CALDERWOOD, W. F. KELLY, D. C. JACKSON, A. S. RICHEY

During 1907 to 1909 the committee on education concerned itself principally with the relation of technical graduates to the electric railway business. A plan for a cadet apprentice course was prepared and brought to the attention of the member companies individually and through the proceedings of the association.

Having done all that seemed practicable in the above direction, the committee turned its attention to a much larger and equally important field. Realizing that there are in the employ of the member companies many young men of limited educational advantages who are capable of developing into first-class mechanics and foremen, the committee desired to do something for them. A correspondence course was planned, somewhat along the lines followed by the American Gas Institute. The plan was laid before the association at the 1909 and 1910 conventions and it met with a cordial response on the part of the member companies.

Correspondence with the member companies was entered into, with the result that a large number indicated their desire to co-operate in putting the plan into practice and tentatively offered to enrol several hundred students in a correspondence course if it were instituted by the association.

The work of the past year has consisted in putting the correspondence plan to a practical test. Five companies were invited to co-operate in an experiment at their own expense. Each was asked to select five young men from various departments and to allow the committee to draw upon it for a sum not to exceed $150. All the companies expressed their interest in the experiment and an indication of their willingness to contribute any reasonable sum, even greater than that requested, to insure the success of the experiment. The co-operating companies were the Boston & Northern Railway Company, the Boston Elevated Railway Company, the Brooklyn Rapid Transit Company, the Indiana Union Traction Company, and the Public Service Railway Company, and twenty-seven students were enrolled last spring. The committee was fortunate in securing the services of Horace W. Flashman as instructor.

The plan which the committee then put into operation was briefly this: In view of the everyday work of each student, he was assigned a topic for report and questions to be answered, which were designed to force him to observe his daily work closely and to record his observations accurately. As will be agreed, these are among the most important elements of success not only in education but in all lines of human activity. The work was laid out to lead from the tangible apparatus and materials upon which the student was working to the reasons for the form and material and the underlying theory. The students were stimulated to ask questions of their foremen, superintendents and shopmates, and to use other available sources of information. They were supplied at half cost with an elementary reference book on the applications of electricity, and the manufacturing companies willingly furnished bulletins and other trade literature. The committee prepared special report books and other stationery for the convenience of the students and the instructor. The instructor carefully examined the students' work and returned it for correction until it was reasonably satisfactory. [Samples of this work, as well as of correspondence between the instructor and the boys, are given in the appendix to this report, not reprinted.]

The expenditures for the period of the experiment have been as follows:

For instructor's salary	$434 00
For printing and stationery	48 00
For postage	10 00
For clerical work	43 00

A total of $535, or $22 per student.

It was not necessary, therefore, to call upon the co-operating companies for the maximum amounts which the committee had been given the privilege of using. The experiment continued from May 1 to Sept. 1, although most of the month of May was occupied in preliminary correspondence and registration.

As is indicated by the letters from superintendents, foremen and the boys themselves [samples of which are given in the appendix], the work has been helpful in stimulating the students to take a more active interest in their work, to ask questions, to stay at home at night studying into the reasons for the use of certain elements of railway equipment and current standard practice in electric railway work. The duration of the experiment was so short that in spite of the encouraging results the committee is not yet prepared to recommend the establishment of a permanent educational department. It, therefore, proposes the following resolution:

In view of the encouraging results of the educational experiment conducted by the committee on education during the past year, and of the desirability of obtaining additional data regarding the virtues and faults of the methods used, the committee recommends:

(1) That the experiment be continued another year.
(2) That the number of students enrolled be increased to 100.
(3) That the number of students enrolled from each co-operating company be not limited to five, but include all students properly prepared, but
(4) That in assigning the scholarships due regard be paid to proper geographical distribution, so that the work may be useful to as large a number of companies as possible.
(5) That each student be expected to pay the sum of $5 as evidence of his appreciation of the work, and
(6) That each company be expected to pay a sum not to exceed $35 for each student enrolled.
(7) That the work be continued during the entire association year, or as much of it as remains after the plan has been put into effect.
(8) That in awarding the scholarship due regard be paid to priority of application.

In explanation of the above, it should be said that the committee estimates the maximum expense for all purposes to be $4,000, of which from one-half to two-thirds will be necessary for the salary of the instructor and the assistants, the remainder being for postage, stationery and stenographic work. This year the co-operating companies were willing to contribute $30 per student for three months' instruction, which is at the rate of $120 per student per year. It will be noted that the committee proposes next year to cut down this rate to about one-fourth.

The committee on education desires to call attention to the work of the committee on education of engineering apprentices of the Engineering Association. The excellent work of this committee in attempting to standardize the practical training of electric railway mechanics is quite different from the work of the committee on education of the American Association; in fact, the two lines of work fit in together in an excellent way, acting in a complementary relation to each other. The two committees have kept in touch with each other's work.

[The report is accompanied by seven appendices, of which one, that of the report of the instructor, is reproduced in part].

APPENDIX D. INSTRUCTOR'S REPORT

I take pleasure in outlining the work for correspondence students which I have been conducting under your direction.

The first essential step was the establishment of confidence and sympathy between the boys and the instructor and con-

* Abstract of report read before the American Electric Railway Association, Atlantic City, N. J., Oct. 9-13, 1911.

fidence in the boys in themselves. The first letter they were asked to write required a listing and description of the more striking pieces of apparatus they see and work with from day to day—controllers, motors, generators, etc. In this letter they gave some indication of how their interests lay—either by asking questions or by dwelling on certain points, and, based on this, the second problem was assigned. Any misstatements were corrected and references to reading matter given where necessary.

From the answers to the second problem the subject of the third developed. The work tended with each lesson to become more and more individual and personal.

Taking the case of one particular student, the first lesson was on car equipment, the second discussed the difference between shunt and series motors for railway service; next problem, methods of suspension of motors, bearings and the magnetic circuit; then an essay on brushes, while the fifth problem went into the theory of shunt and series motors.

In another case the first problem listed the apparatus manufactured by his employing company in its shops. The second problem was an essay on bearings and lubrication, and the third on the suspension of motors, the use of malleable iron, the magnetic circuit, etc. The fourth problem covered a description of shunt and series motors and the essential differences between them. In the fifth problem the question of trucks was treated. The sixth dealt with wheels. A more theoretical study of shunt and series motors made up the next two problems.

SUBJECTS TREATED

Answers were written by one or more on each of the following subjects: Apparatus in a car equipment make-up, differences between shunt and series motors, motor suspensions, bearings, lubrication, trucks, wheels, brake shoes, operation and care of d. c. generators, the equalizer connection, car building.

In all 227 letters were written to the boys. They were encouraged to ask questions regarding their daily work and their problems were so framed as to provide opportunity for the embodiment of suggestions for increasing the efficiency of such work.

QUALITY OF ANSWERS

To the first one or two problems the answers were brief and hesitant. The boys felt that they were walking through unfamiliar fields of theory and investigation, and were adopting a means of expressing themselves unusual to most of them. At the close of the course, in practically all cases, the answers, though on more difficult subjects, are extended and complete. Sketches are used freely and the boys have learned to go to the manufacturers and to the technical magazines and books for the information needed.

The advantage to the boys of asking questions of their foremen and superintendents has been pointed out to them, and most of the boys are alive to the possibilities of advancement which go with a good showing.

THE ATTITUDE OF THE STUDENTS

Attached to this report are copies of letters received from a number of the boys who express in their own various original ways, but sincerely, their appreciation of what the committee has been doing for them. All are anxious to continue the work and state that for themselves the best method of education has been adopted.

CONCLUSIONS

The educational experiment has demonstrated that the majority of young men are appreciative and will respond, and an improvement can be noticed in the value of their work. It has shown among what men we should look for students.

Any opinion expressed is purely personal and the subject can be viewed from many other points of view, but in the writer's judgment, the best age is from twelve to twenty-four years. In the development from boyhood into manhood a stage exists around sixteen to eighteen years when there are many things more attractive than study. Later there comes a more mature view of life—an appreciation of life's responsibility and opportunities creates a desire to become equal to them. Furthermore, in general, boys of sixteen to seventeen years have not seen enough of shop apparatus to appreciate its functions, and for several years ahead there is no probability of their employing company imposing any very great responsibility upon them. Our aim is primarily to make better workmen—better educated workmen. Take this in steps—see they are first of all workmen—then educate them. They will have then had practical experience enough to appreciate instruction.

A COMMERCIAL DUPLICATOR

The commercial duplicator of the Duplicator Manufacturing Company, Chicago, Ill., is exhibited at the Chalfonte. This machine is used to produce from five to one hundred copies. The original is written with duplicator ink if handwritten or with a duplicator ribbon or carbon if type-written. Reproductions can be made in thirty seconds. The machine consists of a rigid frame supporting a flat steel bed, over which travels a sheet of highly absorbent gelatine. By means of a feeding carriage, the original or master sheet is brought into contact with the gelatine band which takes an exact impression of the written matter. The copies are produced by feeding blank sheets in the same manner. After one portion of the 14-foot band is used, a new surface is obtained by turning a handle which automatically winds up the used surface as well. No machine is required to remove the ink which remains after copies have been taken off. The band automatically cleans itself. One band can be used over the entire surface once each day and re-used for several months. This feature makes the commercial duplicator inexpensive to operate. The master sheets cost $0.004 or less each.

REPORT OF THE COMMITTEE ON INTERURBAN RULES*

BY J. W. BROWN, CHAIRMAN; W. R. W. GRIFFIN, C. F. HANDSHY, W. H. COLLINS, F. A. BOUTELLE, A. S. SHANE

The committee this year submits certain suggested amendments to the standard code of interurban rules as adopted at the Denver convention in 1909. This revision has been made to conform to the instructions of the executive committee, which were to the effect that the standard code of interurban rules of this association be again carefully considered and that such, if any, changes be recommended as would seem to provide the maximum of safety for this class of transportation service; that the standard code of the American Railway Association be considered in so far as it appeared to be applicable to interurban operation, and that the standard code of the Transportation & Traffic Association in its entirety be prepared to comprehend general conditions of service and thus admit of acceptance and adoption by the largest proportion of our member companies. Your committee has endeavored to adhere to the above.

Your committee has endeavored to keep in mind the widely divergent conditions existing in interurban service in the different sections of the country, and files its report with the understanding that the suggested revised code in its application by various companies will be added to or subtracted from to meet the requirements of local conditions, and the flexible method of numbering the rules is carried out with this in mind.

[The code as amended has been in the hands of member companies since last June and hence is not reprinted at this time.—Editors.]

*Abstract of report read before the American Electric Railway Transportation & Traffic Association, Atlantic City, N. J., October 9-13, 1911.

THE J. G. BRILL EXHIBIT

The exhibit of The J. G. Brill Company and allied companies occupies a prominent position covering 1500 sq. ft. on the left side of the Main Building. It includes a No. 39-E single motor truck in operation on a testing platform. The operation closely approximates service conditions and gives the visitor an opportunity to see exactly how the brake system responds at all speeds and under various loads. The Brill representatives claim that there is no truck of the present day which fills so completely the requirements of highly developed city traffic as the No. 39-E truck. The operation of the truck here shows the distribution of the load on the two axles and its effect on braking, the danger of slipping during acceleration under light loads, the action of the springs under different loads, etc. Those who are using four-motor equipments and are planning to reduce weights will be able to secure figures to show how far the single motor truck is the principal factor in weight reduction. The Brill engineers who are in attendance have data on the subject resulting from recent investigations of some of the large systems. All will be interested in the brake arrangement method adopted for this truck, which applies pressure proportionately to the load on the wheels, and in the action of the Brill "half ball" hangers. The design of the cast-steel bolster, giving maximum strength with minimum weight, is meeting with general approval. The center plates with self-oiling ring, giving positive lubrication for six months without attention, provide another feature worth attention, as do the protection against wear of the bolster transoms and pedestal jaws by readily removable wear plates.

Of special interest is a truck from an order of eighty for the new Cambridge Subway cars of the Boston Elevated Railway. The truck measures 11 ft. 8 in. over the frame and 8 ft. 3 in. over the journal boxes. It weighs about 12,000 lb. and has a center plate capacity per car of about 90,000 lb. The solid forged side frames and the frame construction throughout give to this truck a character unique among M. C. B. types, and particularly the method of securing the side frames together by the forged gusset plates of large dimensions which are folded over the frames and bolted through the inside and outside transom corner brackets. This construction can be used only on solid forged side frames because of their large section of metal, and this, as is known, is a vital point in frame construction on which squareness mainly depends. Another feature of the solid forged side-frame truck is the low curved extension at each end, giving more squareness and adding more to the squareness of the entire frame, the builders claim, than is possible with any other construction. The highly developed method of securing the ends of the pedestals against longitudinal strains deserves investigation. A light interurban truck of the same type as the above is also exhibited.

A truck of the No. 27-GE-1 type is shown at the front of the Pier. The truck bears a sign with the legend "Six hundred of these trucks are being built for the Chicago Railways Company." Except that the wheel base is a trifle longer than usual—4 ft. 10½ in.—the truck has the standard features of this type. On the Boardwalk, next the Pier, a Brill car for city service is the center of attention. This car has a plain arch roof, Brill semi-convertible windows and prepayment platforms. A unique appearance is imparted to the exterior by the color scheme, which is a Quaker gray with gold and Tuscan red striping. The Fitchburg & Leominster (Mass.) Railway purchased this exhibition car on Monday of this week.

The Railway Materials Company, Chicago, Illinois, has no exhibit this year, but is represented by J. F. Church, G. F. Allen, H. T. Marcur and E. C. Folsom.

PREPAYMENT CARS

The Prepayment Car Sales Company, Electric Service Supplies Company, general sales agent, has on exhibit in space 311, Building 2, two platform models of typical prepayment cars, one being of the pay-as-you-enter type, the other of the pay-within type. The pay-as-you-enter platform is of the center bulkhead design, this bulkhead accommodating two sliding doors by which means the entrance and exit from the car body to the platform is obtained. One side of this pay-as-you-enter platform has a sliding door, which gives a door opening of 30 in. This door is controlled by the motorman when this end of the car is the front end and is closed entirely when used as the rear end. The other side of this platform, normally open when this end of the car is the rear, has a four-leaf door which may be used to close this side entirely. A folding seat is used to afford seating capacity on the platform.

The pay-within platform is inclosed with four-leaf folding doors and disappearing steps, manually operated. These doors give a platform opening of 52 in. The door on one side of the platform is operated by the motorman when used for exit, while the door on the other side is controlled by the conductor when used for entrance. The platform has the extended car floor on which the conductor with his control stand is located.

For convenience in exhibition, these car ends are interconnected by the floor which is built between them. Entrance to the car may be had from either of the platforms or by a set of steps running up to the car floor level on one side of the car. The Prepayment Car Sales Company also has on exhibition an angle iron skeleton model showing in detail the operating mechanism of the prepayment car doors and steps. Many other features have been incorporated in these models to make them typical specimens of prepayment cars for practical operating conditions.

ALLIS-CHALMERS EXHIBIT

Several very interesting exhibits are offered by the Allis-Chalmers Company in spaces 21 and 23 on the left aisle of the main building. The section of a steam turbine which is displayed presents the details of construction to advantage, the blading and balancing features being plainly shown. Both straight and automatic air brake equipments are mounted on racks where the operation of the compressors, governors, engine valves, etc., can be plainly seen. A type 501 interpole railway motor is disassembled to show the construction, while types 301 and 302 standard railway motors are shown on skids. Type S-3 controller, for two-motor equipments, and type S-4, for four-motor equipments, are opened up to exhibit the main and reverse drums, which are made of a special composition called "Menite," which is not affected by arcing and will stand a very high degree of heat before its electrical or mechanical qualities are injured.

A new type of self-cooled transformer is also shown. This has an external jacket which is connected with the main oil tank at several points at both top and bottom. This construction gives three cooling surfaces and provides for the circulation and the rapid cooling of the oil. A complete line of repair parts for air brake equipment and compressors is displayed on tables. Here are also shown the parts of the new Allis-Chalmers air compressor known as the AA-7.

The Illiois Traction System car which is being exhibited by the St. Louis Car Company, and which is one of twelve built by that company for that corporation, was brought from Venice, Ill., to Atlantic City on its own wheels behind one of the regular through passenger trains of the Pennsylvania Railroad.

Among the Exhibits

Atlas Railway Supply Company is exhibiting its complete line of rail joints, tie plates and braces, insulated joints, etc., in Aquarium Court.

* * *

Globe Ticket Company, Philadelphia, Pa., has an interesting exhibit this year at space 279. Special attention is called to its p. m. coupon transfers, which are now in use by over two hundred companies throughout the country.

* * *

A new grade "M" carbon brush is being exhibited by the Speer Carbon Company at space 255. In this connection the company is giving away a neat scale, with which to adjust the spring pressure on the back of brushes.

* * *

Whittier Mills Company, of Chattahoochee, Ga., is showing in space 43½, building 1, samples of bell and trolley cord solid braided and centerless, in which each strand is individually waterproof.

* * *

Paving blocks for all kinds of track paving are being exhibited by the U. S. Wood Preserving Company at Space 303-D. The fine condition of blocks which have been in service for over eight years is also shown. The company's representatives are G. O. Strother and Alexander Reed.

* * *

National Lead Company, New York, N. Y., shows in spaces 317, 319, Building 3, a complete line of its products such as Phœnix babbitt metal, heavy pressure metal, anti-friction metal, bearing metal, sterling journal metal and bar and wire solder. Representatives in attendance are J. B. Mendenhall, Wm. A. Dail, E. A. de Campi.

* * *

C.-O.-Wood-Preserver Company, St. Louis, Mo., is showing in space 208 some interesting specimens of timbers which have been taken up from the tracks of the Long Island Railroad, Freeport Railway & Light Company, Denver City Tramway and Dallas Consolidated Railway, which show the exact condition of the wood after many years of service.

* * *

The exhibit of the Nelson Valve Company, spaces 123-125, is of particular interest to members of the engineering association. The display includes power station valves for all pressures and purposes. Perfect steel castings in rough and section unpainted are shown free from any shrink or defect. The seatless boiler blow-off type is also exhibited, in full size, sectioned. Represented by Carlisle Mason, W. J. Spencer, Russell Bonnell, M. D. Baldy, R. E. Thomas.

* * *

Conventionites who are interested in comfortable cars and window sash that operate easily and prevent accidents by falling should visit the exhibit of the McCord Manufacturing Company, space 330, and see the demonstration of the McCord Universal weather stripping. This product is equally applicable to old and new cars, and it provides positive stormproof windows and allows the sash to be operated easily under all conditions. The company is also showing thirteen models of other improved car window devices.

* * *

The "Halsey" radial truck, exhibited by the Philadelphia Holding Company, at spaces 332, 334, 336, is attracting a great deal of attention as a departure in rolling stock. With this truck the limit of permissible wheel base heretofore governed by curve radius is removed. The wheel base can be made of any required length to carry the car body properly. The truck as exhibited has a wheel-base of 16 ft. and is set on a 33-deg. curve.

* * *

Unfortunately the car which the Jewett Car Company shipped for exhibit at the convention is still on the road somewhere between Newark, Ohio, and Atlantic City, and the chances seem to be that it will not arrive in time to be available. This car is one of an order of 150 pay-within cars being built for the Capitol Traction Company, Washington, D. C. It is 41 ft. long and is equipped with the pay-within door operating mechanism. Sales Manager Besuden is, of course, at the convention as usual.

* * *

The St. Louis Steel Foundries have an interesting exhibit at space 309C of manganese-steel special track work, showing a switch, mate and frog of solid manganese. The switches are built up with only four parts. As these are massive and composed of manganese steel, they are practically indestructible. The manganese used by the Foundries is manufactured in their own plant at St. Louis. The exhibits shown are part of a lay-out built for the Los Angeles street railways.

* * *

As an object lesson in substantial track construction, the New York Switch & Crossing Company, Hoboken, N. J., is showing in spaces 248, 250, 252 a solid manganese anti-straddling tongue switch and mate, a 9-in. rail hard-center combination tongue switch, a T-rail hard-center anti-straddling tongue switch and a hard-center mate frog and crossing; also modern girder rail sections. Representatives are W. C. Wood, H. R. Sherman, A. W. Kennedy, William Weller, John Madge.

* * *

The new Root pneumatic scraper is shown by the Root Spring Scraper Company, Kalamazoo, Mich., at space 411. This scraper is connected with the main air line of the car and is operated by the motorman by means of a three-way air valve located on the front platform. It was designed especially to meet the growing demand for an automatically operated scraper. It does away with the wheel on the platform of the ordinary scraper, is much easier to operate and cheaper to install. It is impossible for the blades to drop when not in use. The scraper is so adjusted that when full air pressure is applied the scraper is held to the rail with proper tension, and when so adjusted the motorman can make no mistake in handling the scraper. In operation one charge of air is ample to hold the blades to the rail for an entire trip. The other types of spring scrapers manufactured by the company are also shown as installed in working position on a car. Fred N. Root, manager, is in charge of the exhibit.

* * *

The General Electric Company shows the "Ideal" steel-flanged trolley wheel now standard on all original equipments furnished by this company. The hub and tread is a one-piece copper casting which is afterward drop-forged. The flanges, which are soft steel stampings, are secured to the casting by turning over the ends of the hub against the flanges. This construction gives an almost perfect balance to the wheels. The flanges are stiffened by turning over their outer edges. Lubrication is accomplished by means of graphite bushings. The steel-flanged wheels are furnished in 4½-in. and 6-in. sizes. Either size wheel has a ½-in. or ⅝-in. bore. The length of hub of the 4½-in. wheel is 1½ in. while the 6-in. is made either 1½ in. or 2 in. A new line of cast alloy spoke wheels is also shown. Graphite bushings provide lubrication and, in the larger sizes, this is supplemented by oil held in an annular reservoir. These wheels are made in 4¼ in., 4½ in., 5 in., 5½ in. and 6 in. sizes. The hubs for the smaller sizes are 1½ in. long and for the larger ones 1½ or 2 in. long. Each size of wheel has a bore of either ½-in. or ⅝-in. diameter.

As usual, the tastefully decorated parlors of the Galena Signal Oil Company are the haven of the tired sightseers.

* * *

The Mica Insulator Company, New York, is represented at the convention by C. H. Bell and A. F. Tinnerholm.

* * *

Wheel Truing Brakeshoe, Detroit, Mich., has an attractive display of wheel-truing brakeshoes in space 347, Building 4.

* * *

The Union Electric Company, Pittsburgh, Pa., is being represented this year by T. M. Cluley and George W. Provost.

* * *

Henry Gulick, of the Gulick-Henderson Company, is attending the convention this year, renewing all of his old acquaintances.

* * *

The Flood Concrete Tie Company, Bridgeport, Conn., is located in space 274, where visitors will be welcomed. John H. Flood is in charge.

* * *

The Under-Feed Stoker Company of America is showing in spaces 404, 406 a model Jones Stoker. The representatives are distributing stoker catalogs and the company's magazine.

* * *

M. Rounds, Stoughton, Mass., the inventor of a prepayment, convertible car and of an articulated car, is a visitor at this convention. Mr. Rounds is prepared to furnish plans and specifications for cars of these types for city and suburban service and also to act as consulting engineer on car design.

* * *

The Star Brass Works, Kalamazoo, Mich., is showing in space 341 twenty styles of Kalamazoo wheels and eight styles of harps. This company asserts that it manufactures 75 per cent of the trolley wheels used in this country. One of the reasons given for holding it the leading position in this respect is the use only of new metal in every wheel which it sends out, thus giving long life without injury to the wire.

* * *

The Hale & Kilburn Company, Philadelphia, Pa., located at spaces 421-424, presents several unique features not hitherto shown—one being its finished pressed-steel sections of all-steel interiors for coaches and cars. This material, which is manufactured in the company's factory and shipped to the car builders "knocked down," can be erected by the latter without refitting. The all-steel frame car seats also present a new feature of combined light weight and greater durability.

* * *

Among the exhibits is one made by the Chicago Railway Equipment Company. Creco and several other types of metal brake beams are shown, as well as Creco roller side bearings, Creco journal boxes and miscellaneous malleable castings for electric railway equipment. The representatives of the company are also showing a novel and exceedingly interesting relief map of the Panama Canal and surrounding country which they are distributing. Edwin F. Leigh and C. P. Williams are in charge of the exhibit at space 438.

* * *

The Positive Clutch & Pulley Works, Buffalo, N. Y., is showing at spaces 262, 264, models of the Positive combined jaw and friction clutch, which combines two features of friction and jaw drive. The combining of these two principles permits the picking up of the load without a strain or jerk on the motor and the transfer of the load to a positive jaw drive which gives a steady drive and with no loss of power. The exhibit is in charge of S. A. Benedict, treasurer and general manager of the company.

The Curtain Supply Company, Chicago, Ill., is showing the Rex all-metal curtain roller at spaces 380, 381, 382. This roller was first brought out one year ago, but has already been widely adopted. The company is also showing a new Rex steel sash balance. This is an all steel roller used for operating balance windows. The roller is made of brazed steel tube with tempered steel ends. The operating chains are detachable, allowing them to be repaired easily. The springs and other parts are interchangeable; also curtain ring fixtures and curtains and accessories are displayed.

* * *

A leather lubricating packing is shown by the Standard Leather Packing Company, Boston, Mass., in space 409. Prepared and treated shredded leather forms the principal absorbent used in its manufacture, the claim being that this packing requires much less attention than wool waste, as it remains plastic under all temperature conditions. The absorbent quality of the shredded leather, together with the ease with which it gives up the lubricant to the journal, is a unique feature of the product. Owing to its nature, the packing automatically stirs itself. When the car changes direction the journal is automatically repacked. The exhibit is in charge of W. A. Farnsworth, treasurer, and P. H. Wilhelm, railroad representative.

* * *

The Cleveland Frog & Crossing Company, Cleveland, Ohio, is making an elaborate exhibit of track special work at its large space, 168, which extends clear across the south end of Machinery Hall. Among the new things this year is an example of split-switch and spring-frog construction for electric railway work. This follows steam railway practice more closely in weight and strength than the type in general use. A crossing for steam and electric roads is shown, the steam railroad part of which is made of rolled manganese rails, the construction of the entire crossing being of the "built-up" type. Another feature of the exhibit is a street intersection for electric railways "built up" of girder rails which is an example of accurate and careful fitting.

* * *

A motor-driven four-spindle drill is one of the new things shown by the American Steel & Wire Company. This drill is designed for use in installing twin terminal bonds. It has three wheels which run on the track rails. The operating motor is accurately balanced between the rails. The drills are easily adjusted. The company is also showing a new bond known as type S. C. S.-02. This is of the solid compressed-stud soldered type. It is similar to the ordinary compressed stud bond, but has an enlarged crown. Other things shown are samples of the wires and cables, wire ropes and strands, various types of bonds and the Improved crown rail bond tester. This tester is said to be the only instrument that is wholly self-contained and that can be used on a dead rail or on rails used for A. C. return circuits.

* * *

The Consolidated Car Heating Company's showing at spaces 376, 379 is of exceptional interest on account of the many new devices presented. A thermostat for controlling electric heaters is shown, maintaining the temperature of a box within 1 deg. of the proper temperature. A pneumatic door-operating device is exhibited in operation with electric control. A small heater for heating water for house or use on Pullman cars is also in operation at this booth. An auxiliary battery lighting system of the automatic type is another feature. A new air-brake governor which provides a very close range of adjustment, a tilting heat deflector for preventing overheating of seats, a hot-air ventilating stove, a full line of 600-volt and 1200-volt heaters and switches, fuse boxes, electric couplers and trolley voltage push buttons and signal systems are also on exhibition.

Railway Roller Bearing Company, Syracuse, N. Y., has received a second order for Rollway journal boxes through The J. G. Brill Company for four storage-battery trucks to be operated by the Third Avenue Railway, New York, making a total of forty-one Rollway journal cars operated by this company.

* * *

The Acme Indicator Company, Cleveland, Ohio, decided at the last moment not to make any exhibit owing to the sudden death on Oct 3 of its president, Major C. W. Johnson. T. W. Small, secretary of the company, had planned to visit the convention, but finds it will be necessary to remain in Cleveland, where the company's indicators are installed on two lines.

* * *

Malleable iron truck and brake forgings are a feature of the Columbia Machine Works & Malleable Iron Company's exhibit. Forty-seven separate forgings are displayed Pinion pulleys, controller handles, brake handles, pressed steel gear cases and bronze bearings, etc., are also shown. R. W. Kerschner, James Grady and M. F. Zigler are representing the company.

* * *

The National Tube Company is showing at spaces 354-357 a remarkable table which is made up of thousands of pieces of Shelby seamless, cold-drawn steel tubing. Each piece is from a tube made to customers' orders. This table is a valuable object lesson in demonstrating the extraordinary variety of shapes and sizes in which this tubing is made and in suggesting possibilities for other uses.

* * *

A striking feature of the exhibit of McGuire-Cummings Manufacturing Company, Chicago, Ill., is the complete model of its solid steel Columbia truck for single truck cars, which is in service on cars of the Chicago Railways Company, Twin City Rapid Transit Company and many other large city properties. One of the important features of this truck is the use of a spring over the journal box to prevent oscillation.

* * *

The Wilson Remover Company, New York, space 43, is demonstrating paint and varnish removers and an advanced process of "stripping" steel equipment, showing the air motor and centrifugal steel brush (2000 r. p. m.) used for cleaning loosened paint and varnish from surfaces of passenger coaches, tender tanks, etc. J. MacNaull Wilson, president, and J. Whitney Wilson are representing the company.

* * *

The National Carbon Company, Cleveland, Ohio, is displaying some Laclede railway motor brushes which have given excellent results in long service. One set of these brushes was taken from an interurban railway motor after 30,000 miles' service and shows only 3-16-in. wear on the brush surface. The armature and commutator of this motor are also displayed to show the fine condition in which they were found after the long run with these brushes.

* * *

Rail Joint Company, New York, N. Y., has space 120, Aquarium Court, where it is exhibiting some finely finished samples of Continuous, Weber and Wolhaupter standard joints, Continuous and Weber girder and high T-rail joints, Continuous and Weber insulated joints, and Continuous frog and switch and compromise joints. Over 50,000 miles of railway track are now equipped with these joints. Representatives are W. E. Clark, E. A. Condit, Jr., W. A. Chapman, H. C. Holloway, R. R. Seward, R. W. Smith, G. W. Smith, J. C. Barr.

* * *

Two sizes of pressed steel hot-water car heaters are shown by the Cooper Heater Company, Dayton, Ohio, in space 223. The company is also distributing a booklet on its new forced ventilation hot-air car heater, which is made in three sizes. The induction draft or funnel-shaped roof intake used with the hot-air heater draws in sufficient air, especially on interurban cars, to operate the heating system without the use of a motor. In general, the heaters are so constructed that they can be used with or without a blower motor, according to requirements.

* * *

Automatic lubricators, designed for use with air brake equipment, are on exhibit by the Emery Pneumatic Lubricator Company, St. Louis, Mo., in space 219. This lubricator is inserted in the air supply pipe of the brake system close to the main reservoirs. All air in passing into the service pipes is thereby charged with lubricant and is carried to all surfaces with which the air comes into contact. The company is also showing a sample of the Emery brake cylinder lubricant, which can be manually applied to the wearing parts of the air brake equipment.

* * *

A complete line of hot water and forced ventilation car heaters comprises the exhibit of the Peter Smith Heater Company, Detroit, Mich., in spaces 254, 256. This includes an improved heater equipped with protective features and ball-bearing motor; also two types of a forced ventilation electric heater which is shown in operation This latter heater is designed along lines similar to the forced ventilation coal-burning heater, but it is so small that it can readily be placed under a car seat or in another location as desired. The chief features of this heater are its ability to ventilate adequately and its economical current consumption.

* * *

The Acme type drop fender, which was reported to have received the highest rating (81.9 per cent.) at the tests made in May at St. Louis by the Board of Public Works, is a feature of the exhibit of the Eclipse Railway Supply Company, Cleveland, at spaces 265, 267. It is claimed that in case of collision this type of fender does not interfere with the action of bumper anti-telescoping devices. The Standard Eclipse life guard, Style C, in connection with the new multiple wheel guard is also shown. A striking feature of the exhibit is a Biogen moving-picture machine which shows an actual fender demonstration of a man being picked up by a car moving at 22 m. p. h.

* * *

Goldschmidt Thermit Company, New York, has spaces 212, 214 for a moving-picture exhibit showing the welding of the full section of a rail in Everett, Mass., and the welding of locomotive frames; sample welds of compromise and straight rail; welding apparatus; various kinds of thermits and metals manufactured by the thermit process, and a broken motor case completely welded. In space 169 the company is showing the new Pellissier rail grinder, the principal features of which are comparatively small size, the over-all dimensions being about 5 ft. 9 in. x 8 ft. 6 in.; weight about 2,800 lbs.; two independent grinder units having vertical and horizontal adjustment and special adjustment for bringing the surface of the emery wheel parallel with the rail surface; eccentric attachment for automatic ally grinding out low joints to a true curve; derailing attachment for removing grinder quickly from the track; power and hand drive for moving the grinder along the track; simplicity; ease of adjustment, and ability to remove large amount of metal in a short time. Representatives are W. C. Cuntz, general manager; G. E. Pellissier, superintendent and engineer; L. Heynaman, manager Pacific Coast branch; W. R. Hulbert, sales manager; Dr. E. Beck, metallurgist; H. B. Atkins, comptroller; H. S. Mann, W. A. Aldrich, J. G. McCarthy, sales representatives, and E. Begtrup, demonstrator.

The Tool Steel Gear & Pinion Company's representatives are as follows: C. E. Sawtelle, Cincinnati, stopping at the Dennis; Leroy Brooks, Jr., Cincinnati, the Traymore, and S. I. Wailes, San Francisco, the Brighton.

* * *

Convenience and accuracy in handling coins of all denominations in large numbers are demonstrated by the coin-counting machines of the Johnson Coin Counting Machine Company, New York, N. Y., at spaces 261, 263. The representatives on hand are C. H. Birdsall, W. P. Butler, S. F. Champion, Jr., J. M. Johnson.

* * *

A full-sized model of a four-step entrance to an interurban or a steam railway car is exhibited by the Universal Safety Tread Company, Boston, Mass., at its space 387, Building 3, to illustrate more fully the application of Universal safety treads to car steps. Various types of Universal treads for other purposes are also shown. Representatives are F. W. Langford, A. L. Whipple.

* * *

A large assortment of armature and field coils made from Heany fireproof insulated wire is displayed by the Heany Company, New York, N. Y., in space 416. Samples of this wire ranging from No. 30 to No. 00 can be had on request. Heany tungsten lamps also occupy a prominent place, several being mounted on a special stand to show the lamp under adverse conditions. Representatives are R. K. Dana, F. A. Duff, F. A. R. Hoffeditz.

* * *

Samples of all types of standard brake shoes are displayed by the American Brake Shoe & Foundry Company, Mahwah, N. J. The corps of representatives includes W. G. Pearce, vice-president; W. S. McGowan, sales manager; J. B. Tarbell, vice-president; F. W. Sargent, chief engineer; J. S. Thompson, T. L. Coolidge, E. L. James, G. R. Law, A. H. Elliot, T. Seaman, E. B. Smith, R. M. Brower, W. L. Boyer, R. E. Holt, L. R. Dewey, J. G. Tawse.

* * *

A notable part of the exhibit of the Whipple Supply Company, New York, is a large framed schedule of the number of railways which have equipped some or all of their cars with the Hedley anti-climber. There are forty-nine roads and a total of 5719 cars. Besides the anti-climber displayed in the booth of this company, are Universal safety treads and tool steel gears and pinions. The company is represented by A. L. Whipple and H. F. Stevenson.

* * *

The Standard Coupler Company, New York, N. Y., is making an operating exhibit of the Shim slack adjuster at spaces 324, 326. After the first showing at last year's convention, the company received a large number of trial orders. During the year the results have proved so satisfactory that sixty-seven roads have equipped a large part of their cars with this adjuster. All electric cars on the Pennsylvania Railroad are so equipped. The merits of this slack adjuster are explained by George A. Post, E. H. Walker, George A. Post, Jr., C. D. Jenks, W. H. Sauvage.

* * *

The National Lock Washer Company exhibit in spaces 320, 322, Building 3, features this company's (non-creeping) cam curtain fixture, which is made of steel tubing and has bronze heads and pinch handles. Creeping is prevented by an eccentric grip, the tension may be adjusted, and release is accomplished by direct action on the eccentric, the heads remaining stationary in the grooves. Passengers cannot draw the fixture from the grooves. Sash locks and sash balances and the National lock washers are also shown by this company, which is represented by W. C. Dodd, F. B. Archibald, R. B. Brown, J. H. Horn, D. H. Hoyt.

The Johnson Fare Box Company, New York, N. Y., is exhibiting the Johnson registering fare boxes at spaces 261-263. During the year after thorough tests orders and repeat orders have been received from the following roads: Third Avenue Railroad, New York, N. Y., 550 boxes; Public Service Railway, Newark, N. J., 300 boxes; United Railways Company of St. Louis, 185 boxes; Oakland (Cal.) Traction Company, 122 boxes; United Railroads of San Francisco, 11 boxes; Omaha & Council Bluffs Street Railway, 30 boxes, and Dayton Traction Company, 50 boxes. The company is represented by C. H. Birdsall, W. P. Butler, S. F. Champion, Jr., J. M. Johnson.

* * *

The General Railway Signal Company, Rochester, N. Y., is distributing Bulletin No. 123, which describes its exhibit at this convention. Among the apparatus shown are universal signals of various types, light signals, relays and indicators, reactance bonds, signal transformers, switch boxes and telephone selectors. Attention is called to the fact that the signals, relays, transformers and other parts are of universal application, as they are made to meet the widest range of requirements with slight changes or by combinations of parts, thereby reducing to a minimum the stock which the user of a signal system would have to carry. The convention booklet contains many views of electric railway installations made by this company.

* * *

Pyrene Manufacturing Company, New York, N. Y., is at space 165. Pyrene is a highly volatile fire-extinguishing liquid of a red color. It is contained in a squirt gun, and one quart when squirted from the gun generates in contact with the air about 3700 cu. ft. of gas. This gas at a temperature of 200 deg. or over is condensed to a heavy blanket which envelops an incipient fire and completely suffocates the flame. The gas is a non-conductor of electricity. In the power house a fire between the commutator and brushes can be instantly extinguished, while in a car the blowing out of an armature and the consequent likelihood of burning the car can also be stopped instantly with this chemical. The Pyrene squirt gun is very handy for reaching inconvenient places. Among the users of Pyrene are the Interborough Rapid Transit Company, Chicago City Railway, the United States government, and many electric railway, light and power companies. Representatives are H. T. Porter, G. H. Peterson, H. C. Futch, C. E. Ware.

* * *

Railway Improvement Company, New York, has spaces 135, 137, 139 for showing its coasting time recorder, which checks motormen and so reduces current consumption. These recorders are attractively mounted and their operation is explained. The methods of keeping accurate records are also demonstrated. The company is showing a terminal clock for checking the arrival and departure of cars, and also exhibiting a small current clock and the Ferranti traction meter. The "Rico" sanitary hand strap is an additional feature of interest. Since the introduction of the coasting time recorders, a year ago, many prominent railways in various parts of the world are using them. Among these are: Interborough Rapid Transit Company, New York; Boston Elevated Railway, Chicago Railways Company, London Electric Railways (London Underground), United Tramways, Montevideo, Uruguay; Rio de Janeiro Railway, Brazil; Denver City Railway, Montreal Street Railway. The following officers and representatives of the company are present: Frank Hedley, president; Andrew J. Pizzini, vice-president and general manager; Rufus L. MacDuffie, vice-president; William O. Welde, chief engineer; Harry Keegan, Western representative; Garrit S. Cannon, George B. Campion, New York office.

Electric Railway Journal

DAILY EDITION

Published at the Annual Conventions of the American Electric Railway Association and Its Affiliated Associations

VOL. XXXVIII NEW YORK—OCTOBER 12, 1911.—ATLANTIC CITY No. 15(

PUBLISHED DAILY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK
MILLION-DOLLAR PIER, ATLANTIC CITY

JAMES H. MCGRAW, President; C. E. WHITTLESEY, Secretary.

CHICAGO OFFICE.....Old Colony Building
CLEVELAND OFFICE.....Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.

Copyright, 1911, by McGraw Publishing Company.

TERMS OF SUBSCRIPTION

Subscription including regular weekly issues and special daily editions published from time to time in New York City or elsewhere, postage prepaid:

United States, Cuba and Mexico	$3.00 a year
Canada	4.50 a year
To all Other Countries	6.00 a year
Single Copies	.10 each

Application made at the Post Office at New York for entry as mail matter of the second class.

Of this issue of the ELECTRIC RAILWAY JOURNAL, DAILY EDITION, *9,500 copies are printed.*

NEW YORK—OCTOBER 12, 1911.—ATLANTIC CITY

PROGRAM TO-DAY

CONVENTION MEETINGS

9.30 a.m. Closing Session of Accountants' Association, Chalfonte Hotel.

9.30 a.m. Session of Engineering Association, Marine Hall, Convention Pier.

9.30 a.m. Closing Session of Transportation & Traffic Association, Greek Temple, Convention Pier.

2.00 p.m. Closing Session of American Association, Greek Temple, Convention Pier.

ENTERTAINMENT

Golf, All Day, A. E. R. M. A. Tournament, Atlantic City Country Club, Northfield, N. J.

10.00 a.m. Obstacle Golf, Lawn of Marlborough-Blenheim Hotel.

11.30 a.m. Concert by Leps and His Symphony Orchestra, Lobby, Convention Pier.

3.00 p.m. Concert by Leps and His Symphony Orchestra, Lobby, Convention Pier.

4.00 p.m. Obstacle Golf, Lawn of Marlborough-Blenheim Hotel.

4.00 p.m. Aviation Exhibition with Curtis Hydro-aeroplane, Ocean End of Convention Pier.

9.00 p.m. Promenade Concert and Ball, Ballroom, Convention Pier.

The Claim Agent and the Exhibits

The splendid exhibitions of electric railway appliances at the annual conventions afford the claim department delegates an excellent opportunity to become familiar in a short time with the many mechanical and electrical features of railway operation. It is logical that the visiting claim agent should give most of his attention to an examination of devices which are directly concerned with accident prevention, but it would be wise to study other equipment as well. For instance, he should acquaint himself with the latest developments in car platform design and seating arrangements, because many damage suits have resulted from accidents on the platform or inside the cars. Even such apparently remote matters as track switch construction and improvements in car wheels will be found to have some bearing on the accident expense account. Broadly speaking, it may be said that the claim agent is justified in taking an interest in all railway equipment developments that promise greater durability, since durability and safety are often synonymous terms. It is not necessary, of course, that he should study the details of the apparatus so closely as an engineer. It is enough for him to know that certain improved devices exist so that he can suggest an investigation of their merits when opportunity offers. It would be desirable for the claim agent to examine the exhibits under the guidance of one of his company's engineers, in order to have the benefit of the engineer's knowledge of the technical phases of the devices displayed.

Standard Overhead Specifications

This year's report of the committee on power distribution of the Engineering Association consists almost entirely of recommended specifications for materials and construction work in connection with the installation of overhead and underground transmission lines. This is a particularly valuable line of work for the committee to pursue, especially because such specifications are most helpful to the smaller companies which do not maintain a large engineering force and consequently are not in a position to prepare suitable specifications of their own. A standard specification prepared by competent engineers after careful study and deliberation is a good guide to follow, especially where there are no local conditions which would require serious modification. A transmission line installation frequently involves the joint rights of other interests besides those of the company which is putting up the line. In such cases a standard specification agreed to by all the interests serves to protect against unreasonable demands by any party to the agreement and to guarantee a type of construction which will insure safety to all. The crossing of a high-tension transmission line over a railway track or an existing line of telephone or telegraph wires is a typical example. The last section of the committee's report contains complete specifications for such crossings which have been prepared jointly by committees of the National Electric Light Association, the American Electric Railway Engineering Association, the American Institute of Electrical Engineers, the Association of Railway Telegraph Superintendents and the American Railway En-

gineering Association and also by representatives of the telephone and telegraph companies. This co-operation of engineering societies in a matter of common interest to all is an encouraging step forward. More can be done along similar lines of procedure now that a precedent has been established.

The power distribution committee mentions in its report three specifications of which it has made outline drafts for consideration by joint committees in the future if such action can be brought about. These are specifications for the joint use of poles, crossings of trolley wires over steam railroad tracks and crossings of foreign and electric railway wires. It is to be hoped that joint action on these subjects will meet with the same success during the coming year as attended the specifications for overhead crossings of high-tension transmission lines this past year.

Efficiency Engineering

The subject of efficiency became of widespread public interest through criticism of steam railroad methods before the Interstate Commerce Commission in hearings on rate cases. Thus it was, in effect, a suggested new application of an old theory that stimulated public interest in the topic. In the report of the joint committee, presented yesterday before the Accountants' and Engineering Associations, a discussion of this subject was included, with the commendable idea that it would attract additional attention to the possibilities involved. The committee wisely refrained from attempting to suggest the application of the doctrine to all branches of railway operation. Unfortunately the time of trainmen and station agents cannot, like that of armies, navies and other protectors of life and property, be rendered of highest efficiency by the elimination of lost motion or lost time. It must include periods of waiting. However, wherever efficiency systems can be introduced they should lead definitely to better results. Constant study of the work of employees in shops, offices and other departments not directly concerned in the operation of cars should promote savings that will be of benefit to the railway and increased capability that it is equally sure will be of benefit to the men it employs.

Action on Interurban Rules

The Transportation & Traffic Association is to be congratulated upon the action taken in the meeting Tuesday morning on the adoption of the code of interurban rules. Charles L. Henry sounded the keynote of the discussion when he said that it was absolutely necessary to have a basic code of rules and that the companies should sink all minor differences of opinion and adopt a standard code at the earliest possible moment. We have no hesitancy in expressing the opinion that the revised code presented by the committee this year is a safe and workable set of rules. There may be some errors of omission and admission in the text which time will disclose, and the practice outlined may not be universally applicable to the conditions in all localities. But the code is practicable and is the best which has yet been proposed. The work of revising the rules is not finished. That must go on from year to year as defects are found or as conditions change, as with the American Railway Association, whose code has been subject to constant revision. But this fact has not detracted in any way from the value of the steam railroad code; rather, the fact has widened its field of application and improved its practice in minor details. Now that the Transportation & Traffic Association has adopted the code as standard, it remains for the member companies to put the rules into effect and thereby support the action of the association. From the discussion on the floor of the convention it would appear that a large number of companies intend to put the rules into effect as soon as possible if indeed they have not already adopted them.

High-Voltage Turbo-Generators

Mr. Crecelius' report on the suitable voltage and frequency for three-phase turbo-generators, read at the Engineering convention yesterday, is very welcome to the designer of stations. It is, of course, a familiar fact that with an assumed distance and amount of power transmitted the most economical voltage is not necessarily or generally the highest one practicable. There comes a time as the voltage rises when extra costs of insulation, particularly in underground cables, overbalance the reduced losses in the conductors. The data bearing on this point have been skilfully assembled by Mr. Crecelius, leading to the result that in the case of underground distribution at present costs of material nothing substantial is gained by passing the 11,000 volts which has often been used in turbo-generators. The common voltage of 6,600, which after all must be regarded as a concession to the uncertainties of early cable manufacture, seems unquestionably to be too low for economy, and double this voltage, which is also a common figure, adds to the cost of transmission at distances up, say, to 4 miles and shows no material gain up to about 10 miles. With generators of about 11,000 volts it does not pay to use raising transformers.

One of the problems which have to be met, however, in dealing with these high-voltage generators is the danger of those formidable short-circuits in the station which are so destructive to equipment. In stations as now designed one may have half a dozen large turbo-generators, all leading practically into the same set of busbars and liable to be involved in a common short-circuit. Mr. Crecelius very properly points out the advantage of using reactances to protect the generators. The usefulness of such protection is unquestionable, but we have a strong feeling that it has not yet been worked out to its limit of efficiency. In the first place we are inclined to think that most switchboard designs give altogether too good an opportunity for dead short-circuits in the station. Bearing in mind the actual operating conditions, it is not infrequently possible so to arrange a plant that save in rare instances the generators will be in parallel only through the transmission lines and so gain the necessary protection without the constant use of impedances. Large transmission networks are often run on this principle with a high degree of success, the lines acting as electro-dynamic buffers to an extent that enables the system as a whole to drive through almost any kind of interruption. If it is necessary to use current-limiting reactances in the station, it should be possible to design them so as to make them tremendously effective on a heavy overload without their cutting much figure at normal current. The design of such apparatus is capable of considerable improvement.

The question of frequency has substantially settled itself so far as the design of power stations for use with synchronous converters is concerned. Twenty-five cycles seems by general agreement to be the figure which on the whole gives the best results. Of course, if alternating-current motors are seriously to be considered, present indications point to the advantage of a considerably lower frequency, certainly less than 20, perhaps as low as 15. In planning, therefore, the great stations which are becoming increasingly common nowadays it may not be undesirable to take the chance of future use of alternating-current motors into consideration to the extent at least of conceding something to that chance in selecting a frequency for the generators. The bigger the generating units and synchronous converters in use the easier it is to build them for very modest frequency, and if a station is to be planned, as one hopes stations may safely be planned now, for twenty years or more of service, a frequency suitable for alternating-current motors as well as for synchronous converters is well worth consideration.

Conventionalities

Is associate membership worth the money? Ask James F. Shaw.

Lost—An opal scarf pin on the Pier on Tuesday. If found, please return to J. W. Flemming, space 226, Building 2.

Pop Sisson arrived upon the Pier early, remaining five minutes before being kidnapped by a party of ladies to pose for a group photograph.

Lost—On Monday evening in the ballroom, a small platinum chain. Finder will please return to Ross F. Hayes, Room 475, Marlborough-Blenheim Hotel.

B. V. Swenson, the genial and always smiling ex-secretary of the American Association, ran down to Atlantic City for the day on Wednesday. He just couldn't stay away.

Former chairmen of the entertainment committee Whipple, Hayes and Berry have condescended to act as plain committeemen at this convention—a worthy precedent.

E. B. Peck, the genial, jovial gentleman who sits on the lid of the Indianapolis Street Railway treasury, claims that he has broken all long-distance records for convention roller-chair flights.

The social festivities on the Pier on Tuesday night were graced by the presence of Hugh J. McGowan, who is deeply interested in the welfare of the traction industry, particularly that part of it in Indianapolis and the heart of Indiana.

F. R. Newman, who recently resigned his position as general manager and purchasing agent of the Southern Cambria Railway, a 1200-volt line in western Pennsylvania, is attending the convention as a guest, merely to keep his hand in on railway matters.

C. N. Duffy, comptroller the Milwaukee Electric Railway & Light Company, is an enthusiastic advocate of the company section plan for increasing the associate membership of the American Association. He spoke on this subject on Tuesday before the Accountants' Association.

E. F. Murphy, for several years train dispatcher on the Cleveland, Southwestern & Columbus Railway, has been made superintendent of the Southern division of that road, which is a modern, high-speed, rock-ballasted line forming an important part of the existing through route between Cleveland and Columbus.

H. H. Littell, who issued the original call for the organization in 1882 of the American Street Railway Association and was its first president, is in attendance at this convention, accompanied by his son. Mr. Littell resides in Buffalo and for many years was general manager of the electric railway system in that city.

Four past-presidents of the American Association are attending the convention this year. They are H. H. Littell, the dean of the association, who was its first president in 1882 and 1883; Albion E. Lang, president in 1897-1898; Charles S. Sergenat, president in 1898-1899, and James F. Shaw, president from 1908 to 1910.

Have you had A. E. Carrier, of the National Carbon Company, come up to you in all his majesty as a member of the exhibit committee and suggest that you change or remove some of your fancy decorations? He does it so delightfully that the worst misanthrope would feel honored by the suggestion. It isn't hypnotism, but just inborn good fellowship hat accounts for his winning way.

W. Worth 'Bean, Benton Harbor, Mich., is attending his twenty-ninth convention of the American Association. There have been only thirty conventions. The one which Mr. Bean missed was that of last year, when he was in California. Mr. Bean was formerly largely interested in the electric railway between St. Joseph, Mich., and Benton Harbor, but has now retired from active management.

L. E. Fischer, of Danville, Ill., which, to be definite, is located 115 miles south of Chicago in the corn belt of Illinois, rang the convention time clock at 11 A. M. Wednesday. Mr. Fischer has been dubbed "Duke of Choctaw" since he gracefully accepted the vice-presidency and general managership of the lighting and railway properties at McAlister, Okla. He is also vice-president and treasurer of a road in Clarksville, Tenn., which has almost 6 miles of track.

Duncan McDonald, general manager of the Montreal Street Railway Company, was due to arrive late Wednesday evening. Other officials of the Montreal property, which, by the way, is soon to known as the Montreal Tramways Company, thus conforming truly to the British phraseology, were J. D. Evans, consulting engineer; R. M. Hannaford, chief engineer; D. E. Blair, superintendent rolling stock, and A. S. Byrd, superintendent power plant and aviation expert.

A. H. Carlisle is present at the convention for the first time. He is stopping at the Marlborough-Blenheim. Mr. Carlisle recently returned from a three months' trip to Europe. While abroad he organized the P-A-Y-E (London) Syndicate, Ltd., which is to be a holding company for the International P-A-Y-E Tramcar Company, Ltd. The latter company will own the foreign P-A-Y-E patents and license electric railways in England and on the Continent to use prepayment cars.

A strong contingent has been sent to the convention by the Milwaukee Electric Light Company. It consists of R. B. Sterns, general manager railway department; C. Nesbit Duffy, comptroller; Fred G. Simmons, superintendent way; George Keummerlein, Jr., superintendent transportation; H. A. Mullett, superintendent rolling stock; F. J. Boehm, assistant secretary and treasurer; and M. S. Rausch, claim agent. They seem to be as glad to get back as their friends are to see them.

H. E. Chubbuck, vice-president, executive and generalissimo of the Illinois Traction Company and the Western Railways and Light Company, president Illinois Electric Railways' Association, and for twelve years secretary Illinois Electric Association, arrived Wednesday morning to take charge of his cohorts, which include C. F. Handshy, general superintendent; J. M. Bosenbury, superintendent motive power and equipment; H. J. Vance, purchasing agent, all of the Illinois Traction System, and W. A. Martin, superintendent Quincy Horse Railway and Carrying Company, and Walter Achepole, auditor Western Railways and Light Company. Fred Buffe, publicity manager, had reservations on the Chicago special train, but was taken ill Saturday. He is reported better. The McKinley system places a minimum weight of 200 pounds on all department officials.

Vice-President-in-charge-of-entertainment W. L. Conwell, of the A. E. R. M. A., since his debut as a high-diving automobilist has been in receipt of the usual flattering offers which theatrical promoters make to meteoric celebrities. "Bill" Wood, who manages the well-known New York and Queens County shows on Long Island, wired Mr. Conwell (in a prepaid message) as follows: "Did accident really happen or are newspaper reports emanations from jealous press agents? Please name salary your appearance for fifty weeks in vaudeville demonstrating waterproof automobile accessories, we to write suitable lines for you. Having run through fence you might secure engagement as racing driver in milk-wagon handicap." Mr. Conwell's private secretary gave out a statement yesterday saying that Mr. Wood's proposition was neither the only nor the most attractive advance made, and that Mr. Conwell was not going to be in a hurry in deciding his future course.

SOCIAL EVENTS TO-DAY

After the athletic orgie of last night the convention delegates will to-day have an opportunity to indulge in a little mild exercise on the golf links, or if they prefer, to watch a real sporting event in the afternoon, when C. C. Witmer will give an exhibition of flying over land and water in a Curtiss hydro-aeroplane. In the morning and afternoon Leps and his orchestra will give concerts in the lobby of the Pier and in the evening the promenade concert and ball will take place.

CONCERTS

The program for the morning concert at 11.30 o'clock will be as follows:

(1) Overture, "Wilhelm Tell".....Rossini
(2) "From Foreign Lands".....Moszkowsky
(3) Fantaisie, "Bohemian Girl".....Balfe
(4) Menuett.....Bocherini
(5) Pizzicato, "Sylvia".....Delibes
(6) March from "Queen of Sheba".....Gounod

In the afternoon the following program has been arranged:

(1) Overture, "Maritana".....Wallace
(2) Largo.....Handel
(3) Waltz, "Roses from the South".....Strauss
(4) Selections from "Stradella".....Flotow
(5) American Fantaisie.....Herbert

GOLF TOURNAMENT

The golf tournament will continue all day at the Atlantic City Country Club, Northfield, N. J. All those wearing the convention badge are eligible to enter. An eighteen-hole blind handicap match will be played. Each player will select his own handicap, based on a net score to be drawn between 80 and 85. The tournament round must be declared by each player with the handicap selected before beginning play and all cards must be attested. First and second net score and low gross score prizes will be awarded. Cars of the Shore Fast Line leave Florida Avenue and the Boardwalk and Virginia Avenue and the Boardwalk every half hour, running direct to the club house.

AVIATION EXHIBITION

The aviation exhibition which will take place at 4 o'clock in the afternoon, weather permitting, promises to be the most spectacular event of convention week. The Curtiss hydro-aeroplane is fitted with pontoons which support it on the surface of the water. The machine will be launched from a boat, and Mr. Witmer will rise from the water, circle over the Pier and perform several graceful evolutions in the air before alighting again on the water. If the surf is too high the pontoons will be detached and the flights will be made from the beach alongside of the Pier.

PROMENADE CONCERT

The promenade concert and ball to-night will be held on the Pier. Leps and his symphony orchestra, beginning at 9 o'clock, will give a concert of selected compositions, which will last about an hour. Immediately after the concert the floor will be cleared of chairs and dancing will begin. A unique feature has been provided in connection with the ball programs whereby gentlemen may know where to locate their partners and meet them in their favorite city, New York, Chicago, Philadelphia, Boston, Washington, St. Louis, Atlanta, San Francisco, Montreal, St. Paul, Omaha. Banners indicating these cities will be arranged about the hall and spaces have been provided in the dance orders for noting the appointed meeting places as well as the names of partners.

D. C. Noble, president Pittsburgh Spring & Steel Company, is one of that growing number who have Atlantic City conventions of two associations marked up on their record. Mr. Noble for many years has been a conspicuous figure at the annual conventions of the Master Car Builders' Association.

THE CURTISS HYDRO-AEROPLANE

C. C. Witmer is preparing to make flights to-day and to-morrow with his Curtiss hydro-aeroplane, the only flying machine that has been successfully developed for starting from and alighting on the water. Mr. Witmer hopes to make his flights from the Atlantic Ocean, and, if successful, his feat will mark an advance in aviation that may prove the first step in transoceanic aeroplane flight. The Curtiss Exhibition Company, which has provided most of the aeroplane exhibitions and contests held in the United States, has made a specialty of providing flights as traffic promoters for electric railways. It was because of the desire of Jerome Fanciulli, general manager of the Curtiss Company, to demonstrate the value of aeroplanes as permanent attractions for electric railway parks that the entertainment committee was able to provide this unusual feature. Mr. Witmer is one of the most skillful operators of the Curtiss machines.

The hydro-aeroplane, which is the result of the inventive genius of Glenn H. Curtiss, is equipped for use on land or water. It is with this machine that Hugh Robinson, another of the Curtiss aviators, will endeavor to fly from Minneapolis to New Orleans over the Mississippi River, making his start on Friday of this week. The Curtiss Exhibition Company has provided aeroplane exhibitions for more than a dozen large street railway companies this summer and has made such a success of this attraction that a number of traction companies are arranging to have regular aviation fields and operate their own aeroplanes next summer. The Curtiss Exhibition Company is a member of the Manufacturers' Association and Mr. Fanciulli is personally in attendance at the convention. The Curtiss hydro-aeroplane is on the beach opposite the Marlborough-Blenheim, and the delegates will be permitted to give it a close inspection.

AMONG THOSE PRESENT

F. A. Healy, secretary and treasurer of the Ohio Electric Railway, is accompanied by Mrs. Healy on this trip.

D. Beatty, of the Public Service Railway of Newark, spent his birthday Wednesday in attendance at the convention and received many congratulations from his co-workers.

L. A. Osborne, vice-president of the Westinghouse Electric & Manufacturing Company, gave a dinner last night to a party of fifteen friends. The dinner was served in the Green Room of the Marlborough-Blenheim.

Robert F. Carr, president of the Dearborn Drug & Chemical Works, is attending the convention for the first time in four years. His absence in previous years was due to illness. Mr. Carr is now sleeping outdoors and is feeling like a two-year-old.

President William H. Forse, Jr., of the Accountants' Association, is having the pleasure of showing Mrs. Forse the East for the first time. As Mr. Forse has a national reputation as a sightseer he has systematized the trip so as to visit the greatest points of interest on the route without loss of time.

Pink Spear has been conspicuously absent from his booth for the first few days of the convention, but Mrs. Spear will arrive this morning and it's a hundred to one that he will be found at the Dearborn Drug & Chemical Works' booth hereafter through the day and at his room at the hotel after 9 o'clock each night.

The United States Light & Heating Company, New York, N. Y., exhibits at spaces 257-9 a full line of National storage batteries, of various types and sizes for power plant installation, signal service, railroad car lighting, vehicle, telephone and in fact every class of service to which a storage battery may be applied.

MEETING OF THE AMERICAN ASSOCIATION

The second session of the American Association was held yesterday afternoon and was executive in character. President Brady called the association to order at 2:30.

The first subject on the program was the appointment of the nominating committee. Mr. Brady said that he would appoint a committee of five. This committee was announced later and consists of Messrs. J. H. Pardee, R. P. Stevens, P. S. Arkwright, E. B. Peck and H. T. Edgar.

Daniel T. Pierce then presented a paper upon measures for the welfare of employees. This paper is published elsewhere in this issue.

J. G. Cannon, president Fourth National Bank, New York, then read a paper on electric railway securities. This paper will be published in a later issue.

General Harries then moved a vote of thanks to Mr. Cannon for his paper. The motion was carried.

J. V. Davies, chief engineer Hudson & Manhattan Railroad, then read a paper on that railroad system. There was no discussion.

Thomas N. McCarter said that it gave him pleasure to move a vote of thanks to Mr. Davies in this instance. Mr. McCarter was familiar with the wonders of the Hudson & Manhattan Railroad from the time that Mr. McAdoo started on what seemed then an impossible venture. The Hudson & Manhattan Railroad was only comparable in its wonderfulness with the new station of the Pennsylvania Railroad in New York, the two together forming the most gigantic engineering scheme from a transportation standpoint that this country has yet seen. Mr. McCarter thought that the world and more especially the metropolitan district of New York owed these gentlemen a debt of gratitude and he wished them every success in their enterprises. When such enterprises as these were started and carried through to completion it made one stop and think where the modern viewpoint was coming out; in other words, should men like Mr. McAdoo and Mr. Davies, and Mr. Jacobs, his partner, give ten years of their lives to the construction of an engineering wonder under the depths of the Hudson River and then be allowed to get savings bank interest for their returns? This was a concrete illustration of the ridiculous proposition now so popular throughout the country that public utilities shall be limited to a mere interest return. None but a fool would put his money in any such enterprise as this, if that were to be his sole reward. The firm of which Mr. Jacobs and Mr. Davies are members is one of the most enterprising engineering firms in the world. The gentlemen composing it were concerned in the building of the Pennsylvania tunnel as well as in the McAdoo tunnel; they had done a vast amount of work in England, and it seemed to Mr. McCarter a healthful sign when the American Electric Railway Association could get such a man as Mr. Davies to give the members the value of his experience and thought. It gave him great pleasure to move Mr. Davies a vote of thanks. The motion was carried unanimously.

President Brady announced that the next business on the program was the presentation of the paper by General Harries on "The Effect of Electric Railway Operation on Taxable City Property," which is reprinted elesewhere in this issue.

Paul Winsor, Boston, presented a paper discussing the subject.

Chairman McCarter then introduced Albion E. Lang, Toledo Railways & Light Company, who presented a paper, "The Toledo Street Railway Situation," which is reprinted elsewhere in this issue.

A vote of thanks was tendered to the authors of the papers.

The meeting then adjourned.

The street railways of Santiago, Chile, carried 83,158,755 passengers during 1910, against 75,670,943 for 1909.

CARNIVAL DAY

Athletes, near athletes and has-been athletes romped and cavorted through a series of stunts in Marine Hall last night to the great amusement and edification of the assembled multitudes. The circus poster artist would have described the occasion as a "Riot of hilarity, side splitting, stupendous, surprising and successful. An aggregation of funny, frisky and frolicsome foolishness." All aboard for the big show.

No, Harold, the gents in striped suits are not real desperate convicts. They never did anything worse than buck a utility commission or abolish a few transfer points. The tough bunch of bone-headed mutts who carry banners are innocent supplymen, who wouldn't even take an order if it was lying around loose. What are they doing? Hush! it's a shame to call it baseball with the World's Championship series so adjacent. What are their real names? Foolish question No. 936,781. Look at the score card.

LIFERS.	STONEBREAKERS.
"Con Walsh" Bracy, p., Capt.	"Monk" Castle, p., Capt.
"K. O. Brown" Page, c.	"Buck" Conwell, c.
"Sandow" Allen, 1b.	"Slivers" Sisson, 1b.
"Walker Weston" Wood, 2b.	"Spike" Williams, 2b.
"Ralph Rose" Hedley, 3b.	"Biff" Ellicott, 3b.
"Hackenschmidt" Harries, s.s.	"Bloke" Heulings, s.s.
"Matty McGrath" Pardee, l.f.	"Chimmie" Ebert, l.f.
"Johnny Hayes" Shannahan, r.f.	"Thug" Evans, r.f.
"Jungstrom" Choate, c.f.	"Humpy" Hawley, c.f
SUBS.	SUBS.
"White Hope" Donecker.	"Mickey" McGraw
"Terrible Turk" Todd.	"Pug" Porter.
"Longboat" Munger.	"Spider" Kerrigan.

Umpire, Mr. Hank Fassett.

The score? Who cares? but the Lifers won the Jumbo cup, and according to the official score keeper the score was 7 to 5.

"Car coming!" Is it 13 or 23, sauerkraut or corned beef and cabbage? Dare-devil Donecker, the Sauerkraut Speed King, against the Pride of Ireland. A sight to thrill the heart. The engines running like clock work, the exhaust spitting spit, the steady hands guiding the juggernauts at breakneck around the turns. Once, twice, three times around the track the daring drivers sped, the Pride of Ireland always in the lead. He made the Sauerkraut King eat his dust all the way and won by 50 ft.

Event No. 3 was a forlorn hope from the beginning. With a crowd of pushing apprentices pitted against a bunch of supplymen, only one result could be expected. The railway men won with two goals to none for the supplymen. The two teams lined up as follows:

MECHANICS.	DUDES.
"Hen" Harvie, Capt.	"Birdie" Besuden, Capt
"Dub" Doyle.	"Ferdie" Keyes.
"Abe" Adams.	"Winnie" Wampler.
"Gabe" Gove.	"Mortie" Hegeman.
"Wap" Winsor.	"Bertie" Tomlinson.
"Bing" Banghart.	"Dollie" Boyer.
"Mack" McWhirter.	"Claudie" Nicholl.
"Chick" Clark.	"Gussie" Bole.
"Ben" Benedict.	"Dudie" Turner.
"Sam" Sawyer.	"Dottie" Green.
"Ack" Ackerman.	"Dickie" Norton.
SUBS	SUBS.
"Lew" Litchfield.	"Clarie" High.
"Sol" Schreiber.	"Nattie" Berry.
"Vic" Voynow.	"Mertie" Swenson.

The tug of war, which concluded the fun, was a strenuous affair. It was the last desperate struggle of supplymen against railway men and was fought to the last ditch. The supplymen won in two straight pulls.

Kerite Insulating Wire & Cable Company, New York, at spaces 316, 318, Building 3, calls special attention to Kerite signal wire. This type of Kerite insulated wire is in extensive use in both steam and electric railway service. As an interesting part of this exhibit, a piece of wire insulated with Kerite compound which has been in service thirty-five years is shown. The insulation is as flexible and in as good condition as the day it was installed. Samples of all types and sizes of insulated wire and cable are displayed. A piece of the cable furnished the government for the Panama Canal Zone is also exhibited. J. A. Renton is representing the company at the convention.

WEDNESDAY SESSION OF THE TRANSPORTATION & TRAFFIC ASSOCIATION

The Wednesday morning session of the Transportation & Traffic Association was called to order by President Page at 10 o'clock. The first matter on the program was the appointment of the following committee on nominations: Robert I. Todd, Terre Haute, Indianapolis & Eastern Railway; C. L. Allen, Syracuse Rapid Transit Railway, and Bruce Cameron, United Railways Company of St. Louis.

DISCUSSION ON CITY RULES

The report of the committee on city rules was then presented by H. W. Fuller. This report is printed on another page of this issue.

The discussion on city rules was opened by I. H. McEwen, who asked why it was deemed necessary to put the phrase "and be loyal to the interests of the company" in the first paragraph. It was desirable to have all rules standardized, and that phrase was used in the interurban or standard code. He also called attention, in the same notice, to the sixth phrase, "In all cases of doubt take the safe side," which was generally placed in the rules proper; also to the words "form of order," which were usually used in putting the rules into effect. He made the suggestion along the lines of standard revision.

After a brief discussion R. E. Danforth, Public Service Railway, moved that the general notice be made to conform in all respects to the general notice as adopted for interurban rules. This motion was carried.

Mr. Danforth called attention to Section A under Rule 2. As this was a general code, it would seem as though the rule as proposed was restricted too much, as it made no provision for near-side or open cars. He proposed as an amendment the wording "for the safety and convenience of passengers," omitting the rest of the sentence. This motion was carried.

C. L. Allen, Syracuse, asked whether the amendment proposed by Mr. Danforth struck out the wording "boarding or leaving car by way of rear platform."

Mr. Danforth said that it did, for this reason: The near-side car passengers do not board or leave from the rear platform and on open cars there are anywhere from eight to fourteen or fifteen entrances for which the conductor is held responsible. In a basic standard code further explanations could be put in to cover local conditions. Mr. Danforth also moved to strike out the phrase "whenever any danger would be likely to result from backing." He did not believe it wise to incorporate in a code which would be published widely an admission that it was dangerous to back a car.

Mr. Fuller thought it was a very good instruction to employees that in times of danger this backing rule should be followed.

Mr. Danforth believed that on double-end cars the motorman should change ends always, and not only when he or his conductor believed there was danger. This practice ought never to be left optional.

After discussion, Mr. Danforth's motion on the elimination of the "backing" phrase was lost.

Mr. McEwen stated that sometimes the rules read "conductor and motorman" and sometimes "motorman and conductor." Upon motion of Mr. Danforth, it was decided to change the entire rules throughout to read always "motormen and conductors."

Mr. Danforth further suggested under carhouse rules, referring to "leave of absence," that the first sentence, "Leave of absence will be granted only on account of illness, or for rest and recreation," be omitted from the code. It seemed unnecessary to state this in a printed code. It was hard to imagine many other things for which a man might possibly be excused from work. This motion was approved.

Mr. Danforth then proposed that the sections under the headings "Suspension, Dismisals," "Pay When Off Duty" and "Re-employment" be omitted from the code. It was not to the interest of the company to publish sections of this character in the code.

Mr. Fuller said that perhaps it was Mr. Danforth's experience, in the neighborhood of New York, to get hold of old men who knew something of railroad regulations when they come to him. In Washington he got many country boys from Virginia and Maryland to whom it was necessary to make clear just what conditions they work under. To make this information clear, it was necessary to have this information in the rules.

E. C. Hathaway, Norfolk, said he had read the carhouse rules very carefully. The three rules to which Mr. Danforth objected had been unwritten rules, if not in the rule book. He believed that the rules should be retained in the code.

M. C. Brush, Boston, stated that in New England a number of motormen and conductors come direct from the farm. He saw no harm in publishing the rules, and such publication might do some good. He was reiterating what the railways would say to a motorman entering their employ, assuming that he knew absolutely nothing about railroading.

Mr. McEwen suggested an amendment for the words "dismiss" and substituting the words "company property" in place of "badges," badges being too limited, and that they should turn into the company "company property." Under the title of "Re-employment," he moved that the word "or" be used instead of "and." The latter would be a more proper word to use so that the employee might obtain either the consent of the head of the department or the consent of the management.

The formal amendment to place under "Suspensions, Dismissals" the words "company property" as a substitute for the word "badge" was carried.

Mr. Brush, referring to the proposed substitution of "or" for "and," said that the man should distinctly understand that when he desires to be re-employed he must not only secure the approval of his immediate superior, who may have discharged him for cause or otherwise, but that he must also secure the consent of the management. If the word "and" was retained, the men were impressed with the fact that when they had been discharged they could not, perhaps, get on the right side of the superintendent to get back into the service again. In a large company it might often occur that the management would instruct the head of a department to discharge a man. Under such circumstances some other head of department might see fit to employ that man. In case both the consent of the management and the head of the department had to be secured, the wrong transferring of one man from one department to another would be prevented.

Mr. McEwens motion to substitute "or" for "and" was lost.

Mr. Fuller asked if any one present had any suggestions to make on the recommended list of details for local carhouse rules. This seemed to be a good innovation.

Mr. Brush said that while the committee believed that it was absolutely impossible to lay down rules which would be applicable to all companies, it thought, nevertheless, that rules should be issued by various companies to cover certain subjects. It simply had given a list of those subjects with the understanding that the companies would take advantage of it to make rules to fit their particular company.

Mr. Danforth said, referring to Rule 108, that he would not put the additional section "Passenger Ringing Bell" in the rule book because he believed it was dangerous to have passengers fooling with the conductor's signal bell. It was a great deal better to have it distinctly understood that passengers were expected to leave signal bells alone. Most new cars and practically all of the prepayment types are provided with electric signal bells for the passengers, by

which the passenger signals the motorman to stop the car. This was eliminating the practice of having passengers ring the conductor's signal bell.

Mr. Fuller said passengers had a right to ring the bell to stop the car but not to start the car. The conductors should try in a polite way, however, to discourage the passengers from doing it.

Mr. Brush said this rule would not result in encouraging the ringing of bells unnecessarily and promiscuously by passengers, but it would have the tendency to compel the conductor to call the attention of passengers courteously to the fact that the practice was a bad one.

J. K. Choate, Otsego & Herkimer Railroad, did not believe the passenger had any right whatever to touch the bell.

Mr. Hathaway thought the rule was a good thing, as it would probably prevent friction between the conductors and passengers. It was put in so the conductor might recognize the fact that a passenger under some circumstances had a right to ring a bell.

C. Loomis Allen, Utica & Mohawk Valley Railway, said that if the committee was trying to make a rule that the conductor would act politely to the passenger who had taken liberties with part of the running apparatus of the car that was one thing, but if it was giving passengers a right to give a stop signal that was a very dangerous thing.

N. W. Bolen, Newark, said there were cases where his company had had passengers arrested and convicted for ringing the bell. If this rule had been in the book of rules the company would have lost these cases. He thought the rule should be omitted.

T. C. Cherry, Utica & Mohawk Valley Railway, suggested that this rule be framed to read: "In case a passenger should take the liberty to put his hand on the bell rope that they (conductors) should try to discourage the matter politely."

Mr. Choate agreed with Mr. Danforth that the rule should be absolutely eliminated.

Mr. Danforth said that he had conferred with the committee, which had an amendment to propose. Both he and Mr. Cherry, therefore, withdrew their motions.

Mr. Brush then put the following amendment in the name of the committee: "When a passenger rings a signal bell to stop the car conductor must try in a polite way to discourage the practice." This motion was carried.

Mr. Danforth expressed the hope that the delegates were individually prepared after this code was adopted by the association vigorously to indorse its use by their companies. The association was not passing a code of rules which the members were not willing to take home to themselves. He had done a great deal of talking because he did not want to appear at the convention as approving a code of rules and then go home to put in force a different code. On the whole the code was generally comprehensive and well got up. In conclusion he moved that the rule under head of "Change" read as follows: "Conductors will make change for passengers to the amount of $——." He would not print the rest of the rule.

Mr. Hathaway thought the suggestion that the amount be left blank was a good one, for the simple reason that it was a legal condition which varied in the different states.

J. V. Sullivan, Chicago, moved that the rule be amended to read as follows: "Conductors are not obliged to change money of larger denomination than $——." This gave them the discretion to change it if they wanted to. This motion was carried in place of the one suggested by Mr. Danforth.

Mr. McEwen called attention to use of the words "barn" and "depot" instead of "carhouse."

Mr. Fuller and President Page said that the word "carhouse" would be used throughout the book.

Mr. McEwen also called attention to the use of the terms "trip report" and "day card."

Mr. Brush said the criticism was well made. The same term should be used throughout to designate the same thing.

Mr. Brush, in reference to a query by Mr. Allen, said that the suggested rules for prepayment cars were added to the end of the proposed code. No effort was made to insert them into the code so that they could be omitted by companies without prepayment cars. In further discussion of the prepayment rules, he called attention to the fact that the chairman of the committee had sent inquiries to 147 companies, of whom eighty-nine approved the addition of prepayment rules. There was no disapproval. There was approval from six and no answer from fifty-two.

Mr. Allen believed most of the members of this association were not in shape at this time to recommend a standard code of prepayment rules. There were several types of prepayment cars and new ones were presented almost every year. More time for consideration should be taken before making a standard code.

E. S. Fassett, Albany, thought the prepayment rules should remain.

Mr. Brush appreciated the fact that prepayment cars would differ as to the gates and as to the manner of collecting revenue.

On motion by Mr. Allen, the code was adopted up to the prepayment car rules. On motion by Mr. Brush, a similar resolution was passed with reference to rules for the prepayment type of cars.

EXPRESS AND FREIGHT TRAFFIC

The next business was the report of the committee on express and freight traffic. F. W. Watts, Utica, read the report, which is published elsewhere.

Charles E. Beattie, New Bedford, opened the discussion. The roads which he operates are doing a purely freight business, and the freight department is operated at a profit. He operates a single car, has no rights for train operation and does not operate carloads. That is practically one-way business. He found the cost of operation under different conditions was practically the same; for one road between two large cities it was 71 per cent and for another serving a summer resort district it was 69 per cent. This covered all charges including trackage, power, rent of equipment and everything which pertained to the business.

The question of soliciting was something that appeals to a great many, but it does not apply under his conditions because he could not guarantee the time of leaving and arriving. Working together with the claim department and the express department gets far better results.

In reply to a question by E. C. Spring, Mr. Beattie said that the percentage of operating expenses on the road, operating one way, was 69 per cent.

F. D. Norviel, Indiana Union Traction Company, said the freight proposition in the northern Central States was not a theory any longer. They were operating under the interstate commerce laws and had about 3000 miles represented in the Central Electric Traffic Association. His line had 365 miles of road and it operates from one to three freight trains a day in each direction. In connection with other lines they had freight service from Indianapolis to Ft. Wayne, about 122 miles, with one train in each direction there; also a new service, Indianapolis to South Bend, 175 miles. They made delivery on freight loaded in the evening on the following morning about 10 a.m. for that distance.

In reply to question by Mr. Spring, Mr. Norviel said that probably 60 per cent was one-way business and 40 per cent in the other direction. The maximum charge per 100 lb. was 31½ cents. The custom with the traction lines through his section was to use the steam railroad rates. They simply meet the competition of the steam railroads. Probably 11 per cent of the gross receipts were from freight business. The members of the Accountants' Association having arrived, the joint meeting followed.

THE JOINT MEETING OF THE ACCOUNTANTS' AND ENGINEERING ASSOCIATIONS

The joint meeting of the Engineering and the Accountants' Associations was called to order by W. J. Harvie, president of the Engineering Association, at 10 a. m. yesterday at Marine Hall. Mr. Harvie asked President W. H. Forse, Jr., of the Accountants' Association, to preside over the joint meeting. Mr. Forse then called on P. S. Young, co-chairman of the joint committee on engineering accounting, to read the report of the committee.

The report of the committee, which is published in abstract elsewhere in this issue, was then read by Mr. Young.

DISCUSSION OF THE REPORT OF THE JOINT COMMITTEE ON ENGINEERING ACCOUNTING

H. H. Adams, Metropolitan Street Railway, of New York, said that the subject of scientific management or efficiency was one which he personally had always considered. It had always been the endeavor of the railways to improve their efficiency in more ways than one. The subject, however, had been given particular attention in the last year or two, with a corresponding increase in results. There was no question in his mind that some incentive had to be given to the workmen in order to attain the best results. Premium work was generally to be preferred to piece work. Some time ago he had a large job to complete within a short time. By a gradual introduction of the premium system he was able to make a material reduction in cost and complete the work in the time required. He could not have done this on the day-work basis. Mr. Adams emphasized the need of a study of existing conditions before any work of this character was taken up. If the day-work basis was used the first thing to know was whether the basis was efficient. If so, that gave the basis for the introduction of a premium work system.

Harrington Emerson, the efficiency engineer, said that he did not consider himself an old man, but that in his lifetime he had witnessed the greatest revolution that had ever occurred during the existence of humanity. When he was born practically all energy was derived from human or animal muscle. Suddenly the world was able to use the stored-up coal, gas and oil for energy. It was exactly like the position of a young man who had been living on a scant allowance and suddenly inherited by the death of his father a great fortune. When, years ago, he started to plow up a section of land he was discouraged to find that it would require four years. Recently he saw a gang plow with engines that would turn over a section of land in thirty-six hours. The object of scientific management was to utilize without waste not only human muscle but also incarnate energy. The greatest mistake made by some labor leaders and workmen, and also, he was sorry to say, by many managers, was in supposing that strenuousness and efficiency were the same. They were not the same. The barnyard fowl who flew over the fence was strenuous without being efficient. The eagle who soared in the sky without moving its wings was efficient without being strenuous.

The aim of efficiency, Mr. Emerson said, was to accomplish the largest amount of work in a given time with the least effort. Wherever scientific management was applied the principal result was to give the workman an easier time. Scientific management rejected the piece-work theory and substituted efficiency, affording the most result with the least effort. Less effort and added responsibility yielded the better results sought by efficient management.

Walter H. Evans, Anderson, Ind., said that efficiency engineering or efforts to introduce scientific management could not accomplish much without the thorough co-operation of all that had to do with the management. The result of the efforts would depend on full co-operation and intelligent understanding by employees of the system. In his mind railway managers had been efficiency engineers for a long time. Only lately, however, had they realized there was a wide, encouraging field for men properly qualified to devote themselves to this work.

J. H. Neal, Boston Elevated Railway, said that, speaking for manufacturing interests as well as street railways, he had found in New England that some misconception existed regarding scientific management. He had talked with some who thought that they were introducing efficiency methods but who were actually introducing only piece-work or a premium work system. The accountant could not help the efficiency engineer or the engineer very much in the introduction of efficiency methods except as he would be a help by keeping the records. Scientific management was very largely a question of whether a man was using his right hand when he should use the left or whether a man was used when power should be employed. It was necessary to keep in mind the value of the result obtained and the amount of energy expended in getting it.

Charles Hewitt, Philadelphia Rapid Transit Company, said that he wanted to congratulate the association on the work done by P. S. Young, co-chairman of the committee, who had given a great deal of time and thought to the discussion if the subject of scientific management and the compilation of the bibliography which was presented with the report.

In discussing the subject of what constitutes maintenance Mr. Hewitt said that during the deliberations of the committee it became very evident that a widespread divergence of opinion existed on this subject, not only among the members and accountants, but also among commissions. The sub-committee to which the consideration of this subject was referred received replies from twenty-nine commissions to a general letter sent to all of these bodies. Most of the commissions followed the system of the Interstate Commerce Commission, which had not given a precise ruling on this subject.

Mr. Hewitt gave one instance where two commissions having jurisdiction over a company differed regarding the charge for rent for a narrow strip of land on which a high-tension, long-distance transmission line was constructed. One commission thought that the rental should be charged to rentals, while another commission suggested that the expense be charged to maintenance of electric-line equipment. It seemed advisable that the association should start early in its consideration of this subject in order that its members and others might be guided properly as to the proper accounts to be charged for various classes of expense. Attention was called by Mr. Hewitt to the replies quoted by the committee, in which there was an intermingling of terms. The consensus of opinion, however, which corresponded with the judgment of the committee, was that maintenance was essentially the upkeep of the property and that any replacement beyond the original value of the thing renewed became a capital charge.

W. F. Ham, Washington Railway & Electric Company, stated that in connection with the work of the Accountants' Association he had been brought closely into touch with the Interstate Commerce Commission through the Bureau of Statistics and Accounts. Mr. Hewitt had really described the situation as Mr. Ham saw it. Whatever expense was required to keep the integrity of the property, Mr. Ham added, was maintenance. That which extended or improved the property over and above maintenance was new construction or betterment. He believed eventually that that was the way in which the problem would be worked out. At the same time it was easier to describe a general theory than to work it out practically in a system of accounting. If it should be assumed that the report of the committee would be adopted, it would appear that the classification was deficient. If it was assumed that a car was worn out in service or decayed, what was there in the classification that provided for the replacement of the car or writing off the

value thereof? It would be found that no account took care of replacement, and some such account was necessary. Just how this would be worked out was a matter for development. Assuming again that a power station was abandoned or a new power plant was constructed to take the place of an old one, the adoption of the theory that whatever maintained the integrity of the property should be charged to maintenance account would put therein the original value of property which had gone out of service. To place that, however, in the maintenance account would destroy the value of the operating statistics for comparative purposes. To what account should the cost of an engine or dynamo be charged if thrown out of service? While it was easy to adopt a general theory, it was not easy to adopt a practical scheme that would be satisfactory to the engineering, accounting and financial elements. He was impressed by the remarks of the committee that no system was complete unless it included all maintenance, and that maintenance included depreciation.

Mr. Emerson said that he had had a great deal to do on a large scale with questions relating to the maintenance of shop tools and locomotives. It had been difficult to find out the maintenance costs. One absurdity after another in the practice developed and made the scheme appear absolutely ridiculous. The proper treatment of this subject did not depend on the classification or the accounting. It depended on an inventory. Only through an inventory could the facts be learned. An annual inventory should be made so as to show specifically what changes had taken place.

Mr. Neal asked Mr. Emerson how he would determine the value of a car, for instance, that had been in service for three years. Most railways earned only 5 or 6 per cent on their capital, and an error in making a valuation would be serious.

Mr. Emerson said that there might be either an increase or decrease in values due to the improvements placed on the car or the treatment to which it was subjected in service, but he did not know how the question could be settled except through a specific inventory.

Martin Schreiber, Public Service Railway, of Newark, N. J., asked if the committee thought it would ever be possible to define maintenance costs without an understanding regarding the different degrees of maintenance. One man might maintain his property at 50 per cent of the reproduction value and another at 75 per cent. The one who kept the property at 50 per cent would show lower operating costs. The costs of the two properties, however, would not be fairly comparable.

T. E. Rust, Boston & Northern Street Railway, asked the position of the committee about the inclusion of costs of labor in various charges.

P. S. Young, Public Service Railway, of Newark, N. J., said that he thought Mr. Emerson had really pointed the answer to the question asked by Mr. Schreiber. Comparisons could not be made fairly except where the percentage of original cost represented by present value was known. Costs were really the costs of both labor and material together. Unless there should be a careful segregation of costs the construction account would be increased abnormally. From an accounting standpoint it was necessary to return to the question of value.

Mr. Schreiber said that the man who spent less on maintenance than he should spend received credit that he didn't deserve. He might have reduced the condition of the property. The question was as to the degree to which the property should be maintained. There was no question as to the large field presented by efficiency engineering at the present date, but there was not so wide an opportunity in the railway industry as in the manufacturing business. For instance, when a car was seen in the middle of the day carrying only one or two passengers it was apparent to everyone that efficiency was not attained. Someone was losing money on the operation of the cars. But the cars had to be operated and what could be done about it? He was in favor of efficiency engineering, but it was not always possible to introduce the methods advocated. On a street railway one of the large elements of costs was that of operation of the cars, but up to this time no one had been able to propose a scheme to reduce this expense.

H. G. Stott, Interborough Rapid Transit Company, New York, said that maintenance comprised everything that was necessary to keep the plant in the condition in which it stood when received from the manufacturer; that is to say, everything that would keep the plant at 100 per cent efficiency. Under this plan there was no depreciation. A serious item, however, to be considered was that of obsolescence. It would require a prophet to know what provision should be made for this item. A great many plants would increase efficiency by taking out engines and installing turbines, effecting economy through decreased cost and reduced expense for labor. The cost of the old units, however, was in the accounts and the cost of the new was not a fair charge to capital account. He had always maintained that an amortization charge should be fixed at a certain percentage and revised at periods of three, five or ten years, so that finally the railway would have a fund to meet necessary expenses. When persons said they could operate a railway at a certain ratio they should include not only the maintenance charges but also a charge for obsolescence.

Mr. Hewitt said that the discussion had been sufficient to impress upon the associations the judgment of the committee as to the wide difference of opinion regarding the question of what constitutes maintenance. If the report did no more than to start the ball rolling so as to crystallize sentiment the committee would feel gratified that its work had accomplished something. The committee realized that it was difficult to take up the subject without discussion of depreciation. He thought that, as Mr. Ham said, there should be some account to provide for large replacements. This would avoid the variations that would otherwise creep into the charges to ordinary maintenance accounts. The conclusions of the committee pointed to the same necessity. The discussion by Mr. Emerson had suggested a new line of thought which only showed the wide divergence of opinion on the entire subject. The suggestion made by Mr. Schreiber might be brought before the committee for consideration during the coming year. One commission had used amortization as applying entirely to capital; for instance, it defined the expiration of franchises as amortization of capital. Mr. Hewitt expressed the wish that the association would continue the committee for further consideration of the subjects in the next year.

Mr. Schreiber said that some parts of a property could not very well be kept up to 100 per cent efficiency, if proper economy was to be exercised.

Mr. Ham moved that the report of the committee be received and that the work be continued for another year.

The joint session was then adjourned.

R. D. Nuttall Company, located at spaces 147 and 149, is displaying very extensively the products of its manufacture. The company has just completed its new works, and is showing a large photograph of them. In this connection it will be interesting to note that in 1888 the company occupied a building with about 10,000 sq. ft. of floor space, while to-day it is occuping a building containing over 180,000 sq. ft.

F. F. Stockwell and William W. Field, of the Barbour & Stockwell Company, of Cambridgeport, Mass., arrived in Atlantic City on Monday. As is their custom, they have no exhibit, but few customers and friends escape their cordial greetings.

WEDNESDAY'S SESSION ENGINEERING ASSOCIATION

President Harvie opened the session by the appointment of the following nominating committee: F. G. Simmons, Milwaukee, chairman; Charles Hewitt, Philadelphia; Charles H. Clark, Cleveland; William Roberts, Akron, and F. R. Philips, Pittsburgh.

L. P. Crecelius then presented the report of the committee on power generation.

Mr. Crecelius said that in most plants the only instrument for the boiler was the steam gage. There was no way of determining the proper mixture of air or fuel or the rate of working. It was almost impossible to adjust the rate of working intelligently, and so the use of instruments of greater accuracy was suggested. The report also suggested the use of a more volatile fuel and hinted at the use of two furnaces for one boiler and the desirability of forced drafts. Mr. Crecelius described other features of the report, discussing it by subdivisions.

Charles Hewitt, Philadelphia Rapid Transit Company, said that the question of larger grates together with forced draft was now very pertinent in Philadelphia, New York and possibly in many other places. He understood that Mr. Stott had recommended, under light loads, the banking off of one fire and the running of the other boiler at a lower capacity with the other fire. Mr. Hewitt had had difficulty in doing that, possibly because of a difference in the design of the fronts and the grates. He found in doing so that smoke and back fire were forced through the hoppers.. A representative of the New York Edison Company had told him that they forced boilers to 100 per cent and even higher rating on tests, but in regular work the boiler was forced about 80 per cent when exceptionally big loads came on. The question came up as to how far this economical forcing of the boiler can go under different conditions. It was a question where to stop in this forcing of the boilers. From what he had gathered it did not pay to go much over 30 or 40 per cent. Mr. Hewitt said that the question of using forced draft depended largely upon the coal. With a good soft coal it was possible with a well designed station to get natural draft which would give full rating out of the boiler. But with the finer grades of anthracite coal, on account of smoke, it became necessary to force the draft, and in using the forced draft there appears to be an abnormal loss of the physical particles, varying in accordance with the amount of the draft. To offset that, the tendency has been toward greater grate area, until at the present time grates that were twelve feet deep were being installed in Jersey City. It was expected to have the firemen throw the coal in part way, and then use a shover. The whole object of using these enormous grates with the forced draft was to reduce the rate of flow through the grates, and the loss of the finer particles of coal. In one station 600 tons of unconsumed carbon had been taken out of the soot chambers during one month. Thus it was a question as to how far to go with forcing the draft and enlarging the grates in order to save that coal. Mr. Hewitt had been very much interested in the diagram of Mr. Stott showing the variations from moment to moment in the output of the boiler.

William Roberts, Akron, spoke of the need for raising the personnel of the men in the boiler room and making them feel more that they were a part of a plant which was producing the right kind of power at the right time. He believed that forced draft was the best means for obtaining increased power.

E. J. Burdick, Detroit United Railways, said that in two large power houses he had a banking period, in one of more than 55 per cent, and in the other of over 40 per cent. Municipalities, sooner or later, would require forced draft to reduce smoke. Some years ago he established in connection with his power department a chemical laboratory and in connection with that a combusion department. Boiler rooms were in the hands of this combustion department, and it was producing very remarkable results. Although the steam flow meters might not give fully accurate results, so far as steam economy was concerned, they did give us operating results of high value.

H. G. Stott said, in regard to the point raised by Mr. Hewitt as to banking, that so long as the draft was kept at about a quarter of an inch, there was no sign of smoke. He had run evaporation tests of double-end boilers, and found the efficiency was practically the same as that with a single stoker boiler, and apparently that was not very good economy. One could sacrifice a good deal in the efficiency of operation in order to save in fixed charges.

Mr. Stott had not the slightest doubt that the committee would be able to report during the next year that it was a practical thing to obtain 300 per cent rating on a boiler. He thought that with the moderate use of a forced draft and with high grades of coal the efficiency would be very good. It would not fall off more than five per cent. At present it was absolutely conservative to say that one could run boilers at double rating with efficiency and economy.

As to the pilot-tube readings, the variation in the moisture was so small that it could be neglected for practical purposes. There was less than one-quarter of one per cent variation in moisture in a twelve-hour run.

Replying to William Roberts, Northern Ohio Traction & Light Company, as to overloading and deterioration, Mr. Stott said that his eighteen boilers using double stokers had now been used for nearly five years. There was absolutely no sign of more deterioration in these double-stoker boilers than there was in the single-stoker boiler. These boilers were running above rating continuously. Of course, that does not apply to the furnace proper. The deterioration there was about 60 per cent more than a single stoker boiler. The boiler itself was actually cleaner than those having a lower rate of evaporation. Presumably this was due to the high velocity sweeping out the tubes and carrying out all the dirt with it.

T. E. Rust, Waterloo, Cedar Falls & Northern Railway, asked Mr. Stott what he considered the point of maximum efficiency in forcing a boiler merely from the evaporating standpoint.

Mr. Stott replied that the boiler itself had very little to do with the question. With one stoker he noticed that the best evaporation efficiency was about 80 per cent. That was raised to about 130 per cent. Another stoker apparently gave 150 per cent on the same boilers. It seems to be more a function of the furnace, the furnace arrangement and the stoker accompanying it than of the boiler itself.

DISCUSSION ON THREE-PHASE GENERATORS

The next discussion was on the best standard voltage and frequency to be adopted for three-phase turbo-alternators, with reference to size as related to voltage.

E. N. Blake understood that there were three rather distinct recommendations, namely, that the transmission potential should be 11,000 volts, that the generation potential should also be 11,000 volts, and that adding voltage changing transformers to introduce more reactance to the circuit was undesirable. As to the transmission voltages these figures should be used with a great deal of care in applying them to a large system transmitting through underground ducts. In investigating this question and making calculations as to the various voltages ranging from 6600 to 33,000, he was very much surprised to find that the limiting factor was not an electrical one, but, strange to say, the size of the duct. He had found that with voltages ranging from 6600 to 33,000 a 3¼-in. depth gave approximately the same carrying capacity for every purpose. His recollection was that the most efficient potential determined at that time was 22,000 volts, using the standard size duct. The generating voltage involved the matter of reactance. Three or four large companies were now introducing reactance either in

their old equipment or in new equipment. This question should be given further consideration. It seems to him that the generating voltage was not necessarily tied up with the transmission voltage. If the advantage of reactance was granted then the generating voltage was a matter of generator design and generator insulation and the transmission voltage was a matter of local conditions or a matter of economy to be attained in a given transmission system.

Mr. Stott said the report entirely confirmed his own opinion. It should be the general province of the designer to require reactance. It certainly introduced additional loss to make up very valuable space. If the same object can be accomplished by introducing reactance in a generator it would look as if that was the desirable way to do the thing. The question of transmission voltage over underground feeders was tied up absolutely till the question of getting satisfactory insulation of cables was settled. Of course the manufacturers quoted a higher potential than 13,000, but his experience with them so far had not been satisfactory. As shown in this report 11,000 volts came so near to being the theoretical voltage for transmission in cities that it seemed a pity to move away from what was absolutely a safe voltage on underground feeders.

Mr. Lake thought it was possible to introduce a generator with the lower generating voltage, thereby simplifying the problem of insulating the generating circuit, and the capacity of the commutator need only be one-half the capacity of the generator. In Chicago they had, in addition to introducing the one to one reactance, stepped up to 20,000 volts in a territory where there are lines from 10 to 18 miles in length. On the new station of the Boston Elevated Railway Company the generators were 6600 volts, and the transmission lines 13,200 volts. In St. Paul there were a couple of 25,000-volt cables that had operated successfully for a number of years. If the size of the duct in transmitting large amounts of power was taken into consideration a higher potential than 15,000 volts might be found more desirable than a lower voltage.

COAL SPECIFICATIONS

There was no discussion on the question of d.c. turbo-generators larger than 500 kw. Referring to the coal specifications, Charles Hewitt, Philadelphia, asked about the advantages and disadvantages of purchasing coal this way. They had before them two distinct specifications, one of which had for its present basis a medium priced coal and the other the highest priced coal. What advantages had the one over the other?

Mr. Bayne, Mechanical Engineer, Pennsylvania Coal & Coke Company, said that last year he had gone through several hundred specifications on coal purchased on the B.t.u. basis. They had been so widely diversified that it was almost impossible to give a direct analysis of any individual one; but the chief trouble seemed to be the impossibility of the mechancal engineer and the chemist getting together on a specification that would suit each particular plant. The specifications have not been acceptable to the coal man, which has been due to the fact that they have been drawn up by chemists, who know very little about furnace conditions or the actual burning of coal in the furnaces. The next trouble was lack of knowledge in sampling coal. Most plants have no methods whatever of sampling coal, leaving it to the fireman to take a shovel out of every wheelbarrow load or something of that kind. That was not fair to the company buying the coal nor to the coal man. His company did not object to bidding on a specification basis. In fact, it would be very glad to, provided it could find specifications that were acceptable to both sides. He had gone on the car and taken samples right along with other chemists and obtained an entirely different result in the same car. Coal was not a manufactured product. If a reasonable leeway were allowed in a specification prepared jointly by a mechanical engineer and chemist there was no coal company in this country that would not be glad to sell on that basis.

Richard McCullough, St. Louis, said he had been buying coal on the B. t. u. basis for several year, buying about one-third of the coal on contract. A coal with 11,000 B. t. u. is considered good. He had a chemical laboratory to test the coal. In making a contract with the mines considerable latitude is permitted in B. t. u. and in the ash. If they run 200 B. t. u. higher than is called for by the contract a bonus is given and if they are 200 units below they are penalized. Similar rules are made for ash. The ash is fixed in the contract with each mine and a latitude of 2 per cent or 3 per cent is allowed in that on good coal. A deduction is made for moisture if it runs more than 6 per cent.

Mr. Rand, Boston, observed that the specifications mentioned only the quantity of ash. He had found that the quality of the ash was of importance, the fusing temperature, in particular, affecting the value of the coal for steam.

Mr. Stott said the beneficial result of their specifications was this: They always know what capacity they can expect from a boiler. Another improvement it gave them was that it made the cost of coal per kw-hour practically constant. The method of sampling was the root of the whole matter. They had a good deal of trouble getting samples fair to each party and so they took samples eventually from the center. It was done by a hopper taking out 10 lb, automatically from every two tons. These samples are thoroughly crushed and quarried, and crushed again to final samples of 20 lb. Too great care could not be taken to have equal parts lumped coal and fine coal. All analyses should be made on the dry basis.

At this point Martin Schreiber took the chair.

C. P. Crecelius, Cleveland, said that analysis of coal would not determine whether the fuel was right for the conditions or not. A boiler test was necessary. The success of the coal specification depended on whether the right kind of fuel was obtained for particular condtiions, and that was based on price. As to coal having a peculiar ash it was manifestly a difficult matter to make a standard set of specifications cover all conditions.

Mr. Hewitt said that the fuel which had been purchased last year by him on this basis had not varied more than 15 B. t. u. and it was an even 1000 B. t. u. higher than the fuel purchased before, and at a lower cost.

Upon motion of H. H. Adams, New York, the report of the committee was accepted and the thanks of the association extended for its valuable report.

The meeting was then adjourned.

LADIES' CARD PARTY

On account of the inclement weather the ladies' party at the Golf Club scheduled for yesterday afternoon was called off and an informal card party substituted, which was held in the lobby at the Convention Pier. The ladies had their choice of playing bridge, euchre or five hundred.

Playing began at 3.30 and lasted until 5 o'clock, during which time refreshments were served. Twenty-four exquisite Irish lace prizes were distributed, seven being given in each division. The ladies winning in their different classes are as follows:

Bridge: Mrs. Wood, Mrs. Cummings, Mrs. Buckley, Mrs. Armstrong, Mrs. Maxwell, Mrs. Gonzenback, Mrs. Deming and Mrs. Nicholl.

Euchre: Mrs. Crabbs, Mrs. Hertzog, Mrs. Kerschner, Mrs. Dempsey, Mrs. Joel, Mrs. Oberlander, Mrs. Raynolds and Mrs. Hazelrigg.

Five Hundred: Mrs. Stieff, Mrs. Hubbell, Mrs. Cook, Mrs. High, Mrs. Adams, Mrs. Easty, Mrs. Collins and Mrs. Crowell.

An electric light and tramway company has been formed in Lujan, province of Buenos Aires.

ANNUAL MEETING OF MANUFACTURERS' ASSOCIATION

The annual meeting of the American Electric Railway Manufacturers' Association was held in Marine Hall at 4 o'clock yesterday afternoon. The attendance, while not large, was representative.

President Castle presided and presented the report of the executive committee. He stated that the membership of the association at the present time was 328, which was an increase of sixteen over the membership this time a year ago. President Castle urged the members of the Manufacturers' Association not to leave to the executive committee the work of soliciting new members, but each individual member should take up himself the responsibility of adding one or two names to the list. The report referred to the establishment of a permanent headquarters office in New York and the assistance which the establishment of this office had been to the executive committee. The amount of space occupied on the Convention Pier at the present convention, aside from the space occupied by track exhibits, was estimated at 76,370 sq. ft., which President Castle thought was a larger amount of space than had been used for exhibit purposes of any other railway convention. The president's statement indicated that the financial condition of the association was extremely satisfactory, although figures could not be given until the expenses of the present convention had been finally adjusted.

President Brady of the American Association spoke to the meeting for half an hour. After expressing his personal and official thanks for the assistance that the manufacturers had given in making this year's convention a great success, President Brady elaborated upon the opportunities offered by existing conditions for closer co-operation between the manufacturers and the representatives of the railways in meeting the present need for a widespread educational movement that would place the transportation industry in its right light before the public. He said that he was not prepared to suggest definitely the means whereby this highly desirable object might be accomplished, but as to the need for closer working relations he was emphatic and positive. Mr. Brady's remarks were received enthusiastically and the appreciation of them felt by the members of the Manufacturers' Association was formally expressed by a rising vote.

On motion made by J. R. Ellicott, James H. McGraw was invited to explain to the meeting what had already been done by a joint committee of the Manufacturers' and the American Associations in the matter of closer working relations between the two associations. Mr. McGraw referred to the fact that at the time the Manufacturers' Association was organized on its present basis at Philadelphia in 1905 it was the idea of many that the Manufacturers' Association should be an affiliated and not an allied association of the parent body, but at that time the authorities of the parent association felt otherwise. Now the situation had changed. The American Electric Railway Association felt that it would like to have in its various classes of membership a full representation of all the various interests that constitute the industry. Mr. McGraw pointed out that the Manufacturers' Association had never failed to live up to the full limit of its opportunities, and now that it had another vista of opportunity opened up to it, he felt that the manufacturers should rise to this opportunity and add possibly 3000 associate members to the main organization and through that means not only get into closer touch with the workings of the parent association and with the purposes which that association is endeavoring to accomplish, but with the manufacturers who by this means bear their full share in bringing about a better condition of public sentiment with regard to the public service corporations, upon whose prosperity the manufacturers so largely depend.

At the conclusion of Mr. McGraw's remarks, D. M. Brady expressed his hearty approval of what had been said by Mr. McGraw and by President Brady of the American Association.

The annual election of five members of the executive committee to serve for three years resulted as follows: E. A. Hegeman, Jr., president U. S. Metal & Manufacturing Company, to succeed C. C. Castle; C. S. Hawley, president Consolidated Car Heating Company, to succeed himself; James H. McGraw, president McGraw Publishing Company, to succeed himself; H. C. Miller, Allis-Chalmers Company, to succeed J. R. Porter, and C. R. Ellicott, Westinghouse Traction Brake Company, to succeed J. R. Ellicott.

Messrs. H. C. Ebert, president Cincinnati Car Company, and W. L. Conwell, president Transportation Utilities Company, were recommended to fill the unexpired terms of the offices to which they had been elected by the executive committee since the last annual meeting of the association.

On motion it was ordered that the exhibit close at 2 p. m. on Friday.

GASOLINE LINE CAR FOR MILWAUKEE LINES

The accompanying engraving shows a very satisfactory automobile tower wagon built by the Milwaukee Electric Railway & Light Company and used by the line department. The car was made up from materials very largely on hand. It is propelled by a standard four-cylinder automobile engine of from 30 h.p. to 35 h.p. rating. The transmission is



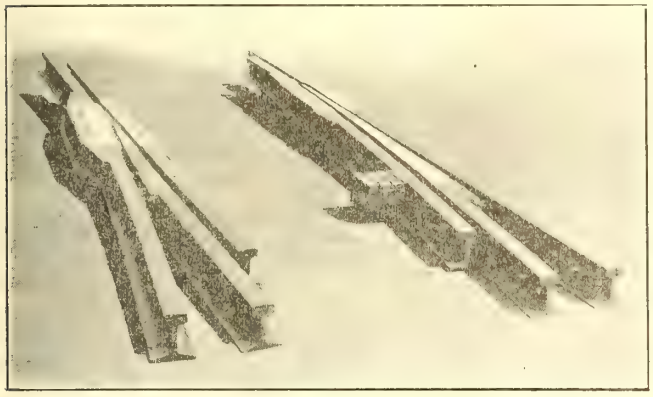
Gasoline Line Car of the Milwaukee Electric Railway & Light Company

of the friction type, by which the change of speed and the reverse are obtained by sliding a friction disk back and forth so as to take power from different parts of the driving disk. The friction disk operates an intermediate shaft which is connected to the front and rear axles of the car by chains. The control apparatus and the brake handle are arranged in the cab between facing seats so that the operator can always face in the direction in which the car is running. This car is used to maintain the overhead system between Waukesha Beach and Watertown and has been found very satisfactory, as well as much more economical than an electric car. This Watertown division is operated with a 1200-volt trolley.

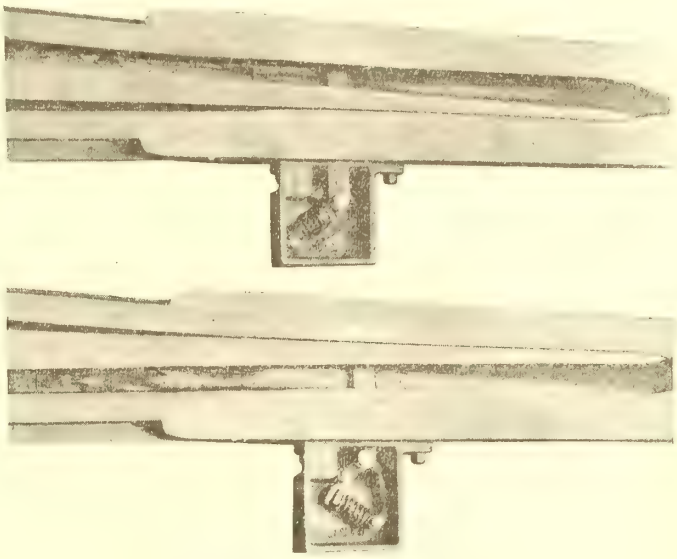
The American Brake Company, St. Louis, Mo., is showing its automatic slack adjuster in the Westinghouse Air Brake Company's spaces 20-24.

LARGE NEW CARHOUSE AT LOS ANGELES

The Los Angeles Railway Corporation is now constructing a carhouse with a capacity for 300 cars of the Los Angeles Railway's standard type, which measure 44 ft. 8 in. long over all. The building was designed under the supervision of G. J. Kuhrts, chief engineer. The new structure will be 351 ft. wide by 624 ft. long and will contain twenty-four through tracks placed on alternate 12-ft. and 17-ft. centers. Each of the six carhouse bays will be 58 ft. wide between center walls and will be subdivided by a central row of columns spaced 20 ft. apart.



Switch and Mate of Dudley 100 lb. Rail

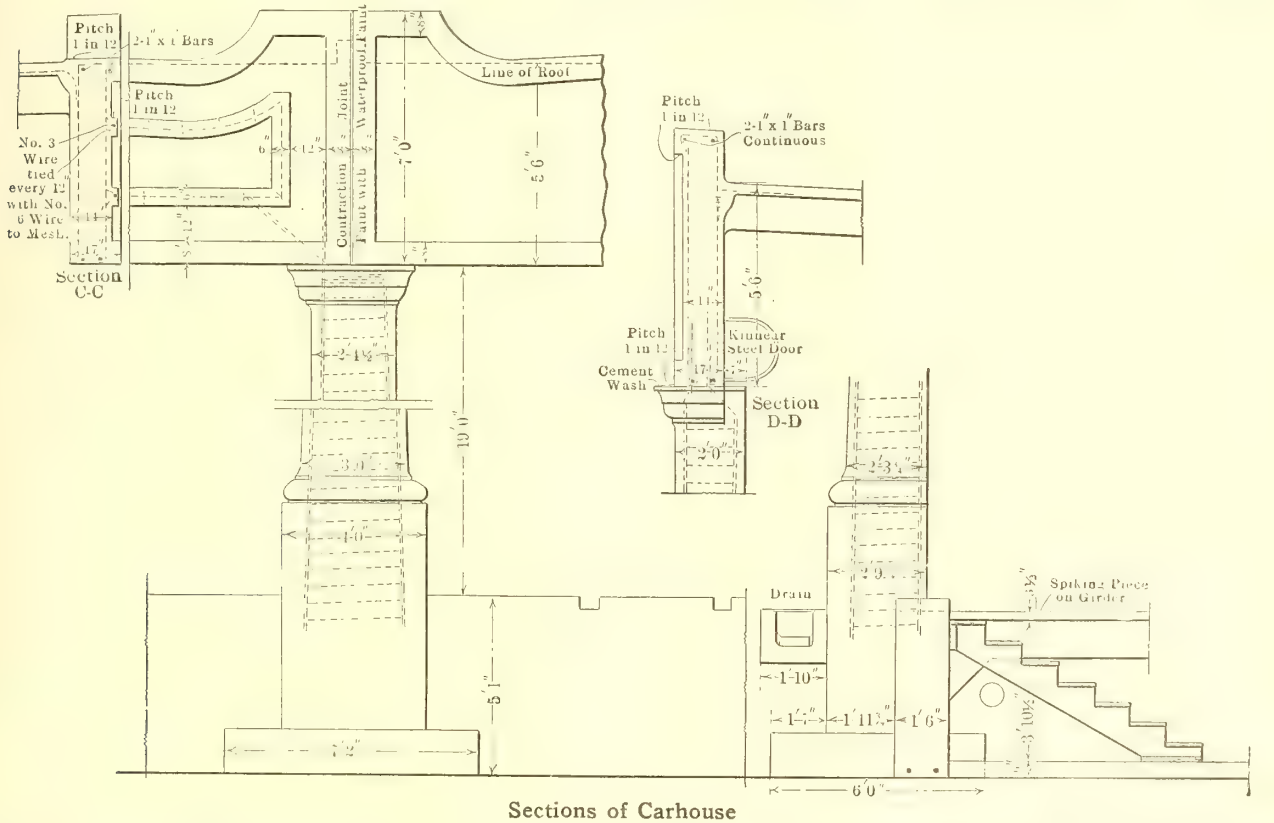


Anti-Kicker for Tongue Switches

The structural features of this large new carhouse are of particular interest because they embody the use of reinforced concrete to make an ornamental building. The six bays of the building are alike in design and dimensions. Each is made up of six sections 104 ft. long by 58 ft. wide. Five connection joints are placed across the roof of each subdivision of the building to provide for expansion and contraction of the long roof structure.

The six sections of the building are separated from each other by continuous fire walls, each pierced above the track level by three doors affording cross passage between the bays. The open type of pit construction will be used, and five fire doors, placed below the track level, will be equally spaced along the partition walls. The openings above the track level will be fitted with Kinnear rolling steel shutters, and the fire doors in the pits wil be of the self-closing type. The roof will be composed of reinforced-concrete slabs, continuous from contraction joint to contraction joint.

Sections of the carhouse are shown in the diagram. The wall above the track openings will be of concrete reinforced with two layers of wire mesh and with 1-in. square bars. This concrete wall is carried by a series of reinforced-concrete columns tapering from 4 ft. in diameter at the base to 2 ft. 4 in. in diameter at the top. The openings between these columns will be closed with Kinnear rolling steel doors. The bases of the columns at the ends of the building are connected by a reinforced wall 1 ft. 6 in. thick. Just outside of the row of columns is a cross gutter, 12 in. square in section, formed by 5-in. concrete walls. This gutter will lead the surface water away from the track entrances. Just inside the end walls are wooden steps



Sections of Carhouse

which have been constructed so as to lead to the pit floor.

The pit floors are made of concrete slabs 6 in. thick, extending from wall to wall. The stairways are placed at both ends of every pit.

SPECIAL TRACK WORK

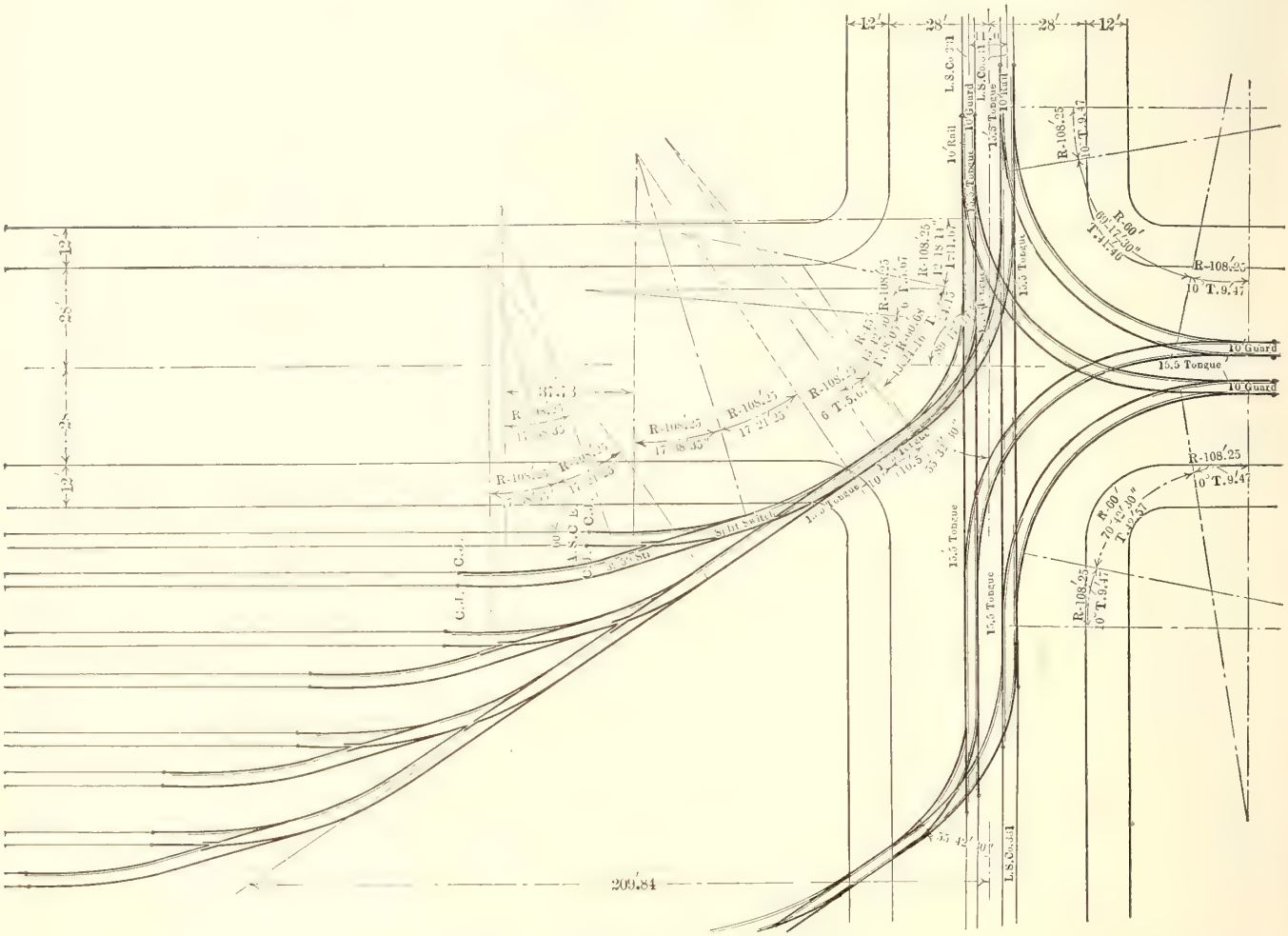
The special track work for the twenty-four leads from this large carhouse to the two tracks on the adjoining street, together with a double-track wye at the corner of the carhouse property, is now being manufactured by The Falk Company, of Milwaukee. The order for this work was placed through this company's Pacific Coast representative, Alphonso A. Wigmore.

The part of the special track work on private property will be made of 70-lb. standard T-rail, fitted where necessary with Cambria-F guard section, and will be the standard built-up type, with rigid frogs and split switches provided with standard ground throws. That part of the special track work laid on public property will be the hardened-center type of construction and will be constructed of 100-lb. Dudley rail, the Lackawanna section 1001. Cambria-D guard section will be used with this rail.

An illustration of the type of switch and mate as designed by the Falk Company for use in the 100-lb. rail portion of the track is presented. It will be noted that the mate is on the right-hand rail and the switch on the left-hand rail, these positions being the reverse of customary practice but standard with the Los Angeles Railway. The frogs are the Falk Company's standard shrunk-in hard-center type. In constructing these the manganese steel plates are set in the molds with the rail ends and are cast in place. The switch tongues and the switch and mate inserts are of manganese steel. The switch tongues are provided with the manufacturers' tongue-pin keying device, which affords an easy means for adjusting the tongue pin either horizontally or vertically.

The type of anti-kicker spring box furnished by the special-work manufacturer for the switchpoints is illustrated in its two positions. The spring boxes are placed about 30 in. from the end of the tongue, where the throw is 1½ in. The tongues, which have a minimum length of 7 ft. and a minimum thickness of 2 in., bear on the switchboard floor for their full length. The throat ways are 1¼ in. wide x 1 in. minimum depth in the switches and mates and 1¼ in. wide x 1 in. minimum depth in the frogs. Clearance is provided for 3½-in. treads. All compromise joints between the 100-lb. rails and the 70-lb. rails and between the 70-lb. rails and the 60-lb. rails, which latter are used inside the carhouse, are to be made with Atlas compromise joints.

One of the accompanying drawings shows one-third of the special track work which is being provided for one end of the carhouse, including the double-track "Y" at the street intersection and the leads for the first eight of the twenty-four through carhouse tracks. The leads for the other sixteen tracks are divided into two groups of eight each with curves and special work similar to the eight tracks here shown.



Portion of Special Work at Carhouse

At a meeting of the special committee appointed to judge the feasibility of municipal control of the Winnipeg Electric Railway it was decided by vote to let the railway remain in the hands of the private corporation.

The Danbury & Bethel Street Railway, Danbury, Conn., has presented the motormen and conductors in its employ with service stars and stripes, graduated according to their respective years of employment with the company. The insignia consist of gold stars, silver stars and blue broadcloth stripes. One stripe is given each year up to five. After five years silver stars are given.

MEASURES FOR WELFARE OF EMPLOYEES*

BY DANIEL T. PIERCE, NEW YORK

Mutual benefit associations are common and of long standing among city and interurban railways. Thoroughly organized and scientifically planned relief, pension and insurance systems are rare. There are many instances where employers act in the capacity of insurance company besides making very substantial contributions toward the deficits of mutual benefit associations. Unorganized welfare measures in other directions are also found upon a considerable number of railways.

There are very few railways that have adopted as a policy welfare systems founded on or inspired by recognition of any obligation to provide, at the employer's expense, for the temporarily disabled or superannuated employee and to insure dependents against immediate want upon the death of the wage earner. This neglect is not peculiar to electric railways. Few industrial concerns, even those whose human scrapheaps are largest, have assumed any definite responsibility for the welfare of their workers. That this responsibility must be asumed is evident from European experience and the trend of legislation here. And if the American employer does not take the initiative in establishing sick relief, pensions and insurance for his employees, this burden is likely to be imposed upon him in some form very much less agreeable than measures of his own devising.

In this country the strongest indications we have of ultimate possibilities in this direction have come in the form of enlargement of employer's liability and in the, to us, new contention that even in those cases of disablement classed as "unavoidable" the burden should not fall entirely upon the person injured by accident or disabled by sickness. But the best way to escape compulsory insurance and pensions and the whole paternalistic policy now generally adopted in Europe is to make such a policy unnecessary. The German employer's enforced contributions to disability, accident and pension funds now amount to five and one-half per cent of his wage account.

MOTIVES AND RESULTS

It makes every difference in ultimate results whether welfare measures are undertaken from motives of pure expediency or because the employer really wants to improve conditions of employment. No welfare plan will prevent labor troubles or even lessen their occurrence if it impresses the beneficiaries as something by which the employer expects to avoid a wage increase. And if that or something like it is the employer's motive the employee will find it out in more ways than one.

Such return as is obtained by the employer from welfare measures comes in the less direct and more intangible forms—in attracting and holding a better class of men and in creating such a spirit of attachment to the employer's interest as manifests itself in loyal, conscientious service. These things have a dollars and cents value, but they must be incidental to another reward—the reward which comes with the discharge of the duty to do something more for the faithful, permanent employee than to pay him his wages while he is able to work. If this is enough to do for the shifting and shiftless employee, it is not enough, judged by the standard either of expediency or obligation, to do for the man who spends his life in railway or any other service.

Many will deny that there is any obligation to care for the disabled employee and to provide at his death for those dependent upon him. This denial, however, is, I believe, based less upon the merits of the case than upon the fancied impracticability of doing systematically for a large number of more or less remote and scattered workers what is done without rule or system for old employees of the class which comes in close contact with the employer and is known to him.

If there is any difference at all in the treatment accorded the two classes of men, those whose wage is smallest and who are not paid except for actual working hours should, but do not, receive the most consideration. Old Uncle John who sits at the president's door, or any long-service employee, is always "taken care of;" but old Uncle Billy, who has motored a car for fifteen years, perhaps after completing about as many years of horse-car driving, who knows or cares anything about him? Certainly not the executive officers of the company; they could not know much about the individual employee even if they wanted to, and this is the reason why we should do by rule for all deserving employees what is done for men who happen to be within the range of official notice.

DATA AND DETAILS

Coming down to details, such statistics and data as we have apply almost wholly to associations to the funds of which members contribute nominal dues. These figures show that the average death benefit paid by such associations on electric railways is $212, and the average sick benefit $6.50 a week. Eliminating from consideration what I have ventured to call the obligation of the employer, in regard to which there is, of course, room for wide difference of opinion, the objections to the mutual benefit associations are that they involve joint control with employees; require a large amount of administrative work, the collection of dues, etc.; that only about 50 per cent of employees take advantage of what such associations have to offer, which makes them only half as effective as a system supported by the employer and comprehending all employees. They also result in carrying large numbers of ex-employees on insurance rolls or in depriving such men of the benefits of their payments. The latter course is unfair and has been made illegal in many States.

It is contended, on the other hand, that employees most highly value something that they pay for, and that while the assumption of the entire cost of pensions and insurance by the employer will at first be greatly appreciated, it will finally be taken as a matter of course and a matter of right. The same thing may be said with equal truth of any plan, but in the one case the employees know that the employer is bearing all the expense, while if the employees pay any dues, however inadequate, they will feel that the benefits they receive are paid for by themselves and that no gratitude is owing to anyone. Furthermore, if the employer is assuming the cost of all the benefits offered by trades unions, and a pension in addition, this fact will retard, though it cannot be said that it will prevent, undesirable organization of employees.

If the mutual benefit association on old lines has any value from the employer's viewpoint, as a social center and as affording a harmless outlet for the tendency, found among all classes of men, toward some form of association, social activities and tendencies can best be encouraged independently of insurance, which is an intricate business proposition and one that should not be complicated with other things, however desirable in themselves.

SAFEGUARDS AGAINST FRAUD

The principles that should govern the payment of death benefits are the same as those I have outlined as applying to payments for disability. Such safeguards may be thrown about both that there is little chance of fraud or imposition. Sick benefits are not paid, as a rule, until the second week of disablement, and so, even if it were possible, it would not be profitable for the employee to lose a week's wages in order to draw $1 a day for the limited time after that. In the case of both sick and death benefits it is not customary to make employees eligible until they have completed at least a year's service.

Pensions in almost all cases are carried wholly at the expense of the employer, and are paid only under such re-

*Paper read before the American Electric Railway Association, at Atlantic City, N. J., Oct. 9-13, 1911.

strictions as will limit pensioners to men who have been in continuous employment for a period of, say, twenty-five years.

The fairest method of fixing the amount of pensions is on the basis of a percentage, determined by length of service, of the average wage for a period of years preceding retirement. There should, however, be a minimum of not less than $20 a month to protect the employee whose wage has been so small that on a percentage basis the pension would be inadequate.

The great preponderance of low-paid men in any industry can be depended upon to keep the average pension very close to the minimum stated. Payments figured on a basis of 1 per cent for each year's service of his average wage for ten years preceding retirement gives a man with an average wage of $1,000 and twenty-five years' service a pension of $250 a year, which is enough to keep a man from want. In such casual investigation as I have made of the life of pensioners, it appears that with an income of $20 a month or thereabouts they become welcome guests in families where as penniless dependents they would be an unwelcome burden.

That it is possible to institute within reasonable limits of cost a sick and death benefit and pension system—all wholly supported by the employer—has been demonstrated by at least one large public service corporation and by a number of industrial corporations. The former company's estimates call for an appropriation of $50,000 a year for this purpose, and its plan makes at least 8500 employees eligible for insurance and pensions. If, as indicated by these figures, $5.50 per employee per annum will defray the cost of insurance and pensions it is easy to estimate the cost of such a system on any railway.

It should be stated that this cost estimate is founded upon very brief experience, and that if, as is hoped, insurance and pensions hold men more permanently in the service, an increasing number would be eligible, and the expense would enlarge in the same proportion. If, however, electric railway service can be made more permanent—that is, if the present small proportion of long-service men can be increased—it will be worth more than the cost in insurance and pensions.

Employment on city railways is not considered very desirable by the class of men that the railways want. We have plenty of applicants, but they are not all that they might be as to quality. Except for a certain minority found on all railways, motormen and conductors seem to be willing to leave railway service for almost any other employment. Street railroading does not appear to be adopted in most cases as a permanent calling, but merely as a makeshift. Those features of the work—such as the hours, wages and friction with the public—that make platform work among the less desirable employments cannot be greatly changed, and as they do improve other employments offer increasing advantages, so that electric railway service retains its relatively undesirable position from the workingman's standpoint. In view of these facts, it appears to be all the more necessary to counterbalance the real or fancied disadvantages of the service by making provisions for insurance and pensions.

LOAN FUNDS

Aside from employees' club rooms, which are not a part of my subject, there is another way in which street railways can help their men and themselves. This is by the loaning of small sums of money—rarely more than $25—to employees whose misfortune or unusual requirements have got them into financial difficulties. Such loans should be made only in cases of real necessity, such as a birth, illness or death in the employee's family. Repayment in small instalments each pay day should be insisted upon. A loan fund of $1,200 has been found adequate on a system employing 7000 platform men. It is possible, owing to the constant repayments, to make each year loans aggregating many times $1,200, and to accommodate probably 250 applicants. With such a fund open to the deserving men, there is no reason whatever why any employee (except those whose difficulties need excite no sympathy) should patronize the loan shark. In large cities the loan shark is a nuisance and sometimes a serious evil. Experience has shown that a carefully administered loan fund very largely eliminates the loan man, is a great help to employees, and enables the employing company to put such financial aid as it is called upon to render employees on a business-like footing.

While the control of welfare work of all kinds must be in the hands of executive officials, it is very desirable on large systems that the detail work, the making of investigations and the immediate contact with employees should be in charge of a welfare secretary. One reason for this is that the manner and spirit in which welfare work is done has much to do with its success. Furthermore, a connecting link (other than subordinate officials whose tendencies are not over-sympathetic) between men and management is a valuable aid toward the establishment of a good understanding and a good feeling.

LAST SESSION OF THE CLAIM AGENTS

The closing session of the Claim Agents' Association was held Wednesday morning at the Hotel Traymore. The first order of business was a paper on "How Can the Public Be Educated in the Prevention of Accidents?" by B. F. Boynton, Portland Railway, Light & Power Company, Portland, Ore. In Mr. Boynton's absence this paper was read by R. E. King, general manager of the same company. The paper was discussed by F. W. Johnson Philadelphia Rapid Transit Company; R. H. Schoenen, Lehigh Valley Transit Company, and others.

Upon invitation of President Drown, Arthur W. Brady, president of the American Association, addressed the meeting, after which a vote of thanks was extended to him by those present. A rising vote of thanks was tendered to the retiring president, Mr. Drown, for the excellent results he had achieved during his administration in increasing the attendance and the general interest in the work of the association. A vote of thanks was also extended to B. B. Davis, secretary and treasurer, for his continued efforts in behalf of the association and to the Traymore Hotel management for its many courtesies.

The nominating committee reported the following choice of officers for the ensuing year: President, H. K. Bennett, Fitchburg & Leominster Street Railway; first vice-president, C. A. Avant, Birmingham Railway & Power Company; second vice-president, R. H. Schoenen, Lehigh Valley Transit Company; third vice-president, W. F. Weh, Cleveland Electric Railway; secretary-treasurer, B. B. Davis, Columbus Railway & Light Company. These gentlemen were elected.

During the proceedings E. C. Carpenter, formerly in the claim department of the Indiana Union Traction Company and an ex-president of the Claim Agents' Association, made an address to the members and thanked them for their courtesy in inviting him to the meeting. Mr. Carpenter is now general manager of the Pittsburgh & Butler Street Railway.

The new president appointed the following committees: Executive committee: James R. Pratt, Baltimore; R. E. MacDougall, Utica; George Carson, Seattle; William Tichenor, Indianapolis; committee on index bureau: H. V. Drown, Newark; C. G. Rice, Pittsburgh; F. J. Whitehead, Washington; M. P. Spillane, Boston; B. B. Davis, Columbus; committee on ways and means: T. B. Donnelly, Connellsville; Charles B. Brunner, Easton; C. B. Proctor, Memphis, L. V. Dixon, El Paso; committee on employment: C. J. McLeer, Schenectady; T. A. Cole, Los Angeles; M. S. Rausch, Milwaukee.

THE TOLEDO STREET RAILWAY SITUATION*

BY ALBION E. LANG, PRESIDENT TOLEDO RAILWAYS AND LIGHT COMPANY.

Much has been said in the newspapers from time to time about negotiations pending in the city of Toledo for the renewal of certain franchises under which the Toledo Railways & Light Company is operating, and from present appearances there will be much more to say before they are renewed, although there is ever present in the minds of the citizens, as well as in that of the company, the hope that a speedy settlement of the subject can be effected.

In the year 1885 three horse car systems were in operation, one being of standard gage, one of 3-ft. and the third of 3-ft. 6-in. gage, several miles of which were located on the sides of streets in the sidewalk bed.

About this date and in the three or four years following the city entered upon very extensive improvement of the streets by way of paving, thus imposing heavy expenses on the roads in reconstructing tracks and paying for pavements as required under their several ordinances.

During this period renewal ordinances had been easily obtained by each company running the statutory time of twenty-five years, and all roads had passed into a single ownership under the name of the Toledo Consolidated Street Railway Company. Subsequently the right to change the narrow to standard gage and extend tracks into new territory had been obtained, and work was actively going forward when electricity as a motive power made its appearance, and the right to change from horse to electric motive power was asked and readily granted by Council.

Added to the work of reconstructing tracks as above mentioned, a power house was built, new cars were purchased, and in the four or five years following very large expenditures were made necessary to meet these conditions.

One of the earliest electric roads, fully designed and operated as such, and backed by the Thomson-Houston Company, was constructed in our city in the year 1888, and extended from the heart of the city into the suburbs, a distance of about 2½ miles. It was built to demonstrate the practicability of operating surface cars by the new power, and notwithstanding that there was little if any natural traffic tributary to it, people from all parts of the city and from neighboring towns eagerly sought a ride over it, and for several months it did a rushing business. This road later became a part of the Consolidated system. From day to day during this period electricity as a motive power grew in popularity, and the promise of its great economy over the expense of operating by horses was so clearly demonstrated by engineers and sales agents that the tales of the "Arabian Nights" in the light of subsequent experience sounded very commonplace.

In 1889 the Toledo Electric Street Railway Company was incorporated and procured from the City Council the right to construct and operate a street railway in certain sections where transportation facilities were really needed, but there was no way for it to reach the heart of the business district except over the tracks of the horse car company. The laws of the State then, as now, permitted the joint use of tracks, 1 mile of old for every 8 miles of new track built, and in order to procure the necessary mileage, the horse car lines were paralleled, in many cases for long distances, in territory where traffic was insufficient properly to support one road.

This great promise of economy led the promoters of the electric road to offer reduced rates of fare—cash fare 5 cents, twenty-four tickets for $1, six for 25 cents, five for 15 cents, good between the hours of 6 and 7 in the morning and evening; 1 cent for children under eight years of age—1 per cent on gross earnings, and other unusual concessions, to the city, thus facilitating the passage of the coveted grant. At the time this grant was made the existing company charged a 5-cent cash fare and voluntarily sold and has since continued to sell eleven tickets for 50 cents, charging children under ten years of age 3 cents, and issuing transfers to all lines embraced in the Consolidated system.

The effort on the part of the electric company to gain entrance to the business district over the horse car tracks was stubbornly contested in court, and continued for two or three years at great expense to both companies, but finally ended triumphantly for the electric company.

The unscientific and haphazard way in which the roads had been laid out resulted in one line competing with another to the detriment of service on both, constant friction between employees, and imposing extraordinary costs of operation and rapid depreciation. It was not difficult to foresee an early termination of such a situation, and it came in 1896, when all the lines passed under a single ownership. Immediately thereafter application was made to Council to make a new grant with uniform terms and conditions, eliminating some of the parallel lines and double-tracking others, and offering not only an improved service but a lower rate of fare than the majority of our patrons were then paying, with transfers good between all lines in the city, coupled with other concessions more favorable to the city than had existed theretofore. This application was promptly refused. The mileage at this time was greater in proportion to population than in any American city, but had this excess mileage been properly placed population would have followed it, and the burden of the company not only lightened, but the city at large greatly benefited. The company was therefore forced to continue operation under these disadvantages to await the growth of population, in the meantime making no extensions of track into territory that needed transportation facilities and building only such double tracks as necessity required. Rates of fare are still collected in accordance with ordinance requirements, and until about three years ago, when the company voluntarily inaugurated a system of transfers between all lines upon the payment of a 5-cent cash fare, passengers were required to pay two fares to reach certain sections of the city.

Many of the grants overlap each other in the length of time they run on the same street, and out of a total of 68 miles of streets occupied by tracks the city is now claiming that on about 9 miles our rights expired in November, 1910.

Under a former management, in 1904, a second effort was made to effect some changes and improve the transportation facilities of the city, but the subject later became engulfed in politics and the application was refused. This is briefly the story of franchise negotiations since the advent of electricity as a motive power down to the year 1908. Since 1904 in every political campaign, although no claim was made that any grants had expired or would expire until 1910, candidates for office have declared that no street railway grant should be made except on a basis of 3-cent fares; hence during this period no new tracks have been built into new territory and no new construction carried on not absolutely required to conserve the business. The feeling has been so bitter, fostered largely by some of the newspapers of the city, that Council was afraid to, or at least would not, grant a right even for a switch or curve, no matter how important such right might be to facilitate the operation of cars, accommodate shipping interests or otherwise benefit the company and our patrons. This spirit of antagonism has put a stop to the construction of a large terminal station estimated to cost in excess of $250,000, and also curtailed the shipping interests of merchants and manufacturers using the several interurban roads to reach their customers in adjacent towns.

With the hope of removing the embargo, so to speak, the present management of the roads called on city officials in

*Abstract of paper read before the American Electric Railway Association, Atlantic City, N. J., Oct. 9-13, 1911.

the autumn of 1908, and said that 3-cent fares with transfers in Toledo are wholly impossible if there is to be any return on the capital invested, but we were met with the statement that nothing could be done until the Cleveland negotiations then pending had progressed to the point of proving that 3-cent fares were impracticable. Later an adjustment of street railway matters was made in Cleveland on the basis of a sliding scale of fares, with which all are familiar, following which, on March 28, 1910, we requested the Mayor and Council to take up the subject of renewing the franchises which by the terms of the original grants would soon expire, with a view of arriving at a settlement of all questions involved fair and equitable alike to the city and to the company, and in so doing offered to furnish the city with every facility for an examination of our street railway properties and books, showing the actual cost of carrying passengers, the capital required for future developments, and all such other facts and information as might be desired. In due time our invitation was accepted, and the city appointed a firm of Cleveland accountants to examine our books, every facility being furnished them to do so.

After the accountants had examined our books and reported their findings, the same accountants requested that we furnish them in great detail with an inventory of our property. This, of course, we declined to do. We said, however, that "if in the course of our negotiations with the city it should become necessary or desirable for the city of Toledo and this company to agree upon a method of reaching the valuation of our street railway property as part of a comprehensive solution of the franchise question, we shall be pleased to present to any board of engineers upon whose selection we can both agree all such data and information as may be required by such engineers in making such valuation." In reply to this offer the city declined to appoint an engineer, but instead asked for an inventory to be turned over to the accountants. We therefore employed a competent firm of engineers to make a complete inventory, and handed the same to the city on the first day of November, 1910. In December following the Mayor addressed to the company a communication outlining his views as to the modern theory of the relations between public service corporations and municipalities; reiterating a belief that he and his administration believed that a rate of fare fixed at 3 cents, with universal transfers, was possible under certain conditions; saying that if 3-cent fares were unjust then the people would not insist upon them; "that these several conditions therefore make it necessary finally to determine the true value of the property employed," etc., and suggesting "that the next step in these negotiations is logically the drafting of an ordinance recognizing these broad general principles and providing for their practical and specific application," etc. Replying to this letter, we asked the Mayor to cause to be drawn an ordinance based upon the principles he had enunciated in his letter, so as to put matters in a concrete form for public discussion (which he had requested), leaving blank spaces for the insertion of valuations of rates of fare. The preparation of the ordinance was committed to the city solicitor, and possibly through some misunderstanding was printed and distributed before being submitted to Council for its approval; but it was a wide departure from the lines and theories outlined in the Mayor's letter. The city solicitor's office had evidently procured copies of various ordinances under which roads were being operated in this country and Canada, and extracted from them all their most burdensome conditions and incorporated them into what was called a tentative ordinance as a proper basis for an easy solution of the franchise question. One reading of the ordinance was sufficient to convince any practical operating man that a fare of 10 cents to 15 cents would not produce enough revenue to meet daily operating expenses. Other communications on the subject were passed between the representatives of the city and the company, which finally resulted in an agreement to hold open negotiations in the Council chamber to discuss the whole subject and try to agree upon the usual conditions of an ordinance, leaving until the end the subject of valuations and fares. Several meetings were held and many provisions agreed upon, while others were rejected, until the subject of fixing a valuation was the next necessary step in our negotiations. We therefore suggested to the city the appointment of a competent board of appraisers, one by the city, one by the company, and the two so named to select the third competent disinterested man, and thus appraise the property. This was followed by the city appointing Professor Bemis as its appraiser, at the same time suggesting the United States judge in this judicial district as the third man. Believing that a proper person to appraise a property embracing so many elements is a man who by training and experience is qualified to deal with the subject, our negotiations with the city have, for the time being at least, come to a standstill.

Since negotiations have been interrupted all sorts of drastic measures have been proposed and discussed, among them being the imposition of a rental charge for the use of the streets where rights have expired as claimed (a procedure clearly not authorized by the laws of Ohio), ejectment from the streets, etc., and Council has figured out what it considers to be a proper rental charge, computed from November 10 last, at the rate of $250 per day, and the city solicitor has brought suit for its recovery.

In the meantime another political campaign has opened up, and the old bogie of standing pat for 3-cent fares is being used as a recommendation for election or re-election, as the case may be, and the subject that is as vital to the growth and development of the city as it is to the best interests of our company is still pressing for solution, as it has been for many years.

During all these negotiations there have been some good business men in the Council, men of decision and sound judgment, and had they asserted themselves with courage at the opportune time the hypocrisy or political cowardice of their associates could have been easily exposed, and the whole subject would have progressed along sensible business lines that would doubtless soon have brought order out of chaos. It must not be inferred from what I have said that some officials have not earnestly and seriously endeavored to bring about a settlement, but the public mind has been so poisoned by the abuse of capitalists and corporations in general for so long a time that many men, especially those holding public office, have become so intimidated that under no circumstances can they be betrayed into a defense of either. Toledo is no exception to the general rule in this respect, and the facts cannot be disguised.

I have many times said in public and private that the manufacturing interests of our city, as well as our real estate and banking interests, can in no way be as rapidly stimulated and improved as by a speedy and just settlement of the franchise question. We have a large body of very intelligent and energetic young business men, and they, as well as citizens generally, are beginning to discuss this phase of the matter, and when they become fully aroused there will be "something doing," as the boys say, and Toledo will be the gainer.

This represents the franchise situation in Toledo to-day, briefly stated; but, being naturally optimistic, I am hopeful that the subject will soon receive that careful and unbiased consideration its importance deserves, and that this will result in a settlement of our differences in a manner mutually advantageous to the city and to the company.

The Tool Steel Gear & Pinion Company reports that among several contracts awarded it last month the latest is from the United Railroads of San Francisco.

THE EFFECT OF ELECTRIC RAILWAY OPERATION ON TAXABLE CITY PROPERTY*

BY GENERAL GEORGE H. HARRIES, VICE-PRESIDENT WASHINGTON RAILWAY & ELECTRIC COMPANY

While there is an overflowing stream of popular sentiment as to the benefits accruing to electric railway companies by reason of an imaginary public generosity in the matter of street-occupying rights, there is nothing in legislative procedure, on the lecture platform, or in the press, with respect to the error of such belief, nor is there even local admission of the actual facts. In spite of the rapidly and tremendously increased number of stockholders whose experiences have been and are exceedingly painful, there still remains the aggressive, countrywide belief that electric railway enterprises must be enormously profitable and that their vast supposititious wealth is due wholly to the mistaken liberality of each charter-giving or charter-selling community.

During the horse-car era and through the days of cable operation the lines were comparatively short and were invariably on busy streets; a reasonable gross income being assured before the investors were called upon to worry over that discounting and sometimes disturbing power which we term "operating expenses." But the incoming of the overhead trolley wrought magically. Strides toward the suburbs became record-breaking leaps. The sociologist foresaw the solution of the slum problem and was encouraged. The municipal authorities had new cause for pride. The rapid-transit organizer was a superior sort of being. The stockholder was hailed as one deserving of confidence, praise and compensation. The public smiled amiably.

What have the years developed? The fulfilment of the farmers' golden dreams; the brokers' opulent visions transmuted into solid cash; the sociological theory a many-times accomplished fact; tremendous municipal growth of the most desirable sort with enormous increase in municipal income; and electric railway construction, equipment, service, indebtedness, deficits, receiverships and strife far beyond the initial thought of any of us who basked in the pleasing sunshine in that seemingly long-ago time when city transportation really began to be.

In this brief paper are set forth figures which should show conclusively where lie the benefits which have come to one city—the National Capital—as a result of individual courage and corporate effort.

Because of the difficulty of obtaining the assessors' figures as to values on specific streets prior to 1902 the comparisons generally are for the eight years following that date, although that method works materially to the disadvantage of the railway case. With respect to the preceding years it may be sufficient to say that all electric-railway operation other than in the heart of the city had been conducted at a net loss which so terrified local banks that when consolidation measures were planned the whole sum needed to make them effective had to be secured from outside interests.

BENEFITS FROM EXTENSIONS

Now as to the relative benefits: In 1902 a total of 406 acres stretched alongside an extension had an average assessed value of $348 per acre; brought up in eight years of operation from $40 per acre. In 1905 the average assessed value was $968 per acre. In 1908 it was $1,013, and in 1911 it was $2,370; an increase per acre in assessed value of 601 per cent, while the city's tax revenue from that property was, of course, correspondingly increased. On this same line was a famous old-time estate of 352 acres. This was sold in 1888 for $30,000; practically $85 an acre. To-day the least desirable of it is bringing 25 cents a square foot, while the better portions are 40 cents or more per square foot.

The railway and the railway only is responsible for the difference between $85 per acre and $18,000 per acre. It is a reasonable conclusion that within the past five years this line has added $8,000,000 to land values in its immediate vicinity. The railway that did the work piled up a deficit in excess of $200,000, and the deficit, decreasingly, continues.

An extension of less than a mile of conduit construction road brought into the real estate market 210 acres in the northwestern section of the city. In 1902 the average assessed value was $553 per acre. In 1905 it was $950. In 1908 it was $2,735 and in 1911 $5,701, an increase of 931 per cent. Since the completion of this extension the aggregate of property values jumped, in response to transportation facilities, to nearly $10,000,000. For the right to extend its lines one mile the railway company was assessed $25,000 by Congress. The construction cost was in excess of $100,000. The company has not yet wiped out the deficit which accrued during the years when it was engaged in making many fortunes for other people and in adding largely to the city's income.

One of the most interesting lines in the exhibit has had a hard time from its beginning. Originally a horse-car line—then electrically equipped, later the victim of a pneumatic exploitation and investment, then completely reconstructed for electric service—it has been the most persistently hammered proposition at which the Washington public ever threw brickbats. It is directly responsible for fully $8,000,000 of increased values and its books show with torturing exactness that it has piled up a deficit of $417,960.17.

Since 1900 one of our lines toward the western edge of the District has been doing a great deal of development work, increasing values considerably in excess of $3,000,000. The bank examiner would say that it is at this time $148,000 short in its accounts.

Other development lines are struggling bravely for the public welfare. One has succeeded in pushing land values from $100 an acre to $1,000 an acre throughout a stretch of territory three and one-half miles in length and two miles wide. This particular public benefactor is $27,484 in arrears, just now.

Other lines, whose owners mourned over deficits for years, but that are now beginning to see daylight, are conceded to have given to the collector of taxes his percentage on more than $13,000,000, but have never given to their stockholders one penny of dividends. The securities that we sold at par are even now to be purchased at an average discount of about seventy-five per cent.

A little more than twelve years ago what is now the Washington Railway & Electric Company's system consisted of eleven separate and distinct railway companies. One of the first moves made by the then holding company was to open up free reciprocal transfers between these independent companies. Discussing railway matters with the president of a local trust company and a great building association, who had many things critical to say of us, and whose conservatism is one of Washington's proverbs, he said that our transfer system—to the effects of which he had given much thought—had added $50,000,000 to property values in the District of Columbia.

How do the books balance? The authorities—never willing to concede overmuch to public utility corporations—are agreed that electric railway development in the District of Columbia during the period covered by this paper has added directly about $46,000,000 to land values (without considering the vast transfer benefits) and is responsible for a steady increase which in a large part of the territory now exceeds one hundred per cent annually.

The railways that did the work have accumulated a deficit of more than a million dollars with further deficits in prospect for two or three years to come.

Who is the debtor?

*Abstract of address made before American Electric Railway Association at Atlantic City, N. J., Oct. 9-13, 1911.

REPORT OF THE JOINT COMMITTEE ON ENGINEERING ACCOUNTING*

P. S. YOUNG, CO-CHAIRMAN; A. D. M'WHORTER, CO-CHAIRMAN; N. E. STUBBS, F. B. LASHER, C. E. THOMPSON, A. F. ELKINS, CHARLES HEWITT, H. H. ADAMS, E. O. ACKERMAN AND JOHN W. CORNING

Your committee during the past year has held two meetings and at the first meeting the following sub-committees were appointed:

Sub-committee on review of 1910 report: H. H. Adams, chairman; N. E. Stubbs, John W. Corning.

Sub-committee on what constitutes maintenance: Charles Hewitt, chairman; E. O. Ackerman, F. B. Lasher.

Sub-committee on inter-department charges: A. D. McWhorter, chairman; C. E. Thompson, A. F. Elkins.

SCIENTIFIC MANAGEMENT

So much has been heard in the last few months about "scientific management" and its relation to efficiency that your committee has thought that mention of this subject might bring about a discussion of the application of its principles to shop management and so prove of value.

F. W. Taylor, who may be termed the leader in this movement to develop the producing capacity of the industrial world, has formulated these four fundamental principles of "scientific management":

(*a*) The development of a science for each element of a man's work, replacing the old "rule of thumb" method.

(*b*) The scientific selection and training of each workman.

(*c*) The hearty co-operation of the management with the men in order that the work may be done strictly in accordance with the principles of the science which has been developed.

(*d*) An almost equal division of the work and the responsibility between the management and the workmen, where in the past the greater part of the responsibility was left by the management to be shouldered by the workmen.

It can be said at the outset that those advocating "scientific management" have been greatly hampered by the failure of both employee and employer thoroughly to understand these principles and the advantages to be obtained by both from their application. The laboring man on the one hand has been afraid that it was another scheme to get more work out of him without due compensation, and back of that has been the thought that there was just so much work to be done, and that if each man did more work a number of men would be thrown out of employment and wages would drop because of the anxiety of these men to get employment. The employer has wanted to be shown practical results. He has so often seen the downfall of attractive theories, presented by men of glib speech, when conditions were met not within the field of vision of the originator, that he has become somewhat skeptical. The laboring man's fears are unfounded. Restriction of output does him more harm than anyone else. The more wealth there is produced the greater becomes his share of it. Increased production means increased consumption. The world's appetite for commodities is insatiable; it is limited always by the commodities produced. The advocates of "scientific management" say that by the selection of the men most fit for each particular job and by the development of these men to the highest state of efficiency in their work the earning power of these men is increased, and such men as fail to meet the tests are not injured, for experience has shown that by finding other work for which they were better fitted their condition has been improved.

The practical man who is an employer must admit that the "scientific management" advocates have proved their case when they point to the industries where the science has been applied for a long time, and to the instances of efficiency found therein.

"Scientific management" recognizes the importance of initiative in the workman and encourages it in every possible way, but it goes farther than any of the so-called initiative and incentive plans whose purpose is increased efficiency by supplementing the individual effort of the workmen by the application of the principles recited above. The system of pay involved is subordinate to many of the other elements. The workman is not allowed to be spurred on by hope of reward without proper guidance, but each task is scientifically studied and both speed and workmanship are carefully considered throughout each step of the operation. A change in the relation between the employer and the employee is gradually brought about. The management comes to be looked upon as the guide, counselor and friend of the employee and a complete change in the mental attitude of both toward their common work through this co-operation is made possible.

Before an attempt is made to apply these principles, careful study of all the conditions should be made. Without full knowledge of the probable effect of these principles when applied to any particular problem, success is impossible.

The committee believes that the accountant and the engineer can meet on common ground in studying this great question of efficiency, and it also believes that a realization of the possibilities of improvement in our industry through a study of what has been accomplished in other industries will be stimulating and instructive. It has, therefore, added to this report a bibliography of the subject.

REPORT OF SUB-COMMITTEE ON REVIEW OF 1910 REPORT

The sub-committee, in reviewing the report submitted to the joint session of the Accountants' and Engineering Associations at the 1910 convention, found from the discussion that there seemed to be a lack of knowledge as to the flexibility of the subdivisions of the accounts suggested, and also as to the possibilities of further subdivisions of the sub-accounts of the 1910 report.

In order to throw further light upon the subdivision of accounts as suggested, your sub-committee has considered it advisable to elaborate the subdivision, and there is submitted a statement which follows, giving an outline of a further subdivision of some of the items contained in the 1910 report; these further subdivisions are submitted only as illustrations of the flexibility of a subdivision of this character.

The sub-committee fully appreciates that under certain conditions, particularly on the smaller properties, the subdivisions, as submitted in last year's report, are too extensive to be put into practice; also that the suggestions of a further subdivision are such as may only be used upon some of the larger properties; but subdivisions may be so arranged as to meet the requirements of the small or the large properties.

In the statement the sub-committee has revised where necessary the numbering of the sub-accounts, as in certain cases in the 1910 report the numbering was in error.

The sub-committee, in considering the discussion of last year's report, not only covered the discussion at the Atlantic City convention, but has also considered the discussion which took place at the convention of the Street Railway Association of the State of New York, held on Dec. 7, 1910.

In the discussion at the Atlantic City convention a letter from James D. Andrew, superintendent of power stations, Boston Elevated Railway, was read, in which it was suggested that sub-account 3001 cover maintenance of prime movers, and that pumps be put in sub-account 3004. Your sub-committee has given this question careful consideration, and after consulting various authorities, finds that it is the usual practice to consider pumps as auxiliaries, and it therefore has to suggest that the item of pumps be placed with the items of auxiliaries in sub-account 3004.

Under the sub-accounts covering the maintenance of rolling stock, the committee has made further subdivisions and

*Abstract of report read before the American Electric Railway Accountants' and Engineering Associations, Atlantic City, N. J., Oct. 9-13, 1911.

added two items which were not subdivided last year; that is, the items of heaters and repairs due to accidents.

The sub-committee has also considered the question of scrap credits for the various months of the fiscal year.

In the 1910 report there was included a method of handling scrap and accounting for same on a monthly basis. This part of the report your sub-committee considers an excellent method where the scrap is sold and accounted for monthly.

In the discussion of this portion of the 1910 report the question of allowing scrap to accumulate for favorable prices and the disposal of the same at other than monthly intervals was brought out, and your sub-committee considered it advisable to deal with this question, together with the accounting features, particularly the question of allowing credits for scrap as accumulated monthly. The following method is suggested:

Any scrap that is accumulated should be turned into the storeroom, when the storeroom or scrap account (if an account of this character is kept) is charged, and the proper operating or construction account, work order or job order is credited with the estimated value of the scrap. Forms Nos. 1, 2 and 3, in triplicate, as recommended in the 1910 reports for scrap material returned, are recommended for use in connection with the turning in of the scrap, upon which the account to be credited should be noted.

A monthly summary is made of these accounts, which shows the total charge to storeroom or scrap account, and the accounts or order numbers to be credited.

As the scrap is sold, credit is taken to the storeroom or scrap account, in which there will of course be some difference, as the amount actually received will be different from the estimated values when turned into the scrap account.

If a scrap account is carried, it may be carried as an open account, and adjustments made by raising or lowering the prices of scrap when turned in. If it is desired to balance the scrap account, this may be done at the end of each fiscal year.

The forms submitted for the handling and accounting for scrap in the 1910 report are recommended for use in connection with the scrap handling and accounting.

ACCOUNTS IN THE RECOMMENDED SUBDIVISION OF OPERATING MAINTENANCE EXPENSE ACCOUNTS, IN WHICH AMENDMENTS ARE SUGGESTED

1910 REPORT.	1911 SUGGESTIONS.
ACCOUNT NO. 30—MAINTENANCE OF POWER PLANT EQUIPMENT:	
3001 Maintenance of engines, turbines and pumps	3001-A Maintenance of engines. 3001-B Maintenance of turbines.
3002 Maintenance of boilers, including furnaces, stokers and settings.	3002-A Maintenance of furnaces, including grates and grate supports. 3002-B Maintenance of stokers. 3002-C Maintenance of boiler settings. 3002-D Miscellaneous boiler repairs.
3004 Maintenance of auxiliaries, including economizers, condensers cooling towers, ash and coal elevators, other elevators, etc.	3004-A Maintenance of pumps. 3004-B Maintenance of economizers. 3004-C Maintenance of condensers. 3004-D Maintenance of heaters. 3004-E Maintenance of ash and coal machinery. 3004-F Maintenance of coal towers. 3004-G Miscellaneous auxiliary repairs.
3005 Maintenance of electric plant.	3005-A Maintenance of d. c. generators. 3005-B Maintenance of a. c. generators and compensators. 3005-C Maintenance of exciters. 3005-D Maintenance of rotary converters. 3005-E Maintenance of transformers and cooling systems. 3005-F Maintenance of switchboards, including busbars, oil switches and instruments. 3005-G Maintenance of storage batteries and charging outfits. 3005-H Wiring. 3005-I Miscellaneous electrical items.
3006 Miscellaneous, including such items as steam gages, steam and water meters, feed water controllers, damper regulators and similar devices.	3006-A Cranes, hoists, etc. 3006-B Miscellaneous steam instruments, etc.
ACCOUNT NO. 31—MAINTENANCE OF SUBSTATION EQUIPMENT:	
3101 Maintenance of electric plant.	3101-A Maintenance of rotary converters. 3101-B Maintenance of transformers and cooling systems. 3101-C Maintenance of switchboard, including busbars, oil switches and instruments. 3101-D Maintenance of storage batteries, including charging outfits. 3101-E Wiring. 3101-F Miscellaneous electrical items.
3102 Miscellaneous substation maintenance.	3102-A Cranes and hoists. 3102-B Air compressors, vacuum cleaners and other non-electrical devices.
ACCOUNT NO. 32—PASSENGER AND COMBINATION CARS:	
(Elevated, Subway and Interurban Cars—weighing over 28 tons without load):	
3204 Truck repairs, including brake rigging.	3204-A Truck repairs, including brake rigging, type X. 3204-B Truck repairs, including brake rigging, type Y.
3207 Air brake equipment.	3207-A Air compressor, including motor. 3207-B Air piping, reservoirs, etc. 3207-C Governors. 3207-D Engineers', triple, electro-pneumatic, emergency valves, etc.
(Prepayment and Semi-Convertible Cars):	3208 Heaters. 3209 Repairs due to accidents.
3217 Air brake equipment.	3217-A Air compressors, including motors. 3217-B Air piping, reservoirs, etc. 3217-C Governors. 3217-D Engineers', triple, electro-pneumatic and emergency valves, etc.
	3218 Heaters. 3219 Repairs due to accidents.
(Closed Cars—Double Truck—other than those classified above):	
3227 Air brake equipment.	3227-A Air compressors, including motors. 3227-B Air piping, reservoirs, etc. 3227-C Governors. 3227-D Engineers', triple, electro-pneumatic and emergency valves, etc.
	3228 Heaters. 3229 Repairs due to accidents.
(Closed Cars—Single Truck):	3238 Heaters. 3239 Repairs due to accidents.
(Open Cars—Double Truck):	
3247 Air brake equipment.	3247-A Air compressors, including motors. 3247-B Air piping, reservoirs, etc. 3247-C Governors. 3247-D Engineers', triple, electro-pneumatic and emergency valves, etc.
	3248 3249 Repairs due to accidents
(Open Cars—Single Truck):	3258 3259 Repairs due to accidents.
MISCELLANEOUS:	
3261 Fenders: All types, passenger and combination cars.	3261-A Projecting fenders. 3261-B Wheel guards.
3262 Signs: All types, passenger and combination cars.	3262-A Car signs, Type X. 3262-B Car signs, Type Y.
3611 Motors.	3611-A Repairs to Motors, Type X. 3611-B Repairs to Motors, Type Y. 3611-C Repairs to Motors, Type Z.

REPORT OF SUB-COMMITTEE ON "WHAT CONSTITUTES MAINTENANCE"

In order to ascertain what action, if any, has been taken with regard to this subject by the various public service commissions, a circular letter was sent to all such bodies and replies were received from twenty-nine. Twenty-two of these have made no ruling on the subject and have not made any attempt to define in any way what constitutes maintenance, other than the fact that they have adopted the general schedule of accounts promulgated by the Interstate Commerce Commission. Seven, however, have attempted to frame a definition in one form or other, and it would appear from a study of these rulings that in most cases "maintenance"

is a comprehensive term including everything that is chargeable to repairs or upkeep, and also including renewals or replacements, whether in part or in toto. One of the commissions requires that renewals when made in toto shall be charged against a "depreciation reserve," created by charges for "depreciation" under the head of "maintenance" in "operating expenses." Some stipulate that renewals when in excess of the value of the thing renewed shall be charged to capital account so far as the excess value is concerned. The Board of Supervising Engineers, Chicago Traction, has attempted to draw a complete distinction between repairs and renewals by adopting a unit for every part of the equipment or plant, so that when a unit is replaced it is charged to a renewal reserve fund accumulated in accordance with the provisions of the traction ordinances under which the companies are operating. These ordinances define "renewals" as "the replacement of any principal part of said street railways or their equipment or appurtenances." When less than a unit is required it is treated as a repair and is included under maintenance.

In the definitions adopted by the Public Service Commission of New York, Second District, the term "renewals" is used in connection with extension of the period of interest in property, as follows: "Renewals include all extensions of terms of years in land and tangible fixed capital and all extensions of the life period of franchises and other intangible fixed capital." The term "replacements" is defined in the following words: "Replacements include all substitutions for capital exhausted or become inadequate in service, the substitutes having substantially no greater capacity than the things for which they were substituted. When a substitute has a substantially greater capacity than that for which it is substituted the cost of substitution of one of the same capacity as the thing replaced should be charged as a replacement and the remaining portion of the cost of the actual substitute should be charged as a betterment." This distinction has no doubt proved useful to companies working under the system of accounts promulgated by that body.

The Public Service Commission of New York, Second District, defines "repairs" as follows: "When through wear and tear or through casualty it becomes necessary to replace some part of any structure, facility or unit of equipment and the extent of such replacement does not amount to a substantial change of identity in such structure, facility or unit of equipment, the replacement of such part is to be considered a repair and the cost of such repair is to be treated as an operating expense and must not be charged as a replacement in any capital account."

The Railroad Commission of Wisconsin rules that "maintenance" should be understood to mean "upkeep" and should cover all expenditures for current or ordinary repairs, renewals or replacements of property resulting through wear and tear, or through those casualties which are incidental to the nature of the operation, such expenditures being necessary to keep up the capacity of the railway to its original or equivalent state of efficiency. When, however, a complete replacement of any building or structure, facility or unit of equipment is made necessary, regardless of such current expenditures, the uncurrent or extraordinary repairs, renewals or replacements made necessary will be charged to "depreciation reserve" accumulated for that purpose.

The Corporation Commission of Oklahoma has never given rulings in special cases. From an accounting standpoint it has ruled generally that "maintenance" constitutes money actually expended for repairs and entire renewals of plant units. It defines "repairs" as follows: "When through wear and tear or through casualty it becomes necessary to replace some part of any structure, facility or unit of equipment and the extent of such replacement does not amount to a substantial change of identity in such structure, facility or unit of equipment, the replacement of such part is to be considered a repair." The commission defines "renewals" as follows: "Renewals include substitutions for any entire structure, facility or unit of equipment provided the substitution does not include the enlargement or improvement of existing structures, facilities or unit of equipment."

The system of accounts of the Public Service Commission of New York, First District, provides that when through wear and tear, or through casualty, it becomes necessary to replace some part of any structure, facility or unit of equipment, and the extent of such replacement does not amount to a substantial change of identity in such structure, facility or unit of equipment, the replacement of such part is to be considered as a repair and the cost of such repair is to be treated as an operating expense and must not be charged as a replacement in any capital account. This is modified to some extent in the definition of "depreciation," which contains this clause: "Where capital is substantially continuous such as tracks and cannot be satisfactorily individualized, the capital shall be kept in efficient operating condition through repair and the renewals and replacements of parts thereof shall be considered repairs." Maintenance includes not only repairs but also charges for depreciation which must be sufficient to provide a reserve by the time capital is retired equal to the original cost thereof less salvage.

In conclusion, your sub-committee is of the opinion that a definition of maintenance that does not include replacements in a system of accounts is incomplete unless the system provides for charging replacements to a "depreciation reserve" account created by charges to depreciation under operating expenses, in which case the term should include such depreciation; and that when the cost of a replacement by reason of increased capacity exceeds the original cost of the thing for which it is substituted that part of the cost in excess of such original cost should not be included in maintenance.

REPORT OF SUB-COMMITTEE ON INTER-DEPARTMENT CHARGES

The sub-committee on inter-department charges reports progress but feels that the subject is so large that it is desirable to defer the report for a year so that fuller information can be obtained.

The reports of the sub-committees have been considered by your committee as a whole and are presented with its approval.

VALIDITY OF ORDINANCE GRANTING FRANCHISE SUSTAINED

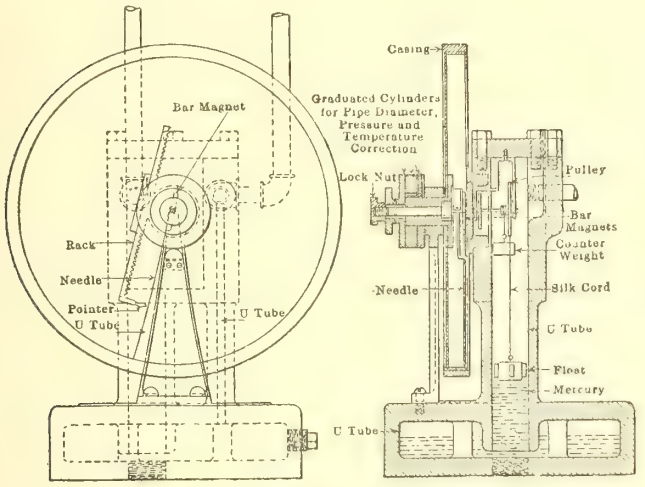
On September 26, 1911, the Supreme Court of the State of Oklahoma, handed down a decision, upholding in every particular the franchise of the Oklahoma Railway, which gives this company an indeterminate blanket franchise over all streets and alleys in Oklahoma City.

This company was granted a franchise in 1905 on certain streets of Oklahoma City. In 1909 the City Council adopted an ordinance extending this franchise over the entire city, which was ratified by a vote of the qualified electors of the city at an election called under the new initiative and referendum law of Oklahoma. The company began construction in one of the principal streets of the city. The validity of the franchise was questioned by the other railway companies in the name of abutting property owners. Claims were made to the court, among many others, that there was no authority of law warranting the enlargement of a franchise, and that, as the constitution of Oklahoma provided that no franchise should be granted, extended or renewed for a longer term than twenty-five years, and that as the franchise in question was practically a perpetual franchise, an ordinance amending this franchise extending it over all of the streets of the city was void. The decision of the Supreme Court completely sustains the validity of the ordinance of 1909 giving the Oklahoma Railway an indeterminate, blanket franchise over all of the streets of Oklahoma City.

REPORT OF THE COMMITTEE ON POWER GENERATION*

L. P. CRECELIUS, CHAIRMAN; H. G. STOTT, VICE-CHAIRMAN; R. A. DYER, W. E. EOLSTON, WILLIAM VON PHUL, B. F. WOOD, A. R. MYERS, C. L. GATES, A. WOLFF

During a meeting of this committee held March 21 at New York City, the subjects assigned were thoroughly discussed and the membership was divided into sub-committees of one. The following papers constitute the report of your committee, and it is suggested that the subjects which it was not possible to include in this report be referred to the 1912 committee.



Power Generation—Section and Elevation Indicating Steam Flow Meter

DEVELOPMENTS IN THE GENERATION OF STEAM—1910-1911

BY H. G. STOTT

During the past year several important steps have been taken in the development of new measuring instruments for use in the boiler room, and more complete recognition has been given the fact that the boiler and furnace of the future must be able to conform more closely to the load curve than in the past.

Heretofore in following the load curve the only thing to be carefully considered was the exact time when the reserve or banked boilers should be cut in or taken off: a boiler was looked upon as a practically inflexible unit which could be added or subtracted as the load curve might demand. Numerous causes existed (and still exist) to account for this condition of the art, but one of the principal causes was the lack of measuring instruments by means of which we could easily and quickly ascertain what a boiler was doing, without waiting for the result of a ten-hour test. While the standard method of boiler testing gives an accurate average result, it does not give any idea of what the boiler is doing for short intervals of time.

Two distinct types of indicating apparatus are now available, first, the Venturi meter, which is preferably used to measure the water fed to the individual boiler. This meter can be graduated to indicate either in pounds of water or in horse power on a vertical mercury column, or on a dial. Results may be obtained from this type of meter probably correct to within 3 or 4 per cent.

The most serious objection to this method of measurement is that the readings are subject to the control of the water tender or fireman, as each time he changes the rate of flow in order to keep the water in the gage at the proper level the indication on the Venturi meter changes simultaneously without any corresponding immediate change in the flow of steam from the boiler.

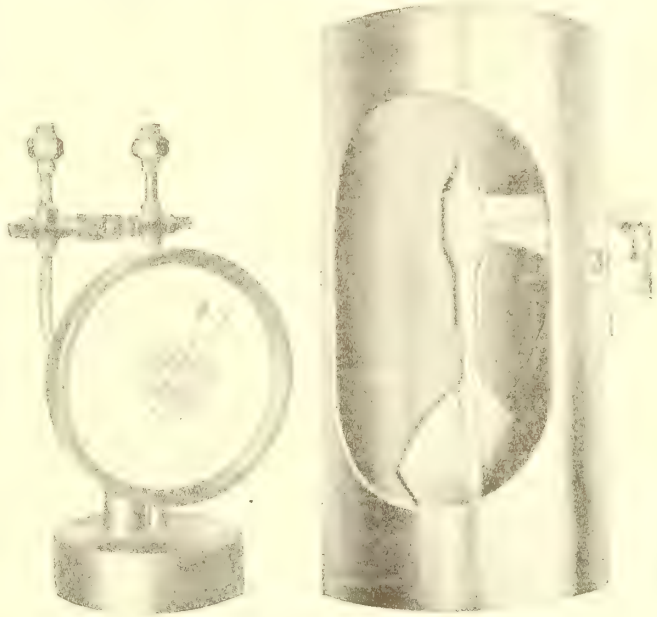
The second method is the use of a steam flow meter of the Pitot tube type, as shown in the illustrations.

This Pitot tube is inserted in the steam pipe connecting the boiler with the steam main or header and is connected to the indicating dial instrument by two ¼-inch steel pipes. The indicating dial may be placed at any convenient point where its readings can be seen by the fireman or water tender. The accuracy of this instrument is probably about the same as that of the Venturi meter and applies closely enough for the purpose of general indication of the relative amount of work being done by different boilers.

A record of one-minute indications of this instrument, together with a record of the actual hourly weights of water evaporated, is shown by the accompanying chart. The instrument is so sensitive that after opening the side door of the furnace it will indicate a drop of about 50 hp within ten seconds. The results which may be obtained by means of such an instrument are evidently of the utmost importance, but extensive experience with it is lacking, as the instrument has just been placed on the market.

A third measuring instrument of almost equal importance, but for measuring the amount of coal fed to each boiler, has also been developed, and is illustrated. It consists essentially of a propeller of large pitch capable of being slipped inside a downtake coal pipe so that the coal in flowing down from the overhead bunkers or conveyor turns the propeller blades and by suitable integrating mechanism indicates on a dial the coal used in any particular period Indications are that the results obtained are sufficiently accurate for comparative purposes.

In the furnace the principal development seems to be in the intelligent use of forced draft in order to obtain high rates of combustion when required. In most railway plants the ratio of one hour peak to average 24-hour load is approximately two to one, and the ratio of minimum hourly load to average 24-hour load about four or five to one, or a ratio of eight or ten to one from maximum hour to minimum hour. To meet this enormous variation of load in an economical manner, taking into consideration not only operating and maintenance charges, but also fixed charges, the best solution seems to be to design the boiler room equipment for maximum operating economy at the average load of the plant, and be prepared to sacrifice some slight loss in efficiency at the higher and lower loads. Several methods of doing this are available, the most obvious one being to install two stokers, or grates, under each boiler, so that one may be banked during the lighter loads. This



Power Generation—Steam Meter and Coal Meter

*Abstract of report read before the American Electric Railway Engineering Association, at Atlantic City, N. J., Oct. 9-13, 1911.

will give a range of steaming of almost two to one as required by the load curve. A second method, which has some very attractive features, but is as yet incompletely developed, is the use of oil in burners protected by the bridge wall from the grate or stoker on which coal is being burned. There seems to be every reason to hope that this will prove a very effective and efficient method of increasing the output of boilers during peak loads, provided that the oil can be obtained at $1 or less per barrel, and that proper facilities for its storage can be obtained.

A third method is in the use of some form of grate or stoker which can be economically operated with natural draft up to, say, 150 per cent of rating, with best economy at 100 per cent rating. With peak loads the natural draft can be shut off and forced draft put on, thus forcing the boiler to at least 225 per cent rating with very good economy.

THE BEST STANDARD VOLTAGE AND FREQUENCY TO BE ADOPTED FOR THREE-PHASE TURBO-ALTERNATORS, WITH REFERENCE TO SIZE AS RELATED TO VOLTAGE.—BY L. P. CRECELIUS

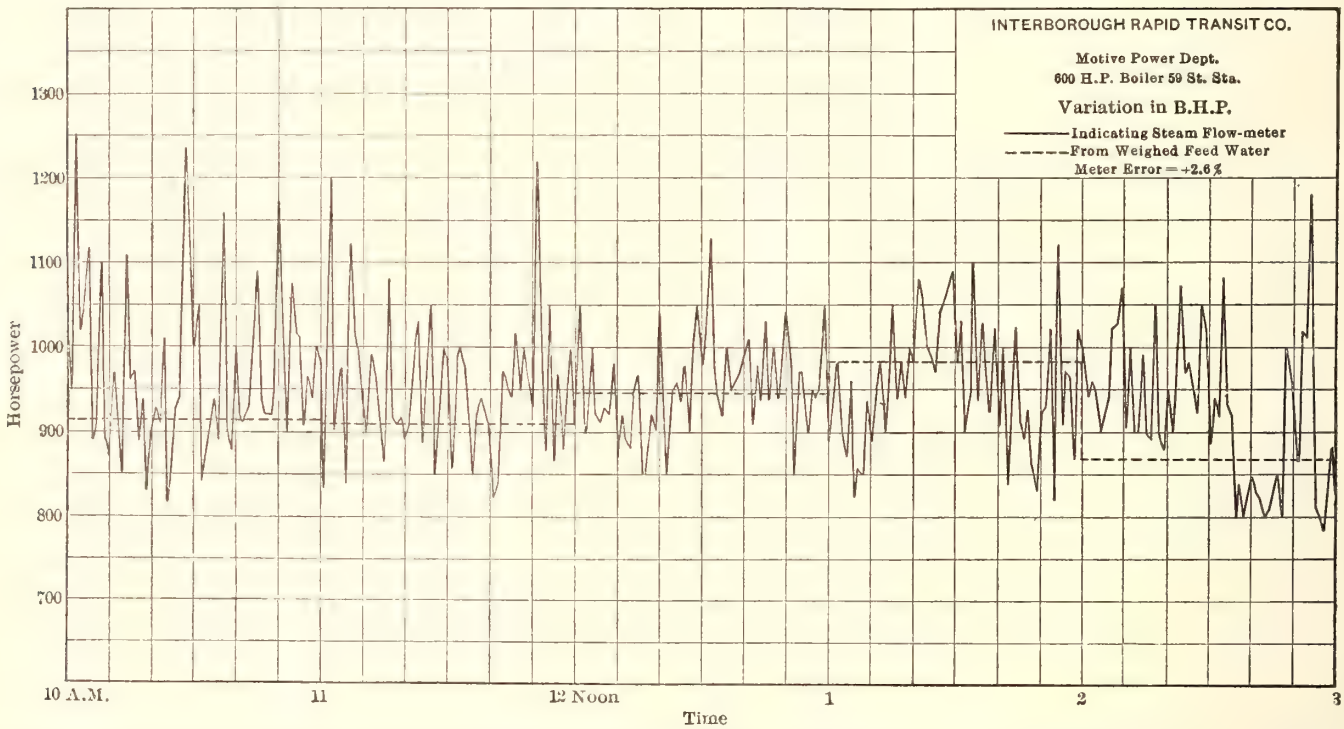
The present tendency toward increasing the speeds of turbines for the dual purpose of better steam economy and lower cost requires of a relatively small amount of iron and copper a large kilowatt capacity, because the high speed demands a reduction in diameter of the elementary revolving parts. Therefore, in large generators designers find it difficult to provide the necessary space for high voltage insulation, and this situation becomes more and more acute with the increased capacities now demanded by some operators, and has brought up the suggestion from builders to limit the voltage of large generators at 6600 volts and lower, and to use voltage-raising transformers.

The first step in analyzing this question is to determine the most economical and satisfactory transmission voltage for general utility on power consuming systems which are so situated as to require the power plant to be located within 50,000 ft. of the substations. Included in this class are those systems supplying centers of population of 200,000 or over in which it is not only desirable but advantageous to generate directly at a potential in the generators corresponding to the transmission voltage. In the systems included the average length of transmission cables is less than 30,000 ft., and none averages more than 50,000 ft. in length, although in a few cases a small amount of power is transmitted over greater distances. Accordingly, the following tables have been prepared to determine the most satisfactory standard transmission voltage. In arriving at the relative costs included below the cost of three conductor, paper insulated cables has been used, based on five per cent I^2R loss, unity power factor, and 30 deg. C. rise in temperature, corrected to comprise the nearest commercial size, and due allowance has been made for spare cables and conduits. For comparison the usual and standard generator voltages have been used.

Distance power plant to substation, in ft.	Transmission voltage	Relative cost of trans. system incl. cables and conduits
20,000	6,600	126%
20,000	9,000	105%
20,000	11,000	100%
20,000	13,200	103%
30,000	6,600	142%
30,000	9,000	110%
30,000	11,000	102%
30,000	13,200	100%
40,000	6,600	161%
40,000	9,000	117%
40,000	11,000	103%
40,000	13,200	100%
50,000	6,600	186%
50,000	9,000	135%
50,000	11,000	104%
50,000	13,200	100%

These figures indicate that 11,000 volts is the most satisfactory standard transmission voltage for most systems requiring large steam turbo-alternators. The small gain in cost noted in favor of 13,200 volts does not seem to be enough to justify its use solely from the standpoint of economy or cost of the transmission system.

Having thus established the proper transmission voltage, it now becomes necessary to determine the voltage of the generators, and considerations of simplicity and economy demand that the voltage of the generators be the same if possible. To eliminate the destruction from short circuits, the resulting current of which reaches enormous values in



Power Generation—Curves of Minute Readings Showing Variation in Boiler Horse-Power Obtained with Steam Flow Meter

large generators, and to improve the stability of the system as a whole, operators are now seriously considering the introduction of some form of impedance or reactance to be placed between the generators and the distributing cables. It has been proposed that this protection should be secured by voltage compensators designed to include the necessary reactance, and it is true that within reasonable limits this is possible; also that the generator windings consequently would not be subjected to potential stresses caused by line disturbances. However, it is obvious that no protection is offered in case of internal trouble in the transformer. On the whole it does not seem proper or desirable to add voltage-changing transformers for the purpose of introducing more reactance to the circuit.

The proper protection can be best secured by connecting the necessary current-limiting reactances, mounted on non-magnetic cores, between the generator and bus, and this reactance should have a value of approximately 6 per cent.

As all turbines are essentially high-speed machines, it is to be expected that the cost goes up and the efficiency down with a reduction of rotative speed. The commercial consideration of cost has a decided influence on limiting the voltage of large turbo-alternators directly coupled to the turbine, while the engineering features involved in considerations of design as affecting the efficiency of the steam end at speeds required for 25-cycle work determine the limits between which the development of large directly coupled turbo-generators at 11,000 volts must stop.

In reference to frequency, for purely railway work the 25-cycle rotary converter is decidedly preferable and outweighs every other consideration. In fact, large lighting and power companies have found a frequency of 25-cycles most advantageous, and, therefore, consideration of the specific advantage resulting from the use of a higher or lower frequency is entirely immaterial.

The use of a three-phase, star-connected, 11,000-volt, 25-cycle generating system with grounded neutral seems particularly advantageous for conditions existing in the average American city of over 200,000 inhabitants where the power supply is generated by means of steam turbines, and it is a debatable question whether this does not constitute one of the principal limitations to large turbo-generators.

D. C. TURBO-GENERATORS LARGER THAN 500 KW CAPACITY

BY R. A. DYER

Information on this subject was requested of the various electric companies, and the reply of the Westinghouse Electric & Manufacturing Company covers the situation in respect to d. c. turbo-generators larger than 500 kw very thoroughly. In part it is as follows:

"In reference to direct-connected units, this company has constructed a number of 500-kw, 1500-r. p. m. units. We have not built any 600-volt railway sets of greater capacity, nor have we ever entertained any serious requests for bids on them. From information, however, taken from the technical press, we would state that units up to 750 or 800 kw at a voltage of 250 and up to 1500 kw at 600 volts have been built by several different European electrical concerns. The average speeds of such size units are in the neighborhood of 1500 and 1200 r. p. m. respectively. The fact that such machines are built, and are running, disposes once for all of the question of the possibility of these sizes of units. On the other hand, the small number of such size machines in operation, and the experience of the manufacturers in this country, seem to indicate that the demand for such machines is not great. This, again, would indicate that there is no particular improvement over slow-speed apparatus in one or more of the essential features, that is, price, floor space, economy and maintenance. In order to show some of the difficulty in the way of building large-size d. c. units we submit the following:

"(1) It is essential to-day that carbon brushes be used on all classes of d. c. machines. No operating engineer would consider the use of metallic brushes on a d. c. turbo-generator, because metallic brushes would require a great deal of attention and adjustment, and would cause excessive wear not only to the brushes but also to the commutator.

"(2) Experience has shown that the limiting speed for carbon brushes is in the neighborhood of 6000 to 7000 ft. per minute. This at once fixes the outside diameter of the commutator for a generator for any given running speed.

"(3) The radiating surface of any commutator fixes the current-carrying capacity. With the best grade of carbon brushes and a peripheral speed of 6000 to 7000 ft. a minute it is known that about 1¼ amp per sq. in. of surface of the commutator is about the safe upper limit of design. To show briefly how this works out, let us consider the case of a 750-kw, 250-volt machine at about 1500 r. p. m. with 6000 ft. per minute peripheral speed. The periphery of the commutator would be 4 ft. At 1¼ amp per sq. in. of surface, we could handle 60 amp total per inch of length of commutator, and for 3000 amp the capacity of the machine would require two commutators each 25 in. in length on its working face, or from 30 in. to 35 in. in over-all dimensions; that is, the distance taken up along the shaft for the commutators alone would be 6 ft. approximately. By the time we have added the armature core and its connections a distance of 10 ft. 6 in. or 11 ft. would be necessary from center line to center line of the bearings. The commutator diameter, at the above circumference, would be approximately 15 in., and it is evident that the shaft could not be made more than 10½ to 11 in. in diameter. With the center distance fixed, this size of shaft would be probably too weak for safe operation and it would undoubtedly be necessary to increase the commutator speed to 7000 ft. per minute.

"The above shows that we are very near our limiting features in every particular in order to obtain a speed of 1500 r. p. m. for a 750-kw d. c. turbo at 250 volts. If we consider the steam end, however, we find that a speed of 1500 r. p. m. is not high enough to give the most desirable working point, when considered from the standpoint of steam economy. Such a unit is, therefore, a compromise on both ends of the set. The speed is higher than is desired for the generator, giving increased friction and windage losses and reducing the efficiency somewhat, and also increasing the cost. On the other hand, a cheaper and more efficient steam end could be built if operated at a higher speed. There is no doubt that d. c. turbos of larger capacity than 500 kw can be built. How much larger capacity depends upon the voltage at which they are to be built. Three thousand amperes is in general about as high current as it has been attempted to handle.

"A consideration of matters like the above, however, has led us to develop a geared set, and we have under contract a considerable number of d. c. turbo units involving the use of reduction gears of the Melville-Macalpine type, and while the only geared d. c. unit which we have in operation at present is a 500-kw, 250-volt set, which has been in operation in the works of the Commonwealth Steel Company, at St. Louis, Mo., since March 31, and which to date has been working very satisfactorily, we have a number of orders for such sets of 250 and 600 volt and 500 and 1000 kw capacity which will be in use within the next two months. The use of this gear renders possible a lower speed for the generator and higher speed for the turbine, both features tending to reduce the cost and improve the efficiency of the units composing the set."

Inquiry of the manufacturers of the reduction gear referred to above has developed the interesting information that the efficiency of the gear on test "shows better than 98.5 per cent" and that the cost of a unit, comprising turbine, reduction gear and generator, will be approximately the same as for a good Corliss engine and direct-connected d. c. generator.

THE PURCHASE OF BITUMINOUS COAL UNDER B. T. U. SPECIFICATIONS.—BY L. P. CRECELIUS

All of the technical reports prepared and distributed by the United States Geological Survey and the Bureau of Mines relate in some way to the subject matter of this report.

[The contracts of the Interborough Rapid Transit Company and the Cleveland Railway Company are included in the original report.—Editors.] Both of these specifications are highly satisfactory for the fuel supply covered for the particular conditions in each case.

Throughout its reports the government has been exceedingly careful to advise against the use of specifications purely on a B. t. u. basis; also recommending that a careful examination of plant conditions be made and a selection of fuel supply be chosen accordingly.

Briefly, the advantages of purchasing coal under a definite specification as found by the government are:

(1) Bidders are placed on a strictly competitive basis as regards quality and price.

(2) The field for both purchaser and dealer is broadened, as trade names can be ignored and comparatively unknown coals offered by responsible bidders may be accepted without detriment to the purchaser.

(3) The purchaser is insured against the delivery of poor and dirty coal, and is saved from disputes arising from condemnation based on the usual visual inspection.

(4) Experience shows that it is not always expedient to reject poor coal, because of the difficulty, delay and cost of removal. Under definite specifications, rejectable coal may be accepted at a greatly reduced price.

(5) A definite basis for the cancellation of the contract is provided.

(6) The constant inspection and analysis of the coal delivered furnishes a check on the practical results obtained in burning the coal.

The government further cautions that the aim in purchasing coal for any power plant should be to obtain a fuel which will produce a horse-power for the least cost, "all" things being considered. The most careful attention should first be given to the nature of the existing furnace equipment, draft and load; the character of coal best suited to the plant conditions, the number of heat units obtainable for a unit price; the cost of handling the coal and ash, and the possibility of burning the coal without smoke or other objectionable features.

In general it may be said that in any market the coal obtainable at the lowest price is the most economical provided the furnace equipment is suitable. If the furnace is not so designed as to permit the use of the cheaper coal, it should be changed.

The results of tests tend to show that, other things being equal, coals of similar composition are of value in proportion to the B. t. u. in the coal—a basis on which, indeed, all coals may be valued approximately.

It should be remembered, however, that the value of a coal for any particular plant is influenced by the fact that all furnaces are not equally suited for burning the many grades of coal. Aside from this factor, coals may be compared in terms of the B. t. u. obtained for a unit price.

The usual and customary element upon which premiums and penalties are based is the heat content expressed in B. t. u. The justification for this is based upon the fact that coal which gives up the most heat per pound of coal is the most valuable. However, because of the presence of the other disturbing elements mentioned above, and because in any market a number of grades of coal can be had at different prices, which variation in price is usually all out of proportion to the respective steam-making quality of the various coals offered, it follows that other restrictions must be added to the specifications.

The most disturbing elements in coal are ash, sulphur and moisture.

The presence of an excessive amount of ash in any coal manifests itself in the nature of a reduction of capacity because of its occupying a relatively large amount of effective grate area with inert matter. It is also the source of additional expense in the matter of cost of removal and extra wear and tear on ash-handling apparatus. It should, therefore, be restricted to a certain limited amount, no premium being allowed for a minimum. Penalties for amounts in excess of the allowable limit should be provided, and these preferably should become excessive after a certain value. The reason for this is principally that the amount of ash is in a measure the key to the nature of the coal, and the principal advantage of any coal specification should be to provide for a steady and uniform supply of fuel, previously determined upon as best suited to existing plant conditions, and to limit all other grades of coal.

Sulphur either free or in combination with other elements in excess of 3.5 per cent is decidedly disadvantageous to the fuel, especially so when burned on certain types of furnaces. It is the principal source of formation of fusible clinkers, which clog the fire, adhere to the grate bars, and increase enormously the cost of maintaining the furnaces. The presence of sulphur even more than ash governs the nature and the source of the fuel supply and excessive amounts should be severely penalized. No premiums for a minimum should be provided.

If coal bills are settled according to weights at the receiving station the moisture value should be determined and the B. t. u. determination made upon samples "as received." If bills are paid according to railroad weights at the loading station the B. t. u. determination should preferably be made on a dry sample.

Moisture is a matter entirely beyond the control of the dealer, depending upon weather conditions, distance of transportation, etc., and if the heat determination is made upon sample either "dry" or "as received," it has been compensated for.

Volatile matter more than any other element provides the means for determining the source of the fuel supply. The amount of volatile matter in coal increases with the distance from the Atlantic Coast to the Mississippi River and furnishes the means of knowing in what section the coal was mined. The presence of volatile matter is not necessarily detrimental to the coal, as experiments have clearly brought out the fact that coal containing more volatile matter can be burned quite as efficiently as coal containing less, in properly constructed furnaces. However, because of existing furnace equipment and severe smoke regulations, it may be necessary to restrict a fuel containing excessive amounts of volatile matter. The specifications of the Interborough Rapid Transit Company provide for this matter.

In some cases the premiums and penalties provided in coal specifications cannot be proportional with respect to the B. t. u. values, but must be of an accelerating nature, either above or below standard. This is the case in the specifications of the Cleveland Railway Company, and a short outline of the underlying conditions responsible for this is as follows:

There are available in the Cleveland market three grades of slack coal, at different prices, and of different steam-making qualities. These for the purpose of this report will be called Grade 1, Grade 2 and Grade 3. The market prices are according to quality and depend also upon the freight rates, but in no case is the market price anywhere nearly proportional to the relative value of the different grades when based upon evaporation, to justify the difference.

After a thorough study of the relative value of these coals, results obtained after careful and prolonged tests indicated (all things being considered, such as load, existing equipment, draft, capacity and price) Grade 2 coal to be the best suited. On account of a loss in effective plant capacity when burning Grade 3 coal, due to its poorer qualities, this fuel had to be cut out of consideration. Grade 1 coal is very satisfactory

and is received, but payment is made according to its value as compared to Grade 2 coal, which has been made the standard in the contract.

The Cleveland Railway Company specifications therefore have been drawn up with a view of stimulating the delivery of Grade 2 coal, adjusting the price of Grade 1 coal according to its real value and restricting the supply of Grade 3 coal as much as possible.

The value of the relative fuels, the prevailing market price and settling price are shown in the following tables:

Kind of coal	Grade 1	Grade 2	Grade 3
B. t. u.	13,350	12,700	12,150
Ash	11.60%	13.80%	18.11%
Sulphur	2.03%	3.50%	5.15%
Moisture	1.52%	2.70%	3.55%
Volatile combustible matter	31.33%	35.62%	35.03%
Fixed carbon	53.52%	44.38%	38.16%
Market price per ton delivered	$1.75	$1.60	$1.40
Settling price according to contract	$1.67	$1.60	$1.32

From the above it can be seen that the specifications thus establish a definite, concise and satisfactory manner of purchasing the fuel supply, avoiding all controversy as to kind of coal, and placing the burden of supplying the right sort upon the dealer.

It is hoped that the necessity in some cases of arranging premiums and penalties on B. t. u. values of an accelerating nature either side of standard has been explained, as also the reason for limiting other disturbing elements such as ash, sulphur, etc., to certain values. From this it can be seen that it will become necessary to change the tables whenever a change in market price disturbs the relative difference in the grades of coal shown above. Each case must necessarily be worked out upon its own particular merits. No one contract can be made to apply to every condition because of the great diversity of power plant equipment and load conditions, and also because of the variation in character and price of the fuel supply.

Statements and conclusions relative to the unfairness of arbitrary penalties and premiums which are not based upon real or proportional variations abound, and lately considerable stress has been laid upon the supposedly excellent results to be obtained from a combination method of purchase based upon an evaporation basis and an analysis basis. It does not seem proper to make an outside party responsible for the economical performance of equipment not in his control, simply because he happens to supply a necessary commodity. This is the circumstance when the coal dealer is called upon to supply fuel on a basis of evaporation and this disadvantageous practice will continue, to the mutual dissatisfaction of both parties, so long as doubt and uncertainty shroud the matter of a proper basis of fuel purchase.

In general, it is decidedly advantageous to purchase fuel under definite specifications wherever conditions are such as to require a fuel supply better than the poorest, lowest priced fuel obtainable.

Whenever conditions warrant the burning of the very lowest grade fuel which corresponds to lowest cost, definite specifications covering heat, ash, etc., are unnecessary.

The drawing up of coal specifications is not the work of a chemist, it is rather the work of a mechanical engineer, who, however, must be in close touch with a chemical adviser.

The McCord Manufacturing Company, Detroit and Chicago, is showing at its booth how the Universal weather stripping and sash fixtures may be adjusted to fit the window opening so as to obviate the necessity of the accurate car construction found necessary when ordinary metal sash is used. This company's window sash provides perfect fitting sash that may be operated easily at all times, regardless of the atmospheric conditions. The sash is made of copper and is proof against rust and corrosion.

REPORT OF THE JOINT COMMITTEE ON EXPRESS AND FREIGHT ACCOUNTING*

WALTER SHROYER, CO-CHAIRMAN; P. P. CRAFTS, CO-CHAIRMAN, G. H. HARRIS, W. S. WHITNEY, E. L. KASEMEIER AND J. C. COLLINS

Two meetings have been held and tentative reports were compiled after each meeting. These were submitted to the members of the committee, with the request that they be studied carefully and such changes as seemed to be advisable reported to the co-chairmen. As the committee members were able to apply the proposed plan to the operations of their respective lines, this procedure produced good results.

Your committee is of the opinion that it would not be practical, even if it were possible, to make an absolutely accurate or scientific separation of passenger and freight expenses, and it, therefore, appears necessary to adopt some plan which all companies may use as a basis for making comparisons. Very few roads operate under the same conditions, and with this in mind it was decided to make the basis of the segregation of expenses as elastic as possible.

Each company has a plan of its own for dividing expenses between the two branches of traffic. Thirteen out of twenty-six companies made no charge against freight traffic for maintenance of way and structures. Some companies did not take into account any charges for power consumed by freight cars, etc.

Your committee took up separately each of the eighty-eight accounts prescribed by the Interstate Commerce Commission in its classification of operating expenses of electric railways, and a plan for the division of each account as between the two branches of traffic was considered, and the recommendations made are in accordance with the opinions of the majority of the committee. It is the unanimous opinion of the committee that all items of expense that can be charged directly should be so charged.

Careful consideration has been given the matter of the adoption of the "car-mile" as against the "ton-mile" unit, and it was decided that the "car-mile" should be the unit basis adopted in view of the fact that interurban railways, with very few exceptions, are handling freight in a comparatively small way, and the freight car mileage is only a small percentage of the total car mileage. It would, therefore, seem advisable to continue the "car mileage" unit until such time at least as the earnings from freight traffic reach proportions that will justify the additional expense necessary to maintain the records which would be required by the use of the "ton-mile" unit.

Your committee, therefore, recommends for your consideration the following plan for segregating operating expenses between passenger and freight traffic:

NOS.	ACCOUNTS
WAY AND STRUCTURES	
1 to 28	*Maintenance of way and structures.* Prorate on the basis of the total passenger and total freight car mileage.
EQUIPMENT.	
29	*Superintendence of equipment (shops and rolling stock).* Prorate on the basis of the total passenger and total freight car mileage.
32, 33, 34, 36, 37	*Maintenance of cars and locomotives (exclusive of service cars).* Charge directly from shop records.
35	*Service cars.* Prorate on the basis of the total passenger and total freight car mileage.

*Abstract of a paper read before the American Electric Railway Accountants' and Transportation & Traffic Associations, Atlantic City, N. J., Oct. 9-13, 1911.

38 Shop machinery and tools.
Prorate on the basis of the total passenger and total freight car mileage.

39 Shop expenses.
Prorate on the basis of the total passenger and total freight car mileage.

40 Horses and vehicles.
Prorate on the basis of the total passenger and total freight car mileage.

41 Other miscellaneous equipment expenses.
Prorate on the basis of the total passenger and total freight car mileage.

42 Depreciation of equipment.
Where this account is used, charge directly for passenger and freight equipment plus proportion of service car depreciation.

43, 44 Other operations, debit and credit.
Charge or credit directly where possible. Items common to both passenger and freight traffic, prorate on the basis of the total passenger and total freight car mileage.

TRAFFIC.

45 Superintendence and solicitation.
Charge directly where possible. Items common to both passenger and freight traffic, prorate on the basis of the gross earnings from passenger and freight traffic.

46 Advertising.
Charge directly where possible. Items common to both passenger and freight traffic, prorate on the basis of the gross earnings from passenger and freight traffic.

47 Miscellaneous traffic expenses.
Charge directly where possible. Items common to both passenger and freight traffic, prorate on the basis of the gross earnings from passenger and freight traffic.

CONDUCTING TRANSPORTATION.

48 Superintendence of transportation.
Prorate on the basis of the total passenger and total freight car mileage.

29, 30, 31 and 48 and 49 to 59 inc. Power (including superintendence of power plant and substation equipment, under accounts 29 and 48).
Prorate on the basis of the total passenger and total freight car mileage.

60 Passenger conductors, motormen and trainmen.
Charge directly to the passenger department.

61 Freight conductors, motormen and trainmen.
Charge directly to the freight department.

62 Miscellaneous car service employees.
Prorate on the basis of the total passenger and total freight car mileage.

63 Miscellaneous car service expenses.
Charge directly where possible. Items common to both passenger and freight traffic, prorate on the basis of the total passenger and total freight car mileage (after deducting items strictly chargeable to expenses of conducting passenger department, viz., tickets, transfers, baggage checks, secret inspection, register rentals, and conductor's books).

64 to 65 Station employees and station expenses.
Charge directly where possible. Items common to both passenger and freight traffic, prorate on the basis of the gross earnings from passenger and freight traffic.

66 to 67 Carhouse employees and carhouse expenses.
Prorate on the basis of the total passenger and total freight car mileage.

68 Operation of signal and interlocking systems.
Prorate on the basis of the train mileage.

69 Operation of telegraph and telephone systems.
Prorate on the basis of the train mileage.

70 Express and freight collection and delivery.
Charge directly to the freight department.

71 Loss and damage.
Charge directly to the freight department.

72 Other transportation expenses.
Charge directly where possible. Items common to both passenger and freight traffic, prorate on the basis of the total passenger and total freight car mileage.

GENERAL AND MISCELLANEOUS

73 Salaries and expenses of general officers.
Charge directly where possible. Items common to both passenger and freight traffic, prorate on the basis of the gross earnings from passenger and freight traffic.

74 Salaries and expenses of general office clerks.

75 General office supplies and expenses.

76 Law expenses.

77 Relief department expenses.

78 Pensions.

79 Miscellaneous general expenses.

80 to 81 Other operations, debit and credit.
Same as No. 73.

82 Injuries and damages.
Charge directly where possible. Items common to both passenger and freight traffic, prorate on the basis of the train mileage

83 Insurance.
Charge directly where possible. Items common to both passenger and freight traffic, prorate on the basis of the gross earnings from passenger and freight traffic.

84 Stationery and printing.
Charge directly where possible. Items common to both passenger and freight traffic, prorate on the basis of the gross earnings from passenger and freight traffic.

85 Store expenses.
Prorate on the basis of the total passenger and total freight car mileage.

86 Stable expenses.
Charge directly where possible. Items common to both passenger and freight traffic, prorate on basis of total passenger and total freight car mileage.

87 Rent of tracks and terminals.
Charge directly.

88 Rent of equipment.
Charge directly.

In recommending certain divisions of operating expenses your committee has shown them based upon the percentage of gross earnings from passenger and freight traffic, freight earnings to include the following accounts under the head of "revenue from transportation": Express revenue, freight revenue, milk revenue and switching revenue.

The Brill car on the Boardwalk has the advertising spaces filled with large sepia photographs of representative types of city and interurban cars built by the different Brill companies and also photographs of the principal Brill trucks. A label on each photograph designates the company for which the car was built and gives the chief dimensions of the car body. Among those shown are the "near-side" type of Philadelphia and Buffalo; the plain-arch roof Brill semi-convertible of the Capitol Traction Company, of Harrisburg; the "one-man" prepayment car of the Selma type and a large variety of interurban coaches, snow sweepers, etc.

REPORT OF THE COMMITTEE ON EXPRESS AND FREIGHT TRAFFIC*

BY H. E. REYNOLDS, CHAIRMAN; G. W. QUACKENBUSH, C. F. BERRY, F. W. WATTS, F. D. NORVIEL, A. R. PIPER

The committee sent a data sheet to member companies on March 1, and 110 replies were received from companies operating in thirty-seven States and in Canada and Mexico, which have been grouped in the following divisions:

North Atlantic.—Maine, Vermont, Massachusetts, Rhode Island, New York, New Jersey, Pennsylvania, Canada.

South Atlantic.—North Carolina, West Virginia, Maryland, Virginia, Georgia, Florida, South Carolina, District of Columbia, Mexico.

South Central.—Tennessee, Kentucky, Alabama, Louisiana, Arkansas, Texas.

North Central.—Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, Kansas.

Western.—Utah, Washington, Oregon, California, Colorado.

Of the 110 companies reporting, ninety-two are conducting an express or freight business. Thirty-seven companies report that no restrictions have been placed upon freight and express business by their franchises. The ninety-two companies conducting an express or freight business operate in 917 cities and towns and serve a total population of over 12,000,000.

In regard to the employment of solicitors for obtaining express business, twenty-seven companies do and thirty-seven do not employ solicitors. Several of those not employing solicitors indicate that employees or agents are sometimes engaged to do work of this character. Eighteen of the companies depend upon their agents to increase the business, while sixteen advertise for this purpose and ten state that no other method, except good service, is used to create new business.

Claims against the companies are handled in thirty cases by the express and freight department, while in twenty-one others they are settled by the claim department.

Eighty-one companies report that they handle newspapers. With one exception all the companies carry newspapers on passenger cars, while eighteen use express cars in addition. Fifty-one of the companies charge for this service and twenty-six do not.

The rates for this service vary from ¾c per cwt. to 75c per cwt., a rough average being between ¼c and ½c per lb. The method of handling collections for this service varies widely, most of the companies rendering a monthly bill. In the Central States, however, the stamped tag or ticket form of collection is principally used. Practically all of the companies report that the matter of charging for newspaper handling has no effect on the relations of the companies with the press.

With regard to transportation of baggage, most of the Eastern roads handle baggage, if at all, in express cars, and most of the Western roads take care of it either on passenger cars or on both passenger and express cars. Only five of the thirty companies reporting from the Atlantic States check baggage free on passenger tickets, while twenty-three of the forty-one companies reporting from the Central and Western States follow this practice.

The capacity of standard express cars averages about 20 tons, being slightly less in the Atlantic States than in the North Central, where one company reports 50 tons capacity and several report 30 tons capacity. The length of the standard express car averages about 45 ft., a few companies reporting cars only 30 ft. over all and two companies in New York reporting cars 60 ft. over all. These cars vary from 9 to 50 tons in weight, averaging about 25 tons.

*Abstract of report read before the American Electric Railway Transportation & Traffic Association, Atlantic City, N. J., October 9-13, 1911.

Most of the companies reporting have established their express and freight business since 1900. All but four companies report that the business has shown a steady increase since the beginning, and one of these four states that the business increased until 1910.

The equipments used by the companies in handling the express and freight business may be classified as follows:

Section	No. of companies reporting	Combination and express	Motor box cars	Trailer cars	Passenger cars	Coal cars	Gondola cars	Electric locomotives	Miscellaneous cars	Total rolling stock
North Atlantic...	22	24	150	49	13	29	20	21	143	471
South Atlantic...	10	81	59	70	2	4	18	18	113	365
South Central...	3	5	5	25	12	13	2	2	9	76
North Central...	31	211	97	82	42	274	23	16	62	838
Western	5	9	14	64	12	72	0	1	111	321
Totals	71	330	325	290	81	392	63	58	461	2,071

Answering the question, "Do you consider it profitable to handle freight at steam road rates in single motor car operation?" twenty-four companies replied "yes" and twenty companies "no."

Forty-four companies handle carload freight. Fifty-seven companies report that they compete with steam railroads, nineteen with water transportation companies and eighteen with both steam and water transportation companies. With regard to contracts with old line express companies, nineteen companies state that they do have such agreements.

CONCLUSIONS

The period of experiment is passed and the trolley express and freight has become a recognized established business. This part of the business is becoming more and more a factor in the earnings of electric railway companies; hence it should be recognized and made to show far greater development.

There has been a great diversity of methods in operation, accounting, billing, equipment, etc., each company working along lines which seemed to it best at the time. The time has now come when it is imperative in the interests of all to make greater effort in the future to unify and standardize methods. With the gradual expansion of what is now more or less a local trolley and express traffic it is not a far look into the future to see the meeting of local services and the resultant exchange and extension of through traffic, in which event standardization of forms and methods would be a great aid. The existing differences are especially noticeable in the units employed in accounting for both earnings and expenses, and it would be of great benefit to all to fix upon a standard, whether car-hours, car-miles or ton-miles, so that an intelligent comparison may be made possible. Unless some particular local condition makes it advisable to do otherwise, the accounting of all trolley express and freight traffic should be entirely segregated from that of the passenger traffic. In no other way can the complete detailed study of the business that is so necessary to its development be obtained.

There is still much to be done in the way of systematic promotion of the business, by advertising, personal solicitation and in other ways. Possible shippers or consignees need to be told exactly what the service can do for them, just what it is and why it is particularly adapted to their individual needs. The way can be paved by the right kind of instructive literature, followed up by solicitors engaged for that purpose alone, or by employees of the express department in cases where the business has not become great enough to justify the added expense of special solicitors. Such solicitors or employees should not only be thoroughly conversant with the business but should make a study of the industries whose traffic they are seeking, that they may be able to talk intelligently of the adjustment of the service to the needs of their patrons.

A high-class service is not the only form of advertising necessary. Good service is essential in holding business already obtained, in overcoming the prejudice that inevitably greets any new idea, and such competition as may exist, but as a mainstay in promoting this or any other kind of business it must from the nature of things be slow in its results.

Aside from advertising, solicitation and high character of service there are other means of increasing the earnings of the future, such as encouragement of the locaton of reputable new industries, from which future traffic may develop. Electric railways should take an active interest in all town or city movements that honestly tend toward the progress, commercially or otherwise, of the cities and towns through which they operate, for increase in population and the introduction of new industries both spell enlarged opportunities for express and freight traffic.

Greater interest and assistance should be given the good roads movement which is sweeping the country. Better roads mean a lowering in cost and a quicker haulage of farm produce to shipment terminals, and this must bring about lower prices, an increase in the demand in the markets and a stimulation of production from which the express transportation companies must benefit. The handling of farm produce is destined to become an important feature of the electric express traffic because the service is especially adapted to handling of perishable goods of this character in a quick, safe and economical way.

Thirteen companies report their belief that finding a market for farm produce is profitable, and, while this question may to some extent depend upon local conditions, the committee believes that the carrying of farm produce is a legitimate and profitable field for development and would recommend that close attention be given it and that every reasonable facility and incentive be offered the farmer to make shipment in this way.

The question as to whether or not companies should charge for the transportation of newspapers and the method and basis of charging is important. In recent years the number of papers so carried has increased so rapidly and to such an extent that it is unquestionably becoming a serious problem that should be met. The majority of the companies charge a rate varying from ¾ cent per cwt. to 75 cents per cwt. It is only fair and just that compensation be received for this service, and the placing of this matter upon a strictly business basis will work out a condition that will be satisfactory to both the companies and the press. The committee recommends the establishment of a standard basis or method of determining such charge. In fixing such a standard it will undoubtedly be necessary to consider the size and selling price of the papers. Such concerted action would eliminate to a great extent, if not altogether, objections which might otherwise be raised by the press here and there were the movement purely individual.

The character and scope of the service seem to govern the equipment used for freight and express traffic. The committee recommends that equipment be carefully considered as to its adaptability to conditions under which it is to be used, as to the relation between the cost of operation and carrying capacity and as to the facility of loading and unloading. The rolling stock should also be kept in a high state of repair so that both efficiency and good appearance may be obtained. In this way the company may be protected against the serious antagonism and unfavorable impressions which oftentimes result from interference with passenger traffic and unattractive physical equipment.

The Railway Roller Bearing Company, Syracuse, N. Y., has received through The J. G. Brill Company the third order from the Third Avenue Railway, New York, for Rollway journal boxes, making a total of 56 car equipments for this company.

REPORT OF THE COMMITTEE ON CITY RULES*

BY H. W. FULLER, CHAIRMAN; D. A. HEGARTY, F. I. FULLER, M. C. BRUSH, C. B. BUCHANAN, M. M. PHINNEY

The committee on city rules submits as its report certain amendments to the present code of rules, several new code rules, a list of titles for local rules, a code of carhouse rules, a list of titles for local carhouse rules, pre-payment car rules and a list of titles for local pre-payment car rules.

[The text of these proposed amendments and additional rules was printed in the Electric Railway Journal for April 22, 1911, p. 713, and is not reprinted here. Editors.]

The committee, from its study of the 1909 code and the amendments thereto, is convinced that the code does not contain all the rules necessary to make a complete set of standard rules, and therefore recommends the adoption of certain new rules, and suggests their place in the code.

No mention is made in the code of the fact that certain rules necessary for the operation of any company must be drawn to meet local conditions, and it is recommended that the titles for such rules be listed in the code under a proper heading.

Further study convinced the committee that the 1909 code and amendments thereto had been drawn with the understanding that each company which adopted the code would have a set of carhouse rules. It has, therefore, drafted a set of standard carhouse rules and supplemented them with a list, by title only, of local carhouse rules.

The standard rules for the operation of pre-payment cars were drafted at the direction of the executive committee, and the list of titles for local pre-payment car rules was added by the committee in order to complete the scheme.

No attempt has been made by the committee to assign numbers to the additional rules recommended, for the reason that it seemed best to await the action of the convention with reference to the report.

The committee sent out a data sheet to 294 member companies requesting criticisms of the proposed amendments and additions. Replies were received from 147 companies, and most of the proposed changes were approved by at least 85 per cent of the companies replying.

KNCCKS FROM THE KNOCKERS

(REPORT OF SUB-COMMITTEE K, OF THE BROADWAY BARBARIANS.)

Who was Sam Trawick's lady friend? She was an artistic landscape, and the only "prop" lacking was a safety razor.

No, Helen, a Brighton punch is not a temperance drink. John L. Sullivan's right was a love tap beside it.

It is understood that Mugsy McGraw and Connie Mack were watching Hank Fassett last night with a view to engaging him as umpire for the world's series. He won't do, though. He is too modest and retiring.

Tom Mullaney is in our midst with his real boss and his pet dinky car. It may not be much, but it beats horse cars, doesn't it, Tom?

Young Bill Silver is attending his first convention. Welcome to our ranks, Billy. You will like us after you get acquainted.

Matt Brush, the boy wonder, is thirty-five years old today. Hence the congratulations which he is receiving. Matty was planning to leave town before he was discovered, but he is being closely watched and will be taken dead or alive to the Brighton Hotel to-night for a little surprise party.

Has anybody here seen Rupert?

*Abstract of report read before the American Electric Railway Transportation & Traffic Association, Atlantic City, N. J., October 9-13, 1911.

HUDSON RIVER TUNNELS*

BY J. VIPOND DAVIES, CHIEF ENGINEER HUDSON & MANHATTAN RAILROAD

The Hudson & Manhattan Railroad, which comprises only 19 miles of single track, probably represents some of the most difficult conditions and also the most expensive construction of any similar railroad, and the total cost per mile of road was probably as high, or even higher, than any other rapid transit railroad in existence.

The difficulties in the construction of any such rapid transit railroad as this, practically the whole of which exists below the level of the sea, involved obviously an extremely large cost. But while the total cost of the undertaking is great and involves for the complete railroad and necessary real estate, power stations and equipment, a sum equivalent to approximately two and one-half millions of dollars per mile of railroad, the railroad is peculiar in the concentration of its business, and the short haul over which it operates its traffic permits a low operating cost per passenger to offset the high original capital cost of construction.

The system as a whole, including its connection with the Pennsylvania Railroad, has been in operation only since the first of October of this year. Nevertheless, the growth of traffic month by month for the current year has shown an increase of practically 20 per cent over the traffic of the same months last year, and as the suburban district of New Jersey develops and the education of the traveling public increases, it appears certain that a growth such as this may reasonably be expected to continue.

DETERMINING FACTORS

The determining factors in arriving at the capacity of a railroad such as this were: (1) The carrying capacity of the train, determined by the dimensions of the cars and the cars per train. Physical conditions of construction at terminals limited the possible train length to approximately 400 ft., suitably divided into eight-car trains. The cars are about 50 ft. long by 9 ft. wide. (2) The headway which it would be feasible to obtain with the best possible equipment of brakes on the cars and by a satisfactory signal system, operating an automatic block system equipped with automatic stops, permitted operation of trains on an actual headway of 90 seconds.

TRACK CONSTRUCTION

For the most part the track in these tunnels is designed with ballast foundation, but at certain points, such as on curves and at junctions, the track is on a concrete foundation, but as a general proposition we have found the ballasted track more satisfactory through the ability of the maintenance department to more easily maintain the surface and to renew ties and rails. For the most part the running rail is open hearth steel with carbon between .75 and .90. This steel is entirely satisfactory in these tunnels where the changes in temperature are extremely slight. The principal trouble which has arisen in the maintenance of track is the rapid corrugation of rail at points where power is usually applied or where brakes are applied. In such locations it has been found desirable to renew the rail without any regard whatever to the fact that the wear of the rail may not be sufficient to justify renewal, but the renewal is made solely to obviate the unpleasant "chatter" due to the corrugations in the rail.

SIGNAL SYSTEM

A portion of the system is equipped with a signal system of all-electric design, while the other portion is equipped with the electro-pneumatic system, all being arranged with single overlap and with automatic stops throughout the lines, which are under cover. The well-nigh perfect results obtained from the signal system may be interesting, as from the signal failure reports for the year ending Aug. 31, 1911, the failure of signals was in the ratio of 1 to 1,050,784; automatic stops at the ratio of 1 to 2,793,591.

VENTILIATION

In the construction of these tunnels, a point which may be of general interest is that of ventilation and temperature in the tunnels. The maintenance of continuity in the single tube system is carried out as far as possible, and only at stations with island platforms or at junctions is there any break in this continuity. The result is that the trains themselves force the column of air through the tunnels to points where exhaust fans are installed, which remove this air column as it is pushed forward to the fans. At the same time at other points intake fans for supplying fresh air from the outside are installed, which force fresh air into the tunnels in the rear of trains to supply the displacement. By actual test and experiment as to the movement of the column of air ahead of trains, it has been found that 60 per cent of the entire tunnel displacement is pushed forward by the moving trains. I stated just above that fresh air is taken in by intake fans. It will be obvious that in the hot summer months when the external temperature is higher than the temperature in the tunnels forcing air into the tunnels or the changing of the tunnel air with the outside atmosphere would not tend to lower the temperature in the tunnels, but, on the contrary, might tend to increase it. Furthermore, there must of necessity be a large heating effect from the operation of motors, journal bearings and from brakes, as well as the great volume of heat generated by the passengers themselves, and it, therefore, becomes of the utmost necessity to actually lower the temperature in the tunnels.

COOLING EFFECT OF CONSTRUCTION

The consruction of the Hudson & Manhattan tunnels, as well as the tunnels of the Pennsylvania Railroad, is for the most part with an exterior metal lining of concrete, but in every case the lining itself is in contact with the moist exterior soil, thereby providing the means of properly absorbing and radiating the heat within the subway into the exterior soil. The effect of this construction has been most satisfactory to the management as well as to the traveling public, with the result that the temperature in the tunnels throughout the year, both winter and summer, does not vary more than 10 degrees.

REPAIR FACILITIES

In the early operation of the railroad, when only the Hoboken line was completed, and it was desirable to commence operation at once, even with an incomplete railroad, we had no car yard in the open and cars had to be inspected and maintained standing on tracks underground. At a later date, when we were able to extend our lines into New Jersey and get our car shops and yards in operation, it was readily seen how absolutely essential it is in the operation of any such tunnel railroad as this to have the inspection and maintenance of cars executed in the open where there is plenty of natural light. The cheapest thing possible in the maintenance and care of car equipment is daylight, and any underground tunnel must be considered only with proper provision for car-shop sand yards in the open daylight.

*Abstract of paper read before the American Electric Railway Association, Atlantic City, N. J., Oct. 9-13, 1911.

The ladies voted down the "thank you" to the weather man yesterday. He spoiled their afternoon at the Country Club. Charley Elliott came to the rescue as usual and arranged a card party on the Pier at the eleventh hour.

Hon. George A. Post, president Railway Business Association, and chief executive of the Standard Coupler Company, spent a few of the late hours on Tuesday and a few of the early hours on Wednesday at the convention. His rotund and eloquent presence was welcome to his many friends.

JOINT MEETING OF THE ACCOUNTANTS' AND TRANSPORTATION & TRAFFIC ASSOCIATIONS

The joint meeting of the Accountants' Association and the Transportation & Traffic Association was held in the Greek Temple yesterday. W. H. Forse, Jr., president of the Accountants' Association, called the meeting to order at 12.15 p.m.

Mr. Forse stated that the co-chairmen of the committee on express and freight accounting were unable to be present. In their absence E. L. Kasemeier, Ohio Electric Railway, a member of the committee, was asked to read the report. Mr. Kasemeier then read the report, an abstract of which is published elsewhere in this issue.

DISCUSSION ON JOINT REPORT ON EXPRESS AND FREIGHT ACCOUNTING

J. K. Choate, Otsego & Herkimer Railroad, asked the committee how freight car mileage was figured.

Mr. Kasemeier said that freight car mileage would be loaded car mileage.

Mr. Choate asked how a comparison would be made on his road, where passenger cars were handled by single cars, and freight cars by train mileage.

Mr. Kasemeier said the record should be made from the dispatcher's report.

Mr. Choate asked how, with the locomotive or a motor car on the front of the train, followed by eight or ten loaded cars, the motor car and the loaded car behind would be handled.

Mr. Kasemeier said it would have to be considered as so much per car. There had to be some basis for division, and car mileage seemed to be the most plausible one.

Mr. Choate said that the company he represented made arbitrarily a charge against freight for expenses. It would not be fair to charge the same ratio proportionately for a steam freight car which had been accepted for delivery as for a single motor car, with its motors carrying an equal load. There would be greater wear and tear on the track for one than for the other. The proportion of power used in propelling ten cars in a train was a very different matter. It would be necessary for many of the roads handling freight to adopt arbitrarily a different method from that outlined in this report.

Mr. Kasemeier said that the report would not meet all conditions. Some roads would have to alter the basis outlined a great deal.

Mr. Choate said that he considered train miles and also earnings in arriving at the charges, and a very different basis from either train mileage or car mileage was used. The wear and tear on the tracks was entirely different with a train of ten or more cars from what it was on a single car. The great difficulty in the determination of a cost figure was the vast difference in the loading of cars. A 50-ton coal car, loaded with coal, might be next to a car of hay with less than 12 tons. He did not know how to make a division.

J. H. Neal, Boston Elevated Railway, did not think the report was intended to cover operations so extensive that they approached in any degree the operations of the steam railroad. The steam railroads had the ton mile unit, and in a case such as had been described he thought that should be used. It was stated that ton-mileage in most cases would work out all right, but each company had to bear in mind factors peculiar to itself. For instance, it was very evident that if a freight terminal was constructed in the heart of the city, the interest on it would eat up the return on the freight received, so that it was not sufficient to figure the operating expenses and then deduct them from the gross earnings and assume that a profit was made. Mr. Neal did not believe that rules of universal application could be made at this stage. Sometimes freight made almost express time. Sometimes trailers could be picked up under certain conditions of grade, etc., and helped along, thereby reducing the actual train mileage.

E. C. Spring, Philadelphia & Western Railway, said there was a great difference between the Eastern and Western roads in the treatment of freight and express service. He was a thorough believer in the ton mile unit rather than the car mile. The ton mile unit afforded a just basis of comparison and could be used by all.

President Forse read a letter on the subject which had been written by Irwin Fullerton, auditor of the Detroit United Railway, who had been asked to speak on this subject, but was detained at the last moment.

F. D. Norviel, Indiana Union Traction Company, said that inasmuch as this meeting would be ended the next day and there had to be some action on the committee reports, it would be better to adopt the report as made by the committee. There would not be any future year in which conditions would not arise that would make revision necessary.

Mr. Russell said that the rules might be recommended to those who were beginning or those who had not adopted any methods of ascertaining the differences, but when a distribution of expenses was made between two different departments of service it had been found by experience that in the passenger department alone the car mileage unit was not a proper basis for comparison between roads. On one road a meter was installed to show the exact amount of power used in one section, and the cost of power per car mile was a little less than one-half what it was on the rest of the system, owing to the difference in cars. The car mileage basis for the passenger department alone was not the proper basis for distribution of the expense accounts. It certainly cost more in the way of maintenance of track, overhead and especially of equipment, for a double-truck passenger car than for a single-truck car. In further consideration of the questions it might be that there would be some other method of division that would appeal to the committee. In formulating a set of rules it should be possible to look far enough ahead to provide for contingencies and make the foundation for the divisions so clear that they could be built upon with any sort of superstructure that might arise afterwards.

The report of the committee was accepted and filed.

The exhibit of the Standard Motor Truck Company includes six types of double trucks, a number of forged steel wheels, including "one wear wheels" and a forged steel gear. The new truck side frames are pressed complete from one piece of sheet steel and are much stronger and lighter than forged frames. The journal bearings are made to hold the axles from end movement and are adjustable to take up wear. The bolster hangers are protected from wearing down. The brake shoes, on trucks with no brake beams, are held by a new form of single brake hanger so they cannot wear unevenly or to one side of the wheels. The shoes are prevented from chattering and squealing on steel wheels by the use of a single hanger which is attached directly to the brake head. A new form of brake rigging is shown on the No. 0-36 maximum traction truck, which is lighter than former designs and has a form of adjustment which reduces the time required to put on brake shoes. An automatic form of brake adjuster is exhibited which is being extensively used on all of this company's trucks. For all of the large trucks a compound form of easy riding elliptic spring is used. The company's "slogan" is in evidence by two printed signs, which read, "Ask Any of the Roads Using Them." The company is represented by A. W. Field, general sales agent; A. Christianson, chief engineer; W. C. Price and R. Hammerstron, engineers of Pittsburgh; W. G. Cory, sales agent of New York, and George Boyd, sales agent of Chicago.

In the booth of the Sangamo Meter Company, Springfield, Ill., several of its latest type watthour meters are shown. Among these is the Sangamo mercury motor watthour meter of the street car trip reading type.

THE CARNEGIE DISPLAY

One of the leading features of the Carnegie Steel Company's exhibit at spaces 354-364 is the display of Schoen and Slick rolled steel wheels. This company manufactures both steam railroad and electric railway wheels by two processes, the older of which is the Schoen process, examples of which have been on exhibition at former conventions. This year it is showing two subway or elevated types of wheels, three interurban wheels of standard design and one narrow rimmed street car wheel for city service. Along with these wheels is shown one of the cylindrical blocks of steel from which the wheels are forged and rolled. These blocks are sheared from a 15-in. round rolled from a 22-in. square ingot, thus giving a reduction of 61 per cent in cross section. The use of these rounds instead of flat, rectangular slabs represents this company's latest improvement in steel wheel manufacture.

The Slick process, being also adapted to the manufacture of comparatively small light wheels, has been utilized to produce rolled steel blanks for street railway motor gears, and two of these blanks, as well as a finished gear, are shown by the company.

Axles have not been given special prominence in former exhibits, but this year special attention has been given to them, due to discussion in the Engineering Association regarding standard specifications. Two racks, containing four standard axles each of medium and hard grade respectively, occupy the center of the Carnegie space. In each grade one axle is shown for each of four qualities, viz., standard forged, annealed, toughened and high test. A comprehensive pamphlet descriptive of the process by which these axles are produced and giving results of a series of tests is being distributed.

Steel sheet piling, while attracting less attention than in former years, is still one of the interesting products being exhibited by this company. In addition to a section of track laid on steel cross ties and with Duquesne rail joints, in concrete construction, the company also has on exhibition a tie taken from track which had been laid seven years. This tie is still in practically perfect condition, having lost but 3 per cent in weight. The general impression is that steel cross ties in concrete construction cost very much in excess over a standard type of wood tie construction, but data published in the company's pamphlet on "Modern Track Construction" show that this impression is far from being warranted by the fact.

Vanadium alloy steel is now being manufactured in considerable quantities by the company, and a number of car parts, such as a rolled-steel wheel, an axle, different types of springs and bars, made of vanadium steel, are on view. A mechanical device for vibrating a car spring to demonstrate the advantages of vanadium steel is in operation at space 183.

The Street Railway Association of the State of New York is perfecting plans to educate children to the danger of accidents that they risk each hour. With the co-operation of teachers and parents, personal talks, pamphlets of warning and danger signs are to be presented in schoolroom, home and playground. Beginning with the mothers and fathers technical data showing the margin of safety about all kinds of cars and tracks are to be distributed. On blotters and other attractive souvenirs prepared for the youngsters there have been printed such maxims as "Don't hitch to a car," "Don't touch loose wires," "Don't play on tracks," "Don't jump off until the car stops," "Don't cross tracks till you look or send your little brother or sister across alone." Recent reports of the Public Service Commission of the First and Second Districts show that accident damages have cost the street railways of New York State almost $5,000,000 in one year.

EXHIBIT NOTES

I. R. Nelson, of I. R. Nelson & Company, Newark, N. J., is attending the convention in the interest of his own company.

Wylie Brown, general sales agent of the Bridgeport Brass Company, is present at the convention in the interest of phono-electric wire. He is stopping at the Shelburne.

W. A. Darrow, Philadelphia representative of the Elliott Company, power accessories, and Liberty Manufacturing Company, tube cleaners' tools, both of Pittsburgh, spent Wednesday on the Pier with his many friends.

The National Brake Company, Buffalo, N. Y., is calling particular attention to a new type of Peacock brake for use on storage-battery cars. This model is very light and weighs only about half as much as the standard types.

E. W. Furbush, L. O. Duclos and E. A. Duclos are attending the convention in the interest of the Massachusetts Chemical Company. They are not exhibiting any of their insulating products, but have an attractively decorated booth in space 234, Building 2, for the reception of their customers and friends.

The Pressed Prism Plate Glass Cmpany, Morgantown, W. Va., with offices in New York City and Chicago, has an exhibit of its ornamental plate glass in space 191, Aquarium Court. It is making a specialty of high windows, deck and Gothic glass for electrical railway equipment. The representatives are A. O. Brown and L. R. Waterman.

The Railway and Industrial Engineering Company, Pittsburgh, Pa., is demonstrating the advantages of a new line of horn-type apparatus for use on high-voltage circuits. Its principal recommendations are reliability, simplicity and low cost. It affords a simple and effective means for controlling and protecting industrial loads on high-voltage railway transmission lines.

At the Brill exhibit in the Main Building is shown a line of fare boxes which cover every requirement. Several types are arranged to be attached to the platform floor and several to railing. Of the latter is a particularly interesting box designed for the Public Service Corporation, and which is largely made of aluminum. It is known as the No. 4 Special. One of the larger boxes, the No. 3A, has an all-steel case and is popularly known as the "narrow four-compartment-till box," as its width is but 3¾ in.; the height is 43½ in., and the weight 70 lbs. All of the Brill fare boxes operate on the same principles and have the same tilting plate and cash drawer mechanisms. The boxes are made with and without trip registers and totalizers. The handle at the top operates both the tilting plate and the totalizer.

Rooke Automatic Register Company, of Providence, R. I., is showing a new type of the Rooke automatic register at space 246, Building 3. The register is of the same size as the old type, but registers on as many dials through different forms of fares, nickels, dimes, and one form of metal tickets to cover a six-for-25-cents, or any other form of fare. The Rooke register is now in successful service on over forty roads throughout the United States. It is stated that not in a single instance for the past four years has a company that once installed the Rooke system discontinued its use. During the past two months the Rooke system has been placed on the lines of the Wallkill Transit Company, Middletown (N. Y.); Port Jervis (N. Y.) Traction Company; Catskill (N. Y.) Traction Company; Black River Traction Company; Watertown (N. Y.) Company, and the Fishkill (N. Y.) Electric Railway Company. George F. Rooke and W. A. Williamson are present to explain the advantages of this system of fare registration.

Among the Exhibits

T. G. Abel, of Brooklyn, N. Y., specialist and contractor in car painting, is at the convention in the interest of his own business.

* * *

Home Rubber Company, Trenton, N. J., is exhibiting all its rubber products at space 274, among them being the black sheet packing N. B. O.

* * *

Charles N. Wood, of the Wilson Trolley Catcher Company, of Boston, Mass., is located at space 305. Wilson trolley catchers and retrievers compose the exhibit.

* * *

James B. Strong, Arthur Gemunder and Wellington B. Lee, of the Ramapo Iron Works, of Hillburn, N. Y., are displaying two types of switch stands and lanterns for interurban and steam railway service at space 400, Building 3. The works manufacture all types of special track work, steam, electric and industrial, but consider this material too cumbersome for exhibiting at the convention.

* * *

The gears and pinions exhibited by The Whitmore Manufacturing Company, Cleveland, at spaces 162, 164, 164A, have all been lubricated by Whitmore's Gear Protective Composition. This company makes the composition, not the gears. The gears and pinions exhibited have had large mileages in regular service on various roads, and their excellent condition is a demonstration of how Whitmore's Gear Protective Composition increases metal life, without increasing the cost of lubrication.

* * *

A new metal trap door for flush platforms and an improved adjustable all-metal shade roller are features of the exhibit of The O. M. Edwards Company, Syracuse, N. Y., in spaces 325, 327, 329, 331. The display includes all its well-known types of trap doors, window fixtures and sash locks, etc., but a large part of the space is devoted to Omeco metal furniture for office use. A specimen of all-metal chiffoniers of special design for use on battleships of the United States Navy is attracting considerable attention.

* * *

Two good things from the other side are to be seen in space 218, occupied by Wonham, Sanger & Bates, New York, N. Y. One of these is the H-B life guard, and the other is the C. H. ampere meter. The life guard is well known, over 21,000 being in use throughout the United States. The meter is of more recent introduction, but the company is confident that its success will be just as great as that of the life guard. Both of these devices were placed before American electric railways only after they had demonstrated their merit on many installations in Great Britain and other countries.

* * *

The largest and most elaborate boiler rooms exhibit ever shown at an electric railway convention is offered by the Murphy Iron Works, Detroit, Mich., at space 99, Machinery Hall. The exhibit consists of a 550-h.p. Murphy automatic smokeless furnace weighing approximately 60,000 lbs. This furnace is of the heavy duty type, operating under natural draft at loads approximately 1,100 h.p. Running at this rating it will burn from 35 lb. to 40 lb. of bituminous coal per sq. ft. of grate surface. The stoker exhibited was built for the American Sugar Refinery's Brooklyn plant, and is one of the units of a 13,200-h.p. installation. The furnace as exhibited is complete in every detail.

The Griffin Wheel Company, Chicago, Ill., is showing a new chilled-iron wheel known as the "F. C. S." type. The specific merit claimed for this wheel is that it possesses the greatest possible efficiency. The surface of the flange and tread is composed of 3½ per cent carbon white iron, which forms an excellent material to reduce abrasion to a minimum. The plates of the wheels are of a soft, yet strong metal capable of withstanding the shocks and strains of severe service. The hubs are also soft enough to permit easy machining, and yet have sufficient elasticity to give the necessary pressure against the axle to prevent the wheels from working loose. Other types of wheels are also shown.

* * *

In addition to the regular exhibit at its booth, the Cleveland Frog & Crossing Company has a Kerwin portable crossover out on the pier beside the Greek Temple. This is the invention of John Kerwin, of the Detroit United Railway. It is constructed of 80-lb. rails and is built together just like a permanent crossover. It rests on flanged shoes which hold it securely in position on the rails of the track without the necessity of any watching or attention whatever. It can be moved from place to place simply by attaching a chain to rings provided for the purpose and pulling it along behind a car, locomotive, etc. It slides readily on its flanged shoes. The whole crossover weighs 20,000 lbs. and can be adapted for any width of devil strip.

* * *

The Indianapolis Brass Company is exhibiting in space 210 a motorman's mirror designed to be attached to the front vestibule of the car. The glass may be adjusted to the proper angle to give the motorman in the vestibule a clear view of the rear steps. The company is also showing the protective and reclaiming pole sleeve for iron poles. This device has self-locking joints which are so designed that the two halves may be fitted together around the pole to make a perfect sleeve. After it is placed around the pole it can be filled in with cement or other substance, giving a bearing surface over its entire length. These sleeves are 30 inches long. The company is also showing its general line of trolley cars, splicers, frogs, crossings, section insulators, Morganite and Battersea carbon brushes, car equipment specialties and linemen's tools. James H. Drew, secretary, is in charge of the exhibit. He is assisted by F. E. Dickieson.

* * *

The General Electric Company is showing its ozonator, a device designed to improve ventilating conditions in confined places by generating ozone, which is a powerful oxidizing and deodorizing agent. It consists of a transformer for changing the supply voltage to a value high enough to operate the ozone-generating elements. The latter consist of several glass tubes coated with copper, each containing an aluminum tube separated from the glass tube by a small annular gap. One high-voltage lead from the transformer is connected to the copper coatings of the glass tubes and the other lead is connected to the aluminum tubes. When the current is turned on a violent electrical discharge takes place between the inner surface of each glass tube and its inclosed aluminum tube, thereby changing the oxygen of the air in the annular air gaps into ozone. A centrifugal blower mounted on the top of the case blows air into the ozonizing chamber and through the generating elements, thence through the screened opening in the front of the box into the room. One small switch on the top of the case is used to put the entire apparatus in or out of service. The other, a three-point switch, serves to connect the transformer to the ozonizer for generating ozone in amounts to suit varying conditions of congestion, humidity and other requirements.

S. D. Barnett, New York, N. Y., is attending the convention in the interests of Randall graphite sheet lubricator, manufactured by the Strong-Carlisle Hammond Company, Cleveland, Ohio. Mr. Barnett also represents the Nickel Chrome Car Wheel Company.

* * *

The Nachod Signal Company, Philadelphia, Pa., is exhibiting at space 142 a track model with cars operating on it to show the LD signal which is used for single track. The company is also showing, for the first time, a new signal box hanging, which greatly reduces the cost of erection.

* * *

Charles E. Smith, manager of the electrical department of the Standard Paint Company, New York, has an attractively decorated booth but no exhibit at space 277. This company's widely used P. & B. insulating products have now been on the market for over twenty years. Harold E. Lavelle is also present at the convention.

* * *

Standard Underground Cable Company is exhibiting at space 282 an extensive line of its products, including cable accessories, as well as bare and insulated wires and cables. The two special features of this exhibit are a terminal pole showing its multiple D. O. A. terminals connecting a 25,000-volt underground, three-conductor, lead-covered cable to an aerial line and a 5,000-volt subway junction box.

* * *

Portable electric track tools in operation are shown by the Chicago Pneumatic Tool Company at spaces 100, 102, 104. Among other tools are track drills for bonding, screw spike drivers, grinders and a complete line of hand drills from 3-16 in. to 2-in. drilling capacity. The company also has in operation a 450-ft. belted compound air compressor, furnishing compressed air for the various exhibitors. Its pneumatic hammers and drills are also on exhibition.

* * *

The exhibit of the Universal Trolley Wheel Company, space 343, contains two interesting trolley novelties. One is an independent center trolley wheel which reduces scrap from pounds to ounces and which is so constructed that interlocked pockets in the axle regulate the flow of grease from the lubricating chamber in the hub. The other novelty is a quick-detachable, non-rivet contact spring which can be placed in the harp in a few seconds without removing the pole from the car. The exhibit is cared for by L. J. Tetlow, L. H. Kendall, H. L. Bancroft.

* * *

A full line of Expansion boring tools, including a new "2 in 1" boring tool for steel wheels is being displayed by the Matthews-Davis Tool Company, St. Louis, Mo., in space 119. The "2 in 1" tool makes both the roughing cut and the finishing cut. It is asserted that this tool increases the efficiency of a boring mill over 50 per cent. It has quick, accurate micrometer adjustment for each pair of cutters. The company is also showing a new micrometer caliper which permits taking the size of the axle to be fitted, making the calculations for hydraulic fitting without having to transfer the size with an inside caliper.

* * *

The Recording Register & Fare Box Company, New Haven, Conn., whose exhibit is located in space 130, Machinery Hall, is exhibiting six types of fare boxes, two types of fare registers and its line of well-known self-lubricating trolley wheels. The fare boxes include samples of the types recently furnished to the United Railways Company of St. Louis and the Public Service Railway, New Jersey. There is also a registering fare box for tickets and cash. It registers all the cash and then returns it to the conductor; the tickets are retained in a drawer and are accessible only to a duly authorized person. Other novelties are a box designed especially for the Boston Elevated Railway and the No. 8 fare box, which is similar to No. 5, but simpler in construction.

* * *

An original application of electricity to the heating of cars is being displayed by the Gold Car Heating & Lighting Company, New York, N. Y., at space 217. The principal part of this device is an iron pipe which runs under the longitudinal seat of the car and which contains a small quantity of water. The outer side of the pipe is surrounded with a radiating coil of wire, while a resistance coil is inserted in a jacket at one end of the pipe. The entrance of current heats the water, which thereupon circulates freely throughout the pipe for the full length of the car. It is stated that this system gives more efficient radiation for a given amount of current than other heaters. In fact, not more than 9 amp were necessary in a given case as compared with 12 amp to 14 amp for the ordinary type of electric heaters. The company is also exhibiting its new ventilated-core electric heaters. The merits of these devices are being explained by Edward E. Gold, E. B. Wilson, J. M. Stayman, F. H. Smith, F. Cahill.

* * *

The Western Electric Company is perhaps unique at the convention, in that not only is its apparatus shown in its regular exhibiting space but Western Electric telephones appear at every other exhibiting space throughout the convention halls. In its spaces 238 to 240 a complete railroad train dispatching system is set up. This consists of one dispatcher's outfit and three way stations equipped with the No. 50 type selectors and the various types of telephone sets which are used in this class of service. These telephone sets include the Western Electric and Van Akin telephone arms, the No. 1020 type arm and a new folding bracket type, the well-known desk stand and a variety of other telephone details. This equipment is the same as that in service to-day on over 50,000 miles of steam railroad in the United States. It clearly shows the recent advance of the telephone, which is rapidly replacing the telegraph for railroad work.

* * *

In view of the agitation regarding the standardization of drawbars the exhibition of the W. T. Van Dorn Company in Aquarium Court is one of timely interest. During the past year this company has developed at least six new coupler heads, each designed to conform to recommendations made by the standardization committees and to be interchangeable with couplers of the M. C. B. type. The very latest Van Dorn drawbar head contains many new automatic features. It not only couples and uncouples automatically, but it is so constructed that the train air line, signal system and heating pipes are automatically connected or disconnected by the same operation. This coupler is not built along M. C. B. standards, but by the aid of a small auxiliary casting it may be coupled with the M. C. B. type of head. Another new coupler shown is the Van Dorn No. 40. This is an M. C. B. radial drawbar which through the use of a pivoting head is adapted for abrupt changes in grade. The head is supported and kept in alignment by strong springs located at the top and bottom of the casting and just back of the head. Practical demonstrations are made showing the ease with which this head can be coupled with the Major M. C. B. head and exploiting its practicability on lines where abrupt breaks in grades occur. The company is also showing for the first time its No. 41 drawbar, which has a 14-in. knuckle, thus affording unusual vertical play. This drawbar has a centering arm and butting wall and other exclusive advantages. It was designed especially for interurban service. Many other types of couplers are also exhibited.

Poole Brothers, Chicago, Ill., are showing in space 315 an attractive line of booklets, time-tables, folders, tickets, etc.

* * *

Niles Car and Manufacturing Company, Niles and Cleveland, Ohio, did not bring a car to Atlantic City this year, but has its headquarters at space 273, where J. A. Hanna and F. C. Robbins may be found.

* * *

The McQuay Norris Manufacturing Company, space 308 Building No. 3, is quoting some very interesting data on the results of using "Leak-Proof" piston head packing rings for air compressor, pump, and engine service.

* * *

The Detroit Steel Products Company is showing in space 168 an interesting model demonstrating Detroit Fenestra solid steel window sash which has been used in the new power station of the Boston Elevated Railway and other modern power houses and carhouses.

* * *

Holland roller-bearing bases, anti-friction pin bases, trolley harps and wheels, and sleet cutters are the principal features of the exhibit of the Holland Trolley Supply Company, Cleveland, at space 414. Mine trolley harps and a mine roof drill are also shown.

* * *

Samples of Galco, the new material for use in headlinings and other interior finish of cars, are at space 186. This material is manufactured by the Gardner Artificial Lumber Company, Barberton, Ohio. The general sales agent is the Marflo Railway Appliance Company, Cleveland, which is represented at the convention by J. P. Henderson.

* * *

Wonham, Sanger & Bates, New York, N. Y., report an order for 900 H-B wheel guards from the Chicago Railways Company. This is in addition to an order of some time ago for 2500 equipments now in service. The Chicago City Railway Company has also ordered 576 H-B wheel guards in addition to 1800 already in service. This guard is now standard on all surface cars in Chicago.

* * *

The Adjustarod is a new "deadman" anchor rod which is being exhibited by Crouse-Hinds Company, Syracuse, at space 216. It is a combination of clamp, pulley, swivel, rod, washer and base-nut, which affords facilities for tightening. The exhibit also includes arc and incandescent headlights, condulets and guy anchors. Literature pertaining to these products is provided for distribution.

* * *

The combination light and trolley poles which are being shown by the Electric Railway Equipment Company, Cincinnati, Ohio, at space 419, are attracting a good deal of attention. There are samples of a number of styles and two poles outside the booth are connected up and lighted. The exhibit includes a very complete display of line material for both regular and catenary construction.

* * *

The new coin register for use on prepayment cars which is shown for the first time by the International Register Company is one of the big attractions in Building 2. This register automatically registers pennies, nickels and dimes and automatically records these in 5-cent fares. When quarters are put into the hopper they are not recorded but are retained at the top so they may be readily withdrawn by the passenger.

* * *

The Baldwin Locomotive Works have on exhibition at spaces 105 to 111 three types of trucks. One feature of the exhibit is the actual weighing of a truck which is suspended from a dynamometer and shows that every pound of truck, (exclusive of wheels, axles and boxes) will sustain six pounds of load. The specifications for these trucks are being distributed in the form of a special pamphlet. The company is represented by S. A. Bullock, Wallace R. Lee, W. B. Keys, C. F. Dodson and C. H. Peterson.

* * *

An innovation in weatherproof windows and fixtures for street and interurban railway car windows is being displayed at spaces 374, 375, by the Transportation Utilities Company, New York. The operation of the window-sash is made easy and positive according to an entirely new design. Different types of weatherproofing make the designs applicable to any particular arrangement of car windows on both old and new equipment with either single or double sash. The weatherproof window arrangements displayed are said absolutely to prevent the admission of wind, dirt, cinder, etc.

* * *

The exhibit of Forsyth Brothers Company, Chicago, Ill., at spaces 342, 344, demonstrates what can be done with pressed-steel units in car construction. This company is showing its unit pressed side sections, which are being used in the construction of some of the latest types of all-steel cars. These sections are made in several styles. When assembled with sills and plates these unit-sections form a truss of the entire side of the car. They reduce the number of parts, joints and rivets to a minimum and may be used in building any type of car. The company is also showing brass sashes suitable for any type of car, and several other types of self-adjusting metal sashes which are being used on cars built both for steam and electric railway service.

* * *

Steel wheels are being exhibited this year by the Lobdell Car Wheel Company. The special features of these wheels are strength, lightness and compactness for a spoke design of special open-hearth steel and heat-treated. The company's special process insures an extremely hard flange and tread section and one that is of uniform hardness all the way through. One-wear steel wheels are furnished for roads not having shops equipped for turning steel wheels to a smaller diameter and for roads desiring a light durable steel wheel with a very hard tread and flange. These are essentially the same as the standard types excepting that the rim is much lighter. Lobdell one-wear wheels are adaptable for any service from electric locomotives to storage battery cars. The company also has a capacity of over 600 chilled-iron wheels a day.

* * *

Feralun, one of the Amco products manufactured by the American Abrasive Metals Company, New York, N. Y., is exhibited in several forms at space 437 on the north aisle near Convention Hall. H. W. Mowery, of the New York office, and J. P. Warfle, of the Philadelphia office, are in attendance. Types of safety treads for cars and plates of Feralun on steel steps are shown. Feralun safety treads are applicable also on station stairs and wear indefinitely. In power houses this material is available for steps or floor plates as it does not get slippery even when covered with oil. To illustrate another quality of Feralun, an interesting contrast is shown by means of a cast iron plate which is subjected to a special torch flame for six minutes. This burns a hole through it, while a Feralun plate of the same size subjected to the same test shows no signs of deterioration. This quality of Feralun makes it invaluable for fire-door liners, grate bars, etc. It is being so used by the Brooklyn Edison Company, New York Edison Company, Interborough Rapid Transit Company and others, but owing to its recent application to these purposes its exact value in this line is not determined, although it has already shown decided superiority over the ordinary materials used. Ash removal system parts subjected to excessive abrasion, as well as crusher parts, pumps, and other pieces of similar apparatus, are also made of this material.

The motor gear and pinion department of the E. W. Bliss Company, of Brooklyn, N. Y., is represented at the convention by B. W. Stone.

* * *

Sterling Varnish Company has spaces 429 and 430, near the farther end of the Pier, where it is welcoming its many friends. The company is represented by H. C. Todd, A. S. King and W. F. Hebard.

* * *

The exhibit of the Duff Manufacturing Company, located at space 431, contains a complete line of its products, which include Genuine Barrett jacks, ball-bearing jacks, Duff-Bethlehem jacks and motor and armature lifts.

* * *

O. H. Reynolds, associate member representing William Jessup & Sons' Steel Company, New York, is present at the convention in the interest of the railroad steel business of the company. Mr. Reynolds was formerly mechanical engineer of the Northern Pacific Railroad, and later New York editor of the *Railway Review*.

* * *

L. Zink, foreman blacksmith of the Detroit United Railway, is showing in the booth of the Baldwin Locomotive Works, spaces 105, 107, 109, 111, a new brakeshoe adjuster which has attracted the attention of mechanical men. This device takes the place of the ordinary turnbuckle for taking up the wear of brakeshoes and of steel wheels.

* * *

N. W. Halsey & Company, dealers in investment bonds, are located in space 10, Building No. 1, and H. D. Robbins, representative of the company, is in attendance discussing financial matters with railway officials. Mr. Robbins reports that at present the bond market is particularly good. He believes that this condition is natural at a time when the price movements in stocks are uncertain.

* * *

An exhibit of much interest is that of the Cambria Steel Company, located at spaces 321, 323. One of the special features is a pair of "Cambria Special" steel axles, made of steel which is hard, but at the same time so tough that the axles have been twisted cold around each other in the form of a rope. The axles made of this "special" steel have given good service on the cars of the Interborough Rapid Transit Company's lines in New York City.

* * *

The National Carbon Company, Cleveland, Ohio, is giving out a line of educational literature, including the following: "Commutator Slotting," a treatise on reasons and methods with illustrations; "Brush Testing," treating on the best known methods and showing how this company does its extensive brush testing; "Arc Lamp Practice," an extensive and well illustrated treatise on the subject; "Analogies Between Battery Current and Water Flow," a non-technical book.

* * *

The Universal Audit Company, New York, N. Y., engineer in economics, administration and efficiency, is displaying charts showing analysis of commercial organizations in every department, including financing, selling, producing and accounting. The exhibit shows the principal features of a correctly designed organization. These charts are reproduced also in booklet form and distributed at the exhibit at space 415. The exhibit is in charge of H. F. Stimson and Frank G. Shinn.

* * *

The Charles N. Wood Company, Boston, Mass., is exhibiting at space 305 the electric railway signal of the Electric Railway Signal Company. This signal is designed for use on city and suburban roads operating cars at moderate speeds and gives its indications by semaphore arms as in steam railroad practice. No lamps are used in the signal circuit, although the semaphore arms are illuminated by reflected light at night. The operation of the signals is explained by the inventor, W. M. Chapman.

* * *

The exhibit of the J. W. Paxon Company, located at space 249, is unique in that it is the only one of its kind at the convention. The company makes a special feature of the steel-wire frog and switch broom equipped with chisel point for cleaning grooves, frogs, switches and special work. In connection with this is also being shown an extensive line of wire and bristle brushes as well as brooms adaptable to all purposes and uses on tracks, cars or power houses. Another feature is a set of circular brushes used in the Nichols system of car cleaning, as mentioned in one of the convention discussions.

* * *

Le Roy Scott, general sales manager Federal Storage Battery Car Company, Silver Lake, N. J. (Beach cars with Edison storage batteries), is apologizing to the many that expected to see one of the latest type Beach cars in operation at Atlantic City during the big show. Mr. Scott is in fine humor and says he is happy because his company has just advanced another step by closing an order for its first storage-battery three-car train to be operated by the multiple-unit system of control, in through service on a steam road. Mr. Scott reports the company's new factory "chock-a-block" with battery cars and that it could not beg, borrow or steal a car from the lot under way or finished to show at the convention this year. Ralph Beach, president, will be at the Marlborough-Blenheim Thursday to see his friends and look over car accessories.

* * *

This year's exhibit of the Pennsylvania Steel Company, located at space 187, possesses many interesting features which have not hitherto been covered by exhibits of this character. The celebrated Mayari steel is represented by rods bent into peculiar shapes and turned to show the possibilities of this steel for the finer parts of automobiles and light machinery requiring superior quality of metal. There are also planer chips demonstrating the difference in the quality of open-hearth steel and bessemer steel The exhibit of street railway frogs, mates and switches of various kinds shows an exceptional quality of excellence in this product. An entirely new feature in the action of an automatic switch stand is also shown. This consists of a special crank and lug which operates a pin that shears off when the switch is trailed through, thus saving the parts of the switch stand from being broken and making a very inexpensive feature in repairs to the stand.

* * *

The Midvale Steel Company's exhibits are at spaces 433 to 436 at the end of Pier near the entrance to the Greek Temple. One of the most interesting of these is a sample of a properly heat-treated locomotive driving axle and a motor-truck axle for electric service. The descriptions from the company's testing laboratory giving the physical properties and the method of producing this quality of steel throw considerable light on this much-discussed subject. Another interesting exhibit for electric railway service is a pair of axle-mounted rolled-steel wheels which have been mated for hardness or carbon content as well as for diameter. Heretofore the latter feature only has been considered important in the mating of wheels, but this exhibit will give food for thought to those who are interested in the uniform wear of wheels where hardness is shown to be such an important factor in pairing. Another exhibit shows a pair of rolled-steel wheels which have already demonstrated their phenomenal wearing qualities by running 80,000 miles without a single turning of the treads. Various types of steel-tired wheels are also shown.

THE WHARTON EXHIBIT

The exhibit of Wm. Wharton, Jr., & Company, Inc., adjoining the main lobby, is unique. Instead of showing the usual variety of special track work, there are exhibited quite a number of pieces which have been in actual service a long time. These pieces were secured from the company's customers and information was obtained of the service which they had given. These records and the appearance of the pieces give most striking testimony of the excellence of the designs and constructions, especially of the great wearing qualities of Wharton manganese steel. The manganese steel parts or centers in all the pieces exhibited are perfectly tight and solid, after having sustained a large amount of traffic, while the adjoining parts are entirely worn away. The whole exhibit tends to prove the general uniformity and reliability of the Hadfield treated manganese steel, of which this company has the exclusive use.

There is shown a manganese steel keyed-in center frog which had been subjected to the traffic of 2,865,000 cars in eight years. The center is absolutely tight and good for considerably more service; the adjoining rails are worn so that they are cut through by the wheel flanges. A solid manganese steel T-rail frog was in service five years under heavy traffic of an elevated railroad for the entire period and actually outlasted twelve plain rail frogs without allowing for increased traffic. A heelless tongue switch, which has seen over four years of service, during which time about 1,650,000 cars passed over it, illustrates the reliability of the metal and the design. There is also exhibited part of a track crossing from slotted underground conduit work. This was in service six years and four months, during which time the tremendous traffic of approximately 5,200,000 cars passed over it. Another exhibit is a cast manganese steel girder rail which has seen over seven years of hard service, equal to the life of three and a half Bessemer rails; it shows little wear and was removed from the track on acount of changes and not because it was worn out. There are several other pieces with similar records.

Some new, recently manufactured samples of girder rail work in solid manganese steel and keyed-in hard centers are also displayed to prove the present-day excellence of Wharton work.

NEW ALLIS-CHALMERS TRACTION BRAKE COMPRESSOR

Among the exhibits made by the Allis-Chalmers Company is its new Type AA-7 air compressor for air brake service. In general the motor follows railway motor construction. One feature is that the armature is constructed upon a sleeve which enables the shaft to be pressed out and a new one to be inserted without rebuilding the armature. The commutator is similarly assembled. The field frame is split, allowing the entire armature to be taken out with little difficulty. The gears are of the herringbone type. The pinions are hard and tough and the wearing qualities are greatly increased by the use of the high carbon steel and heat treatment. The crank shaft is drop-forged and heat-treated. The cylinders of the compressor are fitted with interchangeable bushings. This construction gives a close-grained homogeneous iron in the cylinder bushing and permits replacement of bushings due to wear without reboring the compressor body. In fact, an interchange of bushings and pistons can be made with the compressor in place on the car if desired. The cylinder head is of pipeless construction; that is, the suction and discharge ports register with ports in the compressor body and the suction and discharge pipes connect directly to the compressor body. By this construction the cylinder head may be removed without interfering in any way with the piping. A combination of splash and forced lubrication insures an abundance of oil at all points of friction in the compressor. While primarily designed for air brakes on electric cars and locomotives, it is equally suited for stationary work of any description where compressed air is required up to 100 lb. pressure.

THE LORAIN EXHIBIT

In its exhibit this year the Lorain Steel Company has displayed the "Tadpole" tongue switch in great variety in addition to an interesting exhibit of manganese-steel switch pieces. The "Tadpole" switch is shown in the well-known "Guarantee" brand in 9-in., 7-in. and standard T-rail sections, also in the cast-iron bound design in 9-in. construction and 7-in. and 9-in. construction in solid manganese steel. In this array of tongue switches will be found designs to meet every condition of track service, from the 350-ft. radius switch for steam or interurban railway traffic to the lesser radii necessary in carhouse entrances. The exhibit further contains solid manganese steam crossings in several types and shows the use of manganese steel in the varied forms of frogs, mates, crossings, switch points, etc.

The electrical welding department shows a new form of head-supported electric weld rail joint which is being adopted by most of the users of this form of rail joint. It consists of the usual form of splice bars with an extension reaching nearly to the underside of the railhead, the space between the bar and rail being filled with hot spelter in wedgelike form which prevents any movement and which gives support to the head at and on both sides of the rail joint proper. The company is represented by P. M. Boyd, secretary and treasurer; Carrol Burton, assistant to president; E. B. Entwistle, chief engineer; Frederick Glenton, H. C. Stiff, W. Milt Brown, H. F. A. Kleinschmidt and A. L. George of the general office; and Major H. C. Evans, F. J. Drake, Joseph MacCarroll, A. L. Verner, W. W. Kingston, A. S. Littlefield, D. P. McGough, S. P. D. Ellis and James M. Brown of the sales offices.

AUTOMATIC BLOCK SIGNALS

From the exhibit of the Union Switch & Signal Company, space 300, those interested in the matter of light signals have an opportunity of observing them at a distance of 1000 ft. and under daylight conditions. Types of this variety of signal are installed on the roof of the Hotel Columbia and are controlled from the exhibit. Light signals also are in operation on the tower at the entrance to the Pier. At the Aquarium a style "B" semaphore signal, a duplicate of that on view at the company's booth, is in constant operation. The working models of single track automatic block signal installations, which are, perhaps, the most important feature of this exhibit, show clearly the operation of signals, controlled by continuous track circuits. Most of the layouts are arranged in accordance with conditions shown diagramatically in the report of the joint committee on block signals for electric railways and therefore should be of special interest to railway men. In this connection the company is distributing Bulletin No. 57, which treats the subject in a very extensive manner.

ADDITIONAL LIST OF EXHIBITORS

Lubricating Metal Company, New York, space 187. "No-Heet" bearing, metal. Represented by T. H. Soule and Howard Crane.

Steel Tie Specialty Company, Cleveland, Ohio, space 189. Kohlmeyer clips for fastening rails to steel ties. Represented by James B. Hoge and M. F. Kane.

Whittier Mills Company, Chattahoochee, Ga. "Spiral" waterproof trolley and arc lamp cord at space 43½. Glenn H. Thomas, sales manager, is in charge.

Kerite Insulated Wire & Cable Company, New York, spaces 316-318, Building 3. Kerite insulated wires and cables. Representative, J. A. Renton.

Electric Railway Journal

DAILY EDITION

Published at the Annual Conventions of the American Electric Railway Association and Its Affiliated Associations

VOL. XXXVIII NEW YORK—OCTOBER 13, 1911.—ATLANTIC CITY No. 15D

PUBLISHED DAILY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK
MILLION-DOLLAR PIER, ATLANTIC CITY
JAMES H. MCGRAW, President; C. E. WHITTLESEY, Secretary.

CHICAGO OFFICE.....Old Colony Building
CLEVELAND OFFICE.....Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code.

Copyright, 1911, by McGraw Publishing Company.

TERMS OF SUBSCRIPTION

Subscription including regular weekly issues and special daily editions published from time to time in New York City or elsewhere, postage prepaid:

United States, Cuba and Mexico	$3.00 a year
Canada	4.50 a year
To all Other Countries	6.00 a year
Single Copies	.10 each

Application made at the Post Office at New York for entry as mail matter of the second class.

Of this issue of the ELECTRIC RAILWAY JOURNAL, DAILY EDITION, 9,500 *copies are printed.*

NEW YORK—OCTOBER 13, 1911.—ATLANTIC CITY

PROGRAM FOR TO-DAY

LAST CONVENTION MEETING

9.30 a.m. Closing Session of Engineering Association, Marine Hall, Convention Pier.

ENTERTAINMENT

10.00 a.m. Amateur Exhibition, Ocean End of Convention Pier.

10.00 a.m. Obstacle Golf, Lawn of Marlborough-Blenheim Hotel.

8.30 p.m. Musical Program, Exchange of Marlborough-Blenheim Hotel.

9.30 p.m. Informal Dancing, Marlborough-Blenheim Hotel.

Safeguarding Fares

The most important features of the report of the committee on fares and transfers, presented yesterday before the Transportation & Traffic Association, relate to methods designed to safeguard the receipts of conductors. The committee expressed surprise at the slow progress in the methods of collection and registration of fares, and it is very evident that in so doing it has called attention to one of the possibilities for improvement in railway operation. It is clear that, notwithstanding the prepayment principle and other improvements that have been introduced by many companies, there is still room for advances. It is unfortunate that the companies are obliged to consider so seriously the necessity of protecting themselves against careless and dishonest employees and that part of the public which is anxious to ride free. While it is true, as the committee says, that definite steps should be taken to insure accuracy of records and returns, the problem should be considered from the two standpoints of mechanical device and improvement in the men. Both should be contributory causes of better results. The work allotted to the committee seems so large for one committee that it might be wise to confine its researches to the one subject of greatest importance with which the report deals, the collection and registration of fares.

The Reports on Education

Two reports on education have been submitted at this convention—one Monday at the American convention by the committee of which Prof. Norris is chairman, the other by the Engineering committee on engineering apprentices. Each discusses a different phase of educational work, and one which has not previously been considered at length by either association.

The electric railway business is so new that there has not been time to develop a large number of workmen who are sufficiently versed in electric railway practice to carry on maintenance work properly. At the same time, the business is so old and maintenance methods have become so far standardized as to make it worth while for men to learn the trade and for railway companies to encourage them in doing so. Times have changed since the early days when any bright machinist or workman could acquire in a short time the special knowledge required for inspection or repair work on electric railway properties.

While the reports of the two committees are on different subjects, in a sense they are supplementary to each other. The report on engineering apprentices recommends a regular apprenticeship course of four years for shop men, although it devotes its attention toward advocating particularly the education of men engaged on the work of car repair. The report of the committee of the American Association describes a correspondence course conducted last summer under the auspices of the association among twenty-seven men on the properties of five company members. The results obtained in the comparatively short time during which this course was in progress lead the committee to recommend a continuation of the experiment on a somewhat larger scale, and the committee has wisely, we think, added a recommendation that each student should bear a portion of the expense. This will make each man realize that the service which he is receiving is one involving sacrifice on the part of himself as well as of others, and this knowledge should be an incentive to good work. A larger number of students and a longer course are recommended for next year.

A correspondence course such as was conducted by the committee on education last summer and is proposed for next year when compared with school instruction suffers, of course, under the handicap of distance from the instructor. This handicap should be less, however, than in most other correspondence courses, because the students, instead of being isolated, are together on one property. There is not the same chance that individuals among them will become dis-

couraged as there is when each man works alone. There would be an esprit de corps which would maintain the interest of all in the work. On the other hand, the course has the advantages possessed by all systems of instruction by correspondence in that it compels each student to express his ideas in writing, and it is a maxim in education that the necessity of giving written expression to one's ideas induces accuracy and clear thinking.

There is no doubt that both courses would be most efficacious in developing the high grade of shop men for whom there is a great need on electric railway properties at present. The principal question which will be raised, we think, by railway companies will not be in regard to the intrinsic value of either course to either the company or to the man but as to whether the company which defrays the expense of this instruction is likely to be the final beneficiary. In other words, the question will arise whether the student will not be disposed, after finishing his course, to demand higher wages under threat of going to another company.

This objection, of course, is old, and it has been urged against the establishment of all apprenticeship courses, because in practically all of them the apprentice is paid, in wages and in the time taken to teach him, more than his services are actually worth. Undoubtedly there will be some defections. Nevertheless we believe that this condition will be largely counteracted by the natural tendency of most men to remain in the place where their work is giving satisfaction, and where they are receiving fair remuneration. This, we should think, would be especially true with men who have spent several years learning the details of electric railway repair work, because the special knowledge thus acquired would be less likely to be of value to them in any other industry than if they were simply good machinists and could readily work in any shop.

Economy in the Power Station

No fact is unhappily more familiar to the station manager than the failure of his equipment to give the expected degree of economy. Station design for high efficiency is now a familiar art, but between design and performance there is too often a great discrepancy. The study of the various causes of inefficiency in operation is a very important duty of practical engineering, and Mr. Stott's admirable report on developments in the generation of steam, read Wednesday at the meeting of the Engineering Association, points the way to most useful improvements on ordinary practice. As a glance shows, Mr. Stott deals directly with the problems of boiler and furnace economy. The fact is that in a great power station the prime movers and the electrical equipment of the plant have now been so well worked out that, while improvement, here as everywhere, is possible, it does not in point of absolute efficiency promise anything nearly so considerable as improvements in the generation of the steam.

Modern turbo-generator units give very high efficiency over a wide range of load and on the basis of their efficiency curves should require very low fuel consumption. From actual experience these theoretical expectations are not met even approximately. The steam performance, all things considered, including auxiliaries, is never quite so good as it should be, considering the known efficiency of the turbine itself at various loads, and going back a step further the generation of steam will in every case show the chief cause of failure of the system to reach its theoretical efficiency. From the known performance of the high-grade water-tube boilers used in most recent power stations the coal consumption, assuming first-class fuel, should closely approach 1 lb. per hp instead of approximating or exceeding 2 lb. To put it broadly, the consumption of fuel of supposedly known thermal value is always notably, and sometimes very largely, in excess of what should be necessary from the known possible performance of the boilers for the supply of the requisite amount of steam.

Mr. Stott's suggestions are largely in the direction of checking the boiler performance and of keeping constant watch on conditions that promote boiler efficiency. Perhaps the largest single item that makes for inefficiency in the fire room performance as between coal and steam is uncertainty as to the practical thermal value of the fuel. It is one thing to make calorimetric tests of fuel and quite another thing to secure anything like these thermal values day in and day out under a boiler. Any of the familiar forms of calorimeter secure practically complete combustion, a condition which is never met on a large scale. A systematic study of the relation between coal supplied and ash rejected when using fuel of known calorimetric value would open the eyes of many an engineer to imperfections of furnace design and operation. One of the instruments referred to by Mr. Stott provides for the systematic and continuous measure of the fuel supplied, for instance to an automatic stoker. This in conjunction with a steam meter ought to give a continuous record of very great value.

Furnace design for maximum economy of combustion is the one thing in power plant economy now most in need of persistent attention. Mr. Stott points out the difficult conditions of varying load that must be met by the boiler and furnace, and his point that the boiler room equipment should be designed for maximum operating economy at the average load of the plant is well taken. There must, however, always be provision for effective forcing of any of the boilers even at some loss of economy. The methods of possible forcing are several. The use of duplicate stokers to which Mr. Stott refers and which is already practised by the Twin City Rapid Transit Company is a very feasible scheme, of which the economy, however, is not fully determined. The use of auxiliary oil burners in connection with ordinary furnaces seems to us also a promising method of doing the same thing. It is substantially the method used by the Denver Gas & Electric Company for quick firing of boilers in case of trouble on the transmission lines, and it is there found that the oil burners can be put into full action and the forcing process begun in three minutes. No method of forced combustion seems more prompt or more likely to be useful in emergencies, and while the full economy of a duplex coal and oil burning furnace has probably not yet been worked out, the plan seems deserving of more extensive trial particularly in places where reasonably cheap oil can be obtained.

Segregation of Freight and Passenger Costs

The adoption of the basis for segregation of passenger and freight expenses suggested by the joint committee whose report was considered Wednesday by the Accountants' and Transportation and Traffic Associations would lead to uniform results. We agree with the committee that that is the principal advantage to be obtained now from the use of a system of this nature. It is significant of the difficult nature of this task that the members of the committee reach the unanimous opinion that all items of expense that can be charged directly should be so charged. Other items, in the judgment of the committee, should be charged on the basis of proportionate car mileage or gross earnings. It would be interesting to know what results are secured from the application of the plan. It will not meet all the permanent needs of the industry if a scheme of this character is adopted for the sake alone of introducing uniform methods, but it will be a step in advance and the results secured may furnish data for further study of costs that will lead to a scientific separation of expenses which appears to be impossible now. Differences of opinion between competent authorities regarding the fairness of segregation of costs between departments are so radical that it is to be hoped the method outlined will be given practical tests in operation.

Conventionalities

The delegation from Iowa this year has no head, but is a strong body, which includes among others, L. D. Mathes, Dubuque; Frank J. Hanlon, Mason City, and Brother Cass, of Waterloo.

Bill Bloss, who oscillates through Indiana with a view to congesting the manufacturing plant of the Ohio Brass Company with big orders, says he is only here for a few days and so is making the best of it.

Ask C. J. Franklin, general superintendent Portland (Ore.) Railway & Light Company, whether he really believes in discipline. That is to say, what is etiquette when a policeman tells you to crawl under a rope?

Daniel M. Brady, president of the Brady Brass Company, arrived in Atlantic City Wednesday evening on the Pennsylvania Railroad and he emphatically states that it was the Pennsylvania and not any other road.

It is a long journey from Fargo, N. D., to Atlantic City, N. J., but Curtis P. Brown, manager of the Fargo & Moorhead Street Railway Company, made it and he says that in his opinion this convention is very well worth the trip.

There was a run on the drug stores yesterday morning for court plaster, arnica and witch-hazel by the contestants in Wednesday night's athletic carnival. No serious casualties are reported, however. Red Cross Campbell had little to do during the battle.

Ed. Faber's program for Thursday was run exactly on schedule, as are the trains of the Great Third Rail Route from Chicago to Aurora and Elgin. The aforesaid program was noted to contain several periods devoted to having a picture took on the Boardwalk.

Fred Stockwell, of the Barbour-Stockwell Company, finding that he could not escape the insistent demands for certain special work by hiding in the maze of the convention, has fled to his Massachusetts home. Daffydil—What made Charles Rufus Hot (Harte)?

LOST—Sam McGough is very much disturbed over the loss of his first name from the official registration list. Evidently in registering Sam the typist suspected that the Mc part of his name stood for Mike and something else, thus making the Sam part of it redundant.

C. G. Chamberlin, the handsome young representative of the Devoe & Reynolds Company, is again shaking hands with his many friends, and the only thing to be commented on besides the natural beauty of this popular young man is the stunning way in which he wears his cane.

James Anderson, president of the Canadian Street Railway Association and general manager of the Sandwich, Windsor & Amhertsburg Railway, was seen busily engaged in explaining to his innumerable friends just why his two-year-old reciprocity prophecies were a little in error.

C. B. Fairchild, Jr., statistician, Chicago City Railway, and Mrs. Fairchild sauntered up and down the Pier, but it is understood that the sauntering was not so very good for the first few hours after their arrival. Probably this was because of their many friends greeting them so often.

F. D. Norviel, general passenger and freight agent Indiana Union Traction Company, after witnessing Witmer's flights with the Curtiss hydro-aeroplane yesterday afternoon immediately made arrangements with the Curtiss Exhibition Company for flights at several points on the lines of the Indiana Union Traction Company. The first flights of the series will take place at Anderson, Ind., on Wednesday, Oct. 25. The flights will probably be made by C. C. Witmer.

Charles A. Lindstrom, chief mechanical engineer of the Pressed Steel Car Company, Pittsburgh, Pa., arrived in Atlantic City Thursday morning with his two daughters. He came to help out W. H. Wilkinson, of the New York office of the company, who has been kept busy as chairman of the roller chair committee.

"Charlie Jones" ordinarily would be considered an easy name to transcribe on a typewriter, but somehow or other the machine stuttered and now the genial superintendent of transportation of the Aurora, Elgin & Chicago Railroad is down in black and white as H. J. Jones, which name, to him, does not mean anything.

George Keummerlein, Jr., superintendent of transportation, The Milwaukee Railway & Light Company, has the distinction of being the only really and truly railway man who is a full-fledged associate member of the Illinois Electric Railways Association. All the other so-called associate members are either peddlers or pencil-pushers.

It's a safe bet that the Electric Service Supplies Company never knew that its Keystone valves would ever be connected to a pushball, or that the Burdett-Rowntree Company never knew that its air compressor is the slickest thing in the world for blowing up a pushball. If you want to know how the combination worked, ask the pushball men.

J. S. ("Mack") McWhirter, superintendent car equipment Third Avenue Railroad, New York, was seen disporting himself like a dolphin in the surf on Thursday morning fully recuperated from his pushball efforts of Wednesday night. He was chaperoned by George E. Auston, the natatorial expert of Flatbush and Poo-Bah of the American Engineering Company.

President Castle of the Manufacturers' Association yesterday sent to the Dearborn Drug & Chemical Works a letter containing the following well-merited words of appreciation: "On behalf of the American Electric Railway Manufacturers' Association I wish to express our appreciation of your generosity in permitting your Mr. H. G. McConnaughy to devote so much of his time to the arduous duties of the chairmanship of the exhibit committee. Mr. McConnaughy's work in this connection has reflected great credit upon both himself and the association."

Through the kindness of a judge whose "quality of mercy is not strained," Thomas A. H. Hay, president Northampton Traction Company, Easton, Pa., was permitted, almost at the last moment, to visit this convention accompanied by his rosy cheeks and a dress suit. It takes more than a little litigation to keep the "Man from Montana" away from his fellow-magnates. Mr. Hay's brother, W. O. Hay, vice-president, general superintendent, purchasing agent and a few other things of the Northampton Traction Company, reached the convention first. He is accompanied by his son, who is going to follow father's footsteps when his college days are over.

J. G. White & Company extended a dinner Wednesday evening at the Marlborough-Blenheim to the representatives of its various railway properties and to those from the New York office at the convention. The railway companies represented at the dinner were the Tri-State Railway & Electric Company, Steubenville, O.; Eastern Pennsylvania Railways Company, Pottsville, Pa.; Wilmington & Philadelphia Traction Company, Wilmington, Del.; Tri-City Railway Company, Davenport, Ia.; Augusta Railway & Electric Company, Augusta, Ga.; Oklahoma Railway Company, Oklahoma City, and the Manila Electric Railroad & Light Company, Philippine Islands. The officials of these companies were greeted by the nine representatives of the New York office who are in attendance at the convention.

THE NEW PRESIDENT

Thomas Nesbitt McCarter, who is president of the Public Service Corporation and who was elected president of the American Electric Railway Association yesterday, has always taken an active interest in the association, and has attended regularly its conventions. He was born in Newark, N. J., Oct. 20, 1867. He received his early education at the Newark Academy and at Pingry School, Elizabeth, preparing for Princeton University, from which he was graduated in 1888. He studied law at Columbia Law School and in the office of his father, the late Thomas N. McCarter, one of the recognized leaders of the American Bar. Upon being admitted to practice, Mr. McCarter became a member of the firm of McCarter, Williamson & McCarter, which connection he maintained from 1891 to 1899, when he withdrew and began the practice of his profession alone.

In April, 1896, John W. Griggs, then Governor of New Jersey, appointed Mr. McCarter judge of the First District Court, Newark, for a term of five years. After three years' service, however, he resigned. During his time on the bench



Thomas N. McCarter, President-elect American Electric Railway Association.

Mr. McCarter wrote "McCarter's New Jersey District Court Practice," which work is still recognized as standard throughout the State.

After retiring from the bench in 1899, Mr. McCarter was chosen as the Republican candidate to represent Essex County in the State Senate. He was opposed by Samuel Kalisch, who was recently appointed to the Supreme Court Bench by Governor Woodrow Wilson, and defeated Mr. Kalisch by more than 5000 votes. Mr. McCarter was elected leader of his party in the Senate for one year. He had practical charge of the State campaign which resulted in the election of Franklin Murphy as Governor and managed the campaign which led to Hon. John F. Dryden's election to the United States Senate in 1902.

On Jan. 1, 1902, Mr. McCarter retired from the general practice of law to become general counsel of the Fidelity Trust Company, one of the largest financial institutions in the State, of which he had for years been solicitor. In March of the same year he was appointed by Governor Murphy as Attorney General of the State for a term of five years. He was then completing his term as senator and his colleagues promptly confirmed him in his new position as the successor to the late Samuel H. Gray.

Less than a year after he assumed the rôle of legal adviser to the State, Mr. McCarter was chosen to serve with John I. Waterbury, John D. Crimmins, the late A. J. Cassatt and the late E. F. C. Young on a committee to which was intrusted the task of devising a plan for the rehabilitation and development of street railway and other public utility properties in New Jersey. The work of the committee led to the organization of the Public Service Corporation of New Jersey, which took over some eight or ten street railway systems and a number of gas and electric properties in the northern, central and southern sections of the State. As the result of his work on the reorganization committee, Mr. McCarter was prevailed upon by those most directly concerned to accept the presidency of the new company. He retired from the practice of law to devote his energies to his new field of endeavor, and under his management the properties were rebuilt, improved and extended and their activities so accelerated that the gross revenues were increased from about $10,000,000 in 1903 to something like $30,000,000 last year. An organization was developed, so that the railway business, the gas business and the electric business are carried on by the Public Service Railway Company, the Public Service Gas Company and the Public Service Electric Company respectively, leaving the Public Service Corporation of New Jersey as a parent or holding company. The corporations under Mr. McCarter's management furnish one or more forms of public utilities to 193 municipalities, which have a combined population of more than 2,000,000. A description of the railway properties of the Public Service Corporation was made the subject of the Convention Issue of the Electric Railway Journal this year.

SOCIAL EVENTS TO-DAY

As this is the closing day of the convention, the program of entertainment contains no formal events. At 10 A. M., C. C. Witmer will repeat his flight of yesterday afternoon in a Curtiss hydro-aeroplane off the end of the Pier. In the evening there will be music and informal dancing at the Marlborough-Blenheim Hotel. The obstacle golf links will be open in the morning only, and the competition for prizes will close at noon.

TRAINS FROM ATLANTIC CITY

For the convenience of those who may be leaving to-day the following times of departure of trains from Atlantic City for Philadelphia and New York via the Philadelphia & Reading and Pennsylvania Railroads are given.

To Philadelphia—Reading: 9 a. m.; 11 a. m.; 2:40 p. m.; 5:35 p. m.; 8 p. m.

To Philadelphia—Pennsylvania: 9 a. m., electric; 10 a. m., steam; 11 a. m., electric; 12:45 p. m., electric; 2 p. m., steam; 3 p. m., electric; 4:45 p. m., steam; 4:45 p. m., electric; 7 p. m., electric; 9 p. m., electric; 11 p. m., electric.

To New York—Reading: 8:45 a. m., 2:10 p. m.

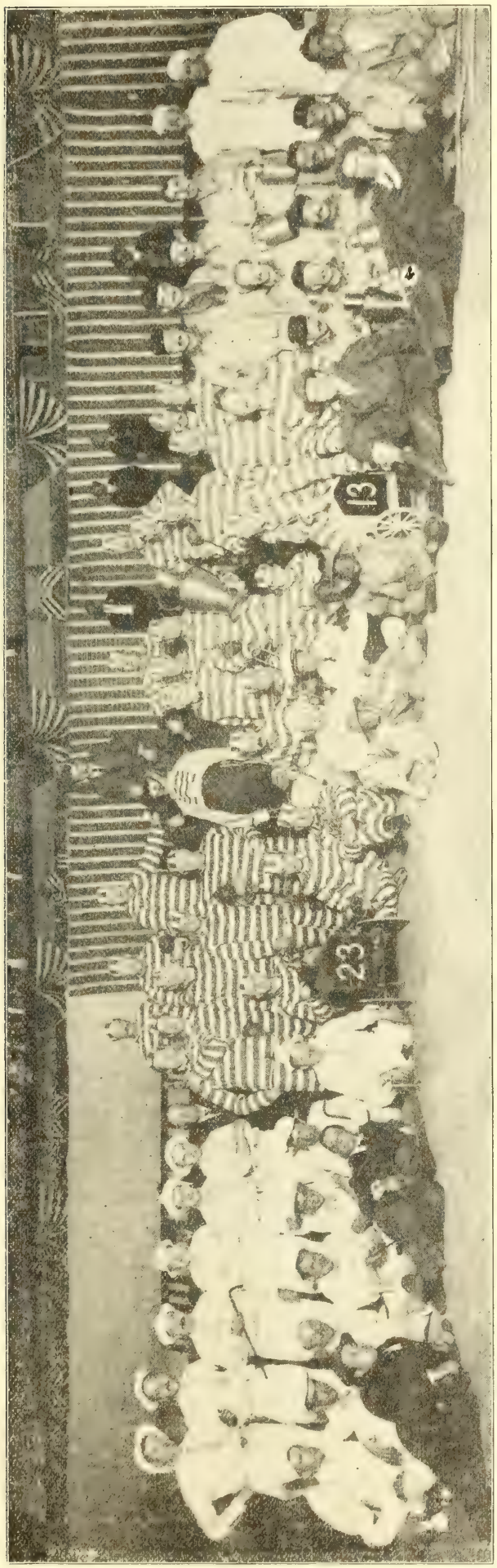
To New York—Pennsylvania: 9:15 a. m., 2:30 p. m.

The Philadelphia & Reading station in Atlantic City is at the corner of Atlantic Avenue and Arkansas Avenue.

The Pennsylvania stations for steam and electric trains adjoin each other, at the corner of Atlantic Avenue and Tennessee Avenue.

PHOTOGRAPHS OF THE ATHLETES

Those who wish to purchase photographs of the group of contestants in Wednesday evening's athletic carnival can do so from Harper Smith, the photographer at the corner of Boardwalk and Kentucky Avenue, Atlantic City. We are publishing this notice because the entertainment committee thought that it would be of more convenience for the delegates and others who wish this photograph to have the notice appear in print rather than to have the photographer circulate on the Pier for orders.



A Group View of the Contestants at the Carnival Wednesday Night.

THE CONTESTANTS OF WEDNESDAY NIGHT

The accompanying photograph shows the doughty athletes in the contest Wednesday night. The victorious "lifers" in the baseball game stand triumphant at the right, with President Brady holding the loving cup in the center. The "stonebreakers" look as downcast over their defeat as though they had been condemned to another twenty years of penal servitude.

Car 23, which proved Wednesday evening that it knew how to "skiddoo" away from unlucky 13, is in the center of the discomfited ball players. The triumphant pushball mechanics are at the right, and the defeated dudes at the left. The policemen, as in the contest and in daily life, are in front of the picture, while the umpire and chairman of the entertainment committee remain modestly in the background.

NICKEL-STEEL RAILS IN ROCHESTER

The New York State Railways at Rochester have been conducting some very interesting experiments on the wear of rails of different compositions. E. J. Cook, general manager of the company, has been strongly of the belief that a well-maintained track is one of the most desirable adjuncts of economical operation and that track maintenance can most readily be secured by a high quality of track construction.

The standard type of rail in Rochester, except on the streets of very heavy traffic, is a T-rail, which is laid in paved streets with a grooved stone block and in brick pavements with a molded brick. In the spring of 1909 the company laid on State Street, Rochester, a section of double track about 800 ft. in length of 7-in. 100-lb. T-rails, containing about 3 per cent of nickel. The surface maintained by these rails was so good that the company this summer laid 150 tons more of the same rail. Operation will be commenced over this track this month. Although the track laid in 1909 has shown no signs of cupping or other deterioration at the joints, the company decided to make the new track even more perfect, if possible, by its equipment with nickel-steel joints. The Continuous joint is standard on the company's lines, and arrangements were made with the manufacturers of these joints, the Rail Joint Company, to provide a supply of nickel-steel continuous joints to equip the track. Nickel-steel bolts and nuts were used with these rail joints.

Track work to be undertaken in the immediate future includes still another interesting feature. Although present indications point to a very low rate of wear by the nickel-steel rail, the company is anxious if possible to use rail of equal durability but with an alloy which is less intrinsically expensive than nickel. Hence it has also decided to lay a section of track with high carbon rails and has just placed an order for 250 tons of 7-in. T-rail with a percentage of carbon varying from 0.75 per cent to 0.875 per cent. Such a rail, of course, is much less expensive than the nickel rail. The company is of the belief that a rail of the high carbon percentage mentioned is amply strong enough structurally to sustain the most severe traffic which will be imposed upon it in electric railway service, and that it can be handled and laid without danger of breakage if sufficient care is taken in unloading the rail. For the rest of the new track construction to be undertaken in Rochester the company has ordered titanium rail, which has been its standard for some time and of which it has laid 1500 tons this year. The type of titanium rail employed has been a 5-in. 100-ton A.S.C.E. section. This rail is purchased from the Lackawanna Steel Company and the nickel rail from the Pennsylvania Steel Company.

The company has also been using some chrome-nickel wheels.

CLOSING SESSION OF THE AMERICAN ASSOCIATION

The closing session of the American Electric Railway Association was held at the Greek Temple yesterday afternoon. President Brady called the meeting to order at 3 o'clock and read the following letter from Thomas A. Edison:

"Dear Sir:—I would suggest that the association appoint a committee to investigate the storage battery cars now in operation in various parts of the country, driven by my new battery.

"I predict a great future for the cars of this character and think the committee if appointed will be surprised both technically and commercially."

The president said that he thought the letter might wisely be referred to the Engineering Association with the suggestion that it investigate the general subject of storage battery cars if it should think proper.

President Brady then read a telegram from Past-President W. C. Ely, in which Mr. Ely said that he was making a good, though slow recovery and hoped to be at the mid-winter meeting. President Brady said he had also received a letter from President Calhoun, of the United Railroads of San Francisco, saying he had expected to be in Atlantic City but had been unexpectedly prevented.

The secretary then presented the report of the committee on the Brill prize. It was contained in a letter from The J. G. Brill Company as follows:

Mr. H. C. Donecker, Secretary American Electric Railway Association:

Dear Sir:—The jury of award, consisting of W. A. House, president United Railways & Electric Company of Baltimore, appointed by the American Railway Association; H. W. Blake, editor of the Electric Railway Journal, and S. M. Curwen, vice-president and general manager of The J. G. Brill Company, has rendered its decision on the relative merits of the theses submitted in the 1911 senior thesis contest for prizes of $250, $150 and $100 offered by The J. G. Brill Company for the best thesis on the subject "Design of a Prepayment Car for City Service," which is as follows:

First prize and John A. Brill Memorial Medal: A. Herber. Packer, Armour Institute of Technology, Chicago.

Second prize: Charles F. Clise, Sheffield Scientific School, Yale University.

Third prize: Henry S. Bagley, department of electrical engineering, University of Arkansas.

In view of the fact that only five theses were submitted in the contest this year, we have decided to discontinue our offer to the senior students of the engineering departments of universities and colleges.

Yours truly,

(Signed) "The J. G. Brill Company."

ELECTRIC RAILWAY DICTIONARY

The next business was the report of the committee on electric railway dictionary, which is printed elsewhere. H. H. Adams, Metropolitan Street Railway, New York, presented the report, which was accepted and adopted and the committee was discharged.

TAXATION

Calvert Townley, Lackawanna & Wyoming Valley Railroad, presented the report of the committee on taxation. He called attention to various features of the report and in conclusion said the report recommended that a committee on taxation be continued and that it be enlarged by the appointment of a member from each state.

Upon motion of Mr. Fassett this was done.

OTHER REPORTS

The following reports of committees were then read: Committee on determining the proper basis for rates and fares, committee on compensation for carrying United States mail, committee on federal relations, committee on insurance. They are found in abstract elsewhere in this issue.

PHYSICAL VALUATIONS

An address on "Physical Valuations" was then presented by O. T. Crosby, president Wilmington & Philadelphia Traction Company, Wilmington, Del. This address will be published in abstract in an early issue of the Electric Railway Journal. A vote of thanks was extended to Mr. Crosby for his paper.

Mr. Crosby's paper was discussed by Prof. D. C. Jackson, Massachusetts Institute of Technology; Prof. M. E. Cooley, University of Michigan; C. N. Duffy, Milwaukee, and C. G. Young, New York.

REPORT OF COMMITTEE ON RESOLUTIONS

Gen. George H. Harries, Washington, chairman of the committee on resolutions, then submitted a resolution expressing the regret of the association at the death of officials of member companies of the association who had died during the year. A resolution of thanks was also expressed for the increased interest taken in the association by the technical and daily press, the resolution referring to "not merely the faithful, efficient all-the-year-round service of the Electric Railway Journal but also the extremely valuable and gratuitously circulated convention daily issues of that wise spokesman." There was also a resolution of thanks to the American Electric Railway Manufacturers' Association "for its long time and growing co-operation in our work, for its highly successful contributions to the success of this convention and for the spirit of helpful good fellowship displayed by the members on all occasions." Another resolution referred to the wide-awake and flourishing condition of the association as being due to the devoted skill of the officers and committees, and the thanks of the members were tendered to President Brady and those others "who had labored untiringly to produce results which are in every sense most gratifying."

LETTER BALLOT

President Brady called attention to the importance of the member companies voting by letter ballot on standards and recommended practice of the Engineering Association. On motion the recommendations contained in the president's address were referred to the incoming executive committee with power to act.

NOMINATIONS

J. H. Pardee, chairman of the committee on nominations, then presented the report of that committee. The following gentlemen were named as officers of the association for the coming year:

President, Thomas N. McCarter, Public Service Railway, Newark, N. J.

First vice-president, George H. Harries, Washington, D. C.

Second vice-president, Charles N. Black, United Railroads of San Francisco, Cal.

Third vice-president, C. Loomis Allen, Syracuse Rapid Transit Railway, Syracuse, N. Y.

Fourth vice-president, Charles L. Henry, Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.

The report also stated that a letter had been received from Vice-president W. G. Ross, requesting that he should not be considered for re-election because he had severed his active connection with his former electric railway interests.

On motion the secretary was instructed to cast one vote for all of these gentlemen and they were declared duly elected officers for the coming year.

The newly elected president, Mr. McCarter, had been called away early in the afternoon by an engagement and was not present, but the retiring president introduced Gen. Harries, the new first vice-president of the association. Gen. Harries made a few remarks in his genial vein, after which a motion to adjourn was carried.

The Board of Control has approved the specifications for the projected tube railway in Toronto, to cost between $4,000,000 and $5,000,000.

THURSDAY MEETING OF ENGINEERING ASSOCIATION

President Harvie called the meeting to order at 10 a. m. The report of the committee on buildings and structures was the first paper on the program. Martin Schreiber presented the report.

BUILDINGS AND STRUCTURES

The secretary then read written communications on the report from Charles H. Patton, of the Cleveland Inspection Bureau; William A. Stoney, manager, Fire Underwriters' Electrical Bureau, and J. W. Brown, assistant superintendent of transportation, Public Service Railway, Newark.

Mr. Patton wrote that there were two features that should be given a thorough test before finally acting thereon. Reference was made to open sprinklers in car yards and monitor nozzles for car yards. Insurance engineers were not all favorably impressed with the monitor nozzle scheme or with the open sprinkler plan for open car yards. A committee of the National Fire Protection Association probably would make some investigations between now and its next meeting and report on them at its annual meeting.

Mr. Stoney wrote that it would be for the interest of the street railway companies to send copies of the report to the members of Fire Underwriters' Electrical Bureau and some others. It would undoubtedly convince the underwriters that the electric railways were endeavoring to minimize fire hazard and would be to the mutual benefit of all parties concerned.

Mr. Brown said that the subject of buildings and structures, while mainly an engineering proposition, had many features of vital importance to the operating officials, particularly when new carhouse plans were under consideration. Economical maintenance was vitally important in these days, when the cost of performing the service steadily increased while the nickel grew no larger. Closely allied with economy of maintenance was economy of movement, and this conservation of the time element should be taken into account in carhouse design. The spectacle of a carload of restless passengers impatiently waiting in front of a carhouse while the conductor went to the receiver's office, situated in the rear of the building, or while the motorman sought his locker in the second-story back, was not an uncommon sight. The two or three minutes' delay thus occasioned was costly and could be greatly reduced by proper design.

Economy of movement was also associated with economy of maintenance in track layouts at carhouses. Where morning and evening rush-hour service required pulling out cars on headways of from one to three minutes every facility should be afforded to get them out of the carhouse with the minimum interference with each other. "Neck of the bottle" conditions must be avoided wherever possible. Congestion at the carhouse had been responsible for many gaps in the service downtown during the rush hour. In various ways the design of buildings and structures affected the work of the operating department, and with economy as the desired attainment it would seem wise to consider these features in connection with maintenance.

Proper facilities for employees might be considered a modern innovation. It was the result of the latter-day conception of the relations between railway companies and their employees. Men were very largely creatures of environment and where inadequate toilet facilities kept in a slovenly manner were maintained, there would be found slovenly employees. Opportunities to wash and brush up in a clean, sanitary lavatory would always be taken advantage of and result in a better appearance of the rank and file.

The suggestion of the committee with regard to locker rooms, assembly rooms and their proper heating, lighting and ventilation should meet with prompt approval by the operating men.

A third suggestion he would make was the development of an efficient corps of fire fighters from among the motormen and conductors during their waiting time at carhouses by instruction and actual use of fire apparatus. This might be of value sometime and would prove an enjoyable diversion to the employees.

E. T. Munger, Hudson & Manhattan Railroad, New York, did not believe in steam heat or hot-water heating systems for use in carshops or carhouses, particularly the latter. The difficulties with steam were usually due to the freezing of pipes in cold weather. On cold nights it was necessary to keep the shops and houses as warm as in the daytime when the men were working, to prevent freezing, while, as a rule, heat was not needed at night. With the blower system of hot-air heating there was no danger of freezing pipes or flooding pits and floors with water, consequently it was an economy. With steam and hot-water heating there was usually more or less water falling from the top of the pipes, which was a nuisance. With regard to doors for large openings there were several designs of rolling doors on the market. One type could not be repaired; with another it was only necessary to take out the damaged portion of the door, straighten and replace it, and the door was again ready for service. The great trouble with rolling doors was that the motormen or switchmen bringing the cars into the shop would not open wide enough to clear the cars. Referring to the recommendation as to heating the inspection sheds, he had always been in favor of a warm pit for the men. They had more nimble fingers, and oftentimes the heat in the pits would melt off snow and ice and disclose things that needed attention. With regard to fire protection in carhouses and terminals, including open yards, there was at the present time an awakening in the public mind to the enormous loss by fire each year. The street railway companies were contributing their full share to the loss. He agreed with the committee that automatic sprinklers should be furnished as the best possible protection in inclosed places. Where cars were stored in yards in large numbers he believed that a sprinkler system which could be operated by an employee was the best thing.

E. B. Katte, New York Central & Hudson River Railroad, said that in building the electric equipment shops at Harmon and the inspection sheds at White Plains hot air was used entirely for heating. About fifteen years ago it was a custom to have all the locomotive repair shops heated with steam coils in the pits. That practice was almost obsolete now on the New York Central. Hot air was used in all of the engine houses and especially in the pits; and in all the electric pits or locomotive shops an abundance of hot-air heat was provided. Roller doors had not been used by the New York Central. The principal trouble with them was that they would stick in a short time. Even the best of them corroded and even when they were repainted the paint interfered with the operation of the doors. It had been his company's practice to use outside swinging doors that come together in the middle between the tracks. In the substations where very large doors were also used roller doors were considered, but in the later designs a sliding door was used. The earlier ones had large swinging doors.

D. G. Knight, Public Service Railway, Newark, believed the best door for carhouses was a sliding door. The swinging door was exposed to the weather twelve months of the year, but the sliding door was exposed only about eight months of the year, and was protected from the weather all the time. The swinging doors cost from $100 to $250 a pair and their life was not over six years, while he thought the life of the sliding doors would be twelve or fifteen years. With regard to the outside construction of buildings he warned against the use of any kind of projections, which catch water and freeze up in the winter time and split the brick. In roofs he would keep away from all hips, valleys and large cornices, which added to the maintenance cost.

E. T. Munger spoke about putting in the stub-end tracks at inspection sheds. They were more trouble to operating men than perhaps any other feature around the yard. The first cars that were taken into the barn on a stub-end track were always the last cars out. Stub-end inspection shops were a positive detriment and cost the company a great deal of money every year.

Secretary Litchfield said that the Interborough Rapid Transit Company in the last year had opened up lunch rooms at the various terminals, taking particular care that the location of these lunch rooms should be accessible to the men. He thought that was a controlling point as to whether they were going to be successful or not. One of the latest ones had been put up in one-half of a subway passenger station. A large proportion of the passengers came in on the side of the station, so the other side had been given up almost entirely to a recreation room in which was a restaurant. It had proved very popular, because the men could get a quick bite in between runs.

Martin Schreiber said relative to floors that some architects thought that a reinforced concrete floor with a cement finish should be used in employees' rooms and offices. Personally, he was of the opinion that the wood floor was better. A tiled floor was to be preferred over a cement floor. He asked if any of the members present had had any experience with artificial floors, such as were used in the Hudson & Manhattan terminals and in some cars. One of the advantages of artificial flooring was it was not dusty, as all concrete floors had been found to be, even though they were painted, and it lent itself very nicely to running up into corners, etc., so that it could be kept clean easily.

E. T. Munger said the Hudson & Manhattan Railroad had been using composition flooring on cars ever since the road opened. Recently it was necessary to repair a number of the first floors that were put in, and a series of experiments was begun with different makes. They were now using a flooring which cost 10 cents per sq. ft. for the material. The labor of laying it amounted to about 1 or 1½ cents per sq. ft. After three or four men were broken in to lay this floor they could lay it very quickly. The flooring which he was using at the present time had a much softer feeling under foot than a concrete or a cement floor, did not seem to be affected by frost and it did not crack.

Henry N. Staats discussed the "Fire Protection" section of the paper. He said that six years ago H. J. Davies, chairman of the comimittee on insurance of the American Association, had asked him why electric railway properties should be rated so high; why they could not eliminate the hazards, and make the risks of such character that the railway people could obtain their insurance at rates as low as the factory mutuals of New England were giving to their members? He had replied that if the electric railways would themselves become interested to the extent of protecting their own interests there would be no trouble in getting or obtaining the very lowest rates of insurance applicable to the hazards. At that time the proper rates which should be applicable to electric railway property were not known, and there had been a great contest over the question of rates during the past six years. The railways were now winning out. They were learning to think and act for themselves, and were getting the results in the reduced rates of insurance. During the past six years the rates on electric railway properties have been reduced from an average of 1½ per cent on each $100 per annum down to less than ¾ per cent. About 73 or 74 cents was the average rate to-day on such property, including both protected and unprotected property. Protected properties were those which had been protected by the most scientific means for extinguishing fire. That might appear to be a pretty satisfactory rate, but mill mutual companies, which include cotton mills, woolen mills, paper mills, combined wood and iron works and planing mills, carry a total of $2,500,000,000 of insurance and at average rates of less than 10 cents per annum on each $100 of insurance.

The hazards connected with the properties of electric railways were less than the hazards in any one of these various factories to which he made reference, with the exception of machine shops. There was no reason why the electric railways in this country should pay more than is being paid by these factory people for their properties. They should pay less. They should obtain their insurance at 10 cents or less on each $100 of insurance carried; and he hoped before the expiration of another year to prove that the exact cost to the insurance companies was 9.93 cents.

Mr. Staats then read a description of the Monitor nozzle system of the Woodhill Road car yard of the Cleveland Railway, which supplemented the brief description of this installation in he committee's report. The insurance rate on that car yard after the nozzle equipment had been installed was reduced $1.05 per $100 from the former rate. The old rate was $1.45 and after the nistallation of the equipment it was reduced to 40 cents. The company saved almost enough in one year to pay for the entire installation of that equipment. The company was going to ask to have the rate made 20 cents instead of 40 cents.

Referring to the installation of sprinklers in the open yard of the Interborough Rapid Transit Company, which he said cost $100,000, Mr. Staats thought that there was only one feature lacking, that was the monitor nozzle or universal nozzle system to reinforce the open sprinkler heads. With that class of protection the Interborough should be able to protect the yards at the reduced rate of 10 cents, or carry its own insurance.

F. G. Simmons, Milwaukee Electric Railway & Light Company, speaking as a member of the committee, said that the committee had prepared nothing which should go at this time to the committee on standards except "Instructions to employees for fire protection." Those rules were applicable in almost any instance, and should be referred to the committee on standards for adoption as recommended practice.

Mr. Hand, Continuous Glass Company, described methods of making wire glass by the old method, styled the "sandwich process," employing two rolls and two corings. In using that process there was an interval of chill and an initial strain was put on the glass which seemed to cause it to crack without apparent cause, especially in skylight construction. The so-called continuous process consists of a single pouring and a single rolling without an interval of chill, and the glass entered the annealing ovens at a bright cherry color. The process of annealing required about three hours' time, during which the glass traveled about 260 ft. It issued ready to trim or cut to size. This glass behaved admirably when used in terminals, car barns, train sheds and skylights generally, and rarely cracked. It is frequently used in 24, 36 and 28-in. widths and in lengths up to 108 in. A pitch for the glass in skylights of less than 3 in. might be challenged. In this climate he would prefer 6 in. pitch. His company was producing for carhouses and roundhouses a corrugated glass. The process used admitted of incorporating wire in a plate of glass ⅛ in. thick and many hundreds of thousands of square feet had been set in the deck lights of trolley cars. Clear wire glass was being used for street car vestibules in Washington, D. C.

Henry S. Staats said he recommended wire glass very highly in certain places, but the one place where it should not be used was in the transom of the car windows. Where automatic sprinklers were used, it was necessary to get water inside the car. This matter had been taken up by The J. G. Brill Company and others, and a strong recommendation had been made not to use wire glass in car transoms.

It was moved that the report of the committee be accepted and placed on file, and that portion of the report on "In-

struction to employees for Fire Protection" be referred to the committee on standards with the recommendation that it be apporved by it as recommended practice. The motion was carried.

WAY MATTERS

J. M. Larned, Pittsburgh Railways, presented the report of the committee on way matters. The question of a standard girder rail had been before the association for some years and tentative sections had been submitted by various committees, but there were no data to show the principles which may have governed them in their designs. It had therefore seemed desirable to draw up an analysis of the rail section submitted, showing under the headings the functions which the girder rail was required to meet and perform, the dimensions affecting such functions and the reason, so far as practicable, for each dimension. The committee was of the opinion that in order to meet the requirements for a girder rail, two depths were called for, a 7-in. and a 9-in. rail with corresponding guard rails. The committee, however, was not able to consider during the year other than a 9-in. section. A tentative bolted joint for this rail had also been submitted for the consideration of the next committee. It would be well for the association to consider a specification for steel in rails in the near future as the chemical analysis and manufacture of these rails had been too often left entirely with the manufacturers.

Mr. Charles A. Clark, Cleveland Railways, submitted an extensive written discussion on the committee's proposed design of 9-in. rail. He approved of the shape of the head of the rail which was the same as he had been using for two years. He thought the tread should be inclined to the gage. All rails wore to about the angle shown in the design submitted by the committee. The width and depth of the groove was sufficient to accommodate wheels with M. C. B. flanges. He thought the head of the rail was slightly too narrow and that it should be made 2⅜ in. wide instead of 2⅛ in.

Mr. Clark preferred a 7-in. rail instead of a 9-in. rail. He thought a 7-in. rail weighing about 100 lb. per yard could be made as strong as the 9-in. rail submitted by the committee. The difference in weight amounted to 51.8 tons per mile, making the difference in cost, at $40 per ton, $2092. The joint plates also weighed 1 ss per pair. This would amount to about $130 per mile, making the total saving $2200 per mile. In addition there was a saving of 2 in. in depth of excavation, amounting to $290 cu. yards per mile at 50 cents, or $150. There was also a saving in the paving blocks. He presented a calculation showing that if the interest on the additional cost of 9-in. rail laid in track was taken into account and the life of the track was assumed to be 15 years, there was a saving of $593 per mile in that time. If brick paving was used, this saving would amount to $2636 in 15 years. He did not agree with the committee that a deep section was needed on account of the joints, as he had found that heavy joint plates of less height had done the work quite as well. With regard to the width of the base, the 9-in. rail would have to have a base 7.08 in. wide to have the same resistance to overturning as a 7-in. rail with a base 5½ in. wide. He was now conducting an experiment with titanium steel rails, containing 0.70 to 0.85 per cent carbon and 0.10 per cent titanium. The rails were very hard, but were also ductile. He had also increased the carbon in the joint plates to from 0.60 to 0.70 per cent. He highly recommended grinding rail joints before new track was put into use.

H. F. Merker, East St. Louis & Suburban Railway, said it was not the intention of the committee at any time to recommend the adoption of a 9-in. rail to the exclusion of a 7-in. rail as a standard. Mr. Clark's ideas of a good rail agreed very closely with the committee's. So far as the angle of the lower part of the head was concerned, 10 deg. was adopted by the committee because it would be very difficult to determine exactly what this angle should be.

Regarding the practice of bonding under the fish-plates, this was a very common practice and for that reason it would have to be provided for in a standard. In regard to the width of the base, the manufacturers were considered in this regard, and it was undoubtedly true that by going to a width greater than 6½ inches, great difficulties would be encountered. A width of 6½ in. was undoubtedly sufficient for stability.

A. F. Nelson, Pennsylvania Steel Company, said that from a practical standpoint the proposed rail had some good points, but he would recommend especially the thick web. The weakest point in all 9-in. girder rails to-day, especially in rails with thin webs, was in a line right through the bottom joining the web and the flange. The committee gave the weight of the rail as 136 lb. He had laid the section out a few days ago, and found that the rail would really weigh a little over 139 lb. The area given of 13.6 sq. in. would make it 138½ lb., so that the rail is about 3 lb. heavier. He thought the tram was a little thin through the bottom of the groove. It should be at least ⅛ in. thicker. The point of the flange was heavy enough. The flange as a whole was too thin for such a heavy rail. The engineer to-day was trying to get the same amount of metal in the head as in the flange, if anything, favoring the flange. A comparison of this rail showed 6.08 sq. in. against 3.77 sq. in. There was no reason that he could see why manufacturers should have any difficulty in furnishing such a rail if it was adopted.

R. C. Cram, Connecticut Company, said the committee realized that in rolling rails, both the head and the base should be made of an equal area or cross-section if possible, but there were other considerations than the question of weight. The amount of metal in the base of a girder rail did not need to be as much as in steam road rails, because it was not necessary to provide for the heavy side thrust which came from unequally balanced locomotive drivers.

Victor Angerer, William Wharton, Jr., & Company, thought the rail section proposed by the committee was admirably worked out. Of course a 7-in. section was a necessary adjunct. The tram of the rail was thinner than might be used to suit the conditions in some cities. The thickness eventually would be reduced by the wear produced by vehicles, and the top would be grooved out by the vehicle traffic in some cities. It was to the interest of the railroad companies to keep the vehicles off the track and make it difficult for them to follow the track, but unfortunately that was an impossibility in some cities like Philadelphia where the streets were so narrow. Another point to which he called attention was the design of a guard rail for curves. Unless the depth of the groove was reduced to less than 1⅜ in., which was undesirable, the thickness of the metal in the center of the bottom of the groove would not be sufficient to withstand the side thrust of the cars on sharp curves.

Martin Schreiber referred to the fact that the committee made a definite recommendation to send this section on to the standard committee alone. He did not think anything would be gained by sending the 9-in. rail alone. The committee conceded that the 7-in. rail must be designed before the subject was fully covered. There was also the 9-in. guard and a 7-in. guard to be covered before the rail subject would be complete.

E. O. Ackerman, Columbus (Ohio) Railway & Light Company, said the proposed section was the best thus far developed for the weight. The web was a departure from the usual rail. Personally he preferred to have the smaller dimension of the web carried down to near the neutral axis and then have the web curved instead of straight, thus slightly increasing the dimensions near the under side of the head of the rail without changing the amount of metal

in the web. The width of the rolling surface or top of the rail he thought was sufficient for the wheel treads which the association had adopted as standard. The amount of provision made for wear upon the rail was perhaps greater than that of any rail section which was being used. In the future there would be more wear upon the surface of the rail than in the past, and the matter of increasing the thickness of the ball of the rail to provide for this was important. If 1/16 in. more was added to the top of the ball of the rail it would give increased life enough to fully warrant it. The addition of ⅛ in. on the top would give practically 12½ per cent more life from a rail with an increase of perhaps 3 per cent of metal. Until a 9-in. guard section rail was fully developed, he would not favor adopting the plain rail as a standard.

H. F. Merker offered a motion that the executive committee be instructed to refer the consideration of a 9-in. girder grooved and guard rail and a 7-in. girder grooved and guard rail, and rail joints for same embracing the principles outlined in the report of the way committee for 1911, to the way committee for 1912. The motion was carried.

WAY DEPARTMENT RULES

J. M. Larned then opened the discussion on the book of rules for the government of way department employees which was presented by the committee. The book of rules endeavored to cover both urban and interurban conditions. This had caused to be added to the book some rules which might be considered unnecessary from a city operating point of view, but were necessary from the viewpoint of the interurban road. Many of the rules were largely copied from the standard interurban book of rules. In other respects the rules were entirely general and would apply to both city and interurban services. With but slight alterations they would meet the requirements of most companies.

Fred Simmons, Milwaukee, presented a written discussion, in part as follows:

"My criticisms and suggestions are based purely on my own views and opinions and must necessarily be to a large extent general. I am willing to concede the advisability and possibly the desirability of the adoption of certain rules of this general character; what I do question is both the advisability and the desirability of adopting at this time, either as recommended practice or as standard, a set of rules as far reaching and as detailed as those now before us. It seems to me that the first step in this proceeding should be to endeavor to lay down some standard form of organization for the way departments, before adopting a voluminous set of rules and regulations which would of necessity have to be very largely modified, altered and amended by many of the members in order to make them properly applicable. The organization chart proposed by the committee seems to be a very comprehensive one although it does not fit in with the present form of organization existing in the way department of which I am at present in charge.

"However, before these rules are so adopted, we should endeavor to agree on a standard chart of organization which can be made in such a manner as to be capable of contraction along exact lines so as to fit the organization and requirements of any of the smaller systems. This may mean the formulation of a series of such charts, two or three, or even a half dozen as the necessity might develop.

"In 1902 the American Railway Engineering Association took up this subject for consideration. No definite conclusion was reached. In 1906 the committee on rules reported a proposed set of rules contemplated to cover the following points: Protection in case of obstruction of track; condition of under, over and grade crossings and proper protection of same; reporting neglect of any department whereby train movements would be jeopardized; personal attention to renewal or extraordinary work. It also formulated some rules for the government of supervisors of structures and supervisors of signals.

"The rules submitted covering the supervision of track were only fourteen in number and it is therefore evident that the association proposed to move slowly in the matter, giving it a great deal of study so as to avoid cumbersome and erroneous rules.

"In the rules under discussion you will find from twenty-five to thirty rules telling us what constitutes a motor or engine, what constitutes a single track, what constitutes a double track, etc., and it seems to me unnecessary to cumber up a book of rules with a lot of this to all intents and purposes unnecessary verbiage.

"In 1910 the rules of the American Railway Engineering Association had been amplified to such an extent that ninety rules were then adopted covering general rules for the way department, track supervisors, track foremen, supervisors of structures, bridge and building foremen, signal supervisors and foremen. As these last twenty-four rules may be eliminated from most of the departments of the electric railways concerned in this work, we would then have but sixty-six rules covering the employees of the way department, and this, after a matter of eight years' work in connection with the formulation of the rules. It therefore seems to me apparent that in attempting to adopt at this time 169 rules covering this work, we are proposing to begin at the wrong end of the ladder.

"In conclusion I desire again to emphasize my recommendation that the form of organization first be standardized, and that then rules which would apply be formulated, but I think that the committee should start with, as before stated, a small number of rules which might be shown to be undisputably necessary and then the rules amplified from time to time as the committee and the association found desirable."

M. J. French said there was one great obstacle to the steam railroads adopting any one set of rules. They have had their rules for years, developing them and working them out, and they are very loathe to give way on that. There seemed to be a great deal of prejudice in regard to these rules. The sooner some rules were put into effect the better it would be. In compiling these rules the committee had considered the rules which have been already adopted or passed on to be adopted by the transportation association.

H. F. Merker said it was the intent to leave no doubt as to what was meant by certain terms. He would view a book of rules as a table of symbols in a book where many symbols were used.

R. C. Cram said in connection with the organization chart that the committee in preparing this started out with several charts, and on the lines suggested by Mr. Simmons; and in that they had several distinctly marked organizations for various sized properties. It had simmered down to this one organization.

M. J. French said that so few rules as Mr. Simmons suggested would require practically an annual revision. If any of the rules in the book were objectionable they could be omitted by any particular company.

Martin Schreiber thought the rules were too large a subject to send to the standardization committee with but one year's consideration.

J. M. Larned said the subject of rules would be before the association from the time they adopted a standard book of rules until the end, and they would be continually undergoing improvement until printed.

A motion that the recommendation of the committee on way matters as given on page 12 of the 1911 report be adopted was passed.

A vote of thanks was given to the committee for the excellent work it had done in the past year in getting up the new idea for the rail section, and for the large amount of labor expended on the rules.

Adjourned until Friday at 9.30 a.m.

THURSDAY SESSION OF THE TRANSPORTATION & TRAFFIC ASSOCIATION

The first matter of business at the Thursday morning session of the Transportation & Traffic Association was the report of the committee on fares and transfers. The report, which was read by M. R. Boylan, Public Service Railway, will be found on another page of this issue.

FARES AND TRANSFERS

E. J. Cook, Rochester, presented a sample of the transfer he had put in force about two years ago when he made certain changes in the rules. On account of the increased percentage of transfer business, it was found necessary to make a general clean-up. The matter was taken up from the legal standpoint first to find grounds for a system of transfers which could be carried out in practice. The general form of the transfer finally devised and adopted was somewhat different from the usual transfer inasmuch as it only carried two punch marks, the idea being to enable the conductor with a minimum number of punch marks to indicate not only the line and the direction, but also the junction point or transfer point.

After handing out samples, Mr. Cook said that the idea of the color scheme was this: It is divided into four fifteen minute parts each hour, each color representing fifteen minuts. In other words, the white transfer would be void at thirty minutes after the hour punched. One punch mark indicated the hour and the other the line on which it was good. The men found it easier to lift the transfers, and the expiration of the transfer was more readily told on the car than in any other way. Mr. Cook said further that the various changes in the transfer system were widely advertised, but it was some time before the general public was fully informed of the situation. The direct result of this change was a falling off in the percentage of transfers and revenue passengers and a possible saving in receipts, but it also prolonged the time necessary for the purchase of additional equipment to handle additional traffic.

C. E. Learned, Boston, believed that the committee's report was one of the most comprehensive ones he had ever read, and many things about it were well worthy of adoption. As an illustration he quoted from it as follows:

"It is surprising that a matter so vital to the welfare of the operating companies should have shown so little progress in methods employed, and that no really scientific basis such as is applied to so many other branches of our work has been devised to insure accuracy of records and returns from the passengers carried on electric railway lines."

Mr. Learned said that was very apparent to anyone who operated twenty-five or thirty years ago in horse car days. In other words, the register of to-day in a general way was no better than the one of thirty years ago. It was simply a record of the passengers carried. The time had certainly arrived, especially in the operation of prepayment cars, when serious attention would be given to a suitable mechanical device. The present form of transfers in general use was, to a large degree, responsible for delays in issuance and acceptance. They were printed to cover every transfer point on the system and consequently it was necessary to use very small type. If printed by lines it would necessitate only points where transfer was permitted to be indicated, and on extending the privilege of transfer no cancellation other than date or time would be necessary. As regarded the standard form of transfer, he thought it high time that one should be adopted. They should be distinctly a.m. and p.m. To avoid loss by office cancellation some check must be used on the date canceled, say Oct. 3, or passed to another year, in order to save it. In Boston they thought of arranging the matter of dates by letter. Take "A" for any particular day or consecutively for two or three days, following with other letters of the alphabet. This would make it necessary for the conductor to come to the office each day and get his new transfers, so the company could expect him to turn in all the old ones. If he received a transfer letter "A," he would know he should have that letter "A" on all that he took in. There were but few conductors who examined the cancellation as to time unless they operated lines in the country where few board or where they were required to turn in transfers every trip. The question of a transfer law was certainly very important. They had stopped the abuse by a law passed in Massachusetts some few years ago. Under that law they had been able to prosecute something like one hundred cases, losing but two cases in the entire number tried. He thought there was a great deal of trouble in proving intent to defraud when a man gave away a transfer. The law is very short and directly to the point. It reads as follows:

"All street railway companies shall cause to be printed on the transfer ticket issued by them to passengers the condition under which such tickets may be used. Whoever uses a transfer ticket in violation of any such condition, or whoever uses or attempts to use a transfer not issued to him, or whoever for value disposes of or attempts to dispose of a transfer ticket issued to him to any person, or whoever for value delivers or attempts to deliver a transfer ticket not issued to him to any person, shall be punished by a fine not exceeding $50 or by imprisonment for a time not exceeding thirty days."

Mr. Learned said that under that law they had been able to prosecute everybody except the man who gave the transfer away. They found that the people who gave away transfers simmer down to newsboys who would solicit transfers and hand them to persons who purchased papers. The company's agents followed the man who received it to the point where he attempted to use the transfer. Thereupon fare was demanded and upon refusal his name and address were taken and a summons secured for him to appear in court. The man was kept under continued surveillance to see if the name and address given was correct. Invariably the man gave a wrong name and address, which was prima facie evidence of intent to defraud. The cases were tried, the sentences ranged from five days to six months and the fines from $10 to $300. Regarding blind registers he said the blinding of the register in an old-fashioned collection was one thing while with the prepayment system it might mean altogether another thing. With the system used to-day in the ordinary registration of fares, they returned the overs and collected the shortages. With the blind register one could neither return the overs nor collect the shorts. The shortage on a blind register meant that the man had not only received the amount of money that he was short but that he had registered the shortage, so that the shortage on a blind register was a gain to the company. In the open registration the mere fact of 40 fares having been turned in to the auditor proved that 40 fares had been registered. That made easy counting and no trouble. If a man had collected 60 fares and had turned in for 40 only, the company made one dollar by the error. With a blind register, of course, it would be necessary for the man to pay the amount from his own cash in the morning and then at night turn in what he had over. As to prepayment cars, Mr. Learned said that in Boston, fortunately, they were on lines where very few transfers were issued. They had so far been unable to find the fare box that they wanted to adopt. They used an ordinary box as an experiment simply to educate the people to deposit the money in a box. This box was open, but the management was considering a box of more serious form. All transfers were registered on a separate register because the conductor had to account for every passenger. The claim that they should not be registered on account of the time consumed in registration or inability to get clerks to count accurately was an ad-

mission of incompetency that the same managers would hesitate to express regarding those hired to collect and examine the cash fares collected. Of course the expense in checking up transfers as to date, time, etc., was an expensive matter, but it was justified by the importance of the subject.

Bruce Cameron, St. Louis, said that on his system each conductor put all of his transfers on a given trip in an envelope and marked on the envelope his leaving and arriving time; all of those transfers must be within that time. Every date is printed on the transfer and there are only two punch marks, the line and the time.

M. C. Brush, Boston, referred to his transfer-checking experiences on a smaller property than St. Louis. They collected the transfers exactly as in St. Louis, in an envelope under a time stamp. Then they checked out the time of the receipt of the transfer as shown by its punch and the time shown on the envelope by the time stamp. They believed that by that means they had absolutely prevented the abuse of transfers by conductors and by passengers. A number of their inside men continuously called attention to the fact that several conductors had left as a result of not being able to make any further money on account of this transfer system. When transfers were collected in an envelope, a man who was thoroughly familiar with all the lines and transfer points was selected to check one day's business in about four or five days. Consequently, he did not check every day's business, but the conductors had no knowledge as to whether they were going to be checked Monday or Friday. This man laid one conductor's transfers out in order. It was found of course that where two conductors roomed together, one man pulled out say ten to twenty transfers in the morning and guessed that at 12 o'clock he would come to a certain transfer point (say the number of the transfer was 2500) and he would punch it for that hour, presuming that he would reach No. 2500 by that hour. Then the other man did likewise. Thus the company would find by looking at the transfer numbers that No. 2500 was issued at 12 o'clock perhaps whereas No. 2600 was issued at 11 o'clock. The conductor was then called in, shown all the transfers and asked to explain the disparity in numbers and the hour of punching. The only reply was that he had pulled the transfers out from the middle of the book. In about three months the conductors began to realize that the transfers were being checked and at the end of about nine months there were not more than three or four instances where there was apparent intent to do anything dishonest.

Mr. Cameron said they checked their transfers, too. The greatest trouble was with conductors rooming at the same place or who had exchanged transfers. There was little of that trouble now that he knew of. The main trouble was in the abuse of the transfer privilege by the passenger. They had made a few arrests and gathered in a few of the worst ones.

C. D. Emmons, Fort Wayne, asked if the conductor was permitted to keep his punches and his transfers over night. If they were deposited every night, that would prevent some of the frauds mentioned.

Mr. Learned said they were allowed to do so. They kept the transfers until they are used up. They turned in the opening and closing number, that is, they turned in the number of the blank transfers that they started with and then the last transfer on their pad at night.

W. B. Rockwell, Pottsville, said that in his experience there was no use in having the open register; that the blind registers were the only ones to be used.

Mr. Boylan said they returned all overages. They had printed in the upper left hand corner of the day cards a space in which to name the amount of change at start, the amount of change at ending and also to give the number of transfers used. If they found that a conductor turned in 25 or 50 cents more than the total registered passengers as called for by the slip while having $5.00 at the start and $5.00 at the end, the overs were not returned; but if he had $4.50 at the end and $5.00 at the start, they did return the 50 cents.

J. J. Anderson mentioned his transfer system as applied to a railway with a terminal station. The line transfers, those that were issued before reaching the terminal, had been cut down to within six or seven blocks of the terminal. The line transfers issued were ordinary transfers good for one direction and within a certain time limit. Inside the station a terminal transfer was issued to all passengers who desired them. They were issued by the motorman as well as the conductor. The terminal transfers were good only in the station but were accepted on any car except on the car on which the passenger came in. The transfers were good all day if the passenger stayed in the inclosure, but not good if he went outside. The company evidently was saving money, as many people were saying now that they had to pay 10 cents for a shorter ride than they used to get for 5 cents. The line transfers had been cut down about 20 per cent.

J. S. Moore, Syracuse, asked what was the common practice with regard to time limit on transfers issued by city lines which had interurban transfer points or where the interurban operates over the tracks of the city line.

Mr. Cherry replied that on his system the transfer allowed the passenger to get the next connecting car.

On motion of Mr. Brush the report of the committee was accepted.

SCHEDULES AND TIME-TABLES

The next matter on the program was the report of the committee on the construction of schedules and timetables, which was read by I. H. McEwen. This paper is printed elsewhere in this issue.

Mr. McEwen said one of the members had made a suggestion which had not been included, namely, under the heading of "Supplements to New Timetables," the further recommendation that in many instances changes of timetable might be made sure by designating on the summer schedule the trains which would be discontinued at the end of the season.

Mr. Emmons said many of the ideas given were very excellent indeed, but there was one question in his mind. He wanted to know if the committee gave attention to the standardization of leaving time for those who operate local and limited cars. In the West it was found almost impossible to do this. If they had the limited leaving one hour after the local, then at the end of the line it is nearly up to it, so a further length of time must be allowed in operation.

Mr. McEwen said no consideration had been given to this topic, but that was because it was mainly a local condition depending largely on the length of the line.

H. A. Nicholl, Anderson, said this report seemed to cover the situation very fully. With reference to the question of Mr. Emmons, it appeared to him that it was good practice for interurban companies to start their cars from the larger terminals on the even hour and half hour as near as possible. If they should be operating a schedule with both limited and local cars, the hourly starting should be followed just the same. In the case of the local cars they should run only as far as they could so as to keep to the one-hour spacing as closely as possible and take a fresh start. If a railroad had business that was standard or constant it was well to schedule the freight train, but if the business is intermittent, one day having a large business at a station and the next day a small one, he thought that in that case the freight trains should be run as extras. His company made a practice of having a detention report for every train operated, the limit being five minutes for a train to be delayed. These detention reports showed the cause for the detention and the number of minutes lost.

These facts were tabulated daily and sent to the head of every department interested. At the end of thirty days they get a résumé of all detentions. The single sheet timetable was all right, but he saw no reason why it could not be in book form just as well. He found that some of the principal steam railroads at the present time were using the book form. This book had a good cover and was not readily damaged by the trainmen. They had not only the time of the trains that they were operating on that division but also the trains of other divisions. He believed further that timetables should not only have the times of the trains or the schedule printed thereon, but should also have such other information as would be given the trainman outside of the regular rules of the rule book. He should have special instructions, bulletins, a list of the surgeons, and, as on their line, a list of the stop numbers, for the use of the conductor particularly. Referring to timetables for public use Mr. Nicholl firmly believed that the large folder of standard size was preferable to a small one in general practice, for the particular reason that it could be put in hotel racks. The small local timetable seemed to be sufficient for individual special trains.

On motion by Mr. Emmons the report of the committee was accepted.

TWO-CAR TRAIN OPERATION

The next paper was one by C. J. Franklin, entitled "Two-Car Train Operation for City and Suburban Travel." Mr. Franklin's paper appears elsewhere in this issue.

C. N. Wilcoxon, Michigan City, said that he wanted to discuss not the two-car train but rather the practicability and value of operating trains of two cars or more. The interurban railway people in the middle West have had the problem of giving good service on lines operating out of the larger cities for a considerable distance where they have a very congested traffic, or where a portion of a line is operated through an industrial section where there is great congestion of traffic during the morning and evening hours with a comparatively light traffic during the other hours. He had had some experience of this kind while connected with the Cleveland & Southwestern Railway. The service had reached a point where the number of trains operated could not be increased. The traffic could only be handled during rush hours and on holidays by increasing the number of single units rather than increasing the number of schedule trains. By reason of certain conditions it was not as yet practicable to operate trains of more than one car. He was now connected with a line answering the latter description, that is, approximately one-third of the total miles was through a thickly settled manufacturing district. In fact, for a distance of approximately 25 miles it might be said to be a continuous town, made up of very large manufacturing establishments, employing from between 200 and 300 to between 4000 and 5000 men, most of whom went to work in the morning and home in the evening. The remaining two-thirds of the mileage, 57 miles, was through a sparsely settled district, where the population per mile of track was comparatively small. The business during six months of the year was very light. It had not even justified hourly service of the ordinary car. On the other hand, the traffic was very heavy for four or five months during the summer season, requiring an hourly service. Possibly for 53 per cent of the time they took care of the traffic as it should be handled. The engineers had fully appreciated the conditions and the property was designed for train operation. It was the practice to operate morning and evening, for the period of possibly an hour and a half to two hours each morning and evening, trains of two, three, four and five cars. The Sunday operation is hourly service, and during the summer season two-car trains were run. Their business, which was very considerable, differed radically from that handled by the average interurban road. They were called upon to handle a large number of people who all wanted to go at practically one time. What they could handle easily by reason of their train operation would be absolutely prohibitive even on the best constructed interurban roads to-day.

H. H. Adams, New York, thought the question of cost had to be given careful consideration. Mr. Franklin had mentioned in the last paragraph of his paper that they were operating prepayment cars and that the forward platform of the second car had to be closed up; that in itself was a disadvantage. The rear car did not have the same advantage that the forward car had. That had led him to think of the center-entrance car. He thought that a car of this type, with doors having the centre section lowered to bring it practically on the level, permitting one step with a centre entrance and an exit on either side of that centre entrance, would divide passenger load in the car practically in half while the facilities for exit would be equal from either end. That type of car had quite an advantage over the car with the two platforms. One could take a car with multiple-unit control and put the motorman in a cab at the side, thereby increasing the seating capacity. Of course, one platform instead of two would also give additional seating capacity. He thought a car of that type would increase the seating capacity by fully 15 per cent over a motor car with two platforms for double car operation, or over cars with a large platform at one end and a small one at the other end for single car operation. In the use of a car of that type for city service due consideration had to be given to the question of the time required for the operation of the doors. The operation of doors on a car meant the slowing down of the car. The congestion might not be sufficient to have that loss amount to any considerable amount of time, but if the congestion was great the stops per mile were high and the loss might be considerable.

Mr. Adams believed that if these cars were to be operated at a speed which did not exceed 25 m.p.h. as a maximum it was thoroughly possible to get very light equipment. A car say 47 ft. over bumpers, equipped with two maximum traction trucks, and having some of the later type of motors, possibly the air-cooled motor or the motor with field control, would have light electric equipment and need not weigh more than 35,000 lb. complete. This would make a very economical train unit as far as the power requirements were concerned.

The following letter on the subject, written by P. N. Jones, general superintendent Pittsburgh Railways, was read by the secretary:

"In Pittsburgh we have had no two-car train operation experience unless we except a single trial trip made five years ago with a multiple-unit train consisting of two motor cars and two trail cars. I remember that on this trip the final trail car decided at one corner to go up a side street and at another point the trolley of the third car left the wire and finally we arrived at the end of a thirty-minute run fifteen minutes late, although we hauled no passengers.

"We decided that two cars were quite enough for one motorman to look after in congested city streets and since then have adhered to our old method of using a single motor car with one trail car for the evening rush. While realizing that the two-car train having both cars equipped with motors has many advantages, I do not agree with the author when he says there is no room for discussion between the two types. Trailer operation has its advantages among which are:

"First—Most city railways already possess four-motor equipments with motors of sufficient capacity to pull light trailers, for one trip, morning and evening. With the better methods of insulation and the superior mechanical design, the motors are not in any way injured by the rush hours' overload.

"Second—Lower first cost. Double-truck trail cars seating sixty people can be purchased with trucks for almost

half the cost of a motor car with its equipment, making the total cost of a motor car and a trailer approximately three-fourths the cost of the two-car train.

"Third—Smaller power requirements for the evening peaks. The peak load has been the nightmare of every railway operator who has anything to do with the furnishing of his own power. For about an hour each evening the power requirements are from 50 per cent to 75 per cent greater than for any other corresponding period of the day. Every pound that can be taken from the weight of the equipment at this time is very much more important than removing a pound at any other time of the day.

"In Pittsburgh we have a double-truck trailer weighing 22,300 lb. and seating sixty people. If the usual methods of design were followed the second car in a two-motor-car train would ordinarily weigh from 50 per cent to 75 per cent more than a trailer, and would therefore take 50 per cent to 75 per cent more power.

"Fourth—A trailer car can be designed for the easy control of one man. One of the greatest handicaps to any kind of two-car train operation in city streets is the greater number of stops that become necessary because of the greater number of people being handled. This slows down the schedule at a time when everybody is in a hurry to get home. There is no possible arrangement of a two-car train that does not have this tendency to slow down the schedule, and, of course, the larger the unit and the more unwieldy the second car, the larger and greater becomes this factor.

"We have in Pittsburgh a center-entrance trail car with 22-in. wheels and the floor level a little less than 30 in. from the rail. This requires only one step into the car and is the quickest loading car that we have ever had. Almost without exception the trailer conductor has given the signal to the conductor of the high-platform motor car before the latter has all its passengers on or off. The conductor being placed at the center of the car can watch the passengers boarding and alighting, especially since he has no trolley to look after. With a motor car as the second unit, having the front door closed, there is sure to be congestion in the aisle near the rear door, resulting in delay in boarding and alighting. In this case the second car is slower in loading and unloading than the first car, thus adding to the average length as well as number of stops.

"Fifth—The statement that a two-car train accelerates much more rapidly is not true excepting when all the axles of both cars are driven electrically. With maximum traction trucks, or ordinary trucks having only two motors per car, not to exceed 70 per cent of the weight of the car and equipment is on the driving wheels. With a light trailer such as described above, a simple calculation disclosed the fact that two-thirds of the weight of the train is on the motor car axles.

"Sixth—The multiple unit train is much more complicated than the ordinary equipment with trailer. Wires of some sort must be carried from one car to the other and the number of contracts, wires, switches, etc., is practically doubled. This necessarily means that the maintenance charges are increased, excepting in the single instance when the motor car has insufficient capacity to operate itself properly for eighteen hours per day.

"It may be argued by some that the later forms of train control have been much simplified and are more easily kept in repair than the drum type of controller. If this be true (a statement I very much doubt), then equip the motor car with the improved control apparatus, and still the motor car and trailer has half the apparatus of the multiple-unit train.

"I quite agree with the author that for long interurban runs or for city service where stops are infrequent, two standard motor cars hooked together will work very well as a two-car train, but for the situation as it exists in many cities, the trailer is a very much cheaper and better method of taking care of the evening rush, especially since there are thousands of double-truck motor cars in the country weighing from 45,000 to 55,000 lb., which give ample traction for pulling the trailers.

"The whole situation may be changed if some of the methods which are now being attempted to reduce the motor car weights are successful, since there would not be sufficient traction to pull a trailer of any size behind the motor car. We have a scheme in Pittsburgh which we are arranging to try out which we expect will bring the weight of a 60-passenger motor car down to 32,000 lb."

Referring to Mr. Jones' letter, Mr. Franklin said that Mr. Jones had designed his motor cars and equipped them with such size motors that they could handle a trailer without overloading. If he had loops at each end of the line where he needed no switching he could get possibly good results with trailer operation. He was using trailer operation under those circumstances himself on a line which was adapted to it, notwithstanding a short grade of about 3 per cent across one of their bridges, over which there was very heavy truck traffic. The roadway is planked, giving a very bad rail. One could see the multiple units go up half way and stop and pick up again without a wheel slipping, whereas when the motor and trailer went up they were stuck until the next car came up and gave them a lift. The advantages of two-motor equipment were that it could be used as one train, which made it merely a four-motor equipment in its operation. It gave more flexibility than the trailer and four-motor car; but where special conditions existed such as loops at each end of the line and the equipment was heavy enough to pull a trailer, the trailer operation had its advantages. Nevertheless the fact remained that multiple unit operation would take the place of trailer operation very largely.

On motion of J. N. Shannahan, New York, a vote of thanks was extended to Mr. Franklin for his excellent paper.

N. W. Storer, Westinghouse Electric & Manufacturing Company, said that for many years he had been much impressed with the value of multiple-unit control not only for city but also for suburban and interurban service. It was a little amusing after what he had just heard but eight years ago he had presented before the Engineers' Society of the Western States a paper entitled "The Effect of Multiple Control on the Traction Problem of Pittsburgh." In that he had offered some of the very same advantages which Mr. Franklin had so ably presented and he had never seen any reason for taking back what he had said at that time. They still had a traction problem in Pittsburgh in spite of Mr. Jones' very light-weight trailer cars. He could not agree with Mr. Jones very far in his preference for trailer operation. Mr. Jones seemed to have the opinion that acceleration was simply a question of adhesion, but motors had certain limitations in regard to capacity and the car which was properly motored would certainly be able to accelerate very much better alone than it could when operating a trailer if it was operated anywhere within reasonable limits of its capacity. Of course, if it was considered safe to overload the motors for one or two hours at a time, which Mr. Jones admitted was necessary where trailers were operated, trailer service was a possible consideration.

Mr. Storer did not believe, however, that he could make the same schedule with the trailer that he could with the single motor car. Mr. Franklin had brought out the fact that operating two-car trains would make a better schedule in spite of a possibly larger number of stops than operating the same total number of cars singly. He believed that statement thoroughly true, as he felt that in the congested sections of the city the two-, three-, or four-car trains would permit the use of 50 per cent more cars on the street at one time with the same amount of congestion. Regard-

ing the use of multiple-unit trains on interurban lines, Mr. Storer said the point had been well brought out as to the advantage of this system in keeping the trains on their regular schedule and being able to handle the excess traffic which comes under certain conditions.

F. E. Case, General Electric Company, said there were undoubtedly a number of roads which could operate two-car trains and thereby increase the carrying capacity. Besides Mr. Franklin's road, there were probably half a dozen others which used that equipment. One point Mr. Franklin's paper did not touch on was that with his multiple-unit cars he had two styles, one with four motors and one with two. He could run those trains in combination either of two two-motors, two four-motors or one two-motor car; and furthermore, it would be entirely feasible to have cars of greatly varying weight connected together in one train, provided the maximum speed of the cars was approximately the same.

W. H. Sawyer, Ford, Bacon & Davis, New York, said that, with all due respect to Mr. Franklin's paper, it seemed to him that in many analyses the much-maligned trailer would be found the most economical proposition. The use of trailers in the early days was due to expecting something for almost nothing, and it had been found prohibitive when liability to accident and satisfactory operation were considered; but that did not mean that trailers could not be used to advantage today. Most trailer service meant overheating the motors or over-motoring the equipment, but let trailers be considered conservatively, using them in such a manner that the single car, properly equipped for single car operation, could safely haul a trailer without overheating the motors. The car leaving the carhouse at 6:30 a. m. had its motors comparatively cool and could for from one to two hours haul a trailer safely without overheating the motors. This also held true of the car which left the carhouse at 4:30 p. m. after a long rest. By using trailers on these cars only the overheating of motors could practically be avoided, while securing the advantages of two-car operation. The whole point was not to overload the motors beyond a safe rise in temperature. To avoid the former disadvantages of trailers, they must be equipped with proper couplings, lights, brakes and protective devices, like the multiple-unit car. The second car of any two-car train must have special precautions taken to prevent accident. The prepayment features could be cared for in the same way as in the multiple-unit car. The centre-door car should have real study. He added that the design of multiple-unit apparatus for city cars had made a notable advance in the last two years but there were many instances where the extra first costs would not warrant the expenditure.

Mr. Franklin said that when he prepared the paper he did not have in mind bringing forth the advantages of two-car train multiple-unit operation only for relieving the rush-hour service. He had in mind what they had done in Portland for the last four years; that is, using a multiple-unit two-car train for city service for eighteen hours straight. A trailer for one trip was a good thing, but what was one going to do then? He wanted to bring out the fact that there were conditions where one could increase the service where necessity demanded it by 33 per cent at the same platform expense.

GENERAL BUSINESS

The next business on the program was general business.

The report of the committee on resolutions was as follows:

"Whereas, the entire program arranged for the benefit of our members clearly indicates the conscientious efforts of the members of your executive committee in the selection of useful and interesting subjects and the reports themselves, as presented here, evidence energetic work on the part of each one of the members of the different committees:

"Now, therefore, be it resolved that the members of the American Electric Railway Transportation & Traffic Association beg leave to record their grateful appreciation of the faithful, efficient and conscientious way in which the officers and executive committee members and the members of the standing and special committees have executed the duties imposed upon them. Respectfully submitted. E. F. Schneider, chairman; J. J. Johnson, J. Stanley Moore."

NOMINATIONS

The report of the committee on nominations was as follows:

President, J. N. Shannahan, New York, N. Y., president Pottsville Union Traction Company; first vice president, Dana Stevens, Cincinnati, Ohio, vice president and general manager Cincinnati Traction Company; second vice president, D. A. Hegarty, New Orleans, La., manager New Orleans Railway & Light Company; third vice president, M. C. Brush, Boston, Mass., assistant to vice president, Boston Elevated Railway.

Members of the executive committee: A. Gaboury, Montreal, Que., superintendent Montreal Street Railway; C. F. Handshy, of Springfield, Ill., general superintendent of interurban lines, Illinois Traction Company; C. B. Buchanan, Richmond, Va., general superintendent railways, Virginia Railway & Power Company; H. A. Nicholl, Anderson, Ind., general manager, Indiana Union Traction Company.

The report was signed by Robert I. Todd, chairman; C. Loomis Allen and Bruce Cameron.

After these gentlemen were duly elected the newly elected president, J. N. Shannahan, was conducted to the president's chair by Mr. Todd. After thanking the members, he said that the president of the association could not carry on the work of the association to a successful conclusion without the aid of every man. He hoped that when he asked gentlemen to serve on the committees he would receive their cordial consent and service.

Under new business W. B. Rockwell moved that the elimination of the reading of printed papers be submitted and referred to the executive committee for favorable action.

The motion was referred to the executive committee with power to act.

The meeting then adjourned.

THE AVIATION EXHIBITION

Yesterday afternoon C. C. Witmer gave a fine exhibition flight with his Curtiss hydro-aeroplane. All morning an interested and curious crowd had been grouped about the machine, which was being tuned up on the beach opposite the Marlborough-Blenheim hotel. A few minutes before 4 o'clock the machine was run down on the beach to the water's edge and Witmer took his seat in the amphibious craft. The Boardwalk was packed with spectators and the ocean end of Convention Pier was black with people. Unfortunately the Pier management permitted the general public on the Pier and many of the convention delegates were unable to secure places of vantage to see the flight.

Witmer took a short run down the beach and entered the water without a hitch. He continued well out in the ocean, occasionally rising in the air, then dipping again to the surface of the water. He returned toward the shore and then went out again before making a successful landing on the beach through the surf. He was in the air and afloat about twenty minutes.

Another exhibition will be given this morning at 10 o'clock. In order to avoid postponing this promised flight on account of the possibility of rough weather Witmer is planning to start early in the morning and fly to the Inlet. If the sea is calm he will fly from the Inlet along the shore to Convention Pier, reaching the Pier shortly after 10 o'clock. If the sea is too rough for a flight to the Pier he will give an exhibition flight at the Inlet.

REPORT OF THE COMMITTEE ON FEDERAL RELATIONS

BY GEO. H. HARRIES, CHAIRMAN; F. R. FORD, C. S. SERGEANT, R. I. TODD, L. S. STORRS, RICHARD M'CULLOCH

Steadily, and against the continuing protest of those far-seeing publicists who deem it easily possible that grave injury shall increase as the self-governing powers of the several states are diminished, we are moving toward absolute Federal control over corporations and natural persons engaged in interstate commerce. To this movement the great transportation agencies no longer offer objection. Driven in every direction but the right one by the conflicting winds of state legislation they are ready to welcome a statute which will be *the* statute and under the terms of which they shall definitely know what they can do. The Sherman Act—which many lawmakers insist should not be amended—leaves the answer to practically every commerce question in the keeping of the grand jury. The great need is for a potent and capable federal force which shall in large sense supplant the inexcusably destructive practice of to-day by definite regulation which shall prohibit the doing of specifically unlawful things. It may be by federal incorporation or "license," although the idea of "license" is illogical and repugnant. The right to do business is basic and therefore has precedence over permission. More probably the legislative conclusion will be "registration." In the propositions submitted to Congress both methods are set forth, and to many of the disputants either conclusion would be satisfactory. But there is a wide difference of opinion among them as to the powers to be placed in the hands of the registering authority. Here the devotees of the sacred Sherman Act insist, practically, that the only way in which the business man can find out whether his method is right or wrong is by going ahead after his own fashion until the grand jury passes upon his procedure. In that way lies industrial confusion and financial disaster. The demand of the hour and of the age is for direct information prior to possible indictment; for a controlling body clothed with authority to say "Yes" or "No;" something closely related to the power which—whether lawfully or otherwise, but with high personal and political courage—averted that frightful shrinkage in values which must have come to this country had Tennessee Coal & Iron been thrown on an abnormally debilitated market.

Whether anything like well-balanced and permanent statutes will be enacted during the approaching session not even the various leaders can safely foretell. With the ever-present presidential campaign approaching a junction with the campaign for 1916 no man knows what one Congressional hour may bring forth, but there is reason for hoping that some good will come out of our legislative Nazareth.

While the output of Federal energy during the past twelvemonth has been almost equal in bus-bar quantity to that of any like preceding period, yet, so far as our business is concerned, there has been a marked drop in voltage and every evidence of a decrease in the distributing and disturbing efficiency. This is due, possibly, to the fact that instead of one great prime-mover we now have a large number of comparatively small and necessarily less economical units. Remedial measures taken by many companies have, of course, reduced the supply of partisan fuel and decreasd the B. T. U. of opposition.

With the nominating conventions almost summoned each party and every faction of one party will strive for accomplishment. There will be much playing with fire in spite of the fully demonstrated danger of such recklessness, but there will also be determined effort to sanely solve the great problem of the time—the problem in which we have so much at stake.

There is demand for at least one Moses, and there are many candidates. Each is industriously yearning to be called to Sinaiatic elevation, there to be named and equipped as the one who led his people out of the wilderness and to whom the borders of the promised land may not prove a barrier. Surely wisdom will somewhere be apparent.

FEDERAL INCORPORATION

Five new bills dealing with Federal control are ready for consideration and others may reasonably be expected at the next session. Some of the more thoughtful legislators are of the opinion that Congress has not sufficient information on which to base sound legislative effort. To meet that situation Representative Martin Littleton will urge his bill to create an industrial and corporate commission to be composed of five members of the Senate, five members of the House and five members not members of Congress to be appointed by the President of the United States. It is to be the duty of this commission to inquire into the method by which industrial and corporate enterprises enter into and transact interstate commerce, and to report at the earliest date practicable what legislation is necessary to enable the Government of the United States to regulate, supervise and control the entry of and the transaction of business by industrial and corporate concerns engaged in interstate commerce. This measure will undoubtedly be opposed by some of those who are satisfied that the remedy lies not in delay but in immediate and direct legislation.

Senator Newlands, of Nevada, who has given the matter much attention, is sponsor for the bill which proposes to create an interstate trade commission, which is to be the successor of the Bureau of Corporations. By that commission all interstate corporations heretofore or hereafter organized within the United States whose gross annual receipts or the total annual receipts of whose subsidiaries exceed five million dollars shall be registered, and shall thereafter be known as "United States Registered" companies, and shall have the sole and exclusive right to use, in connection with their corporate title, their securities, their operations and by way of advertisement of their business, the title "United States Registered" or any convenient abbreviation thereof. The commission may require, should such a thing be necessary, any registered corporation so to readjust its securities or assets as to create no overcapitalization, the penalty for failure on the part of any corporation to make such correction being revocation of its license, and the issuance of an order that such corporation shall not thereafter engage in interstate commerce. Provision is also made for the re-registration of any corporation which may have violated any order of the commission, afterwards repenting and requesting forgiveness.

The five bills referred to form part of the appendix of this report.

Other measures on committee calendars—some calculated to arouse controversy, and some certain to promote argument and laughter—are lightly sketched for the information of members who have no acquaintance with the bill files at the Capitol, and who are not devoted readers of the Congressional Record.

PHYSICAL VALUATION

Physical valuation will have prominent place in any discusssion affecting transportation agencies. Three bills propose to require the Interstate Commerce Commission to value the properties. Those introduced by Senator La Follette and Representative Madden call only for present values, but that presented by Representative Adamson provides for inquiry into every detail or original cost and all facts pertaining to capitalization, no matter how remote.

Representative Macon, however, does not propose to wait until the Interstate Commerce Commission could complete the stupendous task of valuation. He insists that "it shall be unlawful for any company, corporation, organization or association engaged in interstate or foreign commerce to use the mails, the telegraph or telephone lines or the railroads within

*Abstract of report read at the convention of the American Electric Railway Association, October 9-13, 1911.

the jurisdiction of the United States of America for purposes of interstate or foreign commerce without first having filed with the Interstate Commerce Commission an affidavit duly subscribed and sworn to by the chief agent or officer thereof clearly setting forth that the aggregate value represented in and by the stocks, bonds or other securities of the company, corporation, organization or association represented by said agent or officer does not exceed the aggregate physical value of the property and the reasonable value of the business, privilege or franchise that said stocks, bonds or other securities were issued to represent. Any company, corporation, organization or association violating any of the provisions of this Act shall be deemed guilty of a misdemeanor, and upon conviction thereof shall forfeit to the United States of America a penalty equal in amount to the difference between the aggregate value represented in and by said stocks, bonds or other securities and the aggregate physical value of the property and the reasonable value of the business, privilege or franchise that said stocks, bonds or other securities are intended to represent; and each day's failure to comply with the provisions of said Act shall constitute a separate offense, and any agent or officer of any company, corporation, organization or association violating any of the provisions of this Act, or who shall knowingly swear falsely concerning the value of anything mentioned herein, shall be deemed guilty of a felony, and upon conviction shall be punished by a fine of not less than $10,000 and imprisonment in the penitentiary for some period of time not less than ten years."

The other valuation bill is by Representative Lafferty, who goes all the way (leaving nothing for those who may follow after) by seeking to enlarge the jurisdiction of the Interstate Commerce Commission by giving to that body the power to fix reasonable rates, based upon physical valuations, to be charged by railroad, express, telegraph and telephone companies and all other common carriers, in the transaction of interstate business, and also giving to said commission the power to fix reasonable prices to be charged by persons or corporations when found to be exercising a monopoly in the interstate sale of any commodity.

RESTRAINTS AND MONOPOLIES

Desire to protect trade and commerce against unlawful restraints and monopolies found form in many legislative suggestions. These are interesting to us because it is generally provided in each bill that all interstate or international transportation of the products of lawless combinations is prohibited. Occasionally there is no effort to prevent the loading of tabooed products, but when they cross a State line or are being shipped to a foreign country it is laid down as a necessary principle that the goods "shall be forfeited to the United States, and may be seized and condemned by like proceedings as those provided by law for the forfeiture, seizure and condemnation of property imported into the United States contrary to law." The strong arm reaches out also for the responsible individuals. Any natural person who is an officer, director, agent, trustee, receiver, lessee, or any person acting for or employed by such corporations * * * or who shall aid or abet therein, or who shall participate therein, or who shall suffer or permit any act required by this Act to be done or not to be done, or who shall aid or abet any such omission or failure, etc., shall be deemed guilty of a felony with eight years in the penitentiary as a resultant, "and in addition to each imprisonment shall forever be disqualified from acting as trustee, director, agent, manager of any national banking association or of any corporation engaged either in interstate or in foreign commerce, or both, and shall be disqualified to hold any public office whatsoever." Resentment at recent opinions of the United States Supreme Court is frequently displayed in bills which insist "that every contract, combination in form of trust or otherwise, or conspiracy in restraint of trade or commerce of any character whatsoever * * * is hereby declared to be illegal and unreasonable" or as another court-directing measure has it, "shall be presumed, construed and adjudged to be unreasonable." The Act, of course, is a statutory command which will compel the courts to declare unreasonable not only those contracts which are reasonable but also those which, from every point of view, save that of the would-be-destructive politician, are mutually advantageous to the contracting parties and to the public.

The author of one House bill deems it insufficient to prohibit. He would forbid "the purchase of any stock in a corporation engaged in interstate commerce by another corporation engaged in interstate commerce doing a competitive or *similar* business."

In a similarly-designed measure the author seeks to destroy the last hope of the individual who is in any sense party to a merger or a contractual understanding. "It shall not," provides this bill, "be deemed a valid defense in behalf of such officer or members of the board of directors that they had no knowledge of or were ignorant of the facts constituting the offense charged." Heavy fines and long terms are, however, evidently insufficient. One section of one bill read as follows: "That every person engaged in any business any portion or all of which constitutes a violation of this act shall forfeit by reason of such violation any and all rights which such person may have to protection under or right to damages for infringement upon any patent right held or owned by such person, whether directly from the United States or under purchase, assignment, or otherwise; and the right to the free manufacture and use of any and all articles, devices, or machines so held under right of patent by the person who shall have violated any of the provisions of this act shall thenceforth be open to all."

In the extremely important matter of security issues but one proposition—by Representative Miller—has been submitted. It will be found in the appendix. The Congressional disposition is to await the report of the Hadley Commission, which body has not yet reached any definite conclusions.

Just at this point our Manufacturers' Association should become personally interested, for a bill introduced by a member of the House who is most conspicuous in Steel Corporation research says: "No person who is engaged as an individual or as a member of a partnership, or as a director or other officer or an employee of a corporation, in the business, in whole or in part, of manufacturing or selling railroad cars, or locomotives, or railroad rails, or structural steel, or mining and selling coal shall act as a director or other officer or employee of any railroad company which conducts an interstate-commerce business."

It must not be imagined, however, that every legislative proposition looks toward the repression of all organized effort. Always there is a fine vote-bidding discrimination, such for instance as is shown in the proposed amendment to the Sherman Act, which amendment blandly provides: "That this Act shall not be construed to apply to any arrangements, agreements, or combinations between laborers made with the view of lessening the number of hours of labor or increasing their wages, nor to any arrangements, agreements, or combinations among persons engaged in horticulture or agriculture made with the view of enhancing the price of agricultural or horticultural products."

WORKMEN'S COMPENSATION

All members of Congress are not inclined to wait for the findings of the Employers' Liability and Workmen's Compensation Commission before there is any serious framing of legislation.

A comprehensive and drastic measure of fifty-two pages has been introduced by Representative Sabath, which plans to raise revenue from persons engaged in and carrying on occupations subject to the regulative powers of Congress, to create a fund to pay compensation to employees and public servants injured on post roads and mail routes and to change existing general law as to the recovery for personal injuries.

Under the terms of this bill there is to be a new board in the Department of Commerce and Labor, the chief of which board is to be known as the "Commissioner of Injury Awards." The Commissioner will have great latitude in procedure. It is proposed that the commissioner will have power to make general regulations or orders making effective the provisions of the Act, and he may award to any beneficiary or annuitant—after hearing or rehearing—such compensation or amended compensation as he may deem proper in accordance with a schedule which is set forth in minute details. With respect to the injury records and accounts of all common carriers and carriers transporting mail he will specify a form of accounting records and memoranda for carriers and has, as to injuries to employees, authority which is parallel to that of the Interstate Commerce Commission and subject to the action of the United States Circuit Courts and the Supreme Court of the United States.

The projected method of operation is that upon being notified by any corporation or natural person subject to his jurisdiction that an employee has been killed or injured, the commissioner will "promptly notify the person injured, or his widow, personal representative, or next of kin, of their right to compensation" under the act, and shall take all proceedings necessary or proper to make the law effective; which means that in accordance with the table of damages there will be an award by the commissioner of the sum to which the beneficiary is alleged to be entitled. That sum will be paid by the carrier if the carrier accepts the provisions of the act, and that payment will stop any action at law contemplated by the person compensated. Avoidance of the terms of the act by any contract, agreement or device relating to the employment or re-employment of the servants of a carrier is to be made impossible by the declaration that such a contract, agreement or device shall not be valid or enforceable. The funds which are to be at the disposal of the Commissioner are to be secured from taxes levied as follows:

1. Ten cents on each $100 face value of all securities issued by corporations or persons subject to the commissioner and the same tax on all sales or agreements to sell or transfers or memoranda of agreements to secure the future payment of money or for the future transfer of stock, of, if the evidence of transfer is shown only on the books of the company, the stamp shall be placed on such books.

2. One cent for each $1000 value of freight, express, messages or money-orders sent; stamps to be attached to bills of lading, manifests of other memoranda of messages by telegraph or duplicate thereof.

3. An excise tax of $60 per vehicle per year on every locomotive and tender and every other vehicle used on the lines of every common carrier by steam railroad, and on each and every motor, trolley or electrical vehicle used by any electrical railway, when any such vehicles are used on a mail route or on a post road.

4. An excise tax of $5 per mile on every mile of its single wire mileage within the United States by every telegraph company operated along the line of or connected with any telegraph line built, constructed or maintained along the line of any railroad telegraph line to which the United States has granted subsidies, or which telegraph line shall have accepted the provisions of Title 55, Revised Statutes.

Exemption from the foregoing taxes may be had by accepting and abiding by the provisions of the projected statute.

For those corporations or carriers that decline to accept the provisions of the act, trouble in large quantity is provided as follows:

(1.) The Postmaster-General is forbidden to enter into any contract with them for the carriage of mail.

(2.) It shall be unlawful for them to transport any passenger for hire over any line of railway heretofore made and declared to be a post road or by this act said to be a mail route, "and no court of the United States shall entertain a bill or bills for injunctive relief on the ground that the carrier, or any person directly or indirectly suing on its behalf, is engaged in interstate or foreign commerce, or that it is operating on or over a mail route, when its employees shall have started to impede its hauling freight or the mails or shall have entered on a strike," and all laws and regulations in conflict with that sentence shall be deemed to have been suspended until the carrier consents to be governed by the act.

(3.) The doing of business with the United States Government is rendered impossible by a section which forbids the Comptroller of the Treasury from auditing or permitting the payment for any service for the carrying of the mails or for transportation of any kind or for travel in sleeping cars or for charges for express matters or any cable or telegraph or telephone service by any company "that shall not have accepted the clauses of this act by a certificate in form to be prescribed by said comptroller."

It is a most remarkable measure. It invites the voluntary co-operation of the carriers and then assures them that if they will not volunteer they will be put out of business. It reminds us of a South American situation when two nations were at war and when "volunteers" were brought into the training camps roped together in squads of ten. The military authorities invited an alcalde in the mountains to send them additional "voluntarios," to which he responded, "Send me more rope and I will send you more 'voluntarios!'" Which seems to prove rather conclusively that the legislators of this supposedly civilized and highly intelligent land are not above the crude but somewhat effective methods of those who are alleged to be more nearly savage than we.

The Sabath bill, and other measures, the details of which may be deemed worthy of careful study, will be found in the appendix of this report.

In dealing with an important feature of damage suits Representative Clayton has put in bill form a court-instructing proposition which comes home to all of us. That bill provides that in any actions hereafter brought in or removed to Federal courts for negligence causing personal injury or death, questions of negligence and contributory negligence, shall be for the jury. It shall be reversible error for the trial court to refuse to submit these questions to the jury, and no case shall be reversed by the appellate court because these questions are left to the decision of the jury.

With respect to the Employers' Liability and Workmen's Compensation Commission, it may be enough to say at this time that the commission has held many hearings and is considering a number of briefs. If it be practicable your committee will endeavor to see that member companies are supplied with the volumes of testimony and argument published and to be published.

ARBITRATION

A number of men prominent in national administrative and legislative life, who have been much interested in the more conspicuous phases of the labor problem, are, since the recent strikes in England, more intent than ever on bringing into existence some board or court which will have authority to search out the inwardness of each troublesome situation and at the same time bring about a reasonable degree of harmony between the employer and the employed. No one of the measures which will be carefully considered, and perhaps pushed vigorously next session, contains even an intimation of compulsory arbitration, but all are strong with respect to investigating powers, and one—by Representative Foss—provides that the "National Arbitration Tribunal" may require of each of the parties to a submitted controversy an indemnity bond to abide by the decision of the tribunal.

LABOR

The House Committee on Labor has a few measures waiting consideration. These deal with the hours of labor; with the number of men who must be assigned to duty with each switching locomotive; with prohibition of the transportation of wares manufactured wholly or in part by con-

vict labor or in any prison or reformatory, and with prohibition of the transportation of the products of any factory, mine or mill in which are employed children under the age of fourteen.

RATES

With respect to rates there is practically nothing to be considered save some unimportant measures which would amend the Hepburn Act by giving free or reduced transportation to bona fide members of the Grand Army of the Republic, the Women's Relief Corps and the Ladies of the Grand Army of the Republic whenever attending annual encampments; authorizing the interchange by carriers and publishers of newspapers and periodicals of transportation for advertising and printing, and permitting railroad companies to grant free transportation to agents, emissaries and employees engaged in the Co-operative Farm Demonstration work, carried on under the jurisdiction of the Department of Agriculture of the United States. The latter clause is interesting principally because a department of the United States Government (which government is legislatively and oratorically opposed to any form of discrimination) practically asks that there be discrimination in its favor.

MISCELLANEOUS

Efforts of the miscellaneous sort present some interesting pictures of the legislative mind. One bill requires interstate carriers to adjust and pay all claims for overcharges on freight and for loss and injury to property committed to their care within ninety days from the date of the filing of claims. Another forbids the transportation of any sheet and plate iron and steel which does not conform to a standard gage (set forth in nine tabulated columns) which it is proposed to establish. Another would divest whiskey of its interstate commerce character in certain cases, these cases, however, not being cases in which the whiskey is packed. Another would make mileage tickets practically universal in character.

With respect to safety devices there is practically nothing new, although block system operation is demanded in three bills. Clearance between cars and structures is the subject of one measure; the transportation of explosives is dealt with; the use or production of acetylene on cars is sought to be prohibited; and a good deal of stress is several times laid on the substitution of steel for wood in the construction of all passenger-train rolling-stock.

Perhaps the most important bills relating to safety are the two which provide that the American Railway Association shall be authorized to frame and report to the Interstate Commerce Commission a standard code of rules for the operation of trains. Your committee recommends that the president of this association, either in person or by committee, be authorized to confer with the American Railway Association as to this or any other matter which may be of mutual and common interest to the end that such rules, should they be framed, be suitable for electric railway use.

CONCLUSION

Your committee would most emphatically urge member companies to take deep, practical interest, local and general, in tentative legislation by Congress. It is that body which establishes precedents for rulings by state commissions. On Congressional propositions and debate there should be a concentration of association and individual thought and action, for out of them must necessarily come the issues of national health and disease.

A petition will be presented to Mayor Fitzgerald of Boston and the City Council, signed by citizens of Boston, asking the Mayor and Council to take favorable and speedy action on the legislative act that will make possible a plan for the improvement of transportation facilities between South Boston and the city proper.

THURSDAY MEETING OF THE ACCOUNTANTS' ASSOCIATION

President Forse called the concluding session of the Accountants' Association to order at 10 o'clock yesterday morning.

Mr. Forse spoke of the proposed amendment of the constitution of the Accountants' Association on the subject of associate membership which, in accordance with the constitution, was submitted to members by mail thirty days in advance. This amendment was framed to enlarge the scope of the membership of the Acountants' Association by providing for associate members, who have not heretofore been admitted to that organization. In speaking of the proposed change Mr. Forse said he believed that the association should widen its sphere. The association and the industry were growing and should measure up to the fullest responsibilities of the times. The merits of the plan should be given the fullest consideration.

W. F. Ham, Washington Railway & Electric Company, thought that it would be wise to make clear in the amendment just whom it was proposed to include in the privileges of associate membership.

President Forse said that the amendment followed closely the one on this subject adopted by the Claim Agents.

REMARKS OF MR. BRADY

During the discussion on this subject President Arthur W. Brady, of the American Association, entered the hall. The discussion was suspended and President Brady was asked to address the members. He stated that no one of the associations had done more hard work than the Accountants', the results of which were seen most prominently. He said that he was familiar with the work of the association owing perhaps to his close connection with the president and his knowledge of its activities regarding the standard classification.

Referring to the subject of associate membership Mr. Brady said that it was his conclusion after several years of connection with the association that a vast amount of work was ahead of the industry. The association had a great deal to do if it did what the industry demanded. The work would have to be done on broad lines, the immediate effect of which might not be seen at the moment. Every public service corporation was confronted at the present day by a number of widespread heresies which had been preached to the public. A position had been taken that was absolutely detrimental to the foundations of the electric railway industry. The questions of rate of return, the value on which it should be computed, regulation, taxes and various exactions and burdens imposed upon the properties were exceedingly prominent before the people. In the past undoubtedly there had been acts on the part of the public service corporation that should not have been done. Some wrong had been done and arrogance had existed in some quarters, but there was no question now about the fact that the industry was on a sounder basis and in its public relations was characterized by an increasing desire to do justice. The properties were bearing their share of taxes and many burdens that were oppressive.

The main reason for the attitude of the public, Mr. Brady said, was that the case of the electric railways had not been presented fully and frankly before the public. The companies had done very little to offset public criticism. He knew that it was not possible to deal, as the railways do, with hundreds of thousands of human beings without rules and regulations that might run counter to the desires of some. It was highly important to the industry that the companies depart from the policy of silence that they had maintained in the past and let the public know something about the difficulties of the situation.

The electric railways had greater difficulties than other public service corporations. Every transaction was on a

very small scale, five cents being the unit in most cases, and in every one of these transactions there was a personal element involved on the part of both the public and the corporation. The situation was different with the electric lighting and gas properties, whose customers came in contact with the company not oftener than once or twice a month. The companies must lay their side of the case before the public in order that these difficulties might be appreciated. The people who had done so much to create a false opinion had been able to spread their doctrines through the magazines or newspapers or by agitation on public platforms. In order to overcome the effects of agitation the companies must organize on the right scale and regard that object as the main purpose for which the organization existed.

Taking up the question of associate membership Mr. Brady said that the work of the association would be broadened if the great body of men who were really connected with the industry throughout the country became actively identified with the settlement of the problems. Men should feel stimulated and really interested in the question of seeing that public sentiment, so far as it related to the public service corporation, was founded on a correct basis. The scope of the association should be enlarged so as to include as many of the men interested in the railways as possible. The association should have several thousand associate members.

P. S. Young, Public Service Railway of Newark, said that he felt that the time had come when the association should open the door to accountants generally. In addition to that associate membership in the association would educate the younger men in the industry.

C. N. Duffy, Milwaukee Electric Railway & Light Company, said that at the time of organization of the association it was untried and it was felt to be wiser to limit the members to companies. He heartily concurred with Mr. Brady as to the necessity as well as advantage of now widening the scope of the association. Mr. Duffy referred to the attendance of representatives of the association at the National Association of Railway Commissioners and thought that the association should be in touch with public accountants.

F. E. Smith, Chicago Railways Company, thought that the association work should be broadened and public accountants admitted. This would help the industry. The association had nothing to conceal and the closer the accountants got in touch with the work of the companies the better it would be for all.

C. L. S. Tingley, American Railways Company, thought that any associate members acceptable to the executive committee of the American Association ought to be acceptable to the Accountants' Association.

Henry J. Davies, Cleveland Railway Company, said that the association ought to take a position in accordance with the recommendations of Mr. Brady. He believed that by the adoption of the amendment more would be done for the association than could be accomplished through the extension of the privilege of associate membership in any of the other associations.

Mr. Ham offered an amendment. The amendment as amended was thereupon adopted, and is as follows:

AMENDMENT TO ARTICLE III OF THE CONSTITUTION

"The membership of this association shall consist of two classes:

"(A) Active members, consisting of active members of the American Electric Railway Association. Each active member shall be entitled to one vote, which shall be cast by the properly accredited representative of the accounting department.

"(B) Associate members, consisting of those associate members of the American Electric Railway Association who may be employed in the accounting departments of its active member companies, or who are regularly engaged in accounting work in the accounting departments of other urban or interurban railways or electrified sections of steam railways, or such other associate members of the American Electric Railway Association whose application for associate membership in this association shall be approved by the executive committee of this association as may desire to ally themselves with this association. The privileges of the associate members shall be similar to those of active members excepting that they shall not be qualified to vote or hold office."

OVERHEAD CHARGES

Dean M. E. Cooley, of the University of Michigan, then presented an address on the subject of "Overhead Charges." An abstract of this address will be published in a later issue.

Professor Cooley supplemented his paper by a discussion of additional points. With the physical structure complete it was necessary to add other overhead charges before the property could be changed from an inactive to an active position. It was necessary to have working capital, a sum to buy not only stores and supplies but also to pay bills until the property began to earn for itself. Then there would be a long period when a property would fail to earn any adequate return. After a period of ten or fifteen years, or in some cases it might be a shorter time, the earnings would be sufficient to take care of the requirements and the property would be self-sustaining. He had preferred to think of overhead charges, not as a part of the going value, but as a part of the cost of establishing the business. Then, if the property was purchased it had a going value for which the purchaser could well afford to pay. The cost of procuring the going value would be a part of the cost which the new purchaser would have to pay if he started business.

Professor Cooley believed that all these necessary costs were properly to be classified as overhead charges. He did not pretend to say that they should be included in the debt represented by bond issues. Some believed that they should be so treated and others believed that the charges should be carried as a debt and wiped out gradually. While he was not prepared to express an opinion on that point, money absolutely had to be raised to meet these expenses, if the property was to exist. It was altogether necessary that these charges should be taken into consideration in rate-making. There was also an element of value which disappeared in the inventory.

Professor Cooley added that if the property had incurred all the expenses outlined the cost of financing had to be met. Whether discount on bonds was included or eliminated it was impossible, except in exceptional cases, for a company of the nature under discussion to dispose of its bonds at anywhere near their par value. An allowance had to be made, but the proper amount was a subject for consideration. He had found that some new steam roads had disposed of securities around 60 per cent of their par value. In the best case that he had known 92 per cent was secured. A compilation had been made from the reports of the New York Public Service Commission, Second District, showing the principal data bearing on this subject relating to the issue of securities by established companies. On $63 000,000 bond issue, authorized in 1908 by the commission, the average interest rate was 4.29 per cent. The annual interest was $2,700,000. The mean amount for which the bonds were sold was 88. In 1909 $39,000,000 bonds were authorized at an average price of 87.6 per cent. It therefore appeared, assuming that the experience in New York was like that which would be found in other places, that at least 10 per cent should be allowed. Notwithstanding these conclusions the attitude of the average person toward this subject showed that it was necessary to undertake a campaign of education so that all could comprehend the real nature of the problems.

The cost of the property, Professor Cooley said, should be considered in the determination of rates. The value for purposes of taxation, however, did not include all elements that should be allowed in most cases. It was always necessary to obtain the cost of building the property before an accurate determination could be made as to the present value of the property. It was necessary to determine what elements had depreciated and what elements could be transferred from cost to value column without any change because of the fact that they had not undergone any depreciation. Among the items which did not depreciate Professor Cooley mentioned development charges, organization and legal expenses; cost of acquiring rights-of-way and property consents, which could not depreciate and might appreciate; insurance, interest and taxes during construction, stores and supplies, working capital and cost of establishing the business. In the 1900 valuation of the properties of steam railroads in Michigan the value remaining after the properties were subjected to depreciation was about 82 per cent of the cost. That included such overhead charges as were allowed then. Some overhead charges were generally allowed now that were not recognized then as elements of value. He had found that the value of electric railway properties had extended from 77 or 78 to 88 per cent of the cost new. For maintenance in condition where satisfactory and economical service could be given this value should stand around 85 per cent. There was a point in the value beyond which it was impossible to go with economy. Electrical properties, particularly hydro-electric plants, averaged higher percentages of value than electric railway properties.

In some cases Professor Cooley had found that the value of hydro-electric plants was 95 per cent of the cost new. This was apparently owing in part to the fact that the properties were new. In valuations electric railways should show a higher percentage of the cost new than steam railways because of the inclusion of copper, which did not depreciate like other elements of value.

The Accountants' Association and accountants generally could do more than anyone else to disseminate the needful information. They could prepare facts from their records. Precise facts were stronger evidences in court than opinions. The public must have the information regarding the results of the companies. In conclusion Professor Cooley stated that he knew that both the public and the public service corporations were coming out on top at the end, but that it would be the same top.

C. N. Duffy, Milwaukee Electrical Railway & Light Company, in beginning the discussion on the paper stated that Professor Cooley was the first man to be able to demonstrate the fundamental principle of going value and how it could be applied in the valuation of a public utility corporation. Mr. Duffy said that proper publicity was part of the business of the electric railway official. The companies had continued on the assumption that the public knew about as much about the business as the officials themselves. The fact that this was not so had been brought home forcibly to Mr. Duffy in the fare case pending in Milwaukee. During the presentation of the testimony in the case the invariable criticism of the newspapers when facts were brought out by the company was, "Why didn't you tell the public your story?" The company since then had prepared and published a series of educational advertisements. The full series had been bound in book form for presentation to the Accountants' Association. Mr. Duffy said that he was afraid that officials had been too much engrossed usually with the practical side of the business and, as Professor Cooley had pointed out, had failed to realize their full duty in the matter of placing facts before the public so that "he who runs may read." Nine of the educational advertisements had been reproduced in the time-table issued by the company.

Professor Cooley had referred to the compilation of two sets of figures for valuation purposes, one for taxation purposes, the other for the purpose of rate return in the investment. Speaking entirely from a personal standpoint and not as representing the company Mr. Duffy said that he believed that it was absolutely inconsistent to have two sets of values used. Why should not a public utility corporation be willing to pay taxes on the full value of the property or on the full capitalization and then demand recognition of the capitalization and a fair return thereon? The company was entitled to a fair return on the cost of the property and so far as the Milwaukee company was concerned this was less than the capitalization. The stocks and bonds outstanding were issued under authority of the law of the state for a consideration.

Mr. Duffy also referred to the reference by Professor Cooley to the advantage of presenting facts instead of opinions in cases in court. He knew of one item, the cost of making the foundations of a power plant, which the books showed, cost $300,000; the total expense of the construction of the power plant was $2,500,000. It would have been exceedingly difficult to locate this item after the completion of the property unless it had been set forth specifically on the books.

In reference to the important amount which overhead charges sometimes reached Mr. Duffy referred to a notice sent by the Milwaukee company to the heads of departments to guide them in cases where work was done for allied companies or outside interests. The subject was considered at one of the weekly meetings of the fourteen department heads and was referrd to a committee of three, consisting of two engineers and the treasurer. This committee worked out a schedule which is followed. The following percentages are added for overhead charges: For labor without hand tools, 10 per cent; for labor wtih hand tools, 15 per cent; for shop work without machine tools, 70 per cent; for shop work with machine tools, 100 per cent. To the material 5 per cent is added. These percentages are used when the transactions are between constituent companies, but if a profit is to be charged 25 per cent is added to that.

To demonstrate how errors had been made Mr. Duffy referred to the valuation of the property of the allied Milwaukee companies located in the city of Milwaukee. The cost of property and plant of the Milwaukee Electric Railway & Light Company, the Milwaukee Light, Heat & Traction Company and the Milwaukee Central Heating Company, as of Dec. 31, 1909, aggregated $36,571,000. The physical value of the properties as determined by the joint engineering staff of the Railroad Commission of Wisconsin and the Wisconsin Tax Commission, was $23,877,000. The percentage of present value to cost new was approximately 78 per cent. The percentage of physical value to the book cost new was 64 per cent. The assessed value of the property for taxation purposes was 86 per cent of the cost new. In discussing the discrepancy in these percentages Mr. Duffy said that the reason lay largely in the fact that the figures of cost on the books included no overhead charges and represented the bare productive cost of labor and material used in the construction of the property. No contractor could have produced the property for anything like the cost made possible by the fact that the company did its own work.

Referring to percentages of allowance above physical cost, Mr. Duffy said that the joint engineering staff of the commissions allowed as details of the overhead charges 12 per cent, made up of engineering and superintendence, 4 per cent; organization and legal expenses, 2 per cent; interest, 3 per cent; contingencies, 3 per cent.

Henry J. Davies, Cleveland Railway Company, stated that in the valuation made by Judge Tayler of the United States Circuit Court in the Cleveland case, an allowance was made for specific and overhead charges, which was equal to about 21 per cent of the Goff-Johnson valuation. The Tayler valuation of the physical property averaged about $80,000 per mile of single track.

Mr. Davies asked Professor Cooley a question in relation to the Cleveland franchise.

Professor Cooley, in response, said that the public should be educated on the subject of franchises. It should know that a perpetual franchise was the best possible thing for the public and that the shorter a franchise was the more expensive it was to the public. If a short term franchise was given it was necessary to wipe out in the capitalization everything that the public insisted should disappear and to do that it was necessary that the rate of fare be sufficiently high to provide for all the charges.

A. B. Bierck, general auditor Long Island Railroad, was unable to be present to read his paper on the subject of "Statistics of Cost of Electric Operation on Steam Railways." The paper was read by title and an abstract is published elsewhere in this issue.

COMMITTEE ON LIFE OF RAILWAY PHYSICAL PROPERTY

Robert N. Wallis, Fitchburg & Leominster Street Railway, chairman of the committee on life of railway physical property, read the report of this committee. An abstract of the report follows:

"The object of the work of the committee is to make available for members of our association the information on this subject in its various branches, but with no attempt to formulate anything of the nature of fixed rules or methods of procedure.

"The committee broadly divided the work into two parts:

"(A) A bibliography of the subject.

"(B) The assembling of such original material as member companies and others are able and willing to furnish.

"Proceeding on this basis, the committee has made a beginning and finds a mass of data accumulated, largely in the last few years, but absolutely no available compilation or digest. The person who desires to proceed intelligently in solving any of the various accounting problems related to, and depending upon this subject, will be obliged to go over a broad field without guide or help, and each, if at all thorough, must cover the same ground. It is the aim of the committee to supply this help and to so compile and arrange that the accountant can supply his study needs without almost prohibitive labor.

"Your committee was fortunate in securing the assistance of a gentleman who traveled abroad recently and was in an excellent position to secure us reference lists if any existed there. He found a notable absence of any such bibliography, although he was told, while abroad, that in Germany—where he did not go—he might have found one.

"It will not be to our credit as an association if commissions and individuals accumulate a fund of information on this important subject properly compiled, abstracted and digested, while we are idle, until some pressing need of our members cannot be filled for lack of time to secure the necessary data.

"Many of our accounting problems hinge materially upon the question of the life of railway physical property. For the railway accountant to meet these problems intelligently, a careful study of the probabilities and certainties of railway physical life as indicated or demonstrated by actual experience is essential. We cannot become too soon or too well posted in this matter and our association can well serve us by assembling available data from numerous sources.

"The committee has first set to work to secure a reasonably complete bibliography of the subject. This is to be obtained by a scrutiny of various public and private libraries and from references in the technical press.

"From these sources the committee has already gathered over 400 references with more to come. Not only have public libraries been drawn upon, but help has been given or promised from Stone & Webster; Ford, Bacon & Davis; J. G. White & Co., Inc.; Prof. D. C. Jackson; Electric Railway Journal, and others.

"These lists of references, and others which will be secured, are to be classified and sufficient digest made of the more important to indicate their contents. This will, of course, necessitate some expense for research and compiling.

"So far as possible, it would seem best to have in the association's files such pamphlets, papers and articles as most directly bear upon the subject so far as they can readily be obtained. A start in this direction has ben made. This information, including the abstracts, should be properly indexed.

"Concerning the second division of our work, it is apparent to the committee that a wealth of valuable material can be obtained from individual sources where it reposes as yet unwritten and unpublished. Many, and especially those who have been long in the industry, engaged in studying the development of its physical features can contribute data of great value. For this purpose, we have been in communication with manufacturers, such as the General Electric Company, Westinghouse Electric & Manufacturing Company, J. G. Brill Company, and Pennsylvania Steel Company, who, as well as the engineering firms mentioned above and others, are quite ready to aid the committee.

"The committee has not yet systemically taken up the matter of securing the co-operation of member companies in furnishing data. This should be done and the universal willingness to assist (which the committee has so far found) may be confidently expected. But your committee finds that every request for information touches at some point the work of our engineering brethren for reasons which are obvious. Realizing that an engineering view point is necessary to the work, we have suggested the Engineering Association be requested to associate with this committee representation from that association. Your president has indorsed the request and referred it to the president of the Engineering Association. We have endeavored, therefore, not to cover any ground which, in event of such representation being assigned, would have to be gone over again.

"There has been prepared under direction of the committee a tentative chart of its work in securing original material, in order to cover the ground thoroughly and completely. From this chart it is proposed to make assignments of subjects to those best qualified to furnish the information. It is our intention to ask these authorities to furnish for the committee's work and the association facts and figures with which they are familiar or which their experience qualifies them to give.

"The work of the committee does not concern the question of decreasing values alone but equally the appreciation and conservation of value. We must give ample emphasis to the things that preserve or increase the value of physical property—to the things that ward off depreciation. To this side of the question, so far as material can be found, careful attention will be given.

"The committee feels that the work just begun should continue and, if you are of a similar mind, invites your suggestion and the expression of your ideas for its guidance."

After the presentation of the report, W. B. Brockway, New York, suggested that the committee should recognize in its work that anything included in the scope of the investigation should be continuous. In the bibliographical feature alone of the report, articles and books would always be published that might be included in a record. He suggested that the work be continued from year to year or from one committee to another.

Mr. Wallis said that it was the plan of the committee to so conduct the investigations and prepare its report that provision would be made for future work on the same subject.

In response to a question from Mr. Ham it was stated by President Forse that the committee was a standing committee. The report of the committee was accepted.

Mr. Ham presented the report of the committee on stand-

ard classification of accounts and the committee representing the association at the convention of the National Association of Railway Commissioners. Mr. Ham is chairman of both of the associations. Abstracts of the reports of these committees follow:

"Unfortunately, for some years past this association has not been represented by a full delegation, and at the last convention the writer was the only delegate of this association in attendance. I cannot lay too much stress upon what seems to me the desirability of this association having a full attendance of delegates at the conventions of the National Association of Railway Commissioners. It is a great privilege to attend their conventions. The matters discussed cover a wide range, and, while our association is directly interested only in the matter of accounts and statistics of electric railways, we are vitally interested in many of the subjects which come up for discussion. Particular attention is called, in this connection, to the report of the committee on safety appliances, which contained specific reference to the operation of electric interurban railroads.

"Unfortunately, the convention of the railway commissioners this year is called for Oct. 10 to 13, inclusive, thereby conflicting with the dates of our convention and again interfering with the proper representation of our association at their convention.

"I hope that this conflict may not occur again, and that in the future our association may be represented by a full delegation of three members, and would further suggest that this delegation be appointed sufficiently in advance of the convention to make necessary arrangements for attendance."

REPORT OF COMMITTEE ON STANDARD CLASSIFICATION OF ACCOUNTS

"All inquiries received by the Interstate Commerce Commission or by this committee have been carefully considered and decisions have been rendered. By the courtesy of the Interstate Commerce Commission the committee is able to present to this convention a printed pamphlet containing the decisions. Discussion and criticism are invited by the committee in the hope that the decisions may be taken to represent the views of the association as a whole.

"The committee regrets that it has been impossible to place these decisions in the hands of the members at an earlier date in order that the members might have a better opportunity to consider them.

"It is unnecessary to state that in the consideration of these cases a vast amount of correspondence has been required. Our working arrangement, however, with the commission has been so satisfactory that very little time has been lost, and the decisions have been rendered as promptly as could be expected under existing conditions.

"The committee is pleased to state that the relations of this association with the Interstate Commerce Commission are most harmonious and that the plan now being pursued ought to lead to a system of accounting satisfactory alike to the companies and the several regulating commissions."

The reports of both committees were accepted and filed.

CONVENTION COMMITTEES

F. A. Healy, chairman of the committee on resolutions, presented the report of this committee. Thanks were extended to Professor Cooley for his extremely able and timely address. The officers and committees were thanked for their work during the year, and appreciation of the work of those who prepared papers was expressed. The management of the Chalfonte Hotel was thanked for the courtesies extended.

Mr. Brockway, chairman of the nominating committee, presented the report of the committee. The secretary was instructed to cast one ballot for the new officials nominated by the committee. The new officials are as follows: President, P. S. Young, Public Service Railway of Newark; first vice-president, L. T. Hixson, Terre Haute, Indianapolis & Eastern Traction Company; second vice-president, Elmer M. White, Coney Island & Brooklyn Railroad; third vice-president, N. E. Stubbs, United Railways & Electric Company of Baltimore; secretary and treasurer, H. E. Weeks, Tri-City Railway, Davenport, Iowa; executive committee, the officers and James Adkins, United Railway Company of St. Louis; E. D. Gault, Mahoning & Shenango Railway & Light Company; R. Morrison, Jr., Michigan United Railways; M. W. Glover, Mobile Light & Railroad Company.

The newly elected officials who were present were called upon and spoke briefly to the association. The annual meeting was adjourned at 1.15 p.m.

CHICKEN FEED

Schütte & Koerting Company, Philadelphia, Pa., has an attractive exhibit at space 151, where it is displaying a full line of its products, which includes all its different types of valves.

J C. Raymond, Ackley Brake Company, New York, N. Y., was noticed around the exhibition hall wearing a big smile, caused by a cable order in his pocket for 180 Ackley Brakes, received from Japan.

William A. J. Koenig, New York, and wife traveled recently from Syracuse to St. Louis by trolley in five days, traveling only in the daytime. The fare for this trip of approximately 1100 miles was $19.05 for each person.

Nelson Valve Company, Philadelphia, Pa., located at spaces 123, 125, Machinery Hall, is exhibiting a full line of the valves which it manufactures. Among these special attention has been given to rough steel castings, which have been cut off so as to show the excellent steel work.

The National Association of Railroad Commissioners, in session in Washington, has elected officers for the ensuing year as follows: President, Charles F. Staples of Minnesota; first vice-president, O. P. Gothlin of Ohio; second vice-president H. Warner Hill of Georgia; secretary, Wm. H. Connolly of North Dakota; assistant secretary, William Kilpatrick of Illinois.

Motor-driven concrete mixers deliver from 1½ cu. yd. to 2½ cu. yd. of mixed concrete per kw.-hour consumed. The figure will be found to vary slightly with the length of motor-operated conveyor used, but as the mixer is the principal load and the hoisting is intermittent, the average consumption recorded in mixing concrete for conduits, wall footings, tunnels, etc., has been found by a large user of motor-driven mixers to be about ½ kw.-hour per cu. yd.

Escalators will be installed in the London subway stations where elevators are now used. A contract has been awarded the Otis Elevator Company for two escalators to be placed at the Earl's Court station of the London Electric Railway and four at the Liverpool Street station of the Central London Railway. The London tubes are much deeper underground than those of New York City, and the problem of getting passengers from the platform level cannot be solved by elevator service.

McCord Manufacturing Company, Chicago, Ill., is distributing circular matter illustrating its adjustable metal sash, weather stripping, gravity wedging sash locks and other car equipment-hardware specialties. The devices sold by this company include a number of important improvements especially designed to meet requirements of modern car construction. This company's catalog and blue prints should be in the hands of everyone having in charge the designing and making of specifications for car equipments.

REPORT OF THE COMMITTEE ON BUILDINGS AND STRUCTURES*

MARTIN SCHREIBER, CHAIRMAN; F. F. LOW, VICE-CHAIRMAN; F. G. SIMMONS, GEORGE WESTON, G. H. PEGRAM, C. H. CLARK, J. H. FRANK, C. G. YOUNG, M. H. BRONSDON

Your committee was instructed to consider the following topics: (1.) Economical Maintenance. (2.) Proper Facilities for Employees. (3.) Proper Installation for Fire Protection of Carhouses and Terminals, including Open Yards.

ECONOMICAL MAINTENANCE

The committee thought it advisable to take up only a limited number of questions, arising in connection with this subject, that are of importance to constructors and operators.

CONCLUSIONS

The conclusions and recommendations of your committee relating to the general subject of economical maintenance are as follows:

1. Best and most acceptable method for maintenance of buildings and structures is systematic repairs with working force of operating company.

2. Regular inspections and reports should be made out at stated intervals, preferably once a month, on blanks prepared especially for the purpose.

3. Heating systems recommended:

(*a*) For carhouses, a blower system, where the air is blown over steam coils and through the building.

(*b*) For large car shops, the blower system, except in the paint shop, where direct steam radiation is advised. For the small shop, either direct steam or a hot water heating system.

(*c*) For isolated waiting rooms, only practical to heat if attended—generally, standard coal stoves are advisable. If waiting room is large and pretentious, steam or hot water heating system may be used.

(*d*) For unisolated waiting rooms. Direct steam or hot water system is generally advisable.

(*e*) Small isolated ticket booths and the like may be satisfactorily heated with the ordinary electric car heater.

Note.—For direct steam heating system, if plant is large enough to justify it, the addition of vacuum return is good practice.

4. Roof covering for railway buildings preferably should be some form of built-up roofing with felt, pitch and gravel. Copper flashings are recommended in all cases and counter-flashings of either copper or lead. Gutters should be formed, if practicable, away from the wall.

5. Floor construction:

(*a*) Carhouses. Concrete floor with cement finish is best for permanent construction. Otherwise crushed stone and screenings or ashes is advised.

(*b*) Car shops. Concrete floor with cement finish is recommended, except in machine shop, in which if floor is subject to heavy service, creosoted wood blocks on a concrete foundation should be installed.

(*c*) Power houses. For engine room, concrete with cement or tile finish is advised. For boiler room, concrete and cement finish or a floor of brick laid on edge in cement mortar is recommended.

(*d*) Offices, employees' rooms, etc. Maple or combed-grain yellow pine wearing floor should be used. If wearing floor is supported by sleepers embedded in concrete, it is always best to install a false floor underneath the wearing floor.

(*e*) Toilet and locker room floors should be of concrete with cement finish, and connected with sink and trap to drain, so that the floor may be conveniently washed and scrubbed.

(*f*) For waiting rooms or shelters and platforms, floors of concrete and cement finish are recommended for permanent structures. Rolled broken stone and screenings or ashes may be found satisfactory for cheap open shelters for temporary construction.

6. (*a*) For large carhouse doors, swinging and sliding wooden doors are preferable where there is sufficient clearance, on account of the low first cost and the ease of repair.

(*b*) Rolling steel doors should be used for all other large openings, but the power-operated doors, so far, have not given general satisfaction.

7. For effective results paint should only be applied to clean surfaces, and should be put on under careful and intelligent supervision, using first-class materials. Frequent drawing of the sashes will greatly prolong their life. Cold-water paint is recommended for use on the inside walls of buildings for keeping them light and clean, except near the ground, where oil paint should be used.

PROPER FACILITIES FOR EMPLOYEES

The committee offers the following suggestions and recommendations which appear to represent the best modern practice regarding facilities for employees:

1. In designing a carhouse, power house, or car shop, proper facilities for the comfort and convenience of employees and a design that will bring out the highest efficiency of the men should be given very careful consideration.

2. Assuming a carhouse with a capacity of 100 cars, the following schedule of floor areas is offered as meeting the average requirements:

(*a*)	Superintendent's office, with anteroom	400 sq. ft.
(*b*)	Depotmaster or starter	120 sq. ft.
(*c*)	Clerks and receivers	300 sq. ft.
(*d*)	Men's room	1,200 sq. ft.
(*e*)	Locker room (200 lockers), double tier	320 sq. ft.
	Locker room (200 lockers), single tier	700 sq. ft.
(*f*)	Toilets—8 closets, 8 urinals	400 sq. ft.
(*g*)	Assembly room, isolated	3,000 sq. ft.
	If connected with men's room	2,000 sq. ft.

3. Ordinarily it is recommended to have operating offices, toilets and men's rooms on the first floor and the assembly room on the second floor.

4. The advisability of equipping carhouses with lunch rooms or barber shops, or both, is a question that largely depends on local conditions.

5. Some amusements should be provided for the men. The most generally popular games are pool and billiards and bowling.

6. The men's room in connection with the carhouse terminal, where reports may be made out, bulletins posted, and where men may convene while awaiting orders, is a requisite. The assembly room, where employees may hold meetings for entertainments, lectures, and the like, is rapidly growing in favor with the larger companies. There should be at least one assembly room on each property, and many companies are including them in all of their modern terminals.

7. All of the offices, employees' room, men's room, toilets, etc., should be arranged for comfortable heating and ventilation. Any portion of the carhouse used exclusively for shop purposes should be heated. In the carhouse proper generally the cost of heating is not justifiable, but often it may be arranged to place a few steam coils in the pits, where, in the coldest weather, cars can be stored and thawed out while the men are making regular inspection and minor repairs.

PROPER INSTALLATION OF FIRE PROTECTION FOR CARHOUSES AND TERMINALS, INCLUDING OPEN YARDS

It is believed that if the question of the value of an efficient fire protection plant were more carefully studied by the managements of properties, as regards reduction of insurance rates, loss through interruption of service, as well as the actual losses from property burned, it would be realized that better fire equipment would be justified than is now generally found. Convenient means of quenching small fires with sand and water buckets and chemical extinguishers should always be abundant.

* Abstract of paper read before the American Electric Railway Engineering Association, at Atlantic City, N. J., Oct. 9-13, 1911.

It is necessary that the worst conditions should be anticipated in providing equipment. Eternal vigilance is necessary, but long periods of immunity lead to lapses, and so the automatic sprinklers, which never sleep, and standpipes and other prominent installations which suggest ready use have great value.

Fire drills and test alarms at unexpected times should also be practised. Attention is called to the report of the Committee on Insurance, page 188, Proceedings of the American Street and Interurban Railway Association, 1910, relating to standpipe fire nozzles.

The committee submits the following recommendations:

1. Automatic sprinklers are to be preferred as the best possible protection in inclosed places. This applies to all buildings. The very fire itself which is sought to be extinguished sets in operation the means which extinguishes it. There should always be two sources of water supply; city water with adequate pressure; elevated tank, pressure tank; underwriter fire pumps.

(*a*) Sand pails, chemical extinguishers, and water pails should also be provided.

(*b*) Small hose lines are advisable for reaching sparks and flames in places not reached by water from the sprinklers.

2. For open spaces, including yards, the available methods of protection are:

(*a*) Universal nozzles on standpipes.

(*b*) Standard fire hose and nozzle.

(*c*) Open sprinklers set in operation by human agency.

(*a*) Universal nozzles on standpipes are the best protection. There is no possibility of delay during a serious fire through the bursting or cutting of hose. The nozzle should be not less than 1⅛ in. or more than 1¼ in., if ample water supply and pressure can be had. Since the operator cannot move such nozzles bodily to the place of the fire, the range of the nozzle should not be more than 100 ft. in order to secure the greatest degree of efficiency, which distance will necessitate as high a pressure as can be safely maintained. High water pressure is advisable for the further reason that the operator may place water upon the fire from a safe distance. This condition applies to nozzles on hose as well.

The universal nozzle should be located at a height of from 10 to 12 feet above the tops of cars. The pressure at the nozzle should be 100 lb., if possible. For this pressure the discharge for 1¼-in. and 1½-in., 1¾-in. and 2-in. nozzle will be, respectively, 466, 671, 904 and 1,194 gallons per min.

It is believed the most effective way to extinguish a fire, especially one which has gained much headway, is to concentrate heavy streams of water upon one particular car in the yard and maintain it there until its effect is shown. This can be readily accomplished with a standpipe and universal nozzle.

Pumps should be provided to supply at least two nozzles at one time. Nozzles should be located so that their range circle will overlap safely.

Universal nozzles are the best protection for practical installations where cost is considered; certainly to be preferred over standard hose and nozzle in yards where the cars are stored.

Universal nozzles should be supplemented by water pails, chemical extinguishers and small hose and nozzles for getting at sparks and flames not accessible to the stream of the universal nozzle.

(*b*) Standard fire hose and nozzles are the next best protection available. 2½-in. hose should be used ordinarily. Nozzles to be 1⅛ in. or larger. Pressure should not be too great, probably 40 lb. to 60 lb., because men who are not professional firemen cannot handle the nozzles under great pressure.

(*c*) Open sprinklers operated by human agency are probably a very effective means for checking an early fire, and perhaps for extinguishing a fire which has gained more or less headway, but the cost appears to be too great for general use, although for small installations, where the sections are not large and where the controlling valves can be operated by hand, the cost may warrant the use.

3. Auxiliary fire alarms should be installed wherever practicable.

INSTRUCTION TO EMPLOYEES FOR FIRE PROTECTION

The committee recommends the following rules for the instruction of employees:

1. The general plan posted in several locations about the property shows the layout of fire protective apparatus and it is required that each employee acquaint himself with the location and workings of the various appliances.

2. It is the special duty of all employees of this company to use every precaution to prevent a fire starting and to co-operate in protecting the property should a fire occur.

3. If a fire occurs first turn in city alarm. To operate an auxiliary fire alarm which has the same effect as turning in an alarm from regular city station, break glass and pull down the ring. The signal has satisfactorily operated if a buzzing sound is heard.

4. Chemical fire extinguishers should be placed conveniently and judiciously about the property. Where the temperature may be freezing the non-freezing type of extinguisher should be used, or the extinguishers must be placed in heating compartments. Extinguishers must be tagged with a record of charging. When not in service for nine months extinguishers are to be recharged.

5. Fire pails to be arranged in pairs and to be painted red so that the word "Fire" stenciled in black letters is always in sight. It is important that the pails be used only for fire purposes. In freezing season salt is to be added to water, or sand substituted for water. For open yards the safety fire pails may be substituted for the ordinary buckets.

6. Fire hydrants to have wrenches always in place, or a permanent wheel may be substituted for the wrench. Hose and nozzle to be kept attached to hydrant and properly folded. Yard hydrants to be complete with standard hose house and equipment.

7. Inside standpipes and stand connections are to be guarded against freezing by turning off water below the ground line. Standpipes are to be connected with hose stored on a reel attached to a wall or post.

8. All hose and hydrant equipment must be tested at least twice a month, after which the equipment is to be carefully drained and restored to its original position.

9. Smoking is forbidden except in rooms set aside for the purpose. "No Smoking" signs should be judiciously displayed about the premises.

10. Oils and oily waste and all inflammable materials are to be stored in a fireproof oil house. No oils or oily waste are allowed on the property except in small quantities before or after immediate use.

11. Any clothing not worn is to be stored in regular lockers, and even in lockers the clothing should not be retained for a long period; store only such wearing apparel as is regularly used.

12. An ample supply of waste cans is to be provided. Also a large metal box with cover for reception of newspapers, etc., taken from the cars as they enter the barn and yards. Oily particles of waste scrap and car sweepings are to be promptly placed in a waste can. No debris is to be left lying about the property.

13. It is very important to keep boiler rooms clean and tidy and permit no ashes to accumulate. Ashes should not be left under grates until the burnt fuel comes in contact with bottom of grate bars. Steam pipes to be free from woodwork and supported by metal hangers.

14. *Car fires* must be started outside of the building. When a car enters the terminal it should have the fire drawn before coming into the house and the refuse placed in waste cans.

15. *Wiring for trolley and lights* should be examined so that no live circuits are uninsulated or in contact with any inflammable material. No portable incandescent lamps are allowed except in pits where only standard elevator or armored cable is to be used.

16. *Trolley poles* must be pulled off wire as soon as cars are placed in the house. Trolley wires should always be supported so that in case of a break the wire will not reach the ground.



Fig. 1—Buildings and Structures—Steel Viaduct Inclosed in Concrete

17. *Sprinkling system* to be systematically inspected every day. Records kept on file of air and water pressure of dry valve, height of water in tank, temperature, etc., so that the entire system will be regularly and carefully maintained.

18. Watchman's clocks are to be carefully examined each morning. Cards should be checked and filed.

19. *Official head in charge* of property is to conduct a systematic fire drill at least once a month.

20. *A systematic inspection* of all fire appliances and other matters pertaining to fire risks to be made at least weekly by a responsible party. The report is to be retained and kept on file for reference and records. It is important that a clear space be left around the fire protection apparatus so that ready access may be had in case of emergency.

RECOMMENDATIONS FOR REPORT OF 1912

1. Standard general specifications and form of contract for railway structures.
2. Review of standard car house construction, with recommendations.
3. Proper waiting rooms and shelters for electric railways.

REPLIES TO FORM LETTER

Note: The committee obtained answers from fifty-two companies to the following questions; only the answers of the majority are reprinted here:

(1.) Are buildings and bridges maintained by your working force or by contract? By own force, 45.

(2.) Are regular inspections and reports made at stated intervals? No, 24.

(3.) What is the most satisfactory heating system for: (a) Carhouses? Steam 25, none 10; (b) Car shops? Steam 22, none 9; (c) Waiting rooms? Steam 19, none 9, stoves 8.

(4.) What is the best roof construction for railway buildings? Reinforced concrete 19, steel 10, no reply 14.

(5.) What floor construction is recommended? (a) Carhouse? Concrete 39; (b) Offices, men's room, etc.? Wood 27; (c) Car shops? Cement 39, wood block 12; (d) Power house? Cement 34; (e) Waiting room or shelter? Concrete 15, wood 15.

(6.) Do you prefer rolling steel doors or swinging doors? Rolling doors 29, swinging doors 15.

(7.) What type of closet and urinal do you recommend? Self-flushing 6, slate, enamel and porcelain 3 each.

(8.) Have you used cold-water paint, and with what results? Have used—good 7, bad 1; have not used 8; no reply 36.

ECONOMICAL MAINTENANCE AND CONSTRUCTION

BY MARTIN SCHREIBER

It has only been in recent years that systematic maintenance of buildings and structures has been given very serious thought, and many properties still offer an excellent field for improvement. A certain amount of attention is absolutely required by the line, track and equipment of the railway to keep the cars operating, but it is not uncommon to see structures in a shocking state of preservation. We have all seen steel bridges and structures left unpainted until the effect of rust is quite sufficient to impair seriously the strength of the members, and so that renewals are required long before the possible life of the structure is obtained.

It is fortunate that the modern trend towards permanent construction and the efforts of the insurance interests greatly simplify the maintenance problems of our successors.

Fig. 1 shows a street railway viaduct that is being completed. Note the absence of joints and details which require painting and regular maintenance.

One road has just built offices and carhouse shops, for which it was desirable to keep the first cost low; so instead of the building being constructed with corrugated iron, it was built of asbestos-covered metal, which only increased the cost over ordinary corrugated iron by 9 per cent. It requires no painting and has a considerable advantage from a fire risk standpoint. One electric railway company is now constructing a storage carhouse with the asbestos metal for sides and roof. The building will house one hundred 50-ft. cars. It may be of interest to state that the cost of this carhouse is approximately only 30 per cent of the standard brick wall and mill construction type. The standard constructions for carhouses, either the reinforced concrete roof or mill construction roof, or both, are types conducive to low maintenance. Fig. 3 shows the type of carhouse that

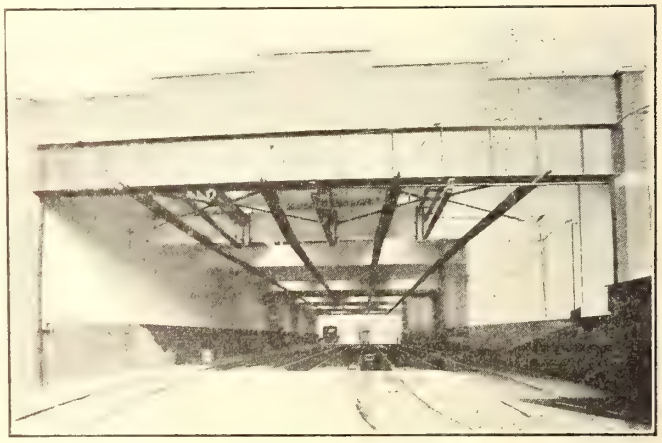


Fig. 2—Buildings and Structures—Carhouse of Mill Type Construction

is representative of mill construction. This building contains four-track bays, has covered steel roof trusses 16 ft. from the floor, and tar and gravel roof, supported by 3-in. splined plank and 6-in. by 12-in. purlins. The trusses are arranged to pitch in one direction for each bay, thus simplifying the number of roof gutters and the entire drainage system. The pits are open, with the rails supported on creosoted wood blocks anchored to reinforced concrete piers. The design is simple and there is no waste space or fancy trimmings.

METHODS AND ORGANIZATION

The methods pursued by the different railway companies in maintaining buildings depend somewhat on the scope of the work. A small company with only a few buildings,



Fig. 3—Buildings and Structures—Shop Wash Basins

trestles or bridges could not afford to employ men for building work alone, particularly where so many special artisans are required. However, even in this case, it may be arranged to have men regularly employed detailed to do whatever repairs present themselves. The large companies now concede that using their own working force is very desirable, this plan being cheaper and more satisfactory. This, of course, does not apply to the construction of large carhouses or terminals, for thorough competition by reliable contractors is generally a means of reducing the cost below what it could be executed for by the company's own men.

One of the principal requisites for good results is systematically to take care of the maintenance and not wait for forced repairs or to cultivate emergency repairs. For example, the proper time to go over and put heating plants in shape is during the summer. The introduction of monthly inspection trips, together with annual inspection by head of departments, recorded and reported to the management, is productive of systematic maintenance.

A shop is provided for the building superintendent of one street railway. Here the machine work is done (to keep the cost of labor at a minimum) which generally is required in the field. In this shop the mechanics spend their time economically when outside repairs do not demand attention; and when repairs are required, the material that is always useful is ready.

HEATING AND PLUMBING

Probably heating and plumbing cause the most trouble for the building department. Fig. 3 is a view of shop washbasins. Generally, toilet rooms should have floors of cement and be connected to drains, in order that the floor may be washed down with a hose.

For a large shop or extensive areas a blower system of heating is recommended, except in the paint shop, where the ordinary direct steam or hot water coil is desirable. The blower system has the advantage of centering all the heating apparatus at one location; it gives good distribution and has a low first cost. With a forced draft only one-third to one-fifth of the heating coils or surface is required as compared with that necessary with natural draft; besides the blowers may be operated in the summer months, producing air circulation throughout the building. If the source

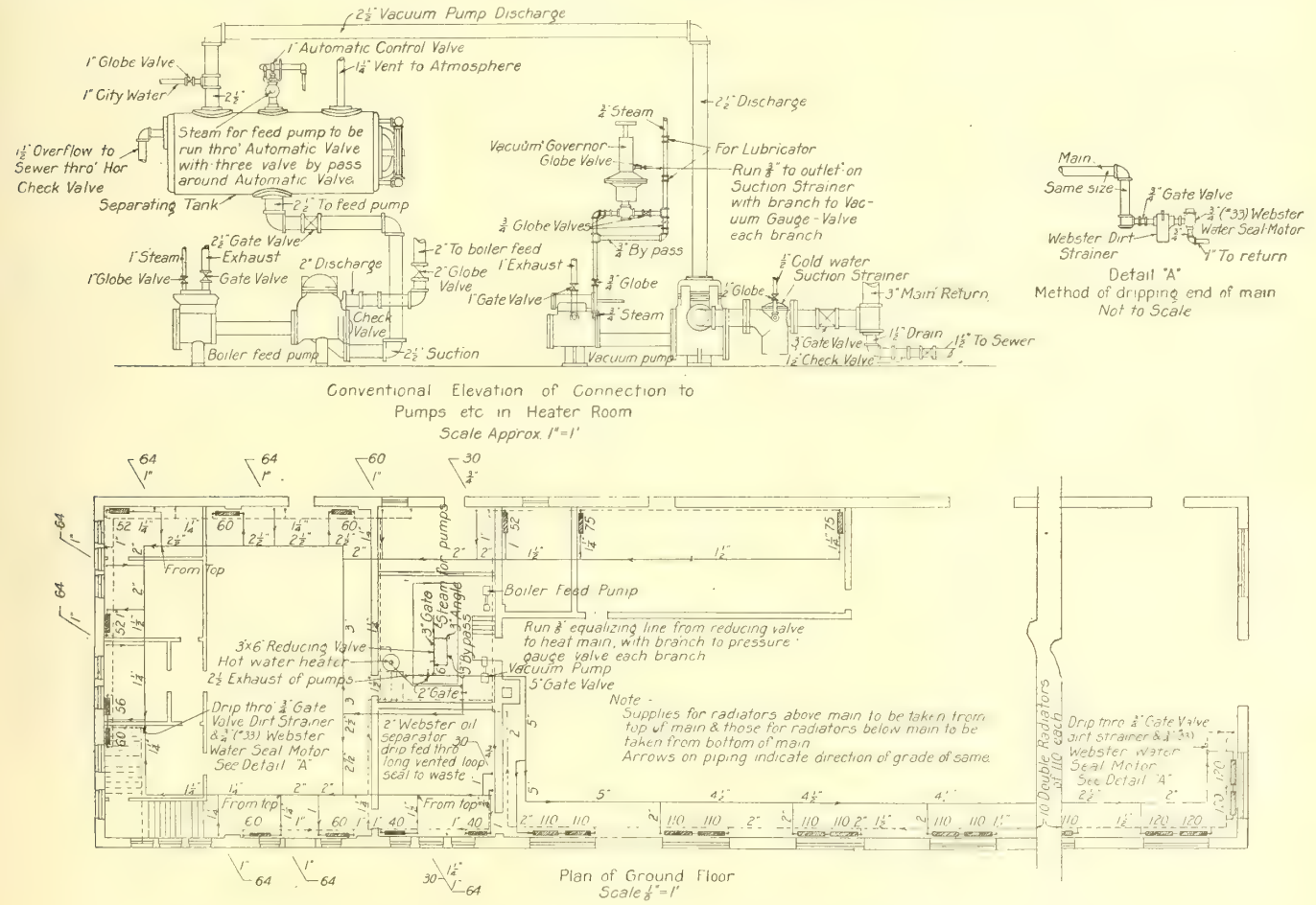


Fig. 4—Buildings and Structures—Direct Steam Heating Layout for 100-Car Terminal

of steam supply is at a considerable distance from the fan and heater, or if there are several equipments receiving steam from the same source, it is best to deliver the steam at high pressure and send it through a reducing valve before it enters the different installations. Also, long return pipes work more satisfactorily and economically if motor valves are put on the coils or radiators and a vacuum system is employed.

For operating offices, men's quarters, etc., a gravity return system or hot water system is generally the best and most economical arrangement. In the gravity return, it is important that the main steam pipe be taken from the boiler and brought up at once as high as practicable. The supply pipes should be at least 2 ft. above the water line of the boiler and pitch down approximately ½ in. in 10 ft., to enable the steam and water to flow in the same direction. For the return pipe, a pitch toward the boiler at about the same angle is required. The boiler should have a capacity of at least 50 per cent more than the nominal heating surface required. Boilers in a small plant may be of the cast-iron sectional type. These boilers have the advantage of allowing additional capacity to be added if the size of the system is ever increased. If there is any question about getting proper pitch to the return for the low pressure gravity heating system, and if the size of the installation will justify it, the plant should be changed to a vacuum system. The vacuum system is not only more economical but absolutely reliable, and generally will give even heat in all the radiators or heating coils, even where there are long runs.

Fig. 4 shows the heating layout for offices and shops in connection with a one hundred capacity carhouse that is now in the course of construction. This plant will generate steam at high pressure. By the use of reducing valves the pressure is reduced before it enters the radiators and coils, a vacuum pump returns the water of condensation to a receiver, where it is pumped back into the boiler by the boiler feed pumps With the long runs, the advantage of this system is obvious.

The open-tank hot water heaters have advantages for isolated offices, men's quarters, etc., where it is not practicable to place steam boilers low enough to have the water line of the boiler below the bottom of the raditators or coils.

It may not be out of place to call attention to the new Harrison system of heating. A big advantage is claimed for this system in both economy of first cost and maintenance. This is a modified blower system—the air is blown directly over the furnace tubes, eliminating steam piping.

On suburban roads, with small isolated stations or waiting rooms, satisfactory heating may be obtained by means of standard pot stoves. About three sizes of stoves will generally meet all the conditions that arise in practice.

FLOOR SYSTEM

Proper floor construction has an important bearing on the economical maintenance of permanent buildings, particularly carhouses, power houses, car shops, waiting rooms, toilet rooms and locker rooms. Concrete floors, with cement finish, probably are the most desirable. For portions of the machine shop, such as the wheel room and the smith shop, which are subject to excessive wear, the creosoted wood block on a concrete foundation is preferable. The wood block will wear better and is more easily repaired. On account of the difficulty of satisfactorily repairing cement floors, it is important that the installation be carefully made.

Wood or plank floors should be avoided wherever possible except for offices. They are the most costly type to maintain, bad fire risk, and deteriorate rapidly.

ROOF CONSTRUCTION

The engineer is most concerned about the type and construction of the roof covering proper, the details of gutters, flashings and leader connections. Leaky roofs are most annoying. For any railway structure, where the roof is reasonably flat and simple, a built-up covering of felt, pitch and gravel—taking first cost and up-keep cost into consideration—is the most satisfactory.

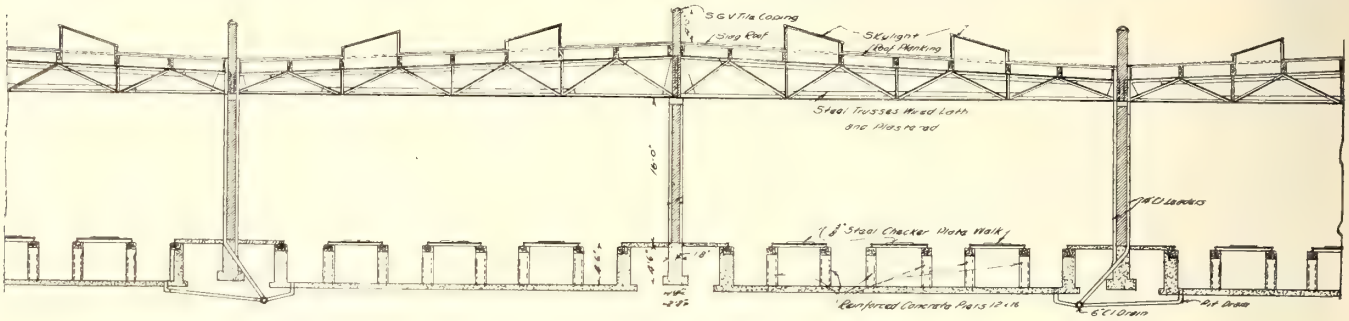


Fig. 5—Buildings and Structures—Section Across Car House with Mill Construction Type of Roof

Fig. 5 shows the general arrangement of an approved carhouse roof. The gutters are all formed by parapet walls. As the trusses pitch in one direction, only one gutter is required per bay and only one leader connection occurs every 40 ft. along the length of the building. All flashings around the skylights, gutters and conductors are 16-oz. copper. The cap flashing laps over the base flashing not less than 6 in. in order to bring the edge of the cap flashing to within 2 in. of roof line. The base flashing, in all cases, laps not less than 6 in. on the roof. The cap flashing extends into the brick work not less than 1½ in.; the back edges are turned out at least ¼ in., and are held with lead wedges not over 8 in. on centers and joints between the metal and the walls, and are thoroughly cemented with elastic slater's cement.



Fig. 6—Buildings and Structures—Wooden Swinging Doors for Carhouse

ENTRANCE DOORS FOR CARHOUSES

The maintenance of carhouse doors has always been a bugbear to the operator, and the repairing of doors is a constant source of expense and annoyance. At present two types of doors are mostly used—the ordinary wooden door, of

either swinging or sliding design, and the rolling steel door. It is practicable satisfactorily to take care of the trolley wire for either type by introducing a wooden circuit breaker at the door opening.

Fig. 6 illustrates a type of swinging door with a frame hung on cast-iron eyelets built into the wall. The doors shown cost per opening 10 ft. by 16 ft., complete with up-bolts and fastenings, about $105. Probably $165 would have been required if rolling steel door had been used. These wooden doors have been in service seven years and are still in good condition. Notwithstanding cost, rolling doors take a minimum space to operate, which is often the controlling factor.

PAINTING

Proper and timely painting is one of the most effective ways of keeping building and structure maintenance at a minimum. Yet how often is painting neglected. Moreover, more painting is ruined by poor application than any other way. The paint is often thinned with cheap, worthless oils and japans.

In painting metal, the paint should not be applied at various degrees of temperature and moisture, or over rust. One part of iron becomes approximately 400 parts of rust. So it may easily be understood how this great increase in volume will force off a protective coating when rust forms under the surface of the coating. If we paint over a rusted surface we are covering over a large percentage of moisture, often 30 per cent, which has a tendency to take up more water and form more rust, and finally break through the paint. In painting steel bridges, trestles and the like, it is important that all metal surfaces before paint is applied be completely cleaned of all scale, rust, dirt, grease, or paint with scrapers, wire brushes or sand blast. The cleaning should proceed each day over an extent that can be given the first coat of paint on the same day. Round bristle brushes should always be used for painting structural work, as these will remove the air, and so the paint may be thoroughly brushed in all cracks and crevices.

Paint materials should always be obtained from reliable dealers. Paint is better if mixed as required. If it is not possible to grind the pigment, better results may be obtained from unmixed paints made from first-class materials than from the ordinary run of prepared paints.

One of the best methods to clean and freshen the inside of an old building is by the use of cold-water paint. The cold-water paint may be applied at a small cost with a spraying machine. Cold-water paint is well adapted to finish the inside walls and roofs of the carhouses and shops. It is desirable, however, to have the walls finished 6 ft. from the floor line with a dark oil paint.

A good, cheap wash for concrete surfaces was used in the Philadelphia subway. This consisted of lime, cement and water. A bushel of lime is used, and while slacking a pail of salt is added; care is taken not to burn the lime, and it is kept covered. The color is determined by the amount of cement used, and the wash is thinned by water.

APPENDIX C. SPECIFICATIONS FOR ROOF COVERING

The Milwaukee Electric Railway & Light Company, by F. G. Simmons, engineer of way, furnished for this report detail specification for the roof covering for its new Cold Spring shops as prepared by R. H. Pinkley.

These specifications include the furnishing and placing of a complete roof covering to be placed on the concrete slab roof, consisting of approximately 96,000 sq. ft. of roof having a pitch of about 1 in. to the foot and approximately 70,000 sq. ft. of roof having a steeper pitch mainly of saw-tooth construction. All roofs having a pitch of less than 3 in. to the foot are to be classed as flat roofs. Roofs on saw-tooth parts of buildings and on other parts where the pitch is greater than 3 in. to the foot are to be classed as inclined roofs. The flat roofs are covered with four-ply composite asbestos cap sheet roofing, consisting of pure coal tar saturated wool roofing felt, weighing between 14 lb. and 16 lb. per 100 sq. ft., single ply.

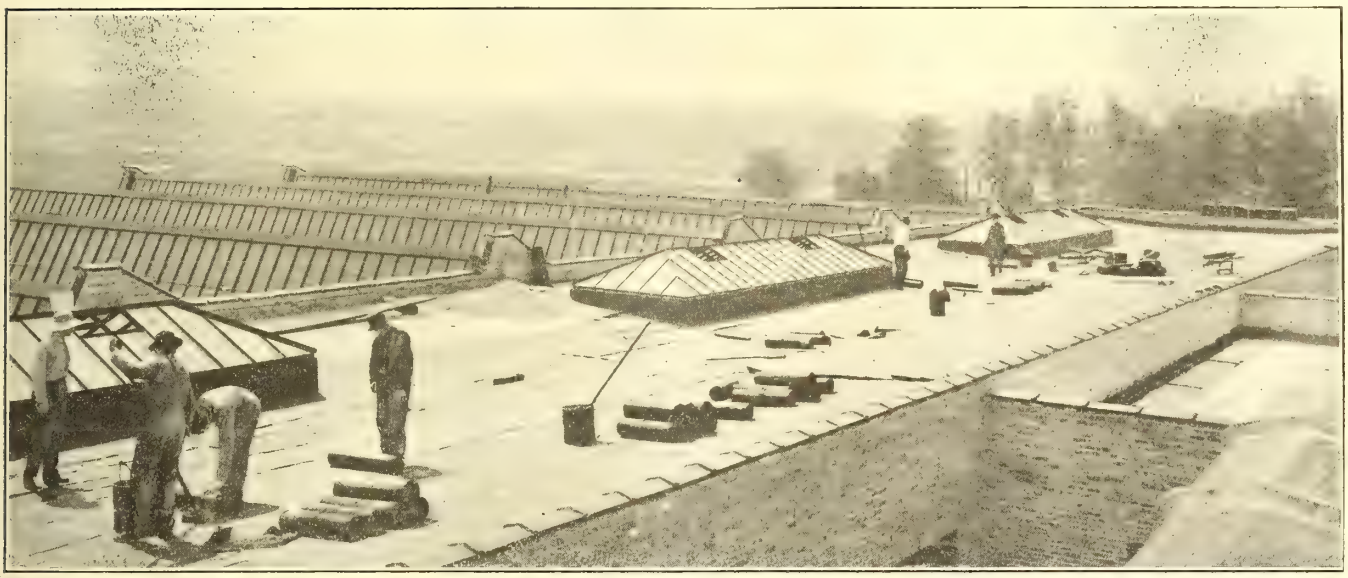


Fig. 7—Buildings and Structures—Application of Felt Roofing to Shop Buildings at Milwaukee

The inclined roof surface is covered with three-ply composite asbestos cap sheet roofing, consisting of pure coal tar saturated wool roofing felt, known as No. 1, and weighing approximately 25 lb. per 100 sq. ft., single ply. An accompanying illustration (Fig. 7) shows the roof surface being covered with the materials mentioned.

APPENDIX E. PROPER FACILITIES FOR EMPLOYEES

A summary of replies to inquiry letter on this subject gave results substantially as shown in our recommendations.

APPENDIX F. FACILITIES FOR EMPLOYEES OF THE PUBLIC SERVICE RAILWAY COMPANY.—BY N. W. BOLEN

The manager of the modern railway recognizes the value of providing proper facilities for the comfort of employees, and this present day view of the matter is reflected in the plans of practically all new carhouses and power stations. Locker rooms, toilets, crew rooms and assembly rooms so far have proved most efficient in providing for the employees' comfort.

The Public Service Railway Company early recognized the

need of such conveniences for its employees, and has amply provided for making the surroundings of the employee pleasant and comfortable. At all carhouses and stations toilets of substantial construction and of sufficient number are installed in well-lighted and ventilated locations. At the various carhouses crew rooms are maintained where men coming off and going on duty may rest, make up reports, write letters, or engage in the games provided.

Locker rooms are in well-lighted locations and are fitted with sufficient lockers of the full ventilated type to provide each employee with a separate compartment. These lockers are made of expanded steel, of ample size to accommodate rubber coats, extra clothing and other personal effects of the employee. Lockers are subject to inspection at frequent intervals by officers. Depot receiver's offices are fitted with all needed conveniences for prompt dispatch of business. Large counters surrounding the receiver's office facilitate the work of conductors turning in at the window.

In all the facilities provided for the comfort of employees of the Public Service Railway Company the importance of accessibility has been kept in mind. Wherever possible, lavatories, locker rooms, crew rooms and depot offices are located on the first floor near the front of the carhouse, in order that the time lost in going to or from a carhouse may be reduced to a minimum. No attempt at ornateness or lavish decoration has been made, but plain, durable, sanitary lines have been followed with a view to providing quarters for the employee that are attractive, comfortable and easy of access.

EXTRACT FROM LETTER OF F. F. LOW ON PROPER FACILITIES FOR EMPLOYEES

"Whether such features cause men to stay longer with the road is an important point, as we all know that the constant changing of help is a cause of accident and possibly figures could be obtained to show the expense of breaking in new motormen and conductors, as possibly a road could afford to spend several thousand dollars a year to make the accommodations more pleasant if the result is gained of having men stay a certain length of time longer.

"In designing a building the first thing to be considered is the extent of the accommodations which will be required, and the space required for the various purposes. It is an easy matter to decide whether there will be accommodation for superintendent, roadmasters, station master, starter, clerks and similar offices, but when it is thought desirable to have something more than a plain lobby for the men, with space for lockers and toilet adjoining, then a problem arises. The temperament of the men, nature of surroundings and the amount of money the road is willing to spend (not only for first cost, but for maintenance) are all factors.

"In addition to the provision of suitable lockers for the protection of the men's clothing, it might be advisable to arrange heating apparatus in such a way as to furnish a convenient place for the drying of wet clothing.

"Railroads everywhere are giving consideration to the question of providing ways of taking up their men's time when off duty. The cardinal principle in carrying on work of this kind, which must be followed in order to be really and permanently successful, may be summed up: Do not *give* the men anything. Do not expect to build a room and put in billiard tables, bowling alleys, baths, etc., and then let the place run itself with the men free to do what they please, for if you do your scheme will prove a failure.

"The question thus arises: How can we provide facilities of this kind and have them enjoyed and appreciated, self-maintained and always kept up in first-class condition? The essential feature is to have everything self-supporting after being once installed, and while small games may be free, there should be a charge for the use of billiard tables and bowling alleys. Where baths are provided, bathing should be regulated to insure proper care of the apparatus and premises.

"In some cases a club organization might be resorted to, allowing men to elect their own officers and manage their affairs themselves, the company providing the premises, paying the initial cost of fitting up, to a greater or lesser extent.

"A great deal of what has been done up to now has been restricted by the space available, but in designing new buildings the question has to be taken up in a broad way, exactly what should be provided depending largely upon local conditions."

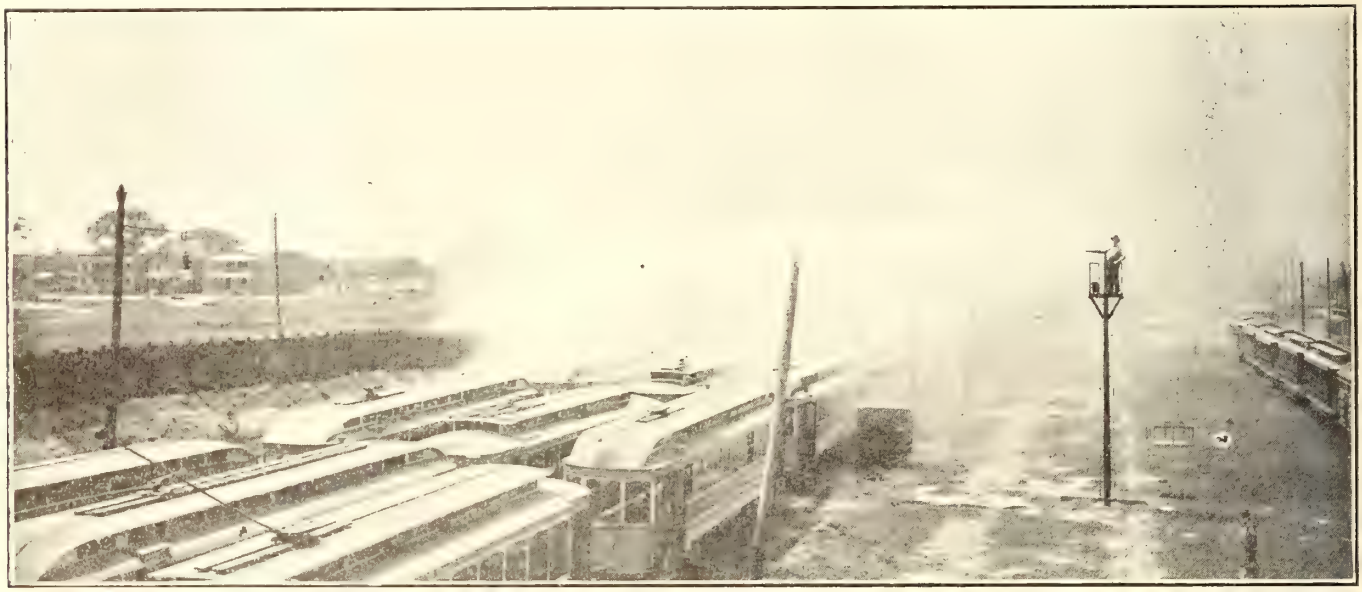


Fig. 8—Buildings and Structures—Monitor Nozzles Protecting Car Yard of Cleveland Railway Company

The subject of Appendix G, proper installation for fire protection of carhouses and terminals, including open yards, is largely summarized in the committee's conclusions and recommendations.

APPENDIX H. AUTOMATIC SPRINKLERS.—BY C. H. CLARK

Railway officials are realizing that the destruction by fire of rolling equipment, be it but a few cars, is an inconvenience and loss of traffic income for months; that the delay in obtaining new cars invites undue criticism from an impatient and not altogether friendly public; so it will be seen that there are at least two favorable propositions before the electric railway people to encourage this protection for their property, viz.:

1. The protection against fire offered to cars.

2. Prevention to delay of traffic for an indefinite period, thereby satisfying the public.

In consideration of the all-gain proposition offered by sprinkler protection, there should be no obstacle to providing efficient protection against fire. The car storage houses and car shops of the Cleveland Railway Company have been provided with a standard automatic sprinkler equiment during the past five years. I have given personal attention to this equipment and have watched with much interest the efficiency of this plan of protection.

I can unhesitatingly recommend automatic sprinkler equipment for car storage houses, car shops and terminal stations as the most efficient, most scientific and most reliable means of extinguishing fire known to-day. Before entering into contract for the protection of the car storage houses, machine shops and car shops an experimental equipment was installed. Actual fires were started in the cars and the automatic sprinkler in every instance extinguished the fire. The remarkable features of these tests were that in no case were the cars on the adjoining tracks injured in the least. The automatic sprinkler formed a water curtain and thus prevented spread of the fire.

The officials of the Cleveland Railway Company were so favorably impressed with the efficiency of the sprinkler equipment, as demonstrated in these tests, that contracts were entered into for the protection of eleven car storage houses, machine shops and car shops at a cost of over $120,000.

PROTECTION RESULTS

The following results were obtained through this plan of protection :

1. The safeguarding of the property against a large fire loss.

2. The reduction of the rates of insurance to a point where the savings made from the rates formerly charged enabled the Cleveland Railway Company to pay for the entire cost of the equipment in less than four years.

I consider automatic sprinkler equipment for traction properties a good financial investment, on which large returns are made for the money expended. The cost of the maintenance of the equipment has been small during the past five years. There has been a slight difficulty in operation of the cars on account of automatic sprinkler equipment.

The automatic sprinkler equipment needs the ordinary care and attention that would be given to any machine that is constantly in operation. Through regular inspections of the equipment made by one of our own employees the sprinkler equipments have been kept in constant working order.

The rules and requirements for the installation of automatic sprinklers in car storage houses, machine shops and repair shops, adopted by the National Fire Protection Association (embracing all the leading stock and mutual insurance companies), should be observed.

PROPER FIRE PROTECTION OF CARS IN OPEN YARDS

The Cleveland Railway Company in 1910 installed a system of standpipes with monitor nozzles in its Woodhill car yards. This system has been tested by prominent engineers of traction companies as well as insurance companies, and I can heartily recommend this system for the use of members of this association. The accompanying Fig. 8 illustrates the actual installation.

APPENDIX I

The open yard sprinkler equipment of the Interborough Rapid Transit Company at One Hundred and Fifty-ninth Street and Harlem River, New York City, was described by George H. Pegram. [The same subject was described and illustrated in the Electric Railway Journal for Aug. 12, 1911, page 277, and therefore is not presented again.—Editors.]

Appendix J consists of fire protection specifications for the Springfield Avenue carhouse of the Public Service Railway Company.

REPORT OF THE COMMITTEE ON TAXATION MATTERS*

BY CALVERT TOWNLEY, CHAIRMAN; C. L. S. TINGLEY, VICE-CHAIRMAN; G. E. TRIPP, J. H. PARDEE, J. B. M'AFEE, C. L. HENRY, G. L. ESTABROOK, A. E. LANG

A letter of inquiry was sent to one company in each state asking for a short résumé of the tax laws of that state. Replies were received from every state except Connecticut, Idaho, Iowa, Nevada, New Mexico, South Dakota and Wyoming. The deficiency as to Connecticut was supplied from the report of the Commissioner of Corporations, United States Department Commerce and Labor, so that every state of any importance, with the exception of Iowa, is represented in this report. The committee regrets that the report is not more complete, but the time remaining after the replies had been received and collated was inadequate to make good the deficiencies in the replies. Considerable correspondence should be conducted to supply the omissions and correct the misunderstandings which have arisen.

The reports of the Commissioner of Corporations covering the states of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, District of Columbia, Ohio, Indiana, Illinois, Michigan and Wisconsin, have been freely consulted and some of the findings are worthy of note. To quote from the letter of submittal covering the New England States, bearing date of May 17, 1909, we find the following: "The taxation of individuals is substantially the same throughout New England. Corporate taxation, on the other hand, shows wide diversity, both in theory and practice. Individuals are taxed on property. Corporations are taxed on property, or on income, or on a combination of both, or on capital stock, either par or market value, or occasionally, as in the case of telegraph and telephone companies, on mileage or number of instruments. Administration ranges from a system highly developed handled centrally by state officials with large powers to no centralized administration whatsoever." This comment of the commissioner will apply throughout the entire country. Another notable utterance is: "Railroads are among the largest taxpayers. Public service corporations, such as street railway, telegraph, telephone, express car, gas and electric companies, are most often brought under special and new systems of taxation. Taxation of public service corporations on gross receipts is growing in use."

The report of the Commissioner of Corporations above referred to discloses that in the State of Maine practically 49 per cent of the revenue of the state is derived from special taxes upon corporations; in New Hampshire 27 per cent, in Vermont 56 per cent, in Maine 35 per cent, Rhode Island 40 per cent, Connecticut 84 per cent, New Jersey 92 per cent, Pennsylvania 72 per cent, Delaware 62 per cent, New York and Maryland 32 per cent, District of Columbia 16 per cent, Wisconsin 71 per cent, Ohio 52 per cent, Indiana 19 per cent, Illinois 34 per cent and Michigan 45 per cent.

In order that the data already collected may be brought up to date and made available at all times, your committee would recommend that the committee on taxation matters be enlarged so that it shall be composed of one member from each state, whose duty it shall be to bring the data up to date, and from time to time as changes are made in the tax laws or practice of the state to epitomize such changes and forward them to the New York office for file. By this method the secretary's office will be kept in close touch and the member companies seeking information may always have it available upon short notice. To copy fully the replies from the various states in their present incomplete form would be unprofitable, but the committee has endeavored to epitomize briefly the replies from each state.

[The committee submitted a digest of state tax laws.]

*Abstract of report read before the American Electric Railway Association at Atlantic City, N. J., Oct. 9-13, 1911.

REPORT OF THE COMMITTEE ON WAY MATTERS*

J. M. LARNED, CHAIRMAN; C. B. VOYNOW, VICE-CHAIRMAN; M. J. FRENCH, R. F. KELKER, R. C. CRAM, C. L. CRABBS, C. S. KIMBALL, H. F. MERKER, B. E. TILTON

The committee has not been able to devote the necessary time to collect data for or consider the subject of "Nosing of Cars," and is, therefore, not in a position to report thereon. With reference to the other matters under consideration, your committee begs to submit the following report:

RAIL SECTIONS—REVIEW OF PREVIOUS REPORTS

The committee on way matters of 1907 made substantially a progress report and submitted a number of sections for consideration.

The committee on way matters of 1908 made no report on girder rail.

The committee on way matters of 1909 confirmed the report of 1907 as follows:

"When the traffic is so confined to the railway strip, or is so congested that the strip is continually used by vehicles, a rail or girder section should be adopted, preferably sections following closely the lines of the Trilby rails, recommended by the committee on way matters of 1907."

The committee on way matters of 1910 confirmed the report of the committee of 1907 and also submitted other sections of lighter weight.

None of the sections submitted have been given the final approval of our association.

WORK DURING 1911

Your present committee, in its design of a rail section, has been guided by the following principles:

1. The performance of rail sections at present in use with a view to embodying the features that have given good service and eliminating defects that may have developed.

2. The redistribution of metal to give the maximum strength at the critical points.

3. An outline of section and distribution of metal that would permit easy rolling without sacrifice of essential characteristics.

4. The possibility of combining in one rail all essential requisites that are necessary in a standard.

The results of its work have been embodied in the section illustrated and in the detailed analysis of this section, which follows:

I. ACCOMODATION FOR WHEELS

(a) The total width of head is made 3 in. The width of the head in girder rails is determined primarily by the area necessary under the head for splicing purposes. A track subject to heavy vehicular travel should not have the level of the paving above the rail head; therefore it should not matter if the wheel treads overhang the head. The additional width of head over the amount necessary for tractive and electric contacts should be beveled off to gain economy in metal and avoid false treads when narrow wheels run on the track.

(b) The tread is made a plane, inclined to the gage. The wear of all mechanical parts indicates that straight lines and plane surfaces should be avoided. Worn rails show rounded heads. A flat head would get less work or compression in rolling, and therefore would be of less dense texture on the wearing surface. Worn rails show also the tread inclined at some angle to the gage. From the above it seems desirable to make the tread of a curve of some radius, but the difficulty of grinding joints on a rounded head and also the added difficulty in rolling, pointed out by the manufacturers, determined the design of the tread, as shown.

(c) The top fillet of the head is made ¼-in. radius. This fillet should be of small radius. Worn-out rails, on tracks where excessive car swaying did not exist, show a small radius corner in the head. The originally proposed standard sections of the A. S. C. E. required a ¼-in. fillet; this was afterwards increased to 5/16-in. radius. The A. R. A. standard sections propose ⅜-in. radius, with a proviso that the ⅜-in. fillet shall be retained as long as the M. C. B. wheels are used. Our standard wheel has a smaller radius fillet between wheel tread and flange than the M. C. B. From the above it could be drawn that a ¼-in. radius fillet would be advisable to use in our standard rail.

(d) The gage side of the head is made a small angle. An angle is made for better alignment with a guard-rail, and on account of the positive statements of the representatives of manufacturers that a vertical head would be impossible to roll.

(e) The depth of groove is made 1⅜ in. and designed so that when the allowable wear in the thread is reached the flange is about to touch the bottom of the groove. This groove will accommodate M. C. B. wheel flanges.

(f) The groove is made 2⅛ in. wide; the angle 37 deg., with a view to self-cleaning. The arguments stated above in "(e)" apply also to the width of groove. Recently built tracks show substantial flange cutting on the tram side of the groove. The "nosing of cars" is the primary cause of this wear. The angle of the groove should be such as to allow dirt, ice and snow to be pressed out and cleaned by the flanges.

(g) The tread is made 2⅛ in., which seems to be ample for city railway purposes. Even for steam roads, with heavier wheel loads, this tread is seemingly sufficient; the extra width provided is to an extent a function of splicing In case of city railways the loads are lighter.

2. VERTICAL STABILITY

(a) The 9-in. section was proposed for the reason that 9 in. is an even figure, providing for all possible irregularities of block paving. While from the standpoint of supporting car loads a smaller depth would be sufficient, there are other important and vital considerations which must govern us in deciding upon the depth, not the least of which is the capital invested in permanent substructures, fittings, paving, etc., which in renewals could provide only for a 9-in. section. Other reasons for a deep section will appear under "Joints," "Distribution of Loads," etc.

(b) The center of web is located ¾ in. from the gage line. While the centrally located head is theoretically the best for vertical stability, the section has the advantage of larger splicing accommodations, and also provides for such permanent substructures as have been installed for rails having a ¾-in. distance from the center of the web to the gage line.

(c) With first-class timber for ties becoming scarcer and more expensive, tie plates are necessary for a narrow base. A 6½-in. base it is thought will not require tie plates. For concrete construction without ties the maximum width of base possible to roll should be demanded. The width of the base is also an essential factor of stability.

3. PERMANENCY OF JOINTS

(a) On electric railways in paved streets it is of the greatest importance to have the joints permanent. Since the opening of the paving for joint repairs is expensive, the heads of the rails are permitted to be considerably hammered before such repairs are undertaken. The depth of section is the greatest factor in obtaining permanency of joints. For welded or riveted joints a less depth may be satisfactory from the standpoint of joints only, but for a bolted joint, when the joint is designed strong enough transversely, the depth is of paramount importance.

(b) A 10-deg. angle is provided for splicing. This angle is primarily for economy in weight.

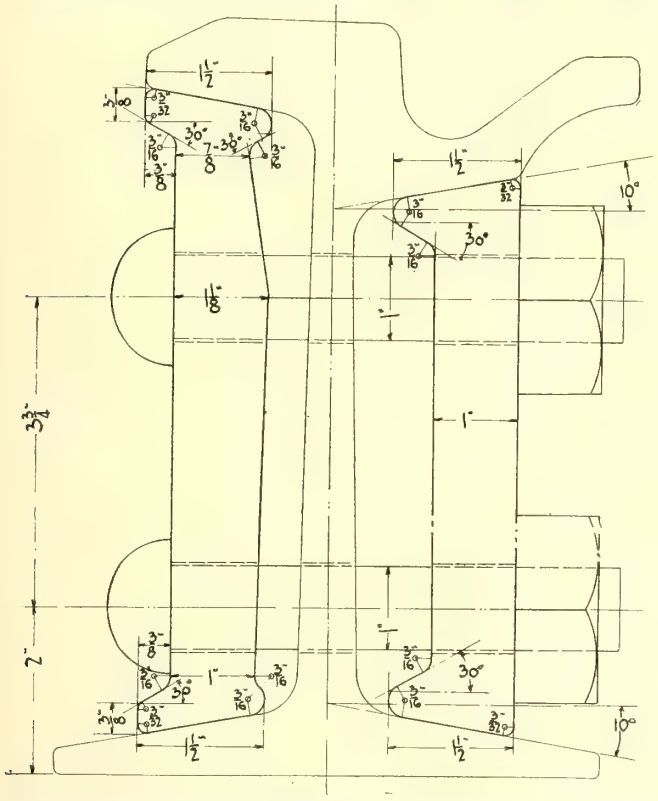
(c) The splicing space under tram side of rail has been made wide enough for a concealed bond.

*Abstract of paper read before the American Electric Railway Engineering Association, at Atlantic City, N. J., Oct. 9-13, 1911.

4. HORIZONTAL STABILITY

(a) The location of the web, as shown, is advantageous for horizontal stability.

(b) The web is made ½ in. thick under the head and ¾ in. thick at base. When the cars sway from side to side or in case of heavy wagon loads on the tram the web acts as a cantilever, and the stability is directly proportional to the cube of the cross-section at the base. The web shown



Way Matters—Recommended Bolted Joint for 136-lb. Grooved Girder Rail

has about two and one-half times the stability of a straight web 9/16 in. thick, yet it contains about the same weight of metal.

(c) The fillets at web are made ½-in. radius. Large fillets are desirable under head, tram and at base, so that the head will not have a tendency to bend over the web or the web over the base; the fillets are limited by the area necessary for splice bars.

(d) Provided the web is properly designed for the transmission of horizontal stresses, the width of the base is the next factor of horizontal stability.

(e) The total width of tram is 2⅞ in., the tram being designed to accommodate wide tires and the heaviest vehicular traffic.

(f) While the depth of the section is a negative advantage, nevertheless as the rail is buried in the paving and has the web and other elements well designed, this seeming defect would be fully overcome by the greater advantages mentioned under "Vertical Stability," "Joints" and "Distribution of Loads."

5. DISTRIBUTION OF LOADS ON FOUNDATIONS

(a) The width of the base is of the greatest importance, whether for wooden ties or concrete substructures, as has already been mentioned under "Vertical Stability."

(b) A deep rail will carry the loads over defects, keep the track in alignment and surface, and help to keep the paving in good condition.

6. ACCOMMODATION FOR PAVING

(a) The depth of section is necessary to accommodate deep paving, and is also an important factor in keeping the paving in true surface.

(b) The tram of the rail takes the wear of the vehicular traffic and prevents ruts from being formed along the rail. The steel trams, under certain severe conditions of vehicular traffic, show as much wear as the head of the rail. For this reason the thickness of the end of the tram is increased.

7. ACCOMMODATION FOR VEHICULAR TRAFFIC

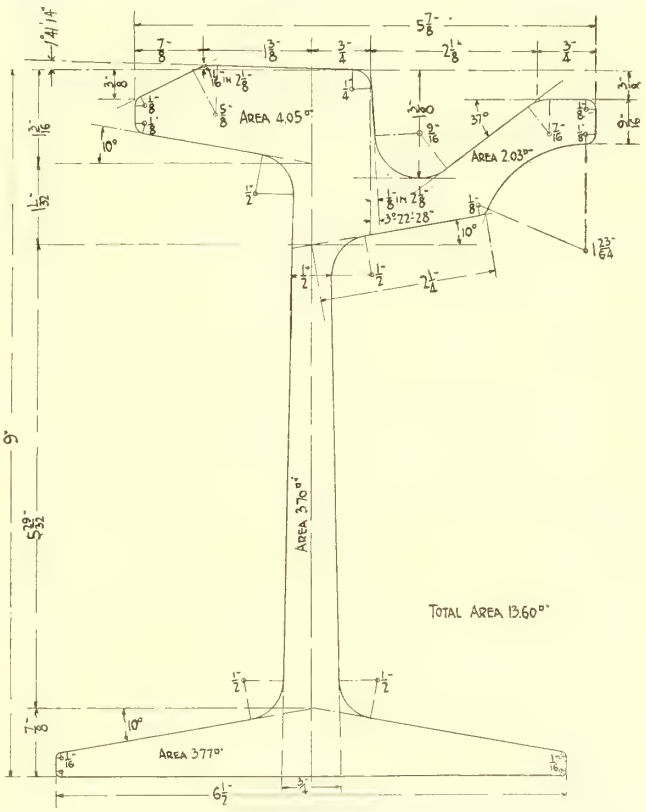
(a) The tram is made ⅜ in. below the head. Such difference in height will form an insignificant obstruction to vehicular traffic, while the advantage of saving in metal, both in width of tram and decreased thickness at the bottom of groove is obvious. Also where vehicular traffic is not very heavy the head will wear more rapidly than the tram.

(b) The width of the tram at the end is made ¾ in. The width as well as the thickness must be considered in connection with wear by wagon wheels.

(c) The width of groove is made 2⅛ in. Any groove presents an objection for narrow-tired wheels. The narrower the groove the fewer wheels will enter it. The width adopted was influenced by the angle of the tram for self-cleaning and the clearance for flanges of the car wheels. The outline is such that narrow-tired wheels will readily turn out.

8. LIFE IN SERVICE

(a) The head is designed for ½-in. to ⅝-in. wear. When the life of the rail is not dependent on the life of the joints, this wear is sufficient for 15 to 18 years of average heavy service. There are no satisfactory data available as to the proportion of wear to traffic, and we have assumed from



Way Matters—Recommended 9-in. 136-lb. Grooved Girder Rail

the performance of former sections that ½-in. to ⅝-in. metal is sufficient.

(b) This depth is made such that the flange will not cut the groove until the head is practically worn out.

(c) The end of tram is made of substantial thickness to stand the wear of wagon wheels in heavily traveled streets.

(d) In designing the rail for a certain length of service, the life of the substructure will have to be considered.

9. WEIGHT

(a) The sections have been carefully considered as to distribution of metal; the head for maximum amount of

wear; the web for maximum of stiffness and strength; the base for best bearing and spiking accommodations.

10. MANUFACTURE

(a) The head, tram, web and base have such distribution of metal as will permit the entire section to be rolled without difficulty. In this matter, as well as with the details, etc., we have conferred with the manufacturers.

(b) The fillet forming the bottom of the groove connecting the side of the head with the angle of the tram is made one continuous radius to facilitate rolling. The end of the tram is also formed to facilitate rolling and compacting of metal. The fillet under the tram at the end of the splicing area is made of small radius, to provide the maximum area for the support of splice bars, and allow the use of concealed bonds without thickening the tram. The fillets at the base of the rail are made of as small a radius as practicable to insure a good vertical contact for spikes, also to avoid sharp corners which would cut the spikes.

JOINT PLATES

Your committee also submits herewith a design for joint plates which embodies the following features:

The plates are set out, and especially the inside plate, leaving maximum room for bonding. The inside plate is flush on the outside, permitting maximum vertical spacing between bolts, and grip on the plates. This design of plate also allows the nuts to be placed on the inside of the rail with sufficient room for a wrench without projecting into the paving.

RECOMMENDATIONS

The 9-in. girder-grooved (Trilby) rail, 136 lb. per yard, outlined in the above report, is recommended as standard.

The consideration of a 9-in. girder guard rail and 7-in. girder-grooved and guard rails, embracing the principles outlined in this report on girder rails, should be referred to the 1911-12 committee on way matters.

The rail joint presented in this report should be referred to the 1911-12 committee on way matters for consideration and further development for use with concealed bonds on the 9-in. girder rail, recommended as standard in this report.

ORGANIZATION AND RULES FOR THE PROPER GOVERNMENT OF THE WAY DEPARTMENT

A uniform code of rules for the government of employees of the way department has not heretofore been under consideration by this association, and the work of your committee has, therefore, been, in a measure, along original lines. The American Railway Engineering Association have had this subject under consideration for some years, but have not taken any final action.

In compiling book of rules, such rules as are applicable to the way department or with which way department employees must be conversant, contained in the standard codes of the American Electric Railway Association, have been incorporated or modified to meet way department conditions, but the spirit and intent of such rules have not been changed. The committee has not thought it necessary to propose two books of rules, one for interurban and one for city service, as way department work and conditions of service upon the two classes of roads differ but little.

The proposed chart or diagram of organization is designed for properties of large size and may be reduced for smaller properties by cutting out blocks until only one important official is left, depending entirely upon the mileage.

The titles "way department" and "engineer of way," for the head of the department, were selected by the committee because they seem to describe correctly the scope of the department, which under many of our organizations is responsible for construction as well as maintenance.

The committee has made no attempt to define the scope of a book of rules, though it has held that a uniform and standard code should only contain such rules as are applicable to all companies.

RECOMMENDATIONS

In conclusion, your committee recommends as follows:

1. That the book of rules be adopted as "recommended practice."

2. That the secretary be requested to call the attention of all member companies to the book and, should they make use of it, request them to advise him of any changes they have found necessary with the reasons therefor, and of any improvements or additions which its use may suggest from time to time.

3. That a member of each future way committee be designated to examine into suggested changes and additions and bring the same to the attention of the committee.

4. That the way committee of 1911-12 be given as one of its topics for consideration a revision of this book and an investigation of methods and systems of operation and illustrations of standard installations, with a view to incorporating in the uniform code such additional instructions and rules relating thereto as may seem desirable and their adoption as standard.

[On account of this being the first presentation of the way rules for consideration they are not reprinted at this time. —Editors.]

STATISTICS OF COST OF ELECTRIC OPERATION OF STEAM RAILWAYS*

BY A. B. BIERCK, CERTIFIED PUBLIC ACCOUNTANT AND GENERAL AUDITOR LONG ISLAND RAILROAD

The adoption of electricity as a motive power on divisions of steam railways where the traffic was, or promised to be, sufficiently dense to indicate that it could be more economically moved by electric power than by steam locomotives was generally begun in the year 1904, and has since increased very considerably.

As a natural consequence, statistics of costs have been demanded, and have been necessary as guides for future installations, as well as proofs of economies effected.

Consideration was given to this condition in the preparation of the classification of operating expenses prescribed by the Interstate Commerce Commission, effective on July 1, 1907, accounts having been provided under the general account "maintenance of way and structures" for electric power transmission, under the general account "maintenance of equipment" for electric locomotives, electric equipment of cars and power plant equipment, and under the general account "transportation expenses" for motormen and purchased power, all of which pertain specifically to maintenance and transportation charges in connection with electric operation.

Subsequently a classification of operating expenses for electric railways was prescribed by the Interstate Commerce Commission, which became effective on Jan. 1, 1909, providing a more comprehensive classification, which may be used by steam roads where it is desired to amplify the accounts provided in the classification of operating expenses prescribed for steam roads. Ample provision has been made, therefore, in a general way, in the classifications provided by the Interstate Commerce Commission and the state commissions for the necessary accounts required by reason of electric operation.

DIVISION OF COMMON EXPENSES

Supplementing this foundation of statistical costs is the more difficult problem of the accurate division of expenses between steam and electric service where items are common to both classes of service.

In order not to burden the general accounts with the detail required in the separation of costs between electric

*Abstract of paper read before the American Electric Railway Accountants' Association, Atlantic City, N. J., Oct. 9-13, 1911.

and steam service, statistical records in this connection may be kept entirely separate, and expenses incurred solely on account of the one or the other separated in accordance with the facts.

Where expenses are common to both classes of service, they may be divided on a percentage basis which will vary according to the nature of the work covered by the charge. These arbitrary divisions may be based on car and ton miles.

The factor "electric car miles" represents the sum of motor and trailer revenue car miles; the factor "electric ton miles" is determined by multiplication of the car miles made by each class of electric equipment by the weight of the equipment, using averages for the weight of motor cars and trailer cars used in electric service. The same method is used in the determination of "steam car miles" and "steam ton miles."

The majority of charges to maintenance of way accounts may be accurately divided between steam and electric operation according to the sections of the road electrically equipped or not so equipped.

Where steam and electric trains operate over the same tracks, a division of maintenance charges may be made, based on the volume of traffic, except in special cases affecting specific accounts, where an arbitrary division may be made, based on the ratio which the total maintenance charges for steam and electric operation bear to each other.

Maintenance of equipment items may be divided accurately, based on the class of service in which the equipment is used.

The cost of maintaining the two classes of motive power, i. e., the electric locomotive and the electric motor car, may be accounted for accurately, and while no definite conclusion has been reached as to the effect on the track of the operation of these two classes of equipment, it is felt that the division of maintenance charges based on the volume of traffic is fairly accurate, as it allows for the weight of the equipment, although the wear on the track through the use of the electric locomotive and motor car is understood to be greater than through the use of the ordinary steam locomotive and coach.

Maintenance of equipment expenses common to both classes of service, such as machinery and tools, may be prorated to steam and electric operation in proportion to the total maintenance of equipment charges made to steam and electric operation.

Traffic expenses may be divided on the basis of passenger car miles, unless specific charges applicable to either one or the other class of service may be determined.

Transportation expenses may be divided accurately in accordance with the nature of the services performed, where such data are obtainable, and accounts common to both classes of service may be divided on the basis of car miles run.

General expenses may be divided on the basis of train miles run—steam and electric operation.

CAR-MILE RESULTS

Having determined the division of operating expenses between electric and steam operation, a statement may be prepared showing car miles run in electric service, car miles run in steam service, ton miles electric service, and ton miles steam service; and these factors, used in connection with the expenses, determine the cost per car mile steam service, cost per car mile electric service, cost per ton mile steam service and cost per ton mile electric service.

Statistics may then be prepared showing the number of passengers carried, divided between electric trains and steam trains, and the number of passengers carried one mile by both classes of service; and these factors, used in connection with the expenses, give the cost per passenger and the cost per passenger mile of each class of service.

Statistics showing the number of passengers carried cannot be obtained by the ordinary methods where electric service supplements or is used in connection with steam service, since a single passenger may use both classes of service in one journey, and hence becomes one passenger for each class.

It is therefore necessary to obtain accurate reports of the actual number of passengers carried from conductors and apportion the revenue and expenses to determine gross earnings and expenses per passenger and per passenger mile.

The usual statistical units of cost, however, are the car mile and the ton mile. These may be supplemented by determination of the seat miles, that is, the seating capacity of cars multiplied by their mileage, and comparison of the result with passenger miles, the comparison revealing the average train load, by units.

SEPARATION OF PASSENGER AND FREIGHT EXPENSES

It is, of course, understood that in the separation of passenger expenses between electric and steam service, there must be a separation of total expenses between passenger and freight service, and this division is made in the following manner:

All maintenance of way expenses common to both classes of service are divided on the basis of total train miles made in passenger and freight service.

Repairs, renewals and depreciation of locomotives are divided on the basis of locomotive miles made in passenger and freight service respectively.

Other maintenance of equipment expenses, when not definitely assignable to either passenger or freight service, are divided on the basis of the ratio of charges to repairs to passenger and freight equipment.

Yard expenses are divided on the basis of actual expense incurred in the operation of passenger and freight yards.

Other expenses in connection with locomotive service are divided on the basis of locomotive miles made by road passenger and freight locomotives.

All other transportation expenses, when not definitely assignable to either passenger or freight service, and also general expenses, are divided on the basis of total train miles.

Electric costs of operation may then be summarized by accounts showing the cost per car mile and the cost per train mile. As similar statistics are kept for steam service, a comparison of the two may be made.

These summaries may be grouped into the principal factors which they contain, and shown in graphic form, providing a ready reference chart for the operating and executive officers.

It has been demonstrated by a study of the results given by the use of these bases that they are reasonably accurate and permit a comparison of the costs of each service.

Where required, the comparison might be carried farther by a division of taxes and fixed charges based on the value or cost of property used, but to my knowledge no attempt has been made by any company to determine these results.

The statistics, of course, may be used for many purposes in addition to those mentioned, and form the bases for studies by departmental heads of costs of operation under particular conditions, making it possible to effect economies in operation which, without a reasonably correct knowledge of costs, would be impossible.

U. S. Metal & Manufacturing Company, New York, N. Y., has arranged an attractively decorated booth in Aquarium Court for the entertainment of its customers and friends. The Diamond tapered steel trolley pole is exhibited, otherwise no efforts have been made to display the various products handled by the company. It has a full complement of representatives present, including A. B. Hegeman, Jr., C. C. Castles, J. J. Ross and H. A Hegeman

REPORT OF THE COMMITTEE ON FARES AND TRANSFERS*

BY M. E. BOYLAN, CHAIRMAN; F. T. WOOD, T. C. CHERRY, E. D. HIBBS, BRUCE CAMERON, J. V. SULLIVAN

In an effort to perform the duties imposed upon it your committee sought certain information which it believed would be of value if compiled and disseminated. Its labors met with indifferent reward. Not in a spirit of faultfinding, but rather with a sense of regret, your committee directs attention to what appears to be a lack of co-operation on the part of many of the members in furthering the interests of this organization and fulfilling the purposes for which it exists. If we are to profit by the experiences of others, it is essential that we know what those experiences have been. If the sum total of knowledge covering matters with which we are directly concerned is to be made available for individual use, the first step, it seems to your committee, is to gather and compile that knowledge in such a way as will make it readily accessible. This, at least, is the view your committee took in approaching the task assigned to it. To this end there was distributed data sheet No. 80.

This data sheet was developed in such a way as to demand a minimum of time in filling out the answers. Your committee, however, has been very much disappointed that the information provided has not been complete enough to warrant an exhaustive study of the subject or the formulation of a report that would show results and examples of actual practice more nearly in line with the importance of the subject taken up.

While hardly necessary to do so, we would direct attention to the almost supreme importance of this matter of fares and to the necessity for substantial progress in methods of collection and registration. It is surprising that a matter so vital to the welfare of the operating companies should have shown so little progress in methods employed and that no really scientific basis, such as is applied to so many other branches of our work, has been devised to insure accuracy of records and returns from the passengers carried on electric railway lines.

Your committee has no recommendation for proper, correct and safeguarding practice, but feels that there is much incentive for the development of some plans, devices or systems for the proper collection, registration and accounting of fares in general such as would make this department of operation more nearly approach the excellent standards established in other branches. Your committee appreciates that considerable progress has been made in the last few years, but still feels that there is room for improvement and submits the subject as one well worthy of consideration not alone by those having to do with transportation and accounting but by the mechanical and engineering departments.

The work carried on this year has not been developed with the idea of formulating any definite recommendations at this time. It has been conducted with a view to developing information, statistical and comparative, that would be an aid to our members.

TRANSFERS IN CONNECTION WITH PREPAYMENT CARS

Perhaps the first thing that impressed the committee in its investigation of this topic is the extent to which the prepayment car has come into use, it being shown from the replies received that practically two-fifths of the 135 companies reporting use this type. This seems to be a confirmation of the opinions expressed in the preceding section and seems to show that the railway companies are on the lookout for perfected methods or plans of fare collection and registration.

But one company reports the use of mechanical devices for issuing transfers on prepayment cars. This company states that the device was applied successfully. The device is operated by the passenger. The issuance of transfers by mechanical action on prepayment cars offers a fertile field of investigation.

Investigations concerning the effect of the issuance of transfers on the time required to load prepayment cars, where such transfers are issued at the time the fare is paid, develops the fact that in a large majority of cases some delay is occasioned. Generally, however, the delay appears to be slight. In one case it is stated that one-third more time is required to load. In still another case the statement is made that the delay is considerable. In nine cases out of thirty-three answers it is claimed that no delay occurs. Some of the companies issue transfers at destination and in at least one case delay in unloading has been remarked. No information is given which would lead to the supposition that in any case has it been found necessary to increase the running time.

Many questions have arisen whether, in prepayment car operation when transfers are issued at the time the fare is paid, there would be an increase in the acceptance of invalid transfers and also as to the effect on the correct punching of transfers issued by conductors. In thirteen instances there has been an increase in the acceptance of transfers that were not good, while in two other cases a decrease has been shown. Other companies responding have observed no difference whatever. The second question brings out the fact that in one case only has there been any increase in the number of transfers incorrectly punched by conductors, while nine companies report a decrease in such errors.

THE 1910 REPORT.

The committee calls attention to the desirability of reviewing the work of the previous year and of endeavoring to ascertain the extent to which recommendations have been utilized by the member companies. With this in mind your committee requests information as to which, if any, of the 1910 recommendations have been adopted. The result of the inquiry follows:

Not adopted	18 companies
Not applicable	4 "
Partially adopted	1 company
Wholly or in part already in use	5 companies
Wholly adopted	1 company
Will adopt	1 "
No answer	108 companies

The committee suggests the advisability of placing in the hands of member companies a brief résumé of all recommendations approved at each annual convention.

INVESTIGATION OF TRANSFER LAWS

At the 1910 convention and in connection with the report of this committee, Lefferts S. Hoffman presented a suggestion for a standard transfer law. Your association approved this and forwarded it to the American Association, with the recommendation that it be approved. The parent body expressed its approval and transmitted the suggested law to member companies.

Your committee has made an effort to ascertain the result of this action and inspection of the replies shows that this protection against transfer abuses has been passed and approved by the Governor of one state at least. In six other states the enactment of the measure has been agitated; without success as yet, however. In some instances present laws are thought to be adequate.

A study of the measures taken by member companies to stop the abuse of the transfer privilege shows some fairly active work during the past year, eleven companies stating that they have more or less vigorously conducted campaigns; one company conducts a continuous campaign, while another feels itself helpless in the absence of proper laws. Abstracts of the answers are interesting; for instance, one company states, "Arrests made and fines imposed stopped abuse to

*Abstract of paper read before the American Electric Railway Transportation & Traffic Association, Atlantic City, N. J., October 9-13, 1911.

some extent;" another, "We believe a good effect has been accomplished;" another, "By watching passengers leaving cars and using p. m. coupon transfers stopped number of abuses;" still another, "Obtained approximately eighty arrests in ten months—penalties slight;" a fifth, "Have been successful in discovering abuses and prevented their continuance;" and last, "Wilful misuse has been prosecuted in the police court and fines imposed."

COLLECTION AND REGISTRATION OF FARES OF ALL KINDS

In considering the general subject of fare collection, your committee took up three subdivisions: ordinary type of cars, prepayment type of cars and interurban service. A summary of the material collected follows:

ORDINARY TYPE OF CARS

The question was asked, "Do you register passengers as they board car and before fare is paid?" One hundred and ten companies reply, "No" as against two which say "Yes."

The committee inquired whether passengers are registered at the time the fare is paid, and of 117 companies responding, 116 answer "Yes."

The next question had to do with the registration of free passengers riding on tickets, and of a total of 120 companies responding, 108 state that such free passengers are shown on the register.

The next query was as follows: "Do you use coupon books or card form with numerals to be punched by conductor for free passengers?" The following indicates the practice: Coupon books, eighty-six companies; books punched by conductor, one company; cards, nine companies; coupon books and cards, eight companies; tickets, seven companies.

Various methods have been utilized to account for passengers riding on badges or uniforms, such as employees, policemen, firemen, etc. By fifty-six companies no record whatever is kept. By nine the number of the badge of the passenger is reported. By fifty a record is kept on the trip sheet or day card. By one a record is kept of all riders except employees. By two companies employees are registered. By three companies free riders of this description are required to fill out pass forms; one of these companies registers such passes.

The practice of covering the totalizer on registers and permitting only the trip total to show, in other words operating a "blind" register, seemed to the committee to be a subject meriting some attention and several questions were framed to bring out the actual working of this plan. It develops that fifteen out of 116 companies follow this practice on all or a portion of their lines; five of these fifteen companies operate city lines and the balance interurban lines, collecting maximum trip fares of more than five cents; one company states that it had this plan in effect for a number of years, finally discarding it as possessing no advantages; another company advises that the system was tried as an experiment with little success. It is interesting to inspect the variation in results as to overages and shortages under this plan. Twenty-six companies report that overages exceed shortages. Thirty-three report that shortages exceed overages. One states that overages exceed shortages in cash but not in tickets. Twenty-six report an equality in errors of this nature.

Rules with regard to the returning of overages and the collection of shortages when "blind" registers are used vary greatly as will be noted from the following summary:

Do you return overages?	Do you collect shortages?	No. of Companies
No answer	Yes	33
No answer	Over 50 cents	1
No	Not under $1.00	2
No	Yes	10
On cash but not on tickets	Yes	2
Yes	Yes	21
In exceptional cases	In exceptional cases	1
No	Over 25 cents	1
No	No	8
If claim is made	No	2
No answer	No	2
Yes	No answer	1

Overages exceed shortages by the following percentages: 2, 3, 19, 20, 20, 30, 50, 50, 53, 470. Shortages exceed overages by the following percentages: 30, 33, 50, 50, 50, 75, 75, 80, 81, 89, 95, 147, 614. The wide differences in results on different lines are rather startling.

PREPAYMENT CARS

The first thing that naturally suggests itself is the use of fare boxes, and the committee finds that twenty-six companies have fare boxes in use on prepayment cars and that one company will soon adopt them, out of a total of sixty companies reporting the use of prepayment cars. Five of these boxes automatically register fares and in each case show the number of fares equivalent to the coin deposited, as, for instance, a registration of two when 10 cents is inserted, etc. Receptacles show different styles of construction as to the kind of coins that may be deposited; for instance, five boxes will take 1-cent, 5-cent, 10-cent, 25-cent and 50-cent coins; one will take 5-cent, 10-cent, 25-cent and 50-cent coins; one will take 5-cent, 10-cent and 25-cent coins; three will take 1-cent, 5-cent and 10-cent coins; two will take 5-cent and 10-cent coins; fifteen companies reply that the boxes in use will take any coin or ticket; seventeen companies reply than an ordinary register is used in connection with the fare box; eleven companies state that registers are not used.

One of the questions suggested by a member company was as to whether cash deposited in fare boxes should be left accessible to the conductor. Your committee finds, out of twenty-six replies, that in twenty-one cases the cash deposited by passengers is not thereafter handled by the conductors, while in five cases the conductor may utilize the cash for change.

There is an equal division of sentiment as to whether fares collected should be held available for change, as out of thirty companies responding fifteen state that money received for fares should be available for use by the conductor, while fifteen claim that the locked fare box is more desirable.

In those cases where the conductor is not permitted to handle fares paid, we find the following provisions as to the sum of money the conductor is required to have when starting work: Two companies require $2; one requires $3; eight require $5; eleven require $10; six require $15; one requires $20; one requires $25; one varies according to run; one requires no cash; eleven furnish conductor with this change, while twenty do not do so.

Passengers frequently through accident deposit in fare boxes coins of larger denomination than is required for fare or fares to be paid. In one case the conductor returns the excess; in one case the conductor returns the excess if not more than twenty-five cents; in two cases the conductor refunds and obtains signature and address of passenger; in sixteen cases the conductor gives passenger an order on the treasurer; in two cases the conductor takes the name of passenger and deposits a slip in the box, stating the amount deposited by the passenger; in one case the conductor makes out duplicate slips, one of which he deposits in fare box, handing the other to the passenger for presentation at the general office; in one case no provision is made for the return of the excess and the passenger loses the amount.

A query was made as to whether the locked fare box is satisfactory and economical. Seventeen companies replied that it was and seven that it was not.

When fare boxes are used conductors should inspect closely all coins tendered, in order to guard against the deposit of counterfeit or mutilated pieces. Your committee, realizing that lax treatment of this matter might lead to large returns of bad money, inquired as to whether conductors are required to pay for such losses. Thirty-seven companies respond that they are required to do so, while fifteen companies say they are not.

The use of a turnstile on cars was referred to, and your committee advises that four companies out of fifty-five re-

sponding report the use of a turnstile. Three of these companies claim that it has been successful in operation, while one company thinks otherwise. Two companies claim that it has retarded operation, while another states it has had a slight effect in this direction, the remaining company claiming that it has had no material effect. As to accidents, it does not appear that the installation of turnstiles has been responsible for any serious cases, though one company states that it has caused a few minor accidents.

There do not appear to be available statistics to show results in the matter of increased receipts due to the operation of prepayment cars, and while your committee attempted to obtain data on this subject, it regrets to report meagre results, certainly not sufficient to warrant comment.

INTERURBAN SERVICE

The collection and registration of fares in interurban service is another new topic. Sufficient time has not been available to go exhaustively into the merits of any of the plans in use, but for information and possible guides, your committee feels that a tabulation will prove valuable to operating men engaged in interurban work. The compilation is submitted with the request that interurban operators discuss the subject not alone for the benefit of the members represented, but as well for the guidance of future committees.

[The committee report then gives the tabulation. It shows the system of fare collection in brief, whether through fares are collected at the first collection or collection is made as each fare zone is entered; whether city fares are collected separately from interurban; whether the interurban tickets have city portions; whether the fares are registered as 5-cent fares or registers are used to show different classes of fares; whether ticket receipts are given when the fare is paid on the car and whether these are collected and turned in by the conductor; whether hat checks are used and collected. It also shows whether ticket agents are employed; whether the conductor is charged with tickets issued and when settlement is made by the conductors for the fares collected.—Editors.]

SHOULD TRANSFERS BE REGISTERED?

The committee asked two questions under this heading. They were, first, "If so, why?" and second, "If not, why not?" The answers have brought out arguments as follows: Those who find the registration of transfers desirable claim that it makes conductors more careful in handling transfers and that it affords an opportunity for checking that would not be possible otherwise. Those who claim that transfers should not be registered state, among other things, that such registration consumes too much time, that it is not feasible and, finally, that it is objectionable because of the office expense of checking the registration and collection of transfers and the difficulty of obtaining clerks who can do so accurately.

CONCLUSION

In conclusion your committee calls attention to the fact that this is not in any sense to be regarded as a report of conclusions, but as one of attempted progress in the gathering of useful information.

The only electric railway of importance in Peru is the Empresas Railway, Light & Power Company of Lima, which has the monopoly of the railway, light and power utilities for Lima, Callao, and their suburban towns. There is no important interurban system in Peru outside of these cities and vicinity on account of the topography of the country. The street railway in Arequipa, in southern Peru, with 40,000 to 50,000 inhabitants, is, however, to be electrified and extended to Tingo, and possibly to one other small town. The original steam road to Callao was electrified in 1910 and is now used almost exclusively for fast freight between Lima and Callao, funerals to the Bellavista cemetery and transporting troops.

REPORT OF ELECTRIC RAILWAY DICTIONARY SUPERVISING COMMITTEE*

BY H. H. ADAMS, CHAIRMAN; PAUL WINSOR, RICHARD M'CULLOCH

Your committee appointed at the 1908 convention to supervise the publication of the Electric Railway Dictionary by the McGraw Publishing Company, of New York City, is pleased to report that the compilation of the book was completed and the first copies ready for delivery on May 1, 1911. A copy of the dictionary is presented to the association herewith as part of this report.

Your committee wishes to call the attention of members of this association to the scope of the contents of the dictionary and its value to electric railway companies. The publishers have spared no pains or expense to make it the most complete reference work on electric railway cars and their equipment which has ever been compiled. The dictionary contains 355 pages, consisting of 63 pages of clear and concise definitions of more than 2200 terms and names of parts used in electric car building, together with 292 pages of illustrations.

The illustrations, 1987 in number, include floor plans and exterior and interior views of more than 200 representative types of cars for city, suburban and interurban service, dimension drawings for car framing, illustrations of all types of trucks, motors and every kind of modern car and truck equipment parts.

The definitions are arranged in alphabetical order as in standard dictionaries, and are followed by the illustrations, which are grouped in six general classifications, as follows: General views and floor plans of cars, car framing, car body details, trucks, truck details and electrical equipment. Wherever a part or term defined is capable of illustration a reference is given in the definition to the figure number assigned to the illustration in the following pages.

The primary purpose in compiling and publishing the dictionary was to assist in bringing about standardization of the terms used in electric railway car building and maintenance. In the past the lack of standardization of terms has resulted in much confusion in ordering parts from manufacturers and in interpreting communications between departments of the same company or between different companies.

The dictionary undoubtedly will be of very great assistance in bringing about standardization of names and terms as time goes on. It is a useful and valuable book for electric railway companies in other respects. It contains data and information constantly required for reference by the officials and employees in almost every department. The purchasing and stores department, for example, should find the illustrations and definitions of great assistance in identifying material specified on requisitions and in ordering from manufacturers. The mechanical department can make use of the dictionary as a comprehensive and complete reference work on car construction and equipment when designing new cars or rebuilding old cars. The executive, operating, auditing and claim departments likewise will find in the dictionary a large amount of valuable information of which daily use can be made.

Your committee desires to again express its appreciation of the work of the editor of the dictionary, Rodney Hitt. His task was laborious, and it was only due to his untiring efforts and past experience in work of this character that the volume was completed at the date it was.

In presenting this report your committee bespeaks for the dictionary widespread use by member companies to the end that the terms and names of parts defined therein shall become the standard of the industry.

*Abstract of report read before the American Electric Railway Association, Atlantic City, N. J., Oct. 9-13, 1911.

REPORT OF THE COMMITTEE ON CONSTRUCTION OF SCHEDULE AND TIME TABLE*

BY N. W. BOLEN, CHAIRMAN; J. J. DOYLE, TIMOTHY CONNELL, F. L. HUBBARD, J. H. VAN BRUNT, I. H. M'EWEN, F. I. HARDY, B. E. MERWIN

The membership of the committee was increased this year in order that special attention might be given to interurban schedules and time-tables, and to this end four of the members, Messrs. Doyle, McEwen, Hardy and Merwin, were appointed a sub-committee to study interurban practice.

DEFINITIONS

Your committee submits herewith definitions of terms which, though in every-day use, vary in meaning according to sectional location.

Run—A group of trips shown on the time-table which constitutes a day's work for a car crew.

Run number—An arbitrary number assigned to a run.

Run guide—An index of the on and off time and the total working time of each run.

Train number—Arbitrary number or symbol used to designate one trip or a given group of trips.

Patch—A substitute for a portion of a time-table in effect applied in such a way as to cover parts of the table for the purpose of increasing or decreasing the service.

Assignment sheet—An index of the names of car crews assigned to each run.

Tripper—One trip or a group of trips shown on the time-table for regular operation, but not assigned to regular crews.

Extra—A trip, or a group of trips, put out to supplement existing service as required, but not shown on any time-table.

Block number—The committee has not attempted to define this and would recommend that its use be discontinued.

DIVISION OF WORK AMONG EXTRA MEN

A letter of inquiry concerning the extent to which the revolving or rotating extra list is in use has developed the following facts:

A total of 144 companies responded. Of these ninety-eight report that they use the revolving extra list method, which is that an extra man after completing an assigned day's work is not again assigned work until every other man on the extra list has had work assigned to him. While a majority of the companies do not comment upon the point and the committee is not certain whether the plan is in effect on such roads, a large percentage state that an extra man does not fall to the bottom of the extra list until he has had an opportunity to work a certain specified number of hours (which range from four to nine) or has earned a given amount of wages. Some companies state that when an extra man is assigned to the run of a regular man who is to be absent for more than one day the extra man retains the run until the regular man returns to work. With other companies such a run is included as a part of the total extra work to be distributed daily and a reassignment to extra men is made each day.

Thirty-six companies reply that the practice of the revolving extra list is not in force and in most of such cases the seniority rule applies; that is, that the man who has been on the extra list the greatest length of time has first call for work each day. A considerable number of these companies, however, state that an effort is made to divide equally the hours of work available, in which case, of course, neither the revolving method or the seniority rule prevails absolutely.

Ten companies reply that extra men are used as shop men, electrical workers, etc., when not required on the cars. In this way the company is able to provide the extra men with a satisfactory number of hours of work, which in most cases, especially if the road is small, would not be otherwise possible.

Your committee recommends the use of the revolving extra list as being a plan which provides a more equitable division of work, as tending to create more satisfactory conditions with regard to new employees and as affording substantial increased inducements to individuals desiring to enter this branch of electrical railway service. But the plan should establish a certain number of hours as a day's work for extra men, and such extra men should not be forced to fall back on the extra list until they have had an opportunity to obtain such stated number of hours of work. By this the committee means that a man who works a short one trip should not by accepting this work relinquish his place on the list and possibly permit those lower down to obtain work of longer duration which it might be possible to assign to the extra man working the one trip mentioned.

RE-ROUTING

The committee recommends that companies, when developing traffic counts, trend of transfer movement, etc., also consider the matter of possible re-routing to the end that their lines may form routes best adapted to the current of traffic.

INTERURBAN SCHEDULES AND TIME-TABLES

The committee received replies from forty-four companies operating 3041 miles of single track, or an average of about 70 miles per company. Practically every section of the country was represented. The mileage of the smallest company reporting was 64, while that of the largest one was 508. The average regular headway on the lines reporting is approximately 40 minutes. As a matter of interest and as indicative of the wide difference in the service provided by electric interurban and steam railroad operation, the committee adds that, from figures available, the average regular headway on steam railroads throughout the United States appears to be about 3½ hours.

SURPLUS CARS

The following table shows the number of cars owned by interurban companies and those actually required by the schedules:

Class.	No. of cars operated.	Cars required by schedule.	Cars owned.	Surplus per cent.
A.....	1- 9	103	208	102.0
B.....	10-24	154	286	85.7
C.....	25-49	137	230	67.9
D.....	50-75	177	277	56.5
Totals.....	.....	571	1,001	75.3

SIDINGS, CROSS-OVERS AND SPEED STATISTICS

The committee found a wide variation in the practice regarding the location of sidings on single track and cross-overs on double track. Sidings vary all the way apart from 0.52 mile to 5 miles, cross-overs from 1 mile to 3 miles. The average for all companies is 2¼ miles between sidings and slightly over 2 miles between cross-overs. The committee also found a great disparity on most roads between schedule speed, even on limited service, and maximum free running speed. Some roads reported a limited train speed of considerably less than one-half of the free running speed, while in other cases there is a difference of only 10 per cent. It appears desirable to call attention to this ratio in view of the possibility that a considerable expenditure might be made in the purchase of unnecessarily high-powered motor equipment and heavy rolling stock, or that lighter motors might be geared to uneconomical speeds. Either of these conditions would, of course, detrimentally affect operating costs.

Average of maximum free running speeds, 43.0 m. p. h.

Average schedule speed, local trains, 22.12 m. p. h.

Ratio average of maximum free running speeds to average schedule speed, local trains, 1,944.

*Abstract of report read before the American Electric Railway Transportation & Traffic Association, Atlantic City, N. J., Oct. 9-13, 1911.

Average schedule speed, limited trains, 32.34 m. p. h.

Average schedule speed, local trains, on lines which also operate limited service, 23.74 m. p. h.

Average of maximum free running speeds of roads operating both local and limited service, 50.6 m. p. h.

Ratio average of maximum free running speeds to limited service average schedule speeds, 1.503.

Ratio average of maximum free running speeds to average schedule speeds of local trains on roads which also operate limited service, 1.811.

Ratio average schedule speed, limited service, to average schedule speed, local trains, 1.362.

STANDARDIZATION OF TERMINAL LEAVING TIMES

Your committee wishes to recommend the practice of standardizing terminal leaving times, in order that trains may meet at the same sidings in all trips, as one conducive to greater safety in interurban operation. Of 38 companies reporting, 31 follow this plan.

SHOWING FREIGHT TRAINS ON TIME-TABLES

Of 36 companies reporting, 26 companies run freight trains as extra trains, 8 show them on the time-table and 2, in some instances, show them on the time-table and, in other cases, run such trains as extra.

SUPPLEMENTS OR NEW TIME-TABLES

Your committee recommends the plan of substituting new time-tables when changes of any character are made in old tables and that the practice of issuing supplements to old tables to provide information concerning such changes be discontinued. In the opinion of the committee, this will tend to greater safety in operation. Of 40 companies responding, 36 issue entirely new time-tables in such cases and 4 companies issue supplements to old time-tables to cover changes made.

NEW TIME-TABLES ON DIFFERENT COLORED PAPER

Your committee also found that 27 companies do not print succeeding time-tables on different colored paper; 8 companies do change color of paper for succeeding time-tables; 1 company shows a different colored number, this number always being of large size; and 3 companies utilize a different colored cover.

The committee recommends that new time-tables be printed on a paper different in color to that used in the time-table superseded or that a different colored cover be used.

DETENTION REPORTS

Thirty-six companies require the making of daily detention reports; 5 companies do not. Twenty-four companies make a report segregating causes of detentions; 14 companies do not do so.

Thirteen companies develop monthly summaries of detentions, 24 companies do not, and 1 company makes a daily summary of this kind.

RECORDS OF PASSENGERS CARRIED

The committee recommends that all interurban railway companies make daily records of passenger business by trains, feeling that such records are necessary statistics, not alone for the proper construction of schedules and time-tables, but as well for purposes of comparison with past results and as essential factors in developing estimates of future operation. Twenty-eight companies make records of this character either in the form of reports or charts; 1 company makes a similar record in loose-leaf form; 1 company reports such records made at irregular periods; and 9 companies develop no records of this sort.

STANDARD INTERURBAN TIME-TABLE

The committee's deductions as to a standard for interurban working time-tables are as follows:

A single-sheet form of folder appears most satisfactory and economical. Preferably it should be in book form, with time-tables on separate sheets.

The time-table should be folded in convenient form, should have ½-in. columns, should be folded to 3 in., thus giving six trains to the fold and, assuming from twenty-four to thirty trains in each direction, would require four or five folds. If the sheet was 6 in. deep, the folder would be of a size convenient for a coat or waistcoat pocket.

Where regular meets are shown by continuous rows of black-face figures, guide lines should be inserted midway between such rows, and where the meets are irregular, guide lines should be inserted between every fifth and sixth row.

The schedule should appear on one side of the sheet and special instructions on the reverse side.

The title should be printed on the first page as folded, and the table should be folded so as to open at the center where station names are shown.

The foregoing is for single track operation.

The same form of folded sheet may be utilized for double track operation by folding once across and printing the time of the trains in opposite directions on the two exposed faces, special instructions to be printed in the last fold of the table.

The use of heavy-face type for p. m. trains is considered objectionable, for the reason that it interferes with the full-face type required by the code of rules.

Care should be taken in all cases to conform to the rules in respect to proper clearances of trains at meeting and passing points.

Station names should be printed in the center. Such companies as have an unusually large number of trains may provide an additional list of stations at either end.

In discussing the question of whether more than one class of train should be indicated, the committee calls attention to the possible desirability of showing the time of inferior class trains in at least one direction. In this case they should be placed at each end of the time-table and separated from the first-class trains by a heavy line. This would be an aid in maintaining satisfactory speed and would reduce the number of train orders required if trains were operated in both directions as extra trains.

Where the stations are shown in a single column, the time of trains in one direction should read down and in the other direction read up. Where separate tables are used for trains running in opposite directions on double track and station names are repeated in each table, the names should read down.

The distance of each station from one terminal should be shown in a column on one side of the list of stations and the distance in reverse directon from the other terminal should be shown in a column on the other side of the list of stations. These distances should be expressed in decimal hundredths of a mile. In the opinion of the committee it is not necessary to show distances between stations on the time-table.

Where the cars of one company operate over the tracks of another, the time of such cars should be shown in italics, for information only.

The committee decided to recommend that Sunday or Saturday and Sunday service, when it varies materially from that of other days, should be shown on the schedule with the proper designation at the head of column, as "Sunday only" or "Saturday and Sunday," in heavy black type, these trains to be shown in the regular order of leaving times. The committee does not approve of the use of red type, except where a new schedule is used for Sunday, in which event the use of red ink in printing this Sunday schedule is recommended.

The committee disapproves the practice of using typographical symbols for designating service, as *—Sunday only; †—Saturday only; etc., etc.

As regards the numbering of trains, the committee recommends that north-bound and west-bound trains be given odd numbers and east and south-bound trains be given even numbers. This is the usual practice on steam railroads. The committee also recommends that the numbers start at midnight as No. 1, west-bound, and No. 2, east-bound.

each succeeding train to be given the next higher number in the order of terminal leaving time; that a different series of hundreds be assigned to each division, and that the trains of foreign companies be given distinctive numbers. Inferior class trains should have a higher series to distinguish them from first-class trains.

In so far as may be possible, the maximum schedule should be considered in numbering trains, and when trains are withdrawn the numbers and spaces should be left blank so that if trains are subsequently added to take the place of those withdrawn the same number will apply to such substituted trains. This will provide practically a standard of train numbers for specified hours and be useful as a means of identification for accounting and other purposes.

A light, first-class bond paper should be used for working time-tables.

Another subject discussed by the committee was whether schedules on electric interurban lines should space trains at regular intervals, such as hourly or half-hourly, or irregularly to meet traffic demands, connection requirements, etc. A difference of opinion exists among the members, but all feel that the adjustment of leaving times to fit volume of business is a matter worthy of careful study on the part of each individual company, and the committee is of the opinion that there is a strong possibility for increased revenues and decreased operating expenses, including material reduction in non-productive lay-over time in irregular spacing, though recognizing that regular hourly or fractional hourly leaving times are convenient to the public and, where long used, perhaps difficult to disturb.

TIME-TABLES FOR PUBLIC USE

The question of the proper form of time-table for public distribution was taken up, and it was the opinion of the committee that a small folder provides the best form of time card for public use.

CONCLUSION

In conclusion the committee desires to recapitulate the various recommendations included in this report as follows:

(1) Definitions published above.

(2) The use of the revolving extra list modified to establish a certain number of hours of work as a day's work for extra men, such extra men not to fall back on the extra list until they have had an opportunity to obtain such stated number of hours' work.

(3) That the advantages of possible re-routing of lines be investigated.

(4) That the ratio of free running speed to schedule speed be investigated with a view to possible economies.

(5) That terminal leaving times be standardized.

(6) That the plan of substituting new time-tables when changes are made in old schedules be adopted and the practice of issuing supplements to show such changes be discontinued.

(7) That new time-tables be printed on a paper different in color from that used in the time-table superseded.

(8) That daily records of passenger business by trains be made.

(9) The adoption as standard of the forms of single track and double track working time-tables submitted as a part of this report.

At the annual meeting of the stockholders of the Boston & Maine Railroad on Oct. 11, 1911, the nineteen directors who served last year were reelected. Later the directors elected Lucius Tuttle chairman of the board and Charles S. Mellen president. Herbert E. Fisher was re-elected treasurer and E. A. Ryder clerk. President Mellen in addressing the stockholders said that he saw a year of hard work ahead. He expressed great confidence in the future of Boston & Maine and he hoped to be able to maintain the present rate of dividends and within about three years to return the stock to a 6 per cent. basis.

CABOOSE CAR OF THE PUGET SOUND ELECTRIC RAILWAY

The Puget Sound Electric Railway recently put into service four new cabooses built to conform to the requirements of the State Railroad Commission. An illustration of one of these cabooses is presented. They were built at the shops of the Tacoma Railway & Power Company. The general dimensions are as follows: Length over all, 30 ft.; width, 9 ft. 3 in.; length between bolster centers, 16 ft.; length of body, 24 ft., and height of rail to the upper deck, 14 ft. 7 in.



Caboose Car for Puget Sound Electric Railway

The bodies of these new cabooses weigh 16,400 lb. each and are constructed largely of wood. They are mounted on diamond-frame trucks with 33-in. wheels and 5-in. axles having 4-in. x 7-in. journals. The cabooses completely equipped weigh 27,600 lb. each. They are fitted with Tower M. C. B. couplers, Westinghouse air brakes and are painted the company's standard green color.

BASEBALL TEAM OF MANILA ELECTRIC RAILWAY

The accompanying illustration of the baseball nine of the Manila Electric Railroad & Light Company, Manila, P. I., is another proof of the saying that baseball, like trade, follows the flag. It is well known that since American influence became predominant in the former Spanish colonies the natives of the latter have become enthusiastic players of the American national game. The Manila team has had such a successful season that C. B. Graves, general manager of the company, is so optimistic as to believe that in another year it will be seasoned enough to visit the United States for a series of games with high school and college nines. The Manila company is one of the properties for which J. G. White & Company, New York, N. Y., act in the capacity of general managers.



Manila Railways Baseball Team

REPORT OF THE COMMITTEE ON INSURANCE

BY H. J. DAVIES, CHAIRMAN; A. H. FORD, S. L. TONE, F. A. HEALY AND A. W. M'LIMONT

In 1905 figures were presented to the association, compiled from reports of more than 400 street and interurban railway companies, showing that fire losses had been less than one-third of premiums paid for fire insurance. The reports were the result of an attempt to collect fire insurance statistics for the previous ten years. While few of the reports contained figures for each year, and the data, therefore, did not give the experience of all of the 400 companies for the full period, it was believed that the companies that had sustained the largest losses made reports for all or a part of the ten years, and that if all companies had made complete reports the percentage of loss would not have exceeded the ratio shown by the incomplete returns. As the reports covered the payment of more than $6,000,000 in premiums, they furnished a sufficient basis for an argument in favor of a reduction in rates. The amount of insurance carried for these premiums was not reported, and it is impossible now to determine what the average rate was during the ten years, but it is safe to say that it was not less than $1.25 per $100 of insurance.

Similar figures were compiled by this association in 1907, 1908 and 1909 and are recapitulated in the following table:

	1905.	1907.	1908.	1910.
Insurance carried ...	$848,000,000 (Est.)	$342,893,377	$54,958,494	$192,364,228
Premiums ..	6,049,641	3,724,835	446,861	1,354,068
Losses	1,971,806	2,152,696	8,821	261,982
Recoveries .	1,673,336	1,587,623	7,264	182,738
Ratio of losses to premiums	32.59 p. c.	57.7 p. c.	1.97 p. c.	19.3 p. c.
Ratio of recoveries to premiums ..	27.66 p. c.	42.6 p. c.	1.63 p. c.	13.5 p. c.
Premiums per $100 of insurance	$1.25	$1.08	81c.	70c.
Losses per $100 of insurance ..	41c.	63c.	1.6c.	13.6c.
Recoveries per $100 of insurance	35c.	46c.	1.3c.	9.5c.

RELATIONS WITH INSURANCE BUREAUS

In our last report we set forth at length our correspondence with the Central Traction & Lighting Bureau in regard to a joint meeting of our insurance committee and that body. The Central Traction & Lighting Bureau was organized by the old-line insurance companies as a result, in part, at least, of the efforts of your committee to confer with them, and its purposes have been stated in previous annual reports of this committee. The bureau has been at work for several years on what the insurance companies call a "universal schedule" of rates to be applied to traction properties.

INCREASE IN RATES

So far as your committe has been able to ascertain the insurance companies have not been called upon to pay one dollar on account of a fire in any carhouse or other building equipped with automatic sprinklers in the past year. In spite of this the old-line insurance companies are increasing the 15-cent rate they made six years ago on carhouses equipped with automatic sprinklers. Your committee believes that the experience of those years justifies a decrease, rather than increase, in rates for the insurance of those protected carhouses. We have constantly insisted, however, that it is more important to prevent a fire than to collect a loss, and we still believe, notwithstanding the present rates and the threat to increase them, that carhouses should be protected in the best possible manner against loss or damage by fire.

*Abstract of report read before the American Electric Railway Association at Atlantic City, N. J., Oct. 9-13, 1911.

In last year's report your committee recommended the protection of cars in open yards by standpipes surmounted by universal nozzles. One car yard has been so equipped. The rate of insurance on cars in that yard has been reduced $1.15 per $100. On $336,000, the value of the cars in the yard, this is a saving in one year of $3,864. The equipment, complete, cost less than $6000. This form of protection was designed and installed by your insurance expert, Mr. Staats, as was the aisle-line automatic-sprinkler protection described in our report to the 1906 convention.

The facts and figures here given indicate that we have made progress—that rates have been reduced, and that properties have been improved. Can we go further? Yes. Gratifying as is the reduction in rates from an average of $1.25 or more to 70 per cent, the lessening of losses from 41 cents to 13.6 cents per $100 of insurance is much more pleasing. It indicates that the railway companies are earnestly, vigorously, intelligently and scientifically taking care of their properties. But thirty-six fires in a single year are too many. Our losses ought not to be a quarter of a million dollars a year. Notwithstanding the reductions indicated in the loss ratio, there should be fewer fires. Notwithstanding the reduction in premiums, our rates are still too high. They should be reduced, or we should carry our own insurance, as a few of our members are doing. The ratio of losses to premiums and to insurance carried shows that we can safely do this for a much smaller sum than the amount we are now paying.

Of the thirty-six fires that occurred in 1910, it should be stated, three occurred in park properties and one in a dwelling house, which, of course, are not a necessary part of the equipment of an electric railway, and several others upon premises not used in railway operation.

It will be possible, if our records are kept up to date, as they can be if all members of the association will furnish the figures called for by the association's blanks, to determine what the rates ought to be. If then the insurance companies decline to make the rates that the history comprised in these records indicates to be reasonable, it will be perfectly safe for the railway companies to carry their own insurance individually or collectively through their own insurance organization.

INSURANCE EXPERT

At your last meeting your committee recommended that you appoint an insurance expert, with authority to employ assistants, whose duty it should be to give advice to members on all subjects relating to fire insurance, the insurance expert and his assistants to be the inspection and survey bureau of the association; the expenses of the bureau to be paid by the association and to be collected from the members in the proportion in which annual dues are collected, or in accordance with the value of the services rendered. The recommendation was referred by the convention to the executive committee, with authority to act upon it. In June the committee appointed Henry N. Staats, of Cleveland, without salary, but with the understanding that he should receive compensation from such companies as retained him at the following rates:

From companies having annual gross receipts of $500,000 or less, a payment of $50 per year, payable quarterly, plus railway fare; from companies having annual gross receipts of more than $500,000, a payment of $10 for each $100,000 gross receipts, payable quarterly, plus railway fare.

Mr. Staats has also been appointed insurance expert of the Street Railway Association of the State of New York, and of the Central Electric Railway Association.

Your committee is still of the opinion that, as the work of the expert and his bureau will benefit every member of the association, the expenses, or at least a considerable part of them, should be borne by the association; but it is entirely willing that this question be referred to and determined by the executive committee.

TWO-CAR TRAIN OPERATION FOR CITY AND SUBURBAN TRAVEL*

BY C. J. FRANKLIN, GENERAL SUPERINTENDENT PORTLAND (ORE.) RAILWAY, LIGHT & POWER COMPANY

Where traffic conditions are favorable, two motor cars coupled together, operated and controlled by one motorman, have decided advantages over single-unit operation and are especially advantageous when two-motor equipment is so utilized.

The rapid extension of residence districts has produced a startling growth in suburban travel, and with this growth a demand has come for better facilities and quicker transportation. On single track suburban lines nearly all turnouts are being used during the rush hours for single-car operation; the old method of doubling up the cars and running them as "double-headers" has been found to be impracticable on account of the increased number of units operated and consequent multiplicity of delays. With the present insufficient track facilities, increasing the number of single units, instead of relieving the situation, complicates it to such an extent that patrons do not reach home as quickly as before such increase was provided. In the center of the city, where cars operate on both city and suburban lines, the traffic is necessarily congested during the rush hour periods and track space is particularly important. Single car operation does not permit of the maximum use of the track, as an increase in headway between cars means a gap in the service.

The advantages of two-car train operation are not by any means confined to suburban or city lines operating on single track. Single-unit operation requires four men to two cars—two-car train requires three men to two cars, thus effecting a saving of 25 per cent in platform time and expense. In single-track operation there is a limit to the number of units that can be moved, for example on a single-track line operating ten single cars, it is impossible to operate closer than a six-minute headway.

A line in Portland was operated with a 10-minute service with single cars, which were overloaded. The situation was relieved by running a 15-minute service with two-car trains, which increased the carrying capacity two cars per hour, or 33⅓ per cent, at no increase in platform time and expense. The running time on the line being 90 minutes for the round trip with 10-minute service required nine cars, and the same running time for the two-car trains with a 15-minute service required six trains. In the former instance eighteen men were required to operate the nine single units, whereas in the two-car train operation, there being but six units with three men to the train, the same number of men were required.

In the operation of cars reliance must be placed largely on the human agency, which is not infallible, and the chances of accident are less with ten motormen than with twenty.

The increased number of stops required per train, as compared with single-car operation, in practice does not work to the detriment of the plan. The running time is much more easily made with two-car operation than with the same number of cars on the line operating as single units.

The question to where two-car train operation is most desirable, where it can be applied and under what conditions it is not desirable, must be left entirely to the judgment of the local operator. Attention is called to long lines operating through the sparsely settled outskirts of the city. It will be found profitable, local conditions permitting, to run a short line of single cars to a point where the travel warrants, in addition to two-car trains which run to the end of the line. Train operation has proved particularly suitable in handling large crowds to and from a race track, country club, county fair, amusement park, etc., where traffic is mostly of a through nature and stops are not made as frequently as in regular traffic in the congested part of the city, even although operated over city streets. In outlying districts, where the travel is increasing, but not to the extent of demanding more frequent service, two-car train operation has been found to give entire satisfaction by increasing carrying capacity without increasing expense in proportion.

It is hardly necessary to compare two-car train operation with a motor car and trailer. Two-car train operation is much smoother in every respect, has increased acceleration and permits of more rapid operation and regularity of schedule than trailer operation. It lessens the danger of the switching required to run around the trailer at the end of the line. This consumes time, frequently to such an extent as to interfere with schedules, to say nothing of the accident risk involved.

EQUIPMENT

The standard gage city cars used for train service by the Portland Railway, Light & Power Company are of Brill manufacture. They are of the closed type, 44 ft. 9 in. long, equipped with Brill double trucks; the total weight is 44,500 lb., and the seating capacity approximately forty-four to the car, eighty-eight to the train. Both two-motor and four-motor equipments are used. The four-motor equipments are GE-81 motors; the two-motor equipments are GE-210 motors. The brake equipment is straight-air with emergency feature and automatic with graduated release.

The control on both the two-motor and four-motor equipments is the type M, having two cable jumpers between cars, one a single-point jumper for the trolley circuit and the other a nine-point jumper for the motor and control circuits.

The difference in cost between the type M multiple-unit control for two-motor equipments and the K-28-F control is approximately $450 per car. The type M control can be used for two or more cars and is capable of handling motors of high power such as are used in interurban work, whereas the K-28-F control is adapted only for two cars of two motors, each of a maximum capacity of 40 hp per motor.

The narrow-gage cars used for train service are of Brill manufacture. They are of the closed type, 41 ft. 4 in. long, equipped with Brill double trucks. The total weight is 36,580 lb. The seating capacity is approximately forty to the car or eighty to the train. Only two-motor equipments are used, the motors being of the GE-58 type. The brake equipment is straight-air with emergency feature. The control is the K-28-F type having three cable jumpers between cars, one a single-point jumper for the light and heat and the other two seven-point jumpers for the motor and control circuits. The operation of this control is practically the same as that of a single four-motor equipment.

When it is considered that the difference between equipping two cars with two motors each with the K-11-H control to operate as single units and equipping two cars with K-28-F control to operate in multiple unit is approximately $150 per car, the advantages obtained in having a flexible equipment which can be used either as single units or in two-car trains certainly more than warrants the expenditure.

Two-motor, two-car train operation may also be obtained by having a car equipped with K-28-F controller and a car equipped with the K-11-H control, using a seven-point jumper between cars, but the train can only be operated from the car having the K-28-F controller. This operation is desirable where loops are provided at each end of the line and of course is half as economical again as equipping two cars with the K-28-F controllers.

Pay-as-you-enter cars are being used in some of these two-car trains. When used in this manner the forward car of the train is used the same as in single car pay-as-you-enter operation. The forward platform doors of the second car are locked and the passengers board the car and alight via the rear platform. This operation has proved successful.

*Abstract of paper read before the American Electric Railway Transportation & Traffic Association, Atlantic City, N. J., October 9-13, 1911.

REPORT OF THE COMMITTEE ON COMPENSATION FOR CARRYING UNITED STATES MAIL*

BY EDGAR S. FASSETT, CHAIRMAN; H. A. NICHOLL, C. H. HILE, C. L. S. TINGLEY, A. R. PIPER, J. K. CHOATE, J. M'MILLAN

At the annual mid-year meeting of the executive committee of the association, held in New York in January, 1911, we submitted the following report, which was accepted by the executive body:

"The committee on compensation for carrying United States mail would respectfully report that, having gone over the data which had already been compiled by previous committees and after a free discussion in relation to the same, it has decided to recommend the following rates of compensation:

"For pouch service, from one to three pouches handled on passenger cars a minimum of 3 cents per car mile; for each additional pouch 1 cent per pouch per mile.

"That the rate for railway post office service on city lines be 1½ cents per linear foot per car mile.

"That the rate for railway mail service on interurban lines be the maximum compensation given to steam railroads for like service.

"That a conference be asked with the committee on compensation for carrying United States mail of the American Railway Association (short-line railroads) with a view of co-operating with it."

In accordance with the above recommendation, the chairman of your committee had a conference with Mr. Ralph Peters, vice-chairman of the committee on railway mail pay of the short-line railroads. While Mr. Peters was very courteous and very much interested in the subject, he thought that there is such a wide divergence between our respective lines that practically nothing could be accomplished by joining forces, although we could work in harmony by exchanging such data and other matters concerning the mails as the two committees might gather.

Your committee is indebted to Gen. George H. Harries, second vice-president of the association, for his able assistance and advice in connection with its work. In cooperation with General Harries, a meeting was arranged in Washington for Aug. 9 between the committee and General Harries, and the acting Second Assistant Postmaster General and the superintendent of the division of miscellaneous transportation. At this conference the recommendations formulated by the committee as to the rates for mail service were presented to the post office officials, and they seemed to be impressed with the fact that the electric railroads were not properly taken care of, and agreed to bring the matter before the Postmaster General at an early date, letting us hear from them in connection with the same in sufficient time for the committee to make a report to the association at the annual convention. We have now been informed that since the date of our conference the time of the Second Assistant Postmaster General has been almost entirely taken up with the work of the investigation of the department, and for that reason he has been unable to give our matter attention. We are assured, however, that it is the intention to take up our case at the earliest opportunity, and we shall be advised when the same is done or when another conference can be arranged.

While the committee feels that it has not been able to accomplish much, yet a start has certainly been made with the post office authorities and our desires have been brought to their attention; but, as General Harries aptly says: "Slow business, this dealing with the United States government when the government is in the debtors' class; if we were the debtors and the government was the creditor things would move much more rapidly."

*Abstract of report read at the convention of the American Electric Railway Association; October 9-13, 1911.

COMMITTEE ON DETERMINING THE PROPER BASIS FOR RATES AND FARES*

BY FRANK R. FORD, CHAIRMAN; C. S. SERGEANT, JOHN I. BEGGS, H. J. DAVIES, WILLIAM J. CLARK, H. G. BRADLEE, HON. JAMES F. SHAW, WILLIAM NORTHROP, E. C. FOSTER

Your committee appointed last winter has given consideration to its subject and reports as follows:

First: We believe that there exists a widespread need of increased fares if adequate service is to be furnished and capital secured to provide for the continued growth of the industry.

Second: Practical methods of securing increased rates for city systems may be summarized by the following:

(A.) Retain present 5c flat rate, but eliminate free transfers.

(B.) Retain 5c rate, but charge 1c, 2c, or 3c extra for transfers.

(C.) Increase 5c rate with (1) free transfers, or (2) without transfers, or (3) with extra charge for transfers.

(D.) Establish straight European zone system without transfers.

(E.) Establish zone system where a 5c fare is charged from outlying districts to central business district, but require a 10c fare from outlying district across business district to opposite outlying district, eliminating such transfers as would defeat this object.

(F.) Establish zone system with 5c fare for a large central zone and 3c extra fare, making 8c through fare to smaller outlying zone, either with (1) free transfers or (2) a charge for transfers, the local fare in outlying zone being 5c.

From analogy with the past history of the industry and from practical considerations we would in general recommend Method F as the most feasible of the above plans. Local conditions, topography and customs are, however, different in each city, and would modify any general conclusions on this subject.

Third: Various members of this committee have prepared memoranda on this problem which are hereto appended (Not reprinted.)

Fourth: We believe that this subject is deserving of the most careful study by the association and we therefore recommend that this report and accompanying memoranda be printed and circulated among the members of the association, and that a full discussion thereof be had at its next winter's meeting.

*Abstract of report read at convention of American Electric Railway Association, Atlantic City, N. J., Oct. 9-13, 1911.

PRESENTATION TO MR. McCONNAUGHY

A feature of yesterday afternoon was the presentation to H. G. McConnaughy by the executive committee of a solitaire diamond pin in recognition of his work as chairman of this committee during the convention. The gift was presented to Mr. McConnaughy at his own booth, that of the Dearborn Drug & Chemical Company, about 5 o'clock by all of the members of the committee. Mr. McConnaughy had many congratulations during the evening over the gift.

A consular report from San Sebastian, Spain, states that an electric railway is being constructed from San Sebastian to Hendaye, the frontier town. An electric railway is also being constructed from Tolosa to the frontier. Belgians and Germans are supplying the construction material.

Otto Conrad, Berlin, Germany, a prominent steam railroad contractor in Germany and electric railway contractor in Sweden, arrived in San Francisco recently on a tour of the world to study railroad and transportation methods.

Among the Exhibits

Fred Atwater, of the Columbia Nut & Bolt Company, Bridgeport, Conn, is at the convention booming the "nut that won't come off."

* * *

The booth of the Dearborn Drug & Chemical Works, as usual, is a haven of artistic beauty. It is located near the main entrance to the Pier.

* * *

In addition to other representatives of the National Lead Company already here, E. A. Mueller and M. L. Shoemaker are among the late arrivals.

* * *

Watson-Stillman Company, New York, N Y., are showing a full line of their products. A feature of this exhibit is a turbine pump in operation.

* * *

J. B. Davidson, general manager of Cameron Electrical Manufacturing Company, of Ansonia, Conn., has been busy at the convention in the interest of the company.

* * *

George E. Austin and F. A. Lachance are present at the convention representing the American General Engineering Company, Imperial Rubber Company and the George E. Austin Company.

* * *

In the absence of John G. Buehler, president of Columbia Machine & Malleable Iron Company, Mrs. Buehler and Miss Buehler are meeting his customers and friends. They are stopping at the Chalfonte.

* * *

National Vending Machine Company, New York, N. Y., located at space 419, is exhibiting a unique automatic money changing ticket and stamp vender which is attracting a great deal of interest. This machine is so constructed that it will accept none but good coins; all others will be returned.

* * *

The Trolley Supply Company, exhibiting at space 207, is displaying the new No. 10 "Peerless" trolley base; also a new combination arc and incandescent headlight, with all the advantages of a larger lamp, but only weighing 22 lb. In addition to these are being shown the Nos. 5 and 2 Knutson retrievers, "Ideal" catcher, "Peerless" check valve and "Star" base.

* * *

Gould Storage Battery Company, New York, is exhibiting a storage battery car equipped with Gould storage batteries on the Boardwalk in front of the Pier. This car has been in service on the Twenty-eighth & Twenty-ninth Street Crosstown line in New York, and is here temporarily for exhibition. W. S. Gould and W. E. Winship are present at the convention.

* * *

A noteworthy feature of the General Electric Company's comprehensive display was that the entire exhibit was erected by one man with a G. E. portable electric hoist, whereas six to eight men were required when tripods were used. A historical equipment on view is one of the original Sprague motors for the Richmond line opened in 1888. This motor operated until Oct. 1, 1911.

* * *

The Railway Track-Work Company, Philadelphia, Pa., has spaces 156 to 160, Machinery Hall, for exhibiting two different types of rail grinder, for removing corrugation from the heads of rails and for grinding hammered joints. A very important feature in these types is that it is not necessary to block traffic in the operation of these machines. Any radius of curve may be ground with either machine.

Stephen D. Barnett, Eastern representative of Strong Carlisle Hammond Company, Cleveland, is attending the convention in the interest of the Randall Graphite Sheet Lubricator Department. The Randall method of lubrication consists of wire gage studded with cones of graphite. This is laid in the bearing and the babbitt poured around it. The exposed graphite lubricates at all times, and it is said that the oil consumption is reduced 80 per cent.

* * *

The Curtiss Exhibition Company, New York, has recently closed contracts for aeroplane exhibitions with the Spartanburg Railway, Gas & Electric Company, Spartanburg, S. C., for Thanksgiving Day, and with the Houston (Tex.) Electric Company, for a three-day meet in November. Jerome Fanciulli, general manager of the Curtiss Exhibition Company, is at the convention and will be pleased to confer with the delegates should they be interested in aviation meets at their lake or park resorts.

* * *

The Cutter Company's exhibit of circuit breakers in space 174 embodies the latest development in remote control apparatus. Three methods of operating circuit breakers are shown. One is the electro-pneumatic type, especially adapted for subway and elevated roads. It is operated with compressed air taken from the system that operates the track switch. The breaker is equipped with the "Auto-ite" feature, rendering its closing on overload impossible. The second design, or motor type, is closed by a worm gear, the worm being brought into mesh with the gear by a solenoid. When the closing movement is completed the motor and the gear solenoid are automatically cut out. The motor is designed to operate through a wide range of voltage. The third, or magnetic, type is closed by a solenoid, the coil of which is in circuit only during the closing movement. The signal lights are mounted with the control switches and indicate the position of the breaker, whether opened or closed. Breakers of the reverse current and the direct acting time limit design are also on exhibit.

* * *

Stamping on a steel rail the number of the heat or melt of steel from which it is made has been a practice followed by manufacturers for many years, but the advantages of such a record have been largely confined to the makers themselves. Railroads are now taking a much keener interest in the matter due to the activities of the rail committee of the American Railway Engineering Association. It is important that the heat number and rail letter (indicating the position in the ingot) be reported of all failed rails. This record can then be compared with the inspector's reports, which, as well known, give the chemical analyses of each heat of steel, with the result, it is hoped, that some questions relating to chemical composition may be solved. There has been considerable difficulty in the past in correctly locating and reading these heat numbers and letters. They have been easily confused with the manufacturers' brand, which is rolled on the rail web, and frequently also some of the figures have been omitted from the numbers, so that the identity of the steel was lost. With a view toward eliminating much of this trouble Robert W. Hunt & Company, the well-known inspectors of rails and fastenings, have just issued a card 11 x 14 in. in size entitled "Branding and Heat Number Stamping of Steel Rails." This card gives an account of how the branding and stamping is done at each mill where rails are made on the American continent. This inspection firm has a permanently located staff of over fifty rail inspectors. The card describes the methods of locating and reading the proper heat number. It will be sent free to any address upon request to any of the Hunt Company's offices. Members at the convention can obtain cards from C. W. Gennet, Jr., by addressing him personally or at the Traymore Hotel, Atlantic City, N. J.

THE ELECTRIC SERVICE SUPPLIES COMPANY

In the quarters of the Electric Service Supplies Company, space 311, "Protected" rail bonds and Keystone overhead material are arranged on two beautiful panel boards. On the bond board are to be found various types of flat ribbon concealed bonds, cable concealed bonds, long cable bonds, foot bonds, bond terminals and many other types. There are also shown numerous styles of screw and hydraulic bonding tools, all of which may be seen in operation. Of particular interest in this bond exhibit are sections of the 150-lb. third rail of the Pennsylvania Tunnel & Terminal Company bonded with "Protected" foto bonds to a capacity of 1,800,000 circ. mils and a section of the "bull-rail" used by the Philadelphia Rapid Transit Company on its subway and elevated division, bonded to a capacity of 1,000,000 circ. mils. On the display board devoted to Keystone overhead material, many new designs of hangers, strains and similar material are shown. All of this material is arranged to permit easy inspection.

A novel but very practical piece of lightning protective apparatus is a Garton-Daniels panel board electric arrester. This panel-board arrester is made up of three 800-amp kicking coils connected in series and shunted by three standard railway type Garton-Daniels arresters. In operation the panel arrangement of the arresters affords three paths to ground for any discharges occurring on the line and so largely increases the protective ability of the arresters. For demonstrating this panel-board lightning arrester there is employed an induction coil. Discharges from this coil are stored in condensers, which condensers discharge across the arresters. This closely approximates conditions surrounding the arresters when they are installed in actual service and are subjected to discharges of atmospheric lightning. Means are also provided for throwing 500 volts across the arresters at the time the discharge from the condensers occurs. This allows the operation of the arresters under both static and normal current to be observed.

The automotoneer exhibit includes styles for practically every type of modern street-car controllers. The standard type K-9 and K-6 automotoneers are shown mounted on the controllers, and also a type R-27-V Westnighouse type is shown. This last automotoneer is the first of its kind designed for both forward and reverse operation. In conjunction with the K-9 automotoneer, there is also shown on the same controller a Keystone double valve controlling the operation of a Keystone pneumatic gong ringer, a whistle and Keystone air sander. This is to demonstrate how the motorman may work the brakes, give an alarm and apply sand, either singly or simultaneously, the signboard reading "Do not cross while bell rings." This refers to the Keystone highway crossing signal system. To demonstrate this signal the company has fitted up a wooden pole with a standard trolley harp and wheel, so enabling a person to walk under the contactors and see actual conditions on the line.

COASTING RECORDS IN SOUTH AMERICA

On Oct. 5 Charles H. Hall, electrical engineer of the Railway Improvement Company, New York, sailed for Rio de Janeiro, Brazil, to supervise the installation of coasting recorders on the Rio de Janeiro Tramways system. T. Frame Thompson, managing director of the English syndicate which controls the United Tramways of Buenos Aires and Montevideo, while in this country placed an order for thirty coasting recorders to be installed in Montevideo. An engineer will be sent from New York to install these machines and also to conduct a test on the surface lines in Buenos Aires.

L. C. Pelott, of the Browning Engineering Company, Cleveland, Ohio, is attending the convention.

HEAT-TREATED, OIL-TEMPERED AXLES

One of the most noteworthy and interesting exhibits is an axle made by the Cambria Steel Company, Johnstown, Pa., which after being finished was bent cold around an 8-in. mandrel forming a complete arc of a circle without sign of fracture. This is a street car axle of standard dimensions about 4¼-in. center diameter. The fact that a piece of steel of this large size could be so distorted is ample proof of its strength, toughness and ductility. The excellent properties of the Cambria "Special" axles are obtained by the use of particular chemical qualities, care in manufacture, and finally the system of heat treatment, including oil tempering and other slow and careful annealing. This axle steel has been adopted as standard by the Interborough Rapid Transit Company, New York, N. Y., and many other important transit lines. The essential points of the specifications are as follows:

"Chemical Composition—All axles shall be made of open-hearth steel with limits not to exceed the following: Phosphorus must not be above 0.04 per cent; sulphur must not be above 0.04 per cent and manganese must not be above 0.80 per cent. It is desired that the percentage of carbon be kept as low as possible.

"Heat Treatment—Physical properties must be obtained by quenching the axles in oil and tempering.

"Physical Qualities—Test pieces cut from one of each ten axles shall show the following qualities: Elastic limit, not less than 50,000 lb. per sq. in.; elongation in 2 in., not less than 22 per cent; contraction of area, not less than 45 per cent.

"Samples for Physical and Chemical Tests—Drillings for analysis and the physical test piece will be taken from the crop end parallel to the axis on any radius 50 per cent of the distance from the center to the circumference.

"For the most special and severe service the phosphorus may be made somewhat lower and the physical qualities slightly higher than above stated."

EXHIBIT NOTES

The reception section of the booth of the General Electric Company has been a popular loafing place.

* * *

C. I. Earll is present at the convention in the interest of Earll trolley catchers and retrievers, exhibited at the booth of the Lord Manufacturing Company.

* * *

M. DeForest Yates, deputy controller of the city of Schenectady, N. Y. is present at the convention. He is here in the interest of the Recording Register & Fare Box Company, New Haven, Conn.

* * *

G. E. Chamberlain of the Southern Exchange Company, New York, N. Y., is visiting his old time friends at the convention. He says he will be at the convention next year with an exhibit of octagonal poles and crossarms without fail.

* * *

The Peter Smith Car Heater Company, Detroit, Mich., spaces 254, 256, is showing a device for electrical operation of cash registers in which much interest has been shown. This apparatus was invented by L. R. Gaw, master mechanic of the Saginaw Traction Company. It will operate any style of register.

* * *

William Marshall, of the Anglo-American Varnish Company, Newark, is present at the convention in the interest of his business. He makes his headquarters at the booth of the U. S. Metal & Manufacturing Company. Mr. Marshall has been a regular attendant at the A. E. R. A. conventions for the past fifteen years.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVIII NEW YORK, SATURDAY, OCTOBER 14, 1911 No. 16

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President; C. E. WHITTLESEY, Secretary.
TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1021 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Thursday, 9 a. m., of the week of issue.

Copyright, 1911, by MCGRAW PUBLISHING COMPANY.

Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 11,000 *copies are printed.*

NEW YORK, SATURDAY, OCTOBER 14, 1911.

CONTENTS.

Proper Basis for Rates and Fares..... 843
Adoption of Association Standards..... 843
Accident Prevention Instruction for Employees..... 844
Design and Maintenance of Carhouses..... 844
The American Convention and Publicity..... 845
Power Plant Extension on Key Route System..... 846
Meeting of the Railway Signal Association..... 848
Engineering Association Papers..... 849
Engineering Association Question Box..... 859
Friday's Session of Engineering Association..... 866
German Street Railway Statistics for the Year 1909..... 868
Street Railways in Australia and Tasmania..... 868
Papers Presented Before the Claim Agents' Association..... 869
Wheel Grinder at Salt Lake City..... 873
Physical Valuations..... 874
Overhead Charges..... 877
Results with Car Meters in Cape Town..... 879
Electric Railway Development in Los Angeles..... 880
Hoosac Tunnel Single-Phase Locomotives..... 881
Semi-Steel Cars for Houston, Texas..... 882
Alundum-Steel Safety Tread..... 883
London Letter..... 884
News of Electric Railways..... 885
Financial and Corporate..... 886
Traffic and Transportation..... 889
Personal Mention..... 890
Construction News..... 892
Manufactures and Supplies..... 895

The Adoption of Association Standards

The rules of procedure for the adoption of standards which were adopted by the Engineering Association at its closing session on Friday morning provide a logical and definite course to be followed in the suggestion, consideration and finally the adoption of standards and recommended practice. All will agree that sufficient safeguards should be provided against hasty adoption of carelessly prepared recommendations. At the same time, if it should be necessary or desirable for any reason to obtain prompt action on a proposed standard, the course of procedure is not too cumbersome to permit the completion of all the work which precedes the sending out of letter ballots within a period of three months prior to the annual convention. The scant attendance at the closing session on Friday morning when this subject and the report of the committee on standards were presented leads us to suggest a change in the order of the program next year so that the report of the committee on standards would be presented on the second day of the convention, when it would receive the careful consideration which it deserves. The report of this committee is perhaps the most important business which comes before the association during the convention, and it should be presented at a time of maximum attendance instead of on the last day, when only a few members, who are anxious to get away, are in the meeting room.

Proper Basis for Rates and Fares

The value of the midyear meeting of the American Electric Railway Association is emphasized in no stronger way than by the recommendation of a committee made at the Atlantic City convention that its report on rates and fares be discussed at the gathering in January. Very often it has happened that excellent suggestions well adapted to improve the status of the industry and the condition of the companies have failed to receive proper consideration because they were presented in the hurry of a convention meeting without a definite request for future action on the proposals advanced. The subject assigned to this committee is the determination of the proper basis for rates and fares, and the association cannot do better than to afford every opportunity within its power for further and definite consideration of this topic at the midyear meeting. It is one of the weaknesses of the electric railway situation that the rate of fare has been made the same in so many cities where costs of construction and operation were not alike. Uniform fares are justifiable when they are applied to like properties and like conditions of travel, but they have been extended indiscriminately and without careful investigation. The "basis for fares" should include an allowance for the

ever-increasing costs of labor and materials. These costs have been realized by practically all companies in the country, if not directly, at least indirectly. Their existence is a tangible element that has overcome in many places the effect of the greater earning capacity which is to be expected from a normal increase in density of traffic. The committee has suggested six different methods, but expresses a preference for a modified zone system. Any form of this kind of fare seems so foreign to American methods that the publication by the committee of its reasons for reaching this conclusion will be of great interest to electric railway companies at large.

ACCIDENT PREVENTION INSTRUCTION FOR EMPLOYEES

The general sentiment of this year's convention of the Claim Agents' Association was expressed in the remark made in B. F. Boynton's paper, that the principal efforts of the modern claim agent must be directed toward the prevention of accidents rather than the care of them after they have occurred. This standpoint was taken not only in Mr. Boynton's paper, entitled, "How Can the Public Be Educated in the Prevention of Accidents?" but also in the papers of Messrs. Carpenter and Whitehead, in which the question of accident prevention by employees was considered. The papers of Messrs. Walsh and Beck, however, went to the root of the problem, namely, the selection and instruction of platform men.

It is a fact that the men who are responsible for the training of new men must impart to them so much detail regarding their regular transportation duties alone that little time is left to discuss the seemingly remote matter of accidents. Probably it would be better to have this subject taken up when the student is nearing the end of his tutelage, because he is then familiar enough with the equipment to understand his responsibilities. The question remains: Who is to impart this instruction, both to the recruit and to the veteran? Some companies leave this matter to the schoolroom instructor, some to the division superintendent, some to the claim department representative, and some use the services of all three but without any definite plan of procedure.

Since the impression that any instruction makes upon a man must depend very much upon the authority of the instructor, it is desirable that the more important features of accident prevention should be presented by the division superintendent, who has full authority over the men and is thoroughly familiar with the conditions under which they work. For instance, he would not expect the men who operate cars through the slum districts to have as few accidents and to secure as many witnesses as those who operate through a better section of the community. Under his direction the representative of the claim department might very well describe the uses of and the methods of filling out the several report forms, but it is the superintendent himself who should take up the moral side, namely, the employee's responsibility for safeguarding life and property. Furthermore, only he should have the authority to point out that an unavoidable accident will not mean a black mark against the man who was concerned in it. It is well to explain this because men are tempted not to report accidents on account of this feeling. Talks on accidents should be given, say, once a month at informal smokers, at which the superintendent can discuss the accidents of the month, pointing out how some of them could have been avoided and mentioning the character of accidents which are likely to be most frequent during the coming month, such as those caused by the opening of schools, introduction of summer cars, approach of snowy weather, etc. Attendance at these meetings should be considered a part of the employee's working time and he should be paid regular platform rates accordingly. This action will go far to impress the men with the fact that the company considers these talks of great importance.

DESIGN AND MAINTENANCE OF CARHOUSES

The report of the committee on buildings and structures which was presented at the convention before the Engineering Association is of a most valuable character in view of its clear and definite conclusions on the subjects of building construction and maintenance, facilities for employees and the fire protection of buildings and yards. Under the head of "Economical Maintenance" the committee recommended that buildings should be regularly inspected, preferably at monthly intervals, and that the conditions be noted on a regular inspection form. This suggestion is an excellent one, as it will tend to fix the responsibility for the condition of buildings. Under the present form of organization in all but the largest companies this responsibility is so widely scattered among the several departments that what is everybody's business becomes nobody's business.

The recommendations on carhouse heating call for the indirect method—that is, a system where the air is blown through steam coils and throughout the building. There is little question that a blower system offers most satisfactory heating for carhouses, especially those with closed pits. In winter time it is superior to steam pipes because the pitmen are in no danger of being burned or scalded, while the pits remain free from condensation; in summer the duct layout is available for forced ventilation. Failures of the indirect system are generally due to ignorance in calculating the heating requirements, to the wrong layout of ducts and to waste of heat at open outlets where no men are working. In short, those who wish to install the indirect system must be prepared to have it designed by a specialist and watched with more than usual care.

The subject of heating is closely related to that of track doors. Steel shutters are a necessity where clearance conditions are paramount, but the labor of raising and lowering them by hand at frequent intervals practically means an open carhouse and a cold one, no matter what heating system is applied. It is therefore regrettable that the committee has not found the motor-operated shutter to be generally satisfactory. Doubtless a little wider experience with power-operated doors will find a cure for any present objections to them.

Perhaps the most striking section of the report is that relating to proper facilities for employees—not only facili-

ties for making out service reports, but also for spending idle time agreeably at the carhouse. The welfare aspect of the handling of platform men has become so important that no railway can afford to overlook these means for keeping experienced men in the service and cutting down the high cost of training new men. In the future no carhouse will be considered complete without a club room and even a cost-price restaurant. Dormitories where the men can have a bed for a low price have also been found desirable for isolated carhouses. It is not necessary or even desirable that the company should give all welfare privileges without cost. Probably the most approved practice is to charge small fees and to turn over any profits to the employees' sick benefit or entertainment funds. On the whole this part of the report is of much more importance than the discussion of carhouse design and it deserves careful attention by managers and other executive officials.

The section relative to fire protection of buildings and storage yards also contained many good points. For example, one recommendation was that there should be an ample equipment of sand pails, water pails and small extinguishers. It is usual to consider these as minor or auxiliary equipments, but they are really of great importance, as they must be depended upon to put out a fire before the sprinklers, standpipes or chemical engines can be brought into action. Another good recommendation was that the layout of all fire-protection apparatus should be given on a general plan which would be posted throughout the property to guide every employee whether or not he was a member of the fire-fighting corps.

THE AMERICAN CONVENTION AND PUBLICITY

The keynote of the convention of the American Association this week was publicity; publicity not only of accounts, but of all the serious economic problems which are now confronting electric railway companies. The financial and economic questions are in many ways related, and the lack of published data in regard to the accounts has undoubtedly been instrumental in perpetuating an ignorance on the part of the public of the fundamental requirements of successful and profitable electric railway operation. Indeed, a misapprehension of the real condition of affairs is to be found, not only among the general public, which gives little thought to such matters, but even among financiers who are supposed to be familiar with the corporate affairs of all large undertakings. It may be difficult to change this situation in a short time, but there appear to be no fundamental obstacles if the railway companies consider that the effort is worth while.

To our minds, two steps are necessary. The first is *real* publicity of the accounts. This is being required in some States, but few companies publish more statistics of their service than are actually demanded by the authorities. The practice followed by many of the large steam railroad companies of issuing annual reports which give the operating expenses and unit costs of the companies in great detail has been honored in the electric railway industry more in the breach than in the observance. Yet without these figures it is impossible for the student of financial values to determine even approximately the extent, if any, to which charges properly belonging to operation are being placed in the construction account. The latter, like charity, often covers a multitude of sins.

We admit that such publicity may be temporarily disadvantageous to some companies, or, rather, that it may be disadvantageous to the financial interests in the control of such companies. We believe that where the policy of silence is followed it is dictated in nine-tenths, and probably in 99 per cent, of the cases by the owners rather than by the managers. The dividend must be maintained or at least a surplus over operating expenses must be shown so as to insure the best market price for the securities. Hence too close scrutiny of the operating expenses and unit costs is not desired. So long as the methods of keeping the accounts of a railway company are made dependent upon the stock ticker, just so long will it be impossible for anyone to learn the whole story about a railway property. This fact should be clearly understood.

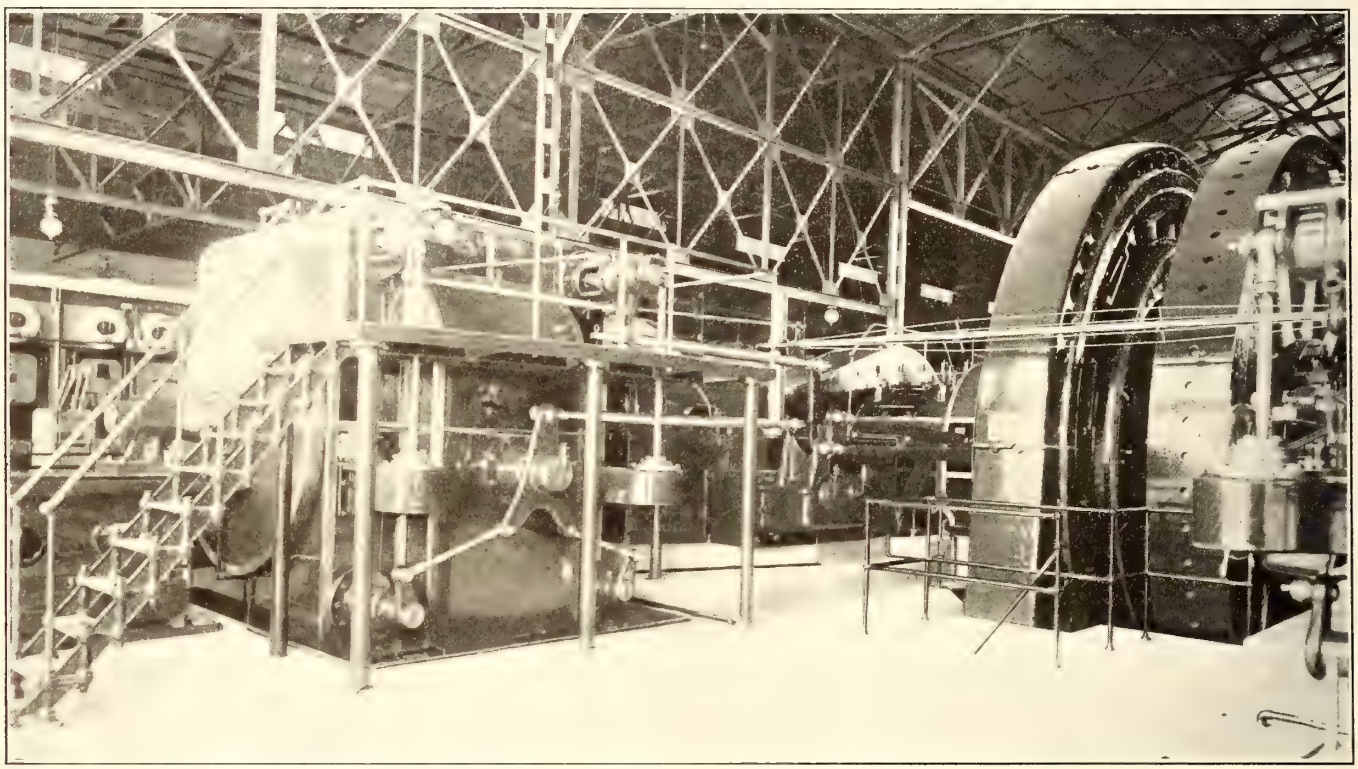
But a policy of complete publicity of accounts alone will not fulfil the requirements, according to the sentiments expressed by many of the delegates at Atlantic City. There is almost as much ignorance in the public mind of the economic conditions surrounding a railway company as there is about its finances. In spite of the widespread talk about the high cost of living, few people realize that during the past ten or twenty years there has been a great reduction in the cost of street railway transportation and that the nickel purchases far more in the way of speed, comfort and safety to-day than ever before. The ordinary householder may grumble at his increased cost of food, clothing and other necessities, but he accepts the advance in prices because he realizes that there has been a world-wide increase in the cost of production. He has even paid with surprising equanimity higher steam railroad fares in different parts of the country because he knows that the steam railroads pay more to their labor and more than they did several years ago for the rails, cars and other materials which they buy. But he argues that with the street railways the conditions are different. Tremendous economies must have followed the operation of cars with electricity. If this were not so, why did the companies make the change? Moreover, some people in some cities have made a lot of money out of electric roads, although whether this money was made through manipulation is not clear in the average lay mind. At any rate, the politicians have said that all street railway passengers should have free transfers, and if a railway company can carry a man on one route 5 miles for 5 cents what good reason can be advanced why the same company or two connecting companies should not carry a passenger the same distance on several routes for the same price?

We believe that one means by which this misapprehension of the real condition of the affairs of electric railway companies will be removed will be through public service commissions, before which at least evidence of the real facts may be laid. But public service commissions alone cannot do all the work. They should be supported by a public sentiment that railway companies require some relief. And there is no one who is enough interested in the matter to conduct this education except the companies and the financial interests behind them.

Power Plant Extension on Key Route System

The New Equipment for This Large Direct-Current Generating Plant Includes a 2700-kw Set Made Up of a Corliss Type Engine and an Interpole Generator

The San Francisco, Oakland & San José Consolidated Railway, generally known as the "Key Route" in California transportation circles, has recently completed a 2700-kw addition to its generating station on San Francisco Bay, including new boilers, feed pumps, condenser, engine and generator unit and a steel stack 9 ft. in diameter by 120 ft. high. The company operates multiple-unit trains in one of the most dense traffic areas in the West, about 575 daily train movements being made in and out of its well-known pier terminal at Oakland in connection with the handling of suburban travel between San Francisco and the cities and towns lying on the easterly side of the bay. The above terminal, where transfer is made between the company's electric trains and ferryboats, is located at the end of a pier 17,000 ft. long. Double-track service, protected by automatic block signals with emergency air-brake trips, is regularly maintained. The power plant is located near the shore end of the pier, practically in the center of electrical distribution of the system, which includes local street railway service in the municipalities of Oakland, Berkeley and Piedmont under separate corporate organization and supplied in part with power from adjacent hydroelectric systems.



Key Route Power Plant—View of Engine Room

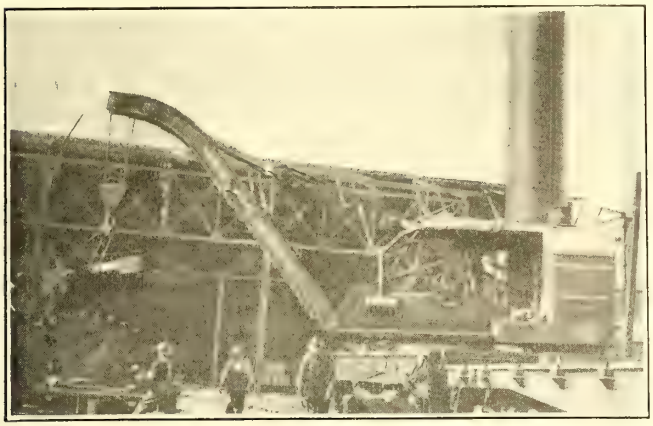
LOCATION OF POWER STATION

The power plant, known as the Yerba Buena station, contains five direct-connected, engine-driven, 575-volt, direct-current railway generators having an aggregate rating of 7350 kw; eight water-tube boilers rated at 250 hp each, and four boilers rated at 500 hp each. Prior to the installation of the present 2700-kw unit the plant contained one 800-kw, one 650-kw and two 1600-kw units, these being operated by the 250-hp boilers above mentioned. The growth of the company's business consequent upon striking gains in population in Oakland, Berkeley and Piedmont and from vigorous publicity work on behalf of the Key Route necessitated a substantial increase in power station capacity and the decision to install an engine-driven equipment was the natural result of the conditions of electrical distribution under which the station operates. The general layout of the system supplied from the Yerba Buena station is fan-shaped, with the handle corresponding to the pier, and the maximum distance of distribution from the station in any direction is about 3 miles. The traffic is of the short-haul type and the absence of any need of high-tension transmission at once precluded the installation of turbine-driven equipment.

RECIPROCATING ENGINE AND ITS FOUNDATIONS

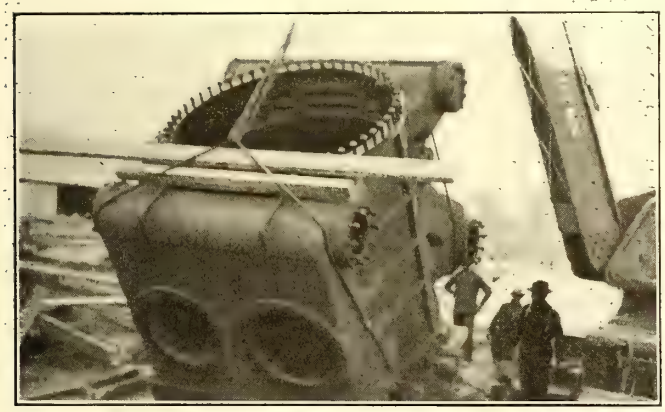
The new unit is a General Electric interpole generator operated at 75 r.p.m. by a 42-in. x 86-in. x 60-in. horizontal cross-compound Hamilton-Corliss condensing engine having a 100-ton flywheel and equipped with a shaft weighing 75 tons. This engine is the largest of the Corliss type in service on the Pacific Coast. It is installed upon new concrete foundations placed on an excavated area at the east of the original engine room, the work of excavation being handled as shown in the accompanying illustrations at an unusually low cost. Excavation for the foundations, which are carried to a depth of about 13 ft., was effected by hand, the spoil being shoveled into skips of 2 cu. yd. capacity each and hoisted from the excavation and discharged upon flat cars by a locomotive steam crane owned by the company, the capacity of the crane being 40 tons. A track was run by the company into the engine room and the cars loaded with excavation hauled in and out by a motor car operated from the overhead trolley. The loaded cars were hauled to an embankment on the station property and discharged into a fill by the use of hydraulic giants having 2-in. nozzles and supplied with water under a pressure of 175 lb. per square inch. With the exception of the initial excavation no handling of the material was required on a

manual basis. The water was supplied to the nozzles by a steam pump and after the earth was discharged upon the filled area it was spread by an ordinary hose. Salt water was used in both instances.



Key Route Power Plant—Handling Flywheel Section with Locomotive Crane

The locomotive crane was also used in handling all machine parts in erection. The heavier pieces were necessarily handled half at a time, as in the case of the shaft,



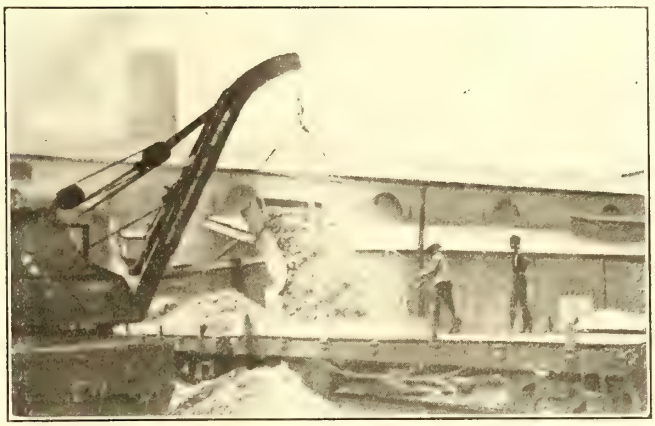
Key Route Power Plant—Handling One of the Cylinders by Crane

but all sectional parts were placed in position by the crane with minimum cost because it was possible for the crane to enter the station on the side track and deposit the ma-



Key Route Power Plant—Spreading Earth in Fill by Hydraulic Jets

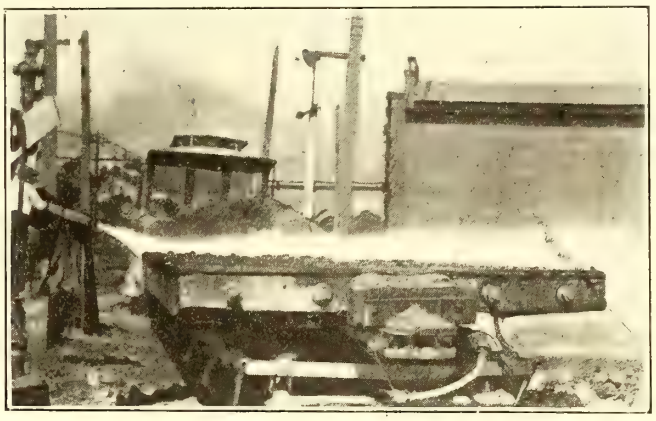
chinery at the desired point without the usual elaborate process of building up timber cribbing and utilizing jacks, skids and pulleys at practically every stage of the work. Pile foundations were required beneath the concrete upon which the frame of the unit rests. All the steel work used in the roof truss of the power house extension was fabricated by the company on the ground, this being placed in position last in the work of construction, the boilers being erected after the engine and generator had been placed.



Key Route Power Plant—Dumping Excavated Earth on Flat Car

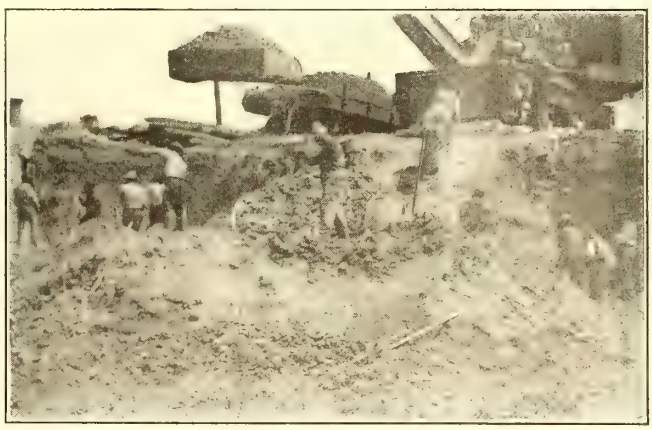
PIPING AND AUXILIARIES

The extension of the plant is arranged to operate in multiple with the older portion of the station, both in the



Key Route Power Plant—Clearing Off Car by Hydraulic Jets

boiler and steam sections. Fuel oil is burned under all boilers in the station, the piping being arranged so that any burner can be blown out by live steam by the adjustment



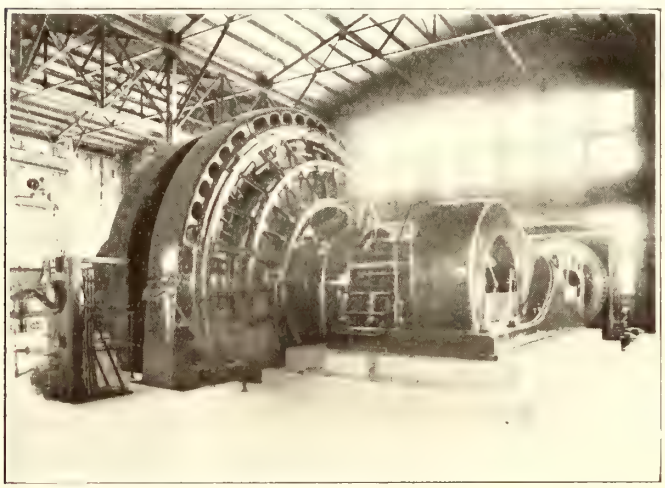
Key Route Power Plant—Removing Excavated Earth from Foundation Site.

of the proper valves. Salt water is used for the operation of condenser equipment throughout the plant, the new unit exhausting into a Wheeler surface condenser provided with an Edwards air pump of the triplex type, with 16-in. x 10-in. cylinders. The circulating water is drawn from a cool-

ing pond connected with the bay and returned to the pond after passing through the condenser. The circulating pump, a 16-in. centrifugal outfit, is direct-driven by an 80-hp, 575-volt, direct-current motor coupled to its horizontal shaft and the same motor also drives the triplex air pump through reduction gearing. The air pump exhausts into a pipe leading to a hot well constructed of redwood, with excelsior filling to separate the oil from the condensed steam. The hot well is 25 ft. long, 6 ft. 3 in. high and 8 ft. 8 in. wide, and contains seven removable compartments spaced 3 ft. apart on centers. Each compartment barrier is provided with 152 holes, 1 in. in diameter, bored in eight rows from the top of the compartment downward, to handle the flowage through the apparatus. A 9-in. intake and 7-in. discharge are provided at the opposite ends of the hot well and the principal timbers used in its construction are 3-in. x 12-in. redwood sticks. The condenser is connected with the exhaust lines of the older engine units through a 30-in. pipe and an atmospheric exhaust is also provided through a 30-in. relief valve and riser leading to the outside of the station in the usual manner.

BOILERS

From each of the new boilers a 10-in. riser delivers steam to a main 16 in. in diameter connecting with the new engine



Key Route Power Plant—2700-kw Unit Consisting of Corliss Engine Direct Connected to Interpole Generator

unit through a separator, the main also having a 16-in. connection with the steam header of the older boiler plant, so that the boilers are all operated in multiple. A 4-in. steam connection leads to the feed pumps for the new installation, these being 12-in. x 7¼-in. x 12-in. Wheeler duplex units, connected by a suction line with the hot well. The boilers are operated at 200 lb. pressure and are provided with a complete 6-in. feed-water loop, insuring continuous service at all times. The generator operates in parallel with the older units on the station busbars, the fluctuations of the load being handled by a 1500-amp hour storage battery and booster installation which have for some time been associated with the older equipment. J. Q. Brown is chief engineer of the Key Route electrical and mechanical department.

John A. Beeler, vice-president and general manager of the Denver (Col.) City Tramway Company, who was in Europe this summer, contributed to the September issue of *Tramway Bulletin*, published in the interest of the street railway men of Denver, an illustrated article entitled "A Few Notes on Europe." In previous issues of this magazine Mr. Beeler gave his opinions of electric railway methods abroad. This bulletin is published under the auspices of the Denver City Tramways and is sent to all the men employed on the system.

MEETING OF THE RAILWAY SIGNAL ASSOCIATION

The sixteenth annual convention of the Railway Signal Association was held at the Hotel Antlers, Colorado Springs, Col., on Oct. 10. The convention was opened by an address of welcome by the Mayor of the city. President C. E. Denney, signal engineer of the Lake Shore & Michigan Southern Railway, was in the chair.

At the morning session reports of the committees on mechanical and power interlocking were received. Lunch was served to the members and guests by the Railway Appliance Association.

The report of the committee on automatic block signals for steam roads was then considered. Following this the report of the committee on electric signals for electric railways was presented. This report comprised detailed descriptions, fully illustrated, of the systems of signaling in service on the various roads. The first described was that of the Pennsylvania Railroad at the Washington terminal, with special reference to the power transmission system, which consists in part of two-conductor No. 6 B. & S. gage flexible cable laid underground in wooden trunking and surrounded by pitch. The alternating-current signals between "A. T." Junction and Holliday, on the Atchison, Topeka & Santa Fé Railway, and a similar system on the Cumberland Valley Railroad were described next. Under interurban railways the signals on the Auburn & Northern Electric Railroad, the Syracuse, Lake Shore & Northern Railroad and the Illinois Traction System were described fully. There was also a section devoted to the Hoosac Tunnel installation on the Boston & Maine Railroad, where alternating-current propulsion is used.

Following the descriptions of existing installations was a report of a sub-committee, consisting chiefly of an elaborate drawing showing the committee's recommendation for a typical alternating-current automatic block signal system, using three-position upper right-hand quadrant signals, normal clear. Next was presented an elaborate description with illustrations of three-position alternating-current relays as made by the various signal companies, giving their application to signaling in the wireless control of the distant indication. With this was a treatise on frequency relays, which are used to respond to current of a certain frequency only. The report was concluded with specifications for apparatus and material to be used in an alternating-current signal installation.

There was very little discussion, as the subject matter of the report dealt rather with the history of the art than with recommendations. It was the consensus of opinion that the committee had made a very valuable contribution to the art and literature of the subject and there were several expressions of approval of the report.

The report was accepted and the specifications will be placed before the members for a letter ballot.

The program for the day was concluded by a consideration of the reports of the committees on the manual and the promotion of signaling education. On following days reports were received from the committees on signaling practice and standards, automatic stops and cab signals, subjects and definitions, storage battery, recording signal failures, wires and cables and contracts reported.

Officers for the coming year were elected as follows: C. C. Anthony, Pennsylvania Railroad, president; B. H. Mann, Missouri Pacific Railway, and F. P. Patenall, Baltimore & Ohio Railroad, vice-presidents; C. C. Rosenberg, secretary-treasurer.

The record of passenger-train performances on the steam railroads of the State of New York for the month of August, just issued, shows that during the month the number of trains run was 70,351. Of the number of trains run 81 per cent were on time at the division terminal.

Engineering Association Papers

Abstracts of the Three Committee Reports Presented at the Closing Session of the Engineering Association on Friday Morning

At the closing session of the Engineering Association on Friday morning reports of the following committees were presented and discussed:

Committee on rules of procedure of the committee on standards: Paul Winsor, chairman; C. B. Voynow, Rodney Hitt.

Committee on standards: Paul Winsor, chairman; H. H. Adams, M. V. Ayres, M. H. Bronsdon, A. F. Hovey, E. R. Hill, E. B. Katté, J. M. Larned, F. G. Simmons, L. P. Crecelius, Charles Hewitt, J. H. Hanna, Martin Schreiber.

Committee on equipment: M. V. Ayres, chairman; H. A. Benedict, vice-chairman; A. T. Clark, F. R. Phillips, H. L. Patterson, Homer MacNutt, F. R. Grimshaw, W. Thorn, J. M. Bosenbury.

Abstracts of these reports follow:

REPORT OF THE COMMITTEE ON RULES OF PROCEDURE OF THE COMMITTEE ON STANDARDS

BY PAUL WINSOR, CHAIRMAN; C. B. VOYNOW, RODNEY HITT

The committee recommends that the standing committees of the association make all necessary investigations and definite recommendations regarding proposed standards and that the functions of the committee on standards be confined to reviewing such recommendations before they are presented to the association in convention for discussion and reference to letter ballot. The form of letter ballot used in voting on the question of standards and the method of apportioning the votes of each member company are matters for joint consideration by the executive committees of the American Association and the Engineering Association. Therefore, this committee has not attempted to cover any of the details of the final voting for the adoption of standards by letter ballot.

The committee has prepared the following rules covering the procedure in the adoption of standards up to the time of their submission to letter ballot, and recommends that these rules be adopted and put into effect:

PROPOSED RULES FOR THE ADOPTION OF STANDARDS

1. Suggestions for new standards or changes in existing standards may be submitted in writing at any time to the president or secretary of the Engineering Association.

2. The secretary shall submit such suggestions to the executive committee at a meeting or by mail. The executive committee at its discretion may refer the suggestions to a proper committee with instructions to investigate the subject and report to the committee on standards.

3. The committee on standards shall consist of the chairmen of each of the standing technical committees of the Engineering Association; an equal number of members of the association, representing each of the branches of electric railway engineering, which are represented by the several standing technical committees; one member at large. The secretary of the Engineering Association shall be the secretary of the committee on standards.

4. Not later than July, the chairman of each committee of the association shall make a report in writing to the committee on standards of all matters relating to proposed standards which have been referred to such committee during the year. With the consent of the executive committee any committee of the association which has had the matter of a proposed standard submitted to it may make recommendations, covering such proposed standard directly to the convention, if the recommendations cannot be submitted in time to the committee on standards. In all cases the reports of the chairmen of committees relating to proposed standards shall contain definite recommendations with reasons in one of the following forms:

(a) "That further investigation is not warranted."

(b) "That the committee be given more time to investigate."

(c) "That the proposed design, practice or specification, which shall have been put in final and proper form by the committee reporting, be adopted as standard."

(d) "That the proposed design, practice or specification be adopted as recommended practice."

5. The committee on standards shall meet during July to consider these reports. The committee shall consider these reports with a view—

(a) To the needs of the member companies.

(b) To the manufacturing and commercial interests involved.

(c) To possible conflict with existing practices or equipment.

6. No standard or recommended practice shall be approved which will tend to create a commercial monopoly.

7. A vote of the committee on standards shall be obtained, by mail, if necessary, on all recommendations submitted to it and two-thirds affirmative vote of the committee shall be required for approval.

8. The committee on standards may approve recommendations as submitted, or may disapprove, giving reasons for disapproval. Both minority and majority reports must be printed and distributed to member companies and all associate members four weeks prior to the convention.

9. The committee on standards may change a recommendation made by a standing committee from standard to recommended practice, but shall have no authority to change such a recommendation from recommended practice to standard. In case the committee on standards finds it necessary and desirable to change materially the wording or the design of a proposed standard or recommended practice submitted to it by a standing committee, it may refer back such proposed standard or recommended practice to the committee from which it was received, stating the reasons which require such change to be made.

10. The majority report and minority report, if any, of the committee on standards shall be submitted to the convention for discussion and disposition.

11. Any proposed standard not already passed on and approved by the committee on standards, or any proposed standard modified in any way by the convention shall be submitted to the committee on standards immediately following the convention.

12. Any standard approved by the committee on standards and the convention shall be forwarded through the secretary of the association to the executive committee. Any standard approved by the convention and forwarded to the committee on standards for action (Article 11) shall be considered promptly by the committee on standards and approved or disapproved. A two-thirds affirmative vote of the whole committee on standards shall be necessary for approval. The result of the vote, with the minority and majority reports, if any, stating the reasons of the members of the committee, shall be forwarded to the executive committee through the secretary of the association.

13. Any standard or recommended practice approved by the committee on standards and the convention, or by the convention and the committee on standards, shall be forwarded by the executive committee of the Engineering

Association to the executive committee of the American Association, with the recommendation that a letter ballot of the members of the American Association be taken thereon.

14. The secretary of the Engineering Association shall announce the vote on all letter ballots relating to the adoption of standards and recommended practices by a circular letter which shall be sent to all members and associate members as soon as possible after a count of the vote has been made, or in such other manner as the executive committee may prescribe.

15. The committee on standards shall hold office until the new committee is appointed by the executive committee following the convention.

16. Each volume of the proceedings of the Engineering Association shall embody a reprint of all standards and recommended practices of the Engineering Association. Such reprint shall appear in the volume with complete data as to the date of adoption as standard or recommended practice and complete references by volume and page numbers to all reports or discussions relating to such standard or recommended practice.

17. In the event of this reprint of standards and recommended practices becoming too bulky, or for other valid reasons, the executive committee may order it printed as a separate volume, but each member and associate member shall be entitled to receive a copy of such separate volume each year when the bound volumes of the proceedings are distributed.

18. It shall be the duty of the committee on standards carefully to go over, and if necessary, revise this reprint of standards and recommended practices each year before it is reprinted.

REPORT OF COMMITTEE ON STANDARDS

BY PAUL WINSOR, CHAIRMAN; H. H. ADAMS, M. V. AYRES, M. H. BRONSDON, A. F. HOVEY, E. R. HILL, E. B. KATTÉ, J. M. LARNED, F. G. SIMMONS, L. P. CRECELIUS, CHARLES HEWITT, J. H. HANNA AND MARTIN SCHREIBER

The matters referred to your committee by last year's convention were as follows:

FROM 1910 COMMITTEE ON EQUIPMENT

(a) Rolled Steel Wheels of Light Design for One Wear.
(b) Proposed Standards for Rolled Steel Wheels.
(c) Gage for Mounting Wheels, both Steel and Chilled.
(d) Standard Taper for Pinions.
(e) Specification for Wrought Iron Bars.

FROM 1910 COMMITTEE ON WAY MATTERS

(f) Specifications for Open Hearth Steel Rails.
(g) Rules for Gage of Track on Curves.
(h) Layouts for Track Switches, Mates and Frogs.
(i) Symbols for Recording Surveys.

A meeting of the committee was held at New York City, September 13, 1911, and the following action was taken:

ROLLED STEEL WHEELS OF LIGHT DESIGN FOR ONE WEAR

Upon the recommendation of the executive committee your committee recommends that this matter be again referred to the committee on equipment for further consideration.

PROPOSED STANDARDS FOR ROLLED STEEL WHEELS

Your committee has considered the recommendation of the committee on equipment that the dimensions for rolled steel wheels, shown in Fig. 2, be adopted as standard. Owing to the state of the art, and also to the fact that this question is now being investigated by a committee of the American Society for Testing Materials, on which the American Electric Railway Engineering Association is represented by a sub-committee of the committee on equipment, your committee holds that the time is not ripe for their adoption as standard. The committee recommends instead that these dimensions be adopted as "Recommended Practice."

Instructions should be issued to the committee on equipment for 1911-1912 to consider the question of dimensions of rolled steel wheels of diameters smaller than 33 in.

GAGE FOR MOUNTING WHEELS, BOTH STEEL AND CHILLED

The committee approves the recommendation of the committee on equipment for 1910 that the gage shown in Fig. 1 be adopted as "Recommended Practice."

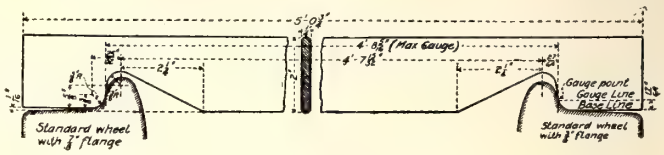


Fig. 1—Standards—Wheel Gage Proposed as Recommended Practice

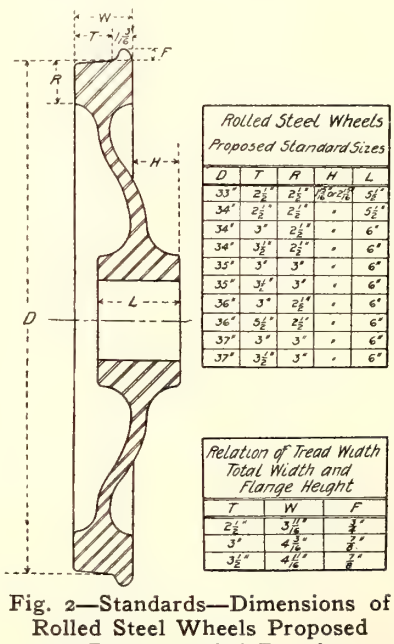
STANDARD TAPER FOR PINIONS

The committee approves the recommendation of the committee on equipment for 1910 that a taper for bore of pinions made in the proportion of 1¼ in. diameter to 1 ft. in length be adopted as "Standard."

SPECIFICATION FOR WROUGHT IRON BARS

The committee on equipment for 1910 recommended that the revised standard specifications for wrought iron of the International Association for Testing Materials forming Bulletin No. 24, June, 1901, of that association be adopted as standard except in regard to the clause governing "inspection" which it recommended be stricken out, and the similar clause contained in the specifications recommended by the committee on standards for 1909 be substituted.

In view of the fact that this subject is now under consideration by a committee of the American Society for Testing Materials, on which the engineering association is represented by a sub-committee from the committee on equipment, your committee does not approve the recommendation of the committee on equipment for 1910, but suggests instead that the matter be referred to the committee on equipment for 1912 for further investigation in conference with the American Society for Testing Materials.



Rolled Steel Wheels
Proposed Standard Sizes

D	T	R	H	L
33"	2½"	2½"	7/8 or 2 1/16	5½"
34"	2½"	2½"	"	5½"
34"	3"	2½"	"	6"
34"	3½"	2½"	"	6"
35"	3"	3"	"	6"
35"	3½"	3"	"	6"
36"	3"	2½"	"	6"
36"	3½"	2½"	"	6"
37"	3"	3"	"	6"
37"	3½"	3"	"	6"

Relation of Tread Width Total Width and Flange Height

T	W	F
2½"	3 1/16"	1"
3"	4 1/16"	1"
3½"	4 1/16"	1"

Fig. 2—Standards—Dimensions of Rolled Steel Wheels Proposed as Recommended Practice

SPECIFICATIONS FOR OPEN-HEARTH STEEL RAILS

Your committee approves the recommendation of the committee on way matters for 1910 that the specification for open-hearth steel rails drawn by it be adopted as "Recommended Practice."

RULES FOR GAGE OF TRACK ON CURVES

Your committee does not approve the recommendation of the committee on way matters for 1910 that the rules for gage of track on curves drawn by it be adopted as standard. Such action is not warranted at the present time. Your committee recommends instead that the aforesaid rules be adopted as "Recommended Practice."

LAYOUTS FOR TRACK SWITCHES, MATES AND FROGS

Your committee does not approve of the recommendation of the committee on way matters for 1910 that the layouts for track switches, mates and frogs drawn by it be adopted

as standard. Such action is not warranted at the present time. Your committee recommends instead that the aforesaid layouts be adopted as "Recommended Practice."

SYMBOLS FOR RECORDING SURVEYS

Your committee does not approve of the recommendation of the committee on way matters for 1910 that the symbols for recording surveys drawn up by it be adopted as standard. Such action is not warranted at the present time. Your committee recommends instead that the aforesaid symbols be adopted as "Recommended Practice."

REPORT OF COMMITTEE ON EQUIPMENT

BY M. V. AYRES, CHAIRMAN; H. A. BENEDICT, VICE-CHAIRMAN; A. T. CLARK, F. R. PHILLIPS, H. L. PATTERSON, HOMER MAC NUTT, F. G. GRIMSHAW, W. THORN, J. M. BOSENBURY

Sub-committees were primarily responsible for the discussions of the following subjects; but the material in its final form has been more or less modified by the action of the committee as a whole.

HEATING AND VENTILATING CARS

This is a study of the relative desirability and economy of various systems, and it includes an appendix prepared by Messrs. Thorn, Benedict and Clark. It is recommended that the association collect data which will show the effect of various systems of car heating on the insurance rates for cars and buildings. This data should cover the entire country, affording a comparison of the practice of the insurance companies in different districts.

DESIGN OF CAR BODIES FOR LIGHT WEIGHT

The advance in the art of car body design has received added impetus in the past few years through the introduction of steel shapes and pressed plates for the principal stress members and a growing tendency on the part of equipment engineers and builders toward the application of engineering principles in the design. The laws governing the determination of the strength of materials and the distribution of the stresses are well known and adequate. It is gratifying to note that car designers are thoroughly alive to the advantages of applying engineering principles to such problems rather than accepting a design based on the "rule of thumb" methods heretofore in general use.

DESIGN OF CAR TRUCKS FOR LIGHT WEIGHT

The possibility of reduction in weight of trucks appears to lie chiefly in the careful design of detail parts. Much has already been accomplished on these lines by various designers and descriptions are given of several light-weight trucks.

DESIGN OF LIGHT-WEIGHT ELECTRICAL CAR EQUIPMENT

The electrical manufacturing companies are fully alive to the growing demand for lightening equipments, and are attacking the problem along several lines that seem promising.

MORE UNIVERSAL STANDARD OF COMPARISON OF CAR WEIGHTS

Opinions differ as to whether or not the seats, lighting and heating equipment, fare register, sand boxes, foundation brake rigging and other accessories should be classified as a part of the car body or be assigned a separate classification. The committee would recommend that the whole car and equipment be divided into five main divisions, as follows:

1. Car bodies.
2. Car-body accessories.
3. Power brakes.
4. Trucks.
5. Motive power equipment.

(1) The car body includes all parts of the underframe, superstructure, roofs, platforms, interior finish, doors with their hinges and latches, window sashes and sash locks, and everything above the center plates not assigned to some other division. Both center plates are part of the trucks, and the truck center pin is part of the car body.

(2) Car-body accessories include in general everything usually supplied with a car body, but readily detachable therefrom, and not assigned to any other classification.

(3) Power brakes include compressor and governor, tank, piping, cylinder, cylinder levers and connecting rod, and pull rods to the truck live lever or radius bar; also all wiring, switches, fuses, conduit, etc., connected with compressor and governor, and all hangers and attachments for supporting any of the above.

(4) Trucks include both center plates, brake beams, shoe heads and shoes, live and dead truck brake levers and radius bar, motor support, wheels and axles, and all parts obviously belonging to the truck; also such fenders, pilots and wheel guards as are attached to the trucks. Motor gears are not included in the truck.

(5) Electrical equipment includes motors, with gears and gear cases, rheostats, control equipment, all wires, cables, conduit, circuit breakers, and fuses required in the operation of this motive power, all supports for same, trolley poles, wheel and bases, and trolley boards.

SEATING CAPACITY

It is customary to compare cars on the basis of their seating capacity. This unit of comparison is not altogether satisfactory but will, doubtless, continue to be used on account of its convenience. One of the disadvantages of this unit at present is the uncertainty as to what constitutes a "seat."

Seat dimensions vary widely, as does the distance between transverse seat centers. It is suggested that the following are fair general values for the dimensions: Width of seat at hip line, 17 in.; height of seat, 17 in.; height of back, 17 in.; distance between centers of transverse seats, 30 in. It is not recommended that the seating capacity of cars be computed in accordance with the above figures in entire disregard of actual seating arrangements, but it is suggested that the dimensions given be used in determining the seating capacity of car spaces not provided with seats, such as baggage compartments, and also in determining the seating capacity of long longitudinal seats.

STANDARD COUPLERS FOR INTERURBAN SERVICE

The subject of standard couplers for interchange with steam railroad equipment was suggested by the Central Electric Railway Association. That association recently adopted as standard a coupler of the M. C. B. type, but equipped with certain auxiliary features not applied to steam equipment cars, and the question was presented for the consideration of this committee as to whether it should recommend the adoption of this coupler to the Engineering Association as a whole, either as a standard or as recommended practice.

This committee consulted with representatives of certain of the traction coupler manufacturers and investigated coupler conditions on a number of electric roads in the Central West where the need for automatic couplers in regular operation is perhaps most strongly felt. As a result, your committee feels that some form of automatic coupler will likely finally be required. The handling of steam road equipment by electric roads is a matter already prominently before certain companies. This interchange of equipment is certain to increase and to entail the use on electric cars of couplers that will automatically couple with steam equipment. It is, therefore, the opinion of your committee that any automatic coupler adopted as standard by the American Electric Railway Association for use on interurban cars should be of the vertical plane M. C. B. type. The height of center line of standard couplers and drawbars should be 34½ in. above top of rail measured from the center line of coupler.

Many roads have adopted couplers of standard M. C. B. contour, or, in lieu thereof, couplers embodying in their

construction the essential features of the M. C. B. coupler but containing certain additional parts not found in steam railroad practice. The need for these additions to the M. C. B. coupler is felt by certain roads that are required at times to operate trains consisting of two or more cars coupled together over tracks in which there are sharp degrees of curvature and sudden changes in grade; the former requiring that the couplers be radial and the latter that they shall be so designed as to prevent uncoupling vertically due to vertical displacement of the adjacent couplers from the same horizontal plane.

The use of a vertical plane coupler of the M. C. B. type with radial drawbar also introduces considerations of resistance against lateral buckling under heavy pushing strains, or under sudden brake applications where there is a variation in the braking effect on cars in the same train. The practice followed by different electric roads using M. C. B. type couplers in providing special attachments on their couplers to safeguard them against vertical uncoupling and lateral buckling is not, however, uniform. Some roads use couplers with such attachments while others have considered them unnecessary and have either not provided them at all or, after trial, have discontinued their use.

The committee feels that this question has become so acute on many of the interurban roads that an early adoption of a standard coupler is urgently needed; and it regrets that the complexity of the problem, and the lack of agreement among those who have had most experience with it, render it impossible to make a definite recommendation at this time.

As an indication of the gravity of the problem may be cited the fact that one large system has spent $125,000 experimenting with the coupler question, and has adopted an M. C. B. type of coupler entirely different from that standardized by the Central Electric Railway Association.

The committee is agreed that the following requirements are essential to the coupler to be finally adopted as standard for interurban use:

REQUIREMENTS FOR INTERURBAN COUPLER

1. Must have substantially the M. C. B. contour, and must couple automatically by impact with all M. C. B. couplers now used by steam roads.
2. Must have radial drawbar.
3. Must provide for successful operation over irregularities of grade met in interurban service.
4. Shank of coupler head should be of such dimensions that in case of emergency it can readily be replaced by an M. C. B. passenger coupler.
5. Must be so constructed as to limit lateral movement in the heads so that the angle between longitudinal axes cannot exceed 8 degrees when any two interurban couplers are coupled together. Construction used for this purpose must be strong enough to withstand severe strain in coupling under impact, and in pushing around curves.
6. All makes of interurban couplers, to comply with these requirements, must couple and operate properly with each other.
7. There must be an arrangement permitting uncoupling without requiring the operator to pass between the cars.
8. The face of the knuckle should be 11 in. minimum and 16 in. maximum, and preferably should be provided with a slot for the use of a shackle bar.

In addition to the above requirements the interurban coupler should operate successfully with steam-road equipments over the widest practicable range of conditions, although it is doubtless impossible to produce a coupler which will operate with steam-road couplers under all conditions of short radius curves and irregularities of grade as found in interurban service.

The great difficulty of determining the essential details of the interurban coupler arises from the fact that different and irreconcilable methods are used and advocated for meeting certain of the requirements as above set forth. A discussion of these differences follows:

Breaks in Grade.—Irregularities of grade as met in interurban service produce variations in height between adjacent bumpers, amounting sometimes to 12 in. or more. Two principal methods are used to make the couplers operate properly under these conditions.

One is the locking together of the couplers so as to eliminate vertical movement between them, and the provision of means to permit great vertical movement of the drawbar.

The other provides a very high knuckle, 16 in. being the height used by one company. This high knuckle is of full M. C. B. contour at the middle portions, and tapers at top and bottom to permit angular movement in a vertical plane. The drawbar is so supported as to prevent its vertical movement.

Limiting Lateral Movement.—To limit lateral movement between coupler heads two different principles are in use. The older device provides an extension on the guard-arm side, and a shelf on the knuckle side, so proportioned that when coupled together the shelf and extension mutually interact to limit lateral movement. This device is not patented, and standard dimensions could be adopted to secure uniformity. It also helps to align the knuckles when coupling and reduces the danger of the couplers kicking violently to one side with possible disastrous results. It is, however, when made strong enough, somewhat heavy and clumsy.

Another method, part of a patented device, employs a latch-piece in the center of the coupler head engaging with a vertical slot in the outside face of the knuckle, in such a manner as to limit to a very small amount both lateral angular movement and vertical movement. Two couplers of this type operate very well together, but the device is totally inoperative with the bracket and shelf type, although it does not prevent intercoupling therewith.

At least one coupler manufacturer claims that no device to limit lateral movement is necessary, and there are some interurban roads operating M. C. B. coupler without such a device; but it is the opinion of your committee that under the more severe conditions of interurban work strains are produced in the standard M. C. B. coupler with radial drawbar sufficient to break or distort the coupler; and it regards a device to limit lateral movement as necessary to meet these conditions.

Your committee had hoped to arrange for a demonstration under actual service conditions of the various M. C. B. type traction couplers now on the market, including couplers of the design submitted by the Central Electric Railway Association, in order that it might judge as to the departure from the standard M. C. B. lines, that should be incorporated in a satisfactory standard automatic coupler for electric railway purposes. It was, however, unable to make the desired arrangements and the idea was abandoned for the present year, but it is strongly of the opinion that an actual service test under varying conditions as found in electric railway practice should be made before definitely recommending any coupler as standard.

The committee suggests that the subject of standard couplers for interchange with steam railroad equipment be referred back to the committee for next year, with instructions to arrange for and make such tests as will demonstrate clearly the requirements based on the results obtained therefrom.

STANDARD AIR, SIGNAL AND CONTROL CONNECTIONS

The subject of air, signal and control connections was hardly touched in the committee's discussion, and it suggests that it be referred to the committee for further consideration

JOINT SUB-COMMITTEES WITH AMERICAN SOCIETY FOR TESTING MATERIALS

In accordance with instructions from the president and in conformity with the agreement entered into with the American Society for Testing Materials, the chairman of the committee on equipment has appointed two sub-committees to work with the committees of that society. These sub-committees are as follows:

Sub-Committee on Standard Specifications for Steel Wheels.—H. A. Benedict, mechanical engineer, Public Service Railway Company, Newark, N. J.; E. W. Holst, superintendent equipment, Bay State Street Railway Company, Boston, Mass.; Henry J. Gulick, Jr., Gulick-Henderson Company, Pittsburgh, Pa.

Sub-Committee on Standard Specifications for Wrought Iron.—C. G. Young, consulting engineer, New York, N. Y.; A. T. Clark, superintendent rolling stock and shops, United Railways & Electric Company, Baltimore, Md.; Carl F. Woods, secretary, Arthur D. Little, Inc., Boston, Mass.

In addition to the two above named, a third similar sub-committee, dealing with a subject within the province of the committee on equipment, has been appointed, but by agreement this committee was named by the chairman of the committee on heavy electric traction. This committee is as follows:

Sub-Committee on Standard Specifications for Steel Axles.—J. S. Doyle, superintendent car equipment, Interborough Rapid Transit Company, New York, N. Y.; John Lindall, superintendent motive power and rolling stock, Boston Elevated Railway Company, Boston, Mass.; Hugh Hazleton, Hudson & Manhattan Railroad Company, New York, N. Y.

None of these sub-committees had completed its work at the time of preparing this report.

STEEL WHEELS FOR ONE WEAR

A large concern manufacturing steel wheels has called attention to the fact that it is now prepared to furnish light steel wheels intended for one wear without turning, as recommended in last year's committee on equipment report.

SQUEALING OF STEEL WHEELS

The superintendent of rolling stock of a large city system has written a letter asking the committee to investigate the cause of and remedy for the squealing of steel wheels when brakes are applied. He states that this is proving a very serious problem with his company. This communication came too late for consideration by the committee this year, and it is mentioned here with the hope that some one may be able to suggest a remedy.

END PLAY OF AXLES WITH STANDARD JOURNALS

An engineer of one of the large truck manufacturing companies urges the reconsideration of our truck journal bearing design with a view to a more effective means of limiting end play. He claims that the so-called M. C. B. journal, as standardized by this association, is deficient in this particular when used in electric railway service, and that the excessive end play which very soon takes place is the cause of many truck troubles not always traced to their proper cause. He particularly specifies broken brake hangers, worn-out gear cases, and a general racking and loosening of the entire truck frame. This question was raised in last year's question box, but did not receive very much attention.

APPENDIX I—HEATING AND VENTILATING CARS, BY MESSRS. THORN, BENEDICT AND CLARK

Cars can be heated by several means, but those usually employed are among the following: (1) Coal stoves, direct methods; (2) coal stoves, indirect method, similar to hot-air furnace used for heating houses; (3) hot-air heaters, air blast, motor driven; (4) hot-water heaters, and (5) electric heaters.

CARDINAL POINTS OF HEATER DESIGN

In order to bring out the characteristics of the various methods of heating cars, they should be considered with regard to the following points:

1. Ability to heat car to uniform temperature.
2. First cost, completely installed on car.
3. Maintenance, including repairs, renewals, replacements, etc.
4. Cost to operate. In the case of hot-water heaters, this will include fuel and labor only; in the case of electric systems, power only, and in the case of the hot-air blast heater using coal—fuel, labor and power.
5. Weight of system complete as installed on the car ready to operate.
6. Fire risk.
7. Reliability.
8. Regulation. This refers to ability to regulate the heat according to the outside temperature.
9. Space occupied.
10. Appearance.
11. Attention required from car crew.
12. Cleanliness, which will include freedom from dust, ashes and obnoxious gases.
13. Adaptability and relation to ventilation systems.

Heating systems which are very economical in a city having a mild climate and favorable load conditions would not be desirable in another city having more severe climatic and load conditions. The type of car operated, whether single end or double end, has a bearing on the most desirable method of heating. Considerations of space, regulation, weight and appearance may be the governing ones, instead of net operating economy. There is no one heating system which is the most economical and desirable for all cases, since each case has its own peculiar conditions.

THE HOT-AIR HEATER

In this system the air is heated by a coal fire and forced through suitable ducts along the side of the car by a motor-driven fan. By its use it is possible to secure quite uniform heating of the car. The heat being applied along the floor line results in dry floors, which is a very strong point in its favor. The first cost is rather high, but as the equipment becomes better developed this cost should be somewhat lower.

The maintenance of this system is considerable, but exact data are not yet available. The cost to operate including only the items of coal, labor of attendance and cost of electricity for the motor, is comparatively low. The weight depends on type and size of car, but is practically the same as electric, and less than hot-water heaters. The fire risk is practically the same as in the case of hot-water heaters. The reliability of the heater in its present state of development seems to be an open question. The regulation is not so good as it should be, but will undoubtedly improve as the apparatus is further developed. When this system is used in conjunction with exhaust ventilation, the regulation is better. The space occupied is perhaps greater than with hot-water heaters. The appearance compares favorably with other types of coal heaters. Considerable attention is required from the car crew from time to time in order to keep fire in proper condition, but where the heater can be placed near the conductor or motorman this is readily accomplished. It is not so clean as the electric system, but compares favorably with hot water. This system being designed to provide for ventilation, it is readily adapted to that end.

THE HOT-WATER HEATER

This system possesses many valuable characteristics, among which are independence of the electric power supply, which is quite a consideration in interurban work where long runs are made and the power supply is subject to interruption. By use of this type of heater it is possible to heat the car very uniformly. The efficiency of hot-water heaters will fall off materially if the pipes and coils are not kept reasonably free from scale and other deposits.

The first cost is not so high as that of the hot-air system. The maintenance is higher than that of the electric system. The cost to operate, including only the items of fuel and labor, is approximately the same as for the hot-air heater. The weight of the hot-water apparatus is high and has long been one of its chief drawbacks, but the latest types show improvement in this respect. The fire risk is substantially the same as for the hot-air heater. In case of wreck there is a hazard from the fire in the coal stove. The reliability is very good. The regulation is comparatively poor, because it takes considerable time for water to take up heat and, conversely, it takes some time for water to lose its heat.

The space occupied is considerable and, except on single end cars, this space is valuable as seating or standing room. The hot-water heater with its expansion drum, water-glass gage, etc., does not add to the appearance of a car, except where it is practicable to partly inclose the apparatus. Considerable attention is required from time to time, but the work is small and where heater can be located close to one of the crew it does not take him from other duties. The hot-water heater as usually installed produces considerable dust, and very frequently obnoxious gases. The heating elements being pipes located one above the other near the floor line, it is easy to adapt this system of heating to any practical scheme of ventilation.

THE ELECTRIC HEATER

With this type of heater it is perfectly possible to secure uniform temperature throughout the car. The first cost is lower than that of any of the other modern systems. When the electric heater is carefully installed with wiring in conduit, the maintenance is very low, being considerably less than that of any of the other modern systems. The cost to operate, which includes power only, is variable. In general, the cost of operation is high. There are many cases, however, where this method of heating will show the greatest net economy.

The weight is the least of any of the modern heating systems, except in some cases, where it is practically the same as the hot-air heater. Where the wiring is properly installed in conduit the fire risk is practically nil. This system is very reliable. The regulation is the best of all, it being possible to follow closely and without trouble rapid changes in outside temperature. The space occupied is very small and is not useful for standing or seating capacity. The appearance of such parts as are exposed is very neat. The electric heating system requires the minimum amount of attention from the car crew. This type of heater is clean and free from dirt or obnoxious gases. The heating units, being subdivided and located under the car seats or along the truss plank, are readily adaptable to any practical system of ventilation.

TOTAL COST FOR ONE YEAR CHARGEABLE TO CAR HEATING.

	Electric heater.	Hot water heater.	Hot air heater.
Cost of power	$137 03	.....	$8 22
Repairs and maintenance	1 09	$4 35	2 90
Interest and depreciation	8 80	18 75	18 60
Coal	.....	47 76	47 76
Labor of attendance	.....	8 70	8 70
Hauling (4 cents per lb. per year)	20 00	60 00	20 00
Insurance charge	.....	12 00	12 00
Total cost per car	$166 92	$151 56	$118 18

The above figures are based on the following data and assumptions:

	Electric heater	Hot water heater.	Hot air heater.
First cost, installed	$80	$125	$155
Interest and depreciation	5% and 6%	5% and 10%	5% and 7%
Weight installed	500 lb.	1500 lb.	500 lb.
Coal consumption per day	.....	85 lb.	85 lb.
Power consumption	5.0 kw. average for heating season	....	0.3 kw.
*Repairs and maintenance	¾c. per day	3c. per day	2c. per day
Cost of car	$6,000	$6,000	$6,000
Investment in barns per car	$1,500	$1,500	$1,500
Hours per day per car	13½	13½	13½
*Labor of attendance	.....	6c. per day	6c. per day
Heating season	145 days.	145 days.	145 days.
Extra insurance over electric heaters on barns	....	10c. per $100	10c. per $100
Extra insurance over electric heaters on cars	....	17½c. per $100	17½c. per $100

* Per day of heating season.

The heating units, being subdivided and located under the car seats or along the truss plank, are readily adaptable to any practical system of ventilation.

COMPARATIVE COSTS

To bring out clearly the comparison in costs of heating a car by the three modern systems, the accompanying estimate may be of interest. The figures in each case are based, in general, on results obtained in practice and are considered fair and reliable.

Assumptions.—32-ft. car body; heating season, 145 days; lowest temperature, about zero; municipal requirements, 50 deg. Fahr.; cost of power, 1.4 cents per kw-hour at the trolley; cost of coal, $7.75 per ton.

Under the conditions assumed, the relative total economy of the three principal heating systems is as follows: Hot-air system, first; hot water, second; and electric, third.

In figuring the power consumption of electric heaters, the following method will probably give the most accurate results. Obtain from the weather bureau temperature readings for each winter for several years. Plot a curve showing variation of temperature for each day of the heating season. Find what point of heat is carried for the different temperatures and then a power curve can be plotted from which the average kw per day can be readily obtained.

In the use of hot-water or hot-air heaters there is a tendency on the part of the car crew to use less coal than would have to be used if the cars were kept at a uniform temperature during the time they are in service, while with electric heaters the tendency is to put on three points when two points would suffice. This gives rise to false ideas of the relative costs of the various heating systems.

In the installation of electric heaters it is preferable to have a comparatively large number of heaters rather than a few, even though the power consumption is on the same basis, on account of the better distribution of the heat. For localities where the temperature reaches zero or lower it is well to have about 4.5 watts per cubic foot of car body, otherwise it may be difficult to keep the cars comfortable when low temperatures prevail.

When a practical, low-cost heater regulator is brought out and comes into general use the cost of electric heating will be very largely reduced. Tests have been made which indicate that the saving in power by the use of thermostat regulators will be in excess of 50 per cent.

The cost of car heating would be somewhat reduced and the comfort of passengers considerably increased if storm sashes were more generally used. The difference in temperature on some cars in the Middle West with the same heating equipment—one with storm sashes, one without, and running together on the street—was about 9 deg. Fahr.

The maintenance of heating systems would be greatly reduced if more care were given to the installation of new equipment. This is particularly true of electric heaters.

VENTILATION—MONITOR DECK WINDOWS

The usual method of obtaining ventilation in electric railway cars has been to provide a monitor deck or clerestory in which are a number of small windows that can be opened. The ventilation afforded by these small windows is largely by dilution; that is, such air as may enter serves to freshen the air in the car. The chief objection to the system is that under some conditions of operation strong drafts are created which are objectionable to passengers.

Authorities differ as to the amount of air to be supplied per person per hour, in order to provide a reasonable standard of air purity. An ordinance of the city of Chicago on this subject calls for the supply of 350 cu. ft. of air per hour per passenger (based on maximum standing and seated load); provided, however, that the air in the car shall at no time show more than 10 parts of $C O_2$ in 10,000 parts. It was found possible to meet these

requirements by any one of a number of ventilating systems.

TYPES OF VENTILATORS

Ventilation systems other than monitor windows have been worked out principally along two lines; those operated by the movement of the car through the air and those operated by motors. The first are usually called the automatic systems and the second mechanical systems. Automatic ventilators are usually "exhausters," and should be so designed as to exclude rain and snow and to prevent gusts of air coming into the car. The action of automatic systems is, of course, variable, depending on the velocity of the car and the direction and force of the wind. The mechanical systems, of which there are two principal kinds, the "exhauster" type and the "blower" type, are positive and practically independent of motion of the car or velocity of the wind.

MECHANICAL SYSTEM

A typical mechanical system consists of a motor-driven exhaust fan located on the vestibule roof, or other practical point, an exhaust chamber formed in the upper ceiling of the car, openings located at various points in the ceiling and intakes located at several points in the floor and connected to the electric heaters. The cold air thus is made to pass over the heating surface before coming into the car body. Tests show that consumption of power for heat is not increased by this method. The fan-motor set consists of a very generously designed ½-hp motor, direct connected to a specially designed 9-in. cone fan. This fan will handle about 33,000 cu. ft. of air per hour under normal coditions of line voltage. The motor is connected direct to the 500-volt trolley circuit through a standard combination snap switch and fuse, and is started and stopped by means of this switch. The motor and fan are mounted in a suitable metal housing which is connected to the exhaust chamber. The fan discharges through protected openings in each side of the housing. The exhaust chamber in the upper part of the car is formed by lowering the ceiling about 4 in. from the roof framing and is continuous from end to end of the car body. Communication between the car interior and the exhaust chamber is provided by fourteen openings, each containing a circular adjustable register. By proper adjustment of the registers a uniform velocity of air through all of them is obtained. The intakes are eight in number, four being located on each side of the car under the seats in such a manner as to be readily connected to the electric heaters. The connection between the screened opening through the car floor and the electric heater is made with a pressed metal duct. The size and number of the intakes is such as to permit of a maximum velocity of the air of about 400 ft. per minute, which is hardly perceptible to passengers.

AUTOMATIC SYSTEMS

The automatic systems installed are of several different kinds, but all depend upon aspirator action for their operation. One of these automatic systems which has shown fair results comprises a number of "exhausters" located along each side of the monitor roof and attached to panels placed in the monitor or deck window openings. An opening in the panel communicates with the "exhauster." These "exhausters" are also designed for use with arch roof cars. Intakes similar to those described in connection with the mechanical system are located in the floor and provide a supply of fresh air. The "exhausters" are rectangular sheet-metal boxes projecting outwardly from the panels to which they are secured, having openings top and bottom, and provided on the middle of each side face with V-shaped projections. The "V" projections are placed horizontally on the faces of the "exhausters" and "split" the air into two streams, one following upward and the other downward. The air streams flow past the openings of the "exhauster" and by induction "draw" the air out from the car.

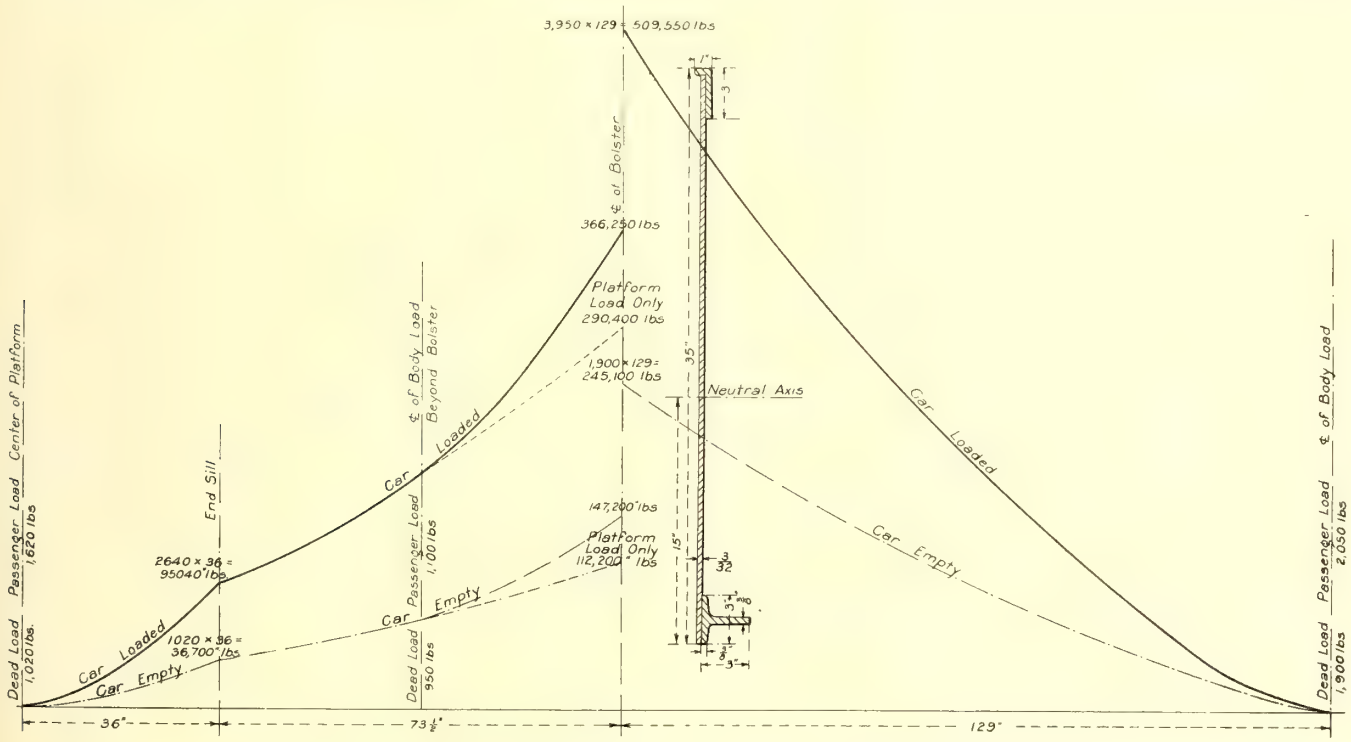


Fig. 1—Equipment—Stress Diagram of Plate Girder Car Side

From the result of tests, it is safe to say that there are now on the market several ventilation systems for cars which will provide a reasonable standard of air purity and which are not very high in first cost or cost of maintenance.

APPENDIX II—DESIGN OF CAR BODIES FOR LIGHT WEIGHT, BY MESSRS. PHILLIPS, THORN AND MACNUTT

Much progress has been made during the past few years in the reduction of car weights through the substitution of engineering principles for "rule of thumb" in car

design, and this progress has been characterized by a growing tendency toward the use of steel instead of wood in all stress members.

SIDE CONSTRUCTION

The plate girder straight-side design offers several advantages in simplicity, clearance and strength when compared with curved side, trussed wooden framing, and this style of construction seems to be rapidly gaining in popularity.

Fig. 1 shows a simple form of plate girder side frame, together with the moment diagram used in determining the stresses and the method of determining the section modulus. Fig. 2 shows the plate girder side frame of another car.

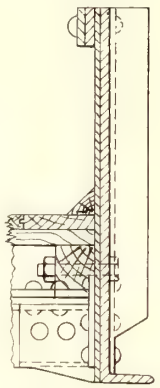


Fig. 2—Equipment—Plate Girder Side Frame

UNDERFRAME

The use of steel in the underframe is applicable to all types of cars. It has the advantages of great strength and low weight. The most important stress member of the underframe in a double-truck car is the bolster. The "diaphragm" type provides great strength with light weight and has practically solved the difficulties experienced with this part of the car body.

The cast-steel bolster is a close rival to the "diaphragm" type and is a vast improvement over the laminated steel and wood construction and the "built-up" type; but must be made under rigid specifications, such as those of the American Society for Testing Materials, and closely inspected in order to avoid the danger of faulty castings and excessive variations in section. Illustrations are presented of a typical "diaphragm type" bolster, a cast-steel bolster and a "built-up" bolster.

Perhaps the next most important members of the drop platform type of car are the platform knees and draft members and a study of the later designs will indicate that the "trussed knee" contains everything to be desired in the matter of strength, weight and simplicity.

SUPERSTRUCTURE

The problem of joining the wood superstructure with the steel parts in a satisfactory manner has in some cases



Fig. 3—Equipment—Diaphragm Type Body Bolster

proved exceedingly perplexing. Where wooden posts are used in connection with plate girder side frames the trouble has been solved satisfactorily by using steel posts.

Metal carlines have long been considered a necessary part of the roof construction in all types of cars and will continue to be used. In certain special car construction,

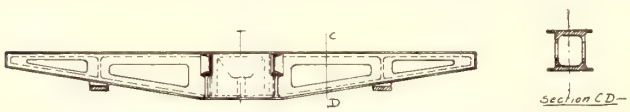


Fig. 4—Equipment—Cast-Steel Body Bolster

such as the all-steel roof, without ceiling, and for use in connection with the arched, mushroom or semi-arched roof, a pressed steel carline is probably preferable to the commonly used forged type.

A great deal of interest has lately been aroused by the return of the arched roof in the design of cars, but we find a great diversity of opinion existing as to the relative merits in comparison with the monitor roof. The arched roof embodies light weight, low first cost, simplicity and less liability of roof leakage, but it is claimed that the arched roof is inferior to the monitor type of roof in the matter of ventilation. This objection has little weight.

REDUCTION IN WEIGHT

Efforts toward reduction of car weights have met with unqualified success, resulting in some cases in a reduction of as much as 20 per cent in the car body weight and a net gain for the whole car of 6 to 8 per cent.

APPENDIX III—DESIGN OF CAR TRUCKS FOR LIGHT WEIGHT, BY MESSRS. BENEDICT, PHILLIPS AND CLARK

The cast-steel bolster of a type used with a short wheel-base city car weighs approximately 300 lb., which is materially lighter than former types. There is still room for much improvement, which can be brought about by more careful design. The castings can by judicious treatment be still further reduced in weight, probably to the extent of 10 per cent.

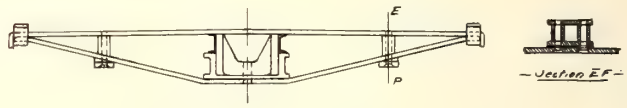


Fig. 5—Equipment—Built-up Bolster

MOTOR SUPPORT

In many cases the rectangular bar extending across the truck has been abandoned and in its stead two pieces of heavy angle iron are used. This one item has meant a saving of over 100 lb. per truck when two motors per truck are used.

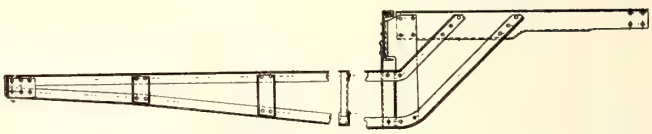


Fig. 6—Equipment—Trussed Platform Knee, Design A

BRAKE-SHOE HEADS

Brake-shoe heads are items in which there is room for considerable reduction, steam railroad freight car brake-shoe heads representing a very economical arrangement of the metal. There is a possibility that the weight of

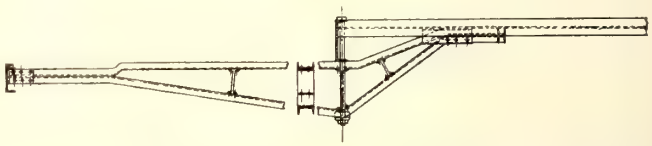


Fig. 7—Equipment—Trussed Platform Knee—Design B

each brake-shoe head can be reduced by from 10 to 30 per cent.

STRUCTURAL SHAPES

There appears to be many parts now made of a rectangular cross-section where the cross-section could readily be that of an I-beam, channel or angle. The result would

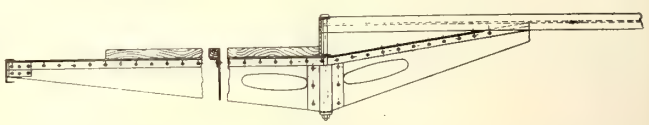


Fig. 8—Equipment—Trussed Platform Knee, Design C

be that the cross-section would be materially reduced. By applying this principle throughout the entire construction, it is quite likely that 100 lb. or more could be cut off almost all designs of trucks.

CASTINGS

The use of cast iron except for brake shoes and wheels should be abandoned, and all castings should be either cast steel or malleable iron. The lightening of the main body of the casting and the placing of reinforcement ribs will greatly lessen the weight of a casting. Almost all

large electric railways and truck builders have types of trucks that to a greater or less extent are standard. A profitable line of action would be to apply the designing skill of the engineers of both the user and manufacturer to reducing the weight of these types until the much sought for balance between strength and weight is found. Considerable progress has already been made by certain designers in producing lighter trucks, both by the process of redesigning cross-sections for maximum strength with minimum area and by the development of novel and improved designs for the truck as a whole.

To give some idea of this progress it has been thought well to give two illustrations and data of trucks recently built.

Figure 9 shows a motor truck for city service, 19,000 lb. center-pin load, with the following characteristics.

Service	City, motor
Center-pin load	19,000 lb.
Wheel base	54 in.
Gage of track	4 ft. 8½ in.
Weight of one truck, without wheels, axles or boxes	3,080 lb.
Weight, with 33-in. steel wheels, 5-in. axles with 4¼-in. by 8-in. journals, boxes, complete	6,950 lb.
Ratio, complete truck weight to center-pin load.	0.366

Figure 10 shows a trailer truck for city service (Phillips design), 17,500 lb. center-pin load, with the following characteristics:

Service	City, trailer
Center-pin load	17,500 lb.
Wheel base 4 ft. 4 in., gage of track 5 ft. 2½ in.	
Weight of one truck, complete, including 22-in. steel wheels, 4-in. axles, 3¾-in. by 7-in. journals	3,800 lb.
Ratio, complete truck weight to center-pin load	0.217

HALSEY RADIAL TRUCK

Figure 11 shows a novel design now being tried out on one large city system, the "Halsey Radial Truck." The design is so radical and on first inspection of such doubtful practicability that it would not have been included but for the fact that the car illustrated has been in regular daily service for more than half a year. It is stated that in practice this truck takes the curves perfectly and with a remarkable absence of flange wear. The car illustrated weighs 44,000 lb. with double trucks and four motors and 32,000 lb. with the radial truck and two motors, a saving of 13,000 lb., or 29½ per cent.

DESIGN OF ELECTRICAL EQUIPMENT OF CARS FOR LIGHT WEIGHT

In the effort to reduce weights of motors, several distinct lines of possible progress have been investigated, of which the following is a fairly complete list:

1. Redesign of motors, with special reference to elimination of unnecessary material.
2. Use of higher speed motors with greater ratio of gear reduction.
3. Forced ventilation.
4. Raising the working temperature by the use of heat-resisting insulation.
5. Field control.

In the elimination of unnecessary material considerable real advance has already been made both in the lightening of the motor frames and in the substitution of sheet metal for malleable castings for cover plates and gear cases. The use of sheet-metal gear cases has been attempted for several years with quite indifferent results, but it is believed that the problem has now been practically solved, partly by proper reinforcement and partly by the substitution of autogenous welding for riveting.

The use of higher speed motors has one argument in its favor, namely, that the output of any electrical machine increases, within limits, about in proportion to its speed. Unfortunately, high speed causes commutator trouble, creates centrifugal forces which are hard to overcome, soon reaches the limit of successful gear reduction and also causes bearing trouble. The present outlook does not seem to be very favorable for progress in this direction. The use of forced ventilation is already in very successful use in heavy locomotive work. There is no doubt that it affords means of very greatly increasing the steady load-carrying capacity of the motors. It does not increase the



Fig. 9—Equipment—Frame of Motor Truck for City Service

momentary power limitation of the motor, and with a motor already worked up to the safe limit of commutation it would not be of much use, but with modern motors of interpole construction there will hardly be any circumstances under which the heating will not be the practical limit of rating and ventilation an effective means of increasing the rating. In locomotive work it is customary to use a separate motor-driven blower attached to the body of the cab, which forces the air through a proper system of piping into the motors. It is very difficult to do this on the ordinary electric car on account of the extreme swing of the trucks and the restricted space available. One of the large manufacturers has attacked the problem by mounting the blower inside the motor case with the rotor attached to the armature shaft. This makes an almost ideal simplification of apparatus but seems to be open to the objection that the fan will suck in dirt and water as they are thrown up by the wheels and the wind against the under side of the car. If some effective means can be found of eliminating these objectionable materials from the air taken in by this method, it ought to prove very useful.

INSULATION

Raising the working temperature by the use of heat-resisting insulation has been tried in several instances with

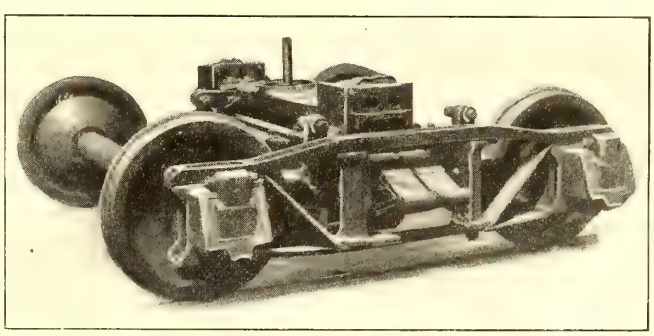


Fig. 10—Equipment—Trailer Truck, Phillips Design, for City Service

very encouraging results. Under some operating conditions with the older type motors it was hardly worth while to seek improvement in this direction, because the motors were also working quite close to the limit of commutating capacity. With the introduction of interpole construction this limitation is removed, and the possibility of operating at higher temperatures means greater horse-power from a given motor or a smaller or lighter motor for a given horse-power.

Asbestos and mica have been used with some success as heat-resisting insulating materials; but the most encouraging results have been attained by the impregnation of armature and field coils with a recently discovered compound which upon being baked becomes hard and dense, like amber, and of great heat-resisting powers. Ordinary cotton insulation, so treated, may be heated above the ordinary charring point of cotton and yet retain nearly the full strength of the cotton. The basis of the compounds used for this purpose is the synthetic substance known as "bakelite." In the extensive experiments being conducted by one of the large manufacturers it is prepared in two forms, one a fluid, resembling shellac, and the other a thick paste. The former is used for painting and impregnating coils and the latter for filling interstices.

Experiments so far indicate that the safe working temperature of motors so treated is much higher than the present allowable melting point of the solder, and the motor applications approach limits of the melting of the solder in the commutator and mechanical strength of parts. There seems to be good reason for believing that treatment of armature and field coils with this substance will prove very valuable, both as a means of reducing the size of motors for a given duty and as a method of prolonging the life of motors already in service.

The use of field control holds out great promise of success. As the system is being worked out in practice the motors, of the ordinary interpole type, are provided with one additional field lead per motor. The control is so arranged as to provide one extra notch for high-speed running. When running on this notch part of the turns of the field winding are cut out of circuit, thus weakening the field and increasing the speed. This makes it possible to use a considerably greater gear reduction for the same maximum speed, provides three efficient running points instead of two, reduces the current used in acceleration, reduces the rheostat losses and the required size of the rheostats and, to some extent, increases the full-speed efficiency. These motors should considerably reduce the power consumption, irrespective of any reduction in the size of the motor, and in many cases they will permit of the use of a smaller and lighter motor. This will be true particularly in mixed city and interurban service, when frequent stops and high rates of acceleration in the city are combined with high maximum speeds on the interurban section.

SUMMARY

It would be by no means impossible to combine all five methods above discussed in one motor. The weight of the motors constitutes so large a part of the total weight of the electrical equipment that the motors seem to afford a more encouraging field for the lightening of cars than do the control apparatus and wiring. Nevertheless, the latter should not be overlooked. The manufacturers have made marked improvements in this field during the past few years.

Systems of multiple-unit control have been developed, both of the electro-pneumatic and the straight electric type, showing considerable reduction in weight. Platform controllers have been improved so that single car operation of the larger equipments is now practicable with controllers both lighter and much more reliable than were available a few years ago. The substitution of sheet metal for cast-iron end frames in resistance is another improvement worthy of mention in this list.

The heavy piping used in the modern system of all conduit car wiring is quite an item in the weight of the finished car. Several large roads have omitted most of the conduit in the wiring of their latest cars. It is claimed that the conduit wiring has not produced the expected degree of improvement in safety and reliability and has introduced some new troubles.

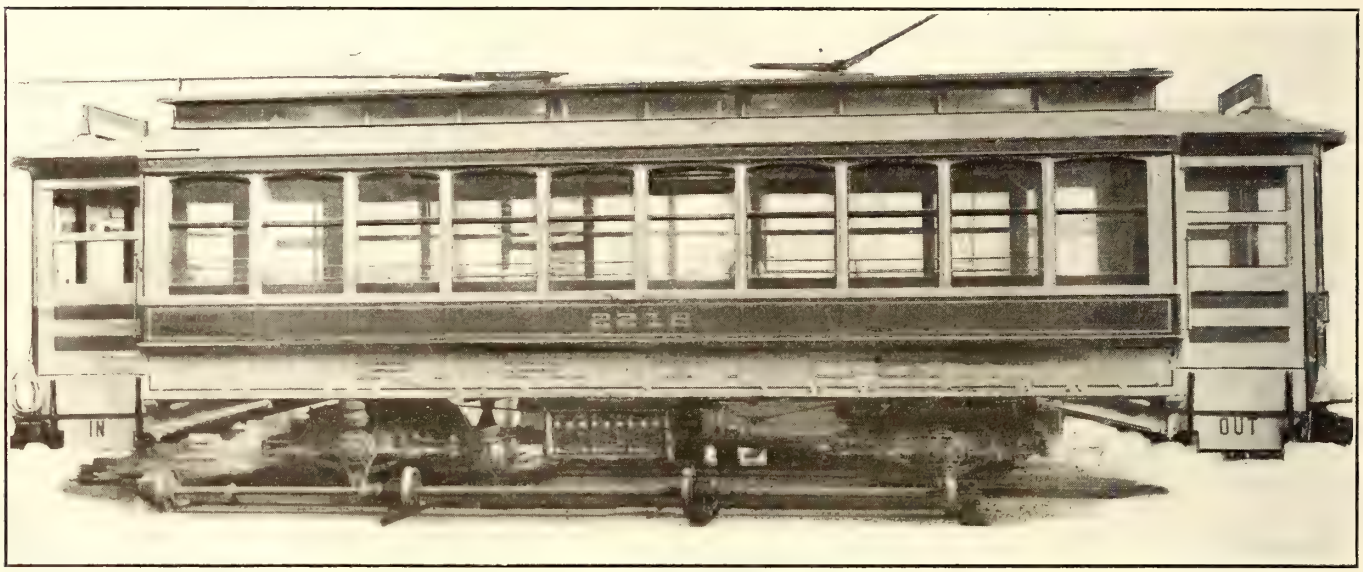


Fig. 11—Equipment—Philadelphia Car with Halsey Radial Truck

COASTING RECORDERS FOR CHICAGO AND BOSTON

The Chicago Railways, after an exhaustive trial test of eighteen months in which it equipped the fifty cars on the Van Buren Street line with coasting recorders, metered the substations which supplied current to this line and made observations as to the current saved, accidents reduced, reduction in brake shoe wear, changes in running time and operation of the clocks, has entered into a contract with the Railway Improvement Company, New York, for the complete equipment of all the surface cars on the system with coasting recorders to the number of about 1800. This contract was approved by the Board of Supervising Engineers Chicago Traction on October 5. These recorders will be of the new steel case, elapsed-time type which show the coasting time, car number and motorman's number. The tests which led to this contract were conducted under the personal supervision of John Z. Murphy, chief engineer of the Chicago Railways.

The Boston Elevated Railway has just concluded an investigation under Paul Winsor, chief engineer, of the Railway Improvement Company's coasting time recorders and has ordered their installation on the new Cambridge subway line and on all the elevated lines.

Engineering Association Question Box

Selected Questions and Answers from the Question Box Compiled by the Committee for Presentation Before the 1911 Convention at Atlantic City.

The preparation of the Question Box of the Engineering Association was assigned this year to a committee consisting of Norman Litchfield, Charles Rufus Harte and Rodney Hitt. This committee sent out a circular letter asking for questions to be submitted, and 124 questions relating to all branches of electric railway engineering practice were sent in by member companies and associate members. These questions were then sent out for answer, and replies to one or more questions were received from forty-nine company or associate members. The answers to each of the questions which are reprinted bear a key number corresponding to the following numbered list of names of those replying:

NUMERICAL INDEX OF MEMBERS ANSWERING QUESTIONS

1. Conestoga Traction Company, Lancaster, Pa.
2. E. P. Roundey, engineer maintenance of way, Syracuse Rapid Transit Railway, Syracuse, N. Y.
3. F. J. Foote, master mechanic, Ohio Electric Railway, Columbus, Ohio.
4. Thos. B. McMath, chief engineer, Indianapolis Traction & Terminal Company, Indianapolis, Ind.
5. Wm. Roberts, superintendent motive power, Northern Ohio Traction & Light Company, Akron, Ohio.
6. F. W. Sargent, chief engineer, American Brake Shoe & Foundry Company, Mahwah, N. J.
8. E. B. Lincoln, general manager, Muncie & Portland Traction Company, Portland, Ind.
9. F. B. Musser, president, Central Pennsylvania Traction Company, Harrisburg, Pa.
10. J. R. McFarlin, electrical engineer, Electric Service Supplies Company, Philadelphia, Pa.
11. F. D. Hain, superintendent construction, Altoona & Logan Valley Electric Railway, Altoona, Pa.
12. C. F. Hewitt, general superintendent, East St. Louis & Suburban Railway, East St. Louis, Ill.
13. E. J. Cook, vice-president, New York State Railways, Rochester, N. Y.
14. J. P. Barnes, electrical engineer, Syracuse Rapid Transit Railway, Syracuse, N. Y.
15. M. J. French, engineer maintenance of way, Utica & Mohawk Valley Railway, Utica, N. Y.
16. C. B. Voynow, assistant engineer of way, Philadelphia Rapid Transit Company, Philadelphia, Pa.
17. R. H. Hayward, general manager, Galesburg & Kewanee Electric Railway, Kewanee, Ill.
18. H. W. Fuller, general manager, Washington Railway & Electric Company, Washington, D. C.
19. W. G. Price, mechanical engineer, Standard Motor Truck Company, Newcastle, Pa.
20. Fred M. Daniels, chief engineer, Milford & Uxbridge Street Railway, Milford, Mass.
22. F. H. Miller, superintendent motive power, Louisville Railway, Louisville, Ky.
23. A. F. Hovey, cable engineer, Interborough Rapid Transit Company, New York, N. Y.
24. Westinghouse, Church, Kerr & Company, New York, N. Y.
25. W. J. Grambs, superintendent of light and power, The Seattle Electric Company, Seattle, Wash.
26. Geo. H. Harris, superintendent railway department, Birmingham Railway, Light & Power Company, Birmingham, Ala.
27. Wm. A. House, president, The United Railways & Electric Company, Baltimore, Md.
28. Norman Litchfield, engineer of car equipment, Interborough Rapid Transit Company, New York, N. Y.
31. G. H. Clifford, general manager, Northern Texas Traction Company, Fort Worth, Tex.
32. Chas. R. Sturdevant, American Steel & Wire Company, Worcester, Mass.
33. J. W. Hulme, general foreman, Hudson & Manhattan Railroad, Jersey City, N. J.
34. J. F. Calderwood, vice-president and general manager, Brooklyn Rapid Transit Company, Brooklyn, N. Y.
36. Richard McCulloch, assistant general manager, United Railways Company of St. Louis, St. Louis, Mo.
38. Albert B. Herrick, New York, N. Y.
41. C. T. Anderson, commercial engineer, Ohio Brass Company, Mansfield, Ohio.
42. Geo. M. Knox, general manager, Oklahoma Railway, Oklahoma City, Okla.
43. Washington Water Power Co., Spokane, Wash.
44. F. G. Grimshaw, master mechanic, Pennsylvania Railroad, Camden, N. J.
45. W. W. Wysor, chief engineer, Lehigh Valley Transit Company, Allentown, Pa.
46. W. Ogelvie, superintendent of overhead, British Columbia Electric Railway, Vancouver, B. C.
47. R. R. Kennedy, superintendent transmission, British Columbia Electric Railway, Vancouver, B. C.
48. F. M. Clouds, assistant superintendent, British Columbia Electric Railway, Vancouver, B. C.
49. H. Jackson Tippet, engineer maintenance of way, British Columbia Electric Railway, Vancouver, B. C.

POWER DISTRIBUTION.

2. *Is it wise to paint cross-arms without first specially drying out the sap and moisture?*

(1). To prevent dry rot, cross-arms should be thoroughly dried before painting.

(9). No, as the inclosed moisture and sap induces early rot.

(12). No, the paint would imprison the sap, which in turn would sour and decay the wood.

(18). It is our practice to paint cross-arms as we receive them from the manufacturer.

(22). It seems to be almost impossible to get seasoned lumber now; no doubt the painting prolongs life.

(24). It is better to have them dry. If you haven't the time to let them season, erect them without paint and paint them later. Prime the part that goes into the grain.

(26). Arms should be thoroughly dry before painting.

(27). Cross-arms should be free from sap and moisture when painted.

(44). From our experience we have found that where cross-arms have been painted when the wood has been green they have rotted out very quickly, and it is best to have the wood seasoned before painting.

7. *What method do you follow in pulling off curves? (a) With radius of 500 ft. or over? (b) With radius less than 500 ft.? What troubles, if any, have you experienced with this or other methods? What do you consider the special advantages of your method? What angle of bend do you allow at each ear? Do you offset the trolley wire from the track center line? If so, how much? How do you give the linemen this offset?*

(1). (a) We use single pull-offs from pole to trolley.
(b) Pull-offs bridled to backbone.
We experience no trouble with our method when poles are anchored.
Easy to keep curve in proper shape.
Whatever angle is required for each individual curve.
After track is finally tamped the linemen build in curve so wheel does not cut wire. Offset is usually about 6 in.

(5). Every 30 ft. on long curves. On short curves every 15 ft.
No trouble with curves.
Uniform support.
5 deg.
Yes; 3 in. to 1 in. in track elevation.

(9). Whenever possible, the poles are set in such a position that span wires can be run direct to the points of suspension. If local conditions do not permit the proper location of the poles a bridal construction is used. The angle at each ear averages from 5 to 8 deg. We offset the trolley wire from the center of the track, the amount of offset depending on the radius of the curve and also the amount of the track elevation. The linemen determine the proper offset by placing the trolley wheel of the line construction car at a point about midway between the ends of the curve and pulling the wire until the wheel sets parallel with the wire. The offset is then measured and the data thus secured are used in setting the hangers on either side of the center one. The last two or three hangers at each end of the curve are set to take up equally the remaining angle, the offset on these hangers being somewhat less than the center of the curve.

(11). Usually with sufficient pull-offs to cause wire to follow closely to track. On bracket construction with poles on outside of curve we run a backbone with sufficient intermediate pull-offs. With bracket poles on inside of curve set additional poles as required, unless additional poles outside cannot be set. We have 6-deg. curves with poles on either side set 75 ft. apart without intermediate pull-offs over which cars run 25 m.p.h. Also 11-deg. curves with poles and pull-offs on 50-ft. intervals over which cars run at same speeds. Curves that are sharp can be run more readily than easy curves, as the cars run more steadily and there is less likelihood of poles coming off. The angle allowed is gaged by the speed and wear, trying to get enough pull-offs so that the kick in the pole will not cause it to leave the wire and also to prevent undue drag on the wire. We offset the wire sufficiently to cause wheels to set tangent to wire. The offset in a vertical line from track on the longer radius curves, is mostly due to the elevation. We figure the offset due to elevation and add the necessary amount for the curve and give the linemen the result as a measure from one of the rails. With plumb line and rule the ears can be accurately located.

(12). Our method is a direct strain from pole, doing away with what is termed a bow string or backbone arrangement. For a radius of 500 ft. or over we set poles at approximately 80 ft. Less than 500 ft. radius we use our standard spacing of 100 ft. With this method we have reduced our trouble to general wear. The objection to the backbone arrangement is that should one rib break there would be a corresponding slackening of all the other ribs in that backbone. Another point is that with so much wire under tension there is bound to be a continual slackening of the trolley wire. The special advantage of the direct-pull arrangement is that of accessibility in making repairs, as the break will either be at the pole or at the trolley wire, and can be repaired from a line car, whereas in the backbone construction it would be necessary to provide a ladder to renew a rib, as the work would have to be done midway between poles and away from the track. We offset the trolley wire from center of track from 2 in. to 20 in., depending on elevation of rail, position of trolley stand and height of car. We have no definite rule for this but are governed by the position of the trolley wheel, which we plumb from the height of the trolley wire to the track.

(13). Pull-offs are placed on curves from 5 to 10 ft., depending on radius. We offset the trolley wire from the track center line, but it depends entirely upon the radius of curves and the position of the trolley pole on the car and the height of trolley wire from the track. This also depends on the track elevation. Linemen are not given any rule, but use their judgment in placing wire.

(22). (a) 500 ft. or over, pole spacing 75 to 100 ft., one or more pull-offs from main strain.
(b) Less than 500 ft., poles spaced 50 ft., one or more pull-offs from main strain.
(c) Very little trouble when trolley is pulled taut.
(d) Simplicity.
(e) Trolley wheel must take bend easily, and without undue wear.
(f) Yes, depending upon elevation, offset from center equals height divided by gage times inches of elevation.

(24). (a) Poles should be set about 80 ft. apart. Two pull-offs in each section. If the curve is a long one, it could be done with a light backbone wire and running square to the pull-off.
(b) Depends on conditions. Generally use two bull rings to each curve. Never allow over 10 deg. bend at any ear. Always offset the trolley wire from 1 ft. to 18 in., depending on the curve and also the elevation.

(25). We have no fixed angle of bend which we allow for the ear. We do offset the trolley wire from track center on curves. The amount of this offset is left to the judgment of the trolley line foreman.

(26). (a) Pull-off in 20 deg. curve, approximate distance, 7 ft.
(b) 8 deg. curve, 20 ft.
(d) None outside usual wear and tear.
(e) We have used no other method.
(f) About 2 in.
(g) From center of track 12 in. back to center of track. This depends upon the ballast of the track.

(27). (a) and (b) We use the pull-off method and also double lacing between poles.
(c) No particular trouble has been experienced with this method.
(d) Easily maintained and kept in line.
(e) We have adopted no rule governing this, but depend upon the line crew foreman in charge of work using proper judgment.
(f) The trolley wire is offset from the track center line, the amount depending on radius of curve and size of car which is to be operated over same. This offset is best determined on the ground.

(46). (a) We run a back-bone with pull-off in the middle of each span.
(b) We use the same construction with more poles and pull-offs but find that the less attachments to the wire, consistent with a good curve, the better.

8. *How often do you anchor the trolley wire? What method do you use? Do you avoid tipping up the ear by this method?*

(1). Every tenth pole on bracket construction. We use anchor ears and anchor. Yes.

(5). Do not anchor. Depend on upkeep of suspension.

(9). Every ¼ mile on a straight line, a four-wire swivel strain yoke anchored to four poles being used. The line is also anchored at each end of all curves, a two-wire double curve suspension being used. This method is the best we have found yet, but it is not altogether satisfactory.

(11). Every half-mile with soldered strain ears and double guys each way giving four anchors. On double track, run a strap between ears at both ends and single guys each way. This keeps the ears in proper position.

(12). Every half mile. We use a Metropolitan strain pan made up into the regular span wire and anchored to poles pulling from the four corners of the pan, poles are in turn guyed to succeeding poles in line; this is for single trolley; for double trolley the same general scheme is followed with the exception that pans are guyed to each other. In fastening guys to poles we raise the guy about 2 ft. above the regular span make-up to allow for the greater distance from pole to trolley; this prevents throwing additional weight on span wire supporting strain pans. We have experienced no tipping up of ears.

(13). Trolley wire is anchored about once every ½ mile. The strain plates are of our own design and are used in connection with double-end pull-offs which prevent the ears from tipping due to the uneven strain of either the adjacent sections of trolley wire or the pull of strain wires.

(22). Once per mile. Strain plates bolted to ear, guyed in four directions. Yes.

(24). Anchor every ¾ of a mile on interurban roads. Also anchor at the curves. If anchor guys are properly applied, will have no trouble with the ear tipping.

(25). We do not anchor the trolley wire.

(26). Every 1500 ft. on a straight line. On curve work strain plate at each end of curve.

(27). The trolley wire is anchored at the ends of all curves, and every 3000 ft. on straight line. Anchor ears with swivel is the method used. Very little trouble is experienced by ears tipping.

(46). In city work we anchor all curves in all directions, so that they are independent of the straight wires. We also anchor straight wires at all splices and section insulators. In interurban work we sectionalize trolley wire every 6 miles and also anchor the lines at intervals of about 3500 ft., or at every splice. The method of attaching anchors is by running a second span wire over the trolley span and anchoring both ways vertically over the wire. This leaves nothing for the wheel to catch in, if it should leave the wire. In the case of bracket construction a similar method is pursued, fastening the anchor cable to the bracket arm above the trolley ear. We have found this construction uniformly successful.

15. *Have you experienced trouble with round-top hangers and ears failing to square up when screwed together? If so, how do you obviate this?*

(1). Yes. We obviate this by the use of leather washers.

(5). Some. Push up with extra leather washer.

(9). Yes. Have no remedy as yet.

(11). They scarcely ever square up. We give a liberal dose of machine oil inside the ear before screwing up and very rarely have any trouble from rusted ears. In localities where rusting effects are bad it would be better to use a regular joint compound as it is less likely to dry out. As long as threads are protected from rusting we do not think it very important to have them square up.

(12). Have experienced trouble by failure of hanger to tighten on ear causing a loose fit in thread and in time cutting thread smooth in ear, allowing it to become detached from hanger.

(13). We have very little trouble. If the ear does not turn completely around on the hanger, it is unscrewed and oftentimes a spring washer placed between the ear and the hanger stud.

(24). Very often have this trouble. Sheet lead washers will remedy the trouble.

(27). We do not use round top hangers for the reason that they do not square up.

(31). Yes. To obviate the trouble we buy our hangers with studs ½ in. longer than standard and place a spring washer between the hanger and the ear.

(41). We, as manufacturers of overhead materials, find that there is a growing demand for a hanger or an ear which will permit the two being tightly fastened together when they are in proper alignment. It would not be necessary to use the Tightlock ear with the Tightlock hanger, but rather the Tightlock ear with the ordinary hanger or vice versa. The scheme is in effect a strong lock washer between the ear and the hanger. If placed on the ear the boss is machined to the proper shape and a metal cap is swaged over the tapered portion of the boss to retain the washer in place before installation. If the lock washer is applied to the hanger the stud is made in two pieces, the lower portion being free to move up and down vertically within the cup casting. Both of these devices have been found practical and efficient.

28. *To what amount do you limit the total drop in voltage per mile in the negative return system?*

(5). This ought never to be as great as the copper drop. If it is, it is due to neglect of bonding.

(13). Five volts per mile.

(22). Ten volts per mile.

(23). Average total drop would depend largely on distance between substations and condition of track and amount of traffic. On sections one mile long for two track sections 13 volts, for four tracks 12 volts, per mile where substations are 2½ miles apart.

(26). Five per cent in entire line.

(27). We use only sufficient return to prevent positive conditions in water and gas mains adjacent to our system. When this condition is attained and the returns do not heat up, we consider that we have sufficient negative return.

(38). This question involves the cost in dollars of the loss in the ground return circuit. Consequently the cost of the energy frittered away in this circuit and at what rate this energy must be charged has to be fixed in each individual case. However, it should be borne in mind that the cost of current production for this superimposed load, to make up for these losses, should not be taken at the same rate per kw-hour as the unit cost for the total station output. This additional load can be produced at a much lower rate than the station rate, because it does not carry any of the fixed charges. Where the cost of this additional load is not known, it is the usual practice to take it at a value of one-half of the station cost. The losses in the return circuit increase with the square of the current value. Hence, the average we take must not be the average of the circuit values on the return circuit, but the mean average of the square value of the current delivered to the section of track in question. When the product of the average resistance and the mean square current value found over this section of track back to the power station is multiplied by the time in hours per annum during which the current is conducted through this circuit, the product will be the lost energy, which multiplied by this energy cost will give the cost of energy loss from the point of test to the negative bus. (The method of discovering these potential drops and current values is given in answer of No. 38 to question 29.) The actual money saved by increasing the conductivity of the return circuit will be the difference in the cost of the energy lost in the present and the improved return circuits added to the interest and amortization of the cost of the improvement. The amount of money that will yield a profitable return on this improvement will be approximately fifteen times the cost of the losses between the improved and original return circuits. It will be seen that several calculations will have to be made in each consideration in order to arrive at the investment which will return an interest of 6 per cent; therefore it is impossible to state a fixed allowable voltage drop over any track return without knowing the cost of this loss, which varies with the square of the density on the rail and resistance of the circuit. The problem cannot be reduced to an empirical form, as each case has to have an individual solution on account of the variables involved. In the case where an additional car has to be put in service to maintain the headway, due to reduced speed in miles per hour arising from excessive return drop, the problem must be solved as follows: The cost per car mile of the additional mileage made by this car, multiplied by the number of miles this car makes per annum, multiplied by fifteen, will give the permissible investment that would approximately earn 6 per cent on the additional cost for increasing the conductivity of the track return. Of course, this is not all the profit involved in the improvement, for when we have a higher voltage delivered to the motor brushes the average equipment temperature will be reduced, the secondary effect being in the reduction of cost of electrical maintenance. Again, as the natural earth return is in multiple with the artificial rail return, any increase in drop on the rail circuit will divert more current from the track. Furthermore, if the track parallels any conducting pipe lines, this diverted current will take the pipe path back to the power station. Any neglect in the circuit from this point of view will produce a hazard, and careful engineering requires special attention along this line, as neglect leads to a direct liability for damage due to the action of electrolysis.

(42). Five volts.

(43). Twenty-five volts irrespective of distance.

29. *What is the best way to test the total drop in voltage of the negative return system between two points on the track or between a point on the track and the power house?*

(5). With adjustable resistance on car.

(13). Tests that we have made to determine the drop between a certain piece of track and the power house have been made by using a telephone circuit or an auxiliary feeder.

(17). The best way of testing the drop in the return circuit is that followed by us several years ago. We made the test during the hours of no car service, by short circuiting the trolley on the rail and then throttling the steam pressure, and adjusting the field excitation of one of the main units at the power house until a value of current and voltage was obtained that could be read with reasonable accuracy on the station instruments. The volts divided by the amperes gave the total ohms resistance in overhead and return, from which the resistance of the return was obtained by deducting the resistance of the overhead, figuring it from the known length and cross section of the conductors.

(20). I have always used the wires of the telephone despatching system for potential wire to test rail drop either between points on the track or to negative bus at power station. By simply grounding the line to the rail at one end and reading the voltage at the other end the result is very readily accomplished. If telephone wires are not available, any other wire that can be spared for a few minutes can be used in the same way.

(22). A voltmeter between a negative potential test wire free from all stray currents, grounded on one end, station end, and the rail.

(23). Use telephone wire or run temporarily insulated copper wires between the two points.

(25). We use telephone wire for pressure wires. When we have no telephone lines, we run No. 18 weather-proof wire out from a reel and hang it on pole steps.

(27). Voltmeter and potential line.

(36). The best method is the use of a pressure wire in connection with a recording voltmeter. This voltage may then be taken either from the negative bus bar to any part of the track, or between any two parts of the track.

(38). Steel rails, with bonded or welded joints, in parallel with earth, underground metallic structures, and auxiliary copper form the conducting path. In elevated roads, the rails may be largely insulated from the structure and if so form a special case. The resistance of the return circuit is not a constant quantity. It is, of course, desirable to arrive at a mean value which closely approximates the resistance under the average operating conditions. The variable factors include ground moisture, associated with the length of time the current has been flowing from a rail into the earth, defective bonded or welded joints associated with the time of day or night; and the weather, including temperature fluctuations, rain, or frost in the ground. A rail delivering current into moist earth has a tendency to insulate itself from the earth. The action of the current repels the water from the rail, thus drying the soil and raising the resistance through the earth. A continuous current flow of a few hours will produce a marked change in the earth resistance. A measurement taken during the night will not give the same results as one taken during the day, due to this change in the current flow. A defective bonded joint will not have the same resistance in the early morning that it has in the later afternoon. During the hours of the night a light film of oxide will form upon the more or less imperfect contact surfaces at the joint, and during the day this film is broken down, both by the mechanical action of the car wheels passing over the joint and by passage of the return current through the joint. An extreme case has been noted where the first car out on the line in the morning had difficulty in moving at all, because of low voltage due to this cause. If the measurements are to be made at night this trouble may be overcome by placing a rheostat beyond the point of test, and allowing a current of say 100 amp to flow continuously through the rails. The temperature coefficients of the conductors will ordinarily be negligible, but the earth resistance due to variation in rainfall, drainage or frost in the ground, is highly fluctuating at different times. Frost and good drainage produce a high resistance, wet ground low resistance. As to the method of making the tests: A pressure wire between the two test points is essential. Any unused feeder or any other conductor may be used. The most convenient pressure wire available will be found in the telephone system. It is possible to pick up a telephone line at almost any point of a railway system at present. It is not necessary to remove such a line from telephonic service for more than five minutes for the test, but suitable preparations must be made beforehand. All foreign currents or potentials must be removed from the pressure wires. This is done at the exchange by simply removing the heat coils on the main frame. At the power station a jumper from the negative bus is made ready to clip on the telephone line and at the exchange another jumper is ready. Both sides of the line are used in multiple to reduce the line resistance. The men on the track, in the exchange and at the power station will all be in communication by telephone just before the test is to be made and it is but a few seconds' work to attach the jumpers and remove the heat coils in the exchange. The voltmeter may be anywhere in the circuit, at the track, in the exchange or at the power station. Since the voltage varies with the traffic loads, it is best to take instrument readings for two or three minutes in order to secure a fair average. At any time all three parties may re-establish telephonic communication by cutting in on the line with telephone test sets, using the earth potential as battery, with the earth forming one side of the line. When the test is completed the jumpers are removed and the heat coils replaced, after which the lines are all in service as before. As stated previously, good operators will not take more than five minutes for a test. It will be noted that the voltmeter reading obtained will not be the true voltage between the test point on the track and the negative bus, due to the potential drop in the pressure wire. To eliminate this error, two readings must be taken as nearly simultaneous as possible, using two different scales in the voltmeter. Thus two different voltmeter resistances will be inserted in the line and the true voltage may be quickly calculated by a simple formula. By this easy method track drops may be obtained over a very large system with great facility. If a large number of tests are to be made, it is possible for two men to do all the work, if a spare wire can be run to the negative bus at the power station. Tests made between any two points on a track may be made in exactly the same way. Inasmuch as the telephone companies are highly desirous of having these tests made, because of the electrolysis situation, they are generally very ready to lend the use of their lines.

(42). Use telephone line.

(43). We use one of our series arc circuits and by grounding it at the power house we measure the drop with a voltmeter.

32. *What is best method of inspecting lightning arresters that have no moving parts?*

(1). Examine each arrester thoroughly and see that no part is damaged.

(10). The only practical manner in which to inspect arresters having no moving parts, particularly if the arresters are pole arresters, consists in giving the arresters a very careful visual examination. Especially is this true if we consider that a lineman is the man upon whom such work as this is bound to fall.

(12). For series gap, test each gap or layer individually (this test is for leakage); to make test for ground we jump around the arrester with a lamp circuit.

(13). Arresters of the type made by the Westinghouse Company we do not test, otherwise than the ground connections. Arresters such as the G. E. type are tested by means of tin-foil inserted in the spark gap.

(22). Carefully inspect all connections, and if there is any air gap; keep free from dust; test for open circuit.

(26). Lightning arresters are tested three times a year. Ground wire is tested for 15 amp and arresters that have movable parts are short circuited to see if coils are closed and in good condition.

(27). Open case to see if proper gap exists.

(42). Paper slips inserted between points in gap.

(43). By taking them apart.

(47). In electrolytic arresters by carefully noting the condition of the charge, and if necessary by removing the nest of trays and making a thorough inspection of each tray for punctures and blisters. On multigap arresters by noting the condition of the blocks and keeping the units free from dust.

33. *What do you consider the best way to ground lightning arresters? Why? Is it desirable to ground pole line arresters to rail as well as to earth?*

(1). We ground pole line arresters to rail and earth, as it gives a better ground.

(8). To ground and rail. Ground should be made with galvanized iron pipe, put down 6 or 8 ft. deep.

(9). Our present method of grounding lightning arresters is to drive a ¾-in. galvanized pipe, 14 ft. long, into the ground to a depth of 6 ft. On top of pipe a brass cap is fitted. This cap has a lug to receive the ground wire from the arrester. About 6 in. below the ground line a tee is fitted to the pipe, and at this point a branch pipe is run to the track and there soldered to a cross bond. The pipe construction is preferred to a wire construction, as it best resists the corrosive action of electrolysis, and also the pipe is not so likely to be tampered with by outside persons. On open track set up on ballast we think the arrester should be connected to the rail as well as to the ground.

(10). The best method to ground lightning arresters is bound to vary in different localities. What is a good ground and an economical ground in one place may be a poor ground and an expensive ground in another place. Station arresters are, as a general rule, grounded to a permanent and well-made ground which is made and maintained at the station. This class of ground is usually made from a large and heavy metallic plate placed in the soil deep enough to always be in contact with permanent moisture. This class of ground is very efficient usually, but the use of a ground even approximating this on the pole line is barred usually on account of the excessive cost. We consider the best and most economical ground for pole line work to be that obtained by the use of iron pipe driven into the earth. The iron pipe ground possesses the advantages of efficiency, durability and economy in a marked degree. It is a cheap ground; it is easy to install; in most soils a pipe driven to a depth of say 8 ft. makes an efficient ground, and in case the conductivity of a single pipe in any particular soil is low, it is an easy matter to drive an additional pipe or pipes, and by connecting them all in parallel to get the required conductivity from the multiple ground. The time required to install a pipe ground and to connect the arrester thereto is very small, thus making the matter of installation of these grounds an easy one and a cheap one from a financial standpoint. And withal, the pipe ground is very durable. Pure iron pipe placed in the soil has a life many times greater than that obtained by other grounding methods, notably copper plates buried in the earth. Pole arresters should by all means be grounded to the rail as well as to the earth. The most important reason for connecting the arrester to the rail as well as to the earth is to eliminate the possibility of an induced charge collecting on the rails and discharging through the car apparatus at the same time the pole arrester discharged. This rail induced discharge becomes especially prevalent on roads on which the rails are laid on rock ballast and so are practically insulated from earth for considerable distances; the extra connection from the arrester ground to the rail serves to equalize the potential between the rail and earth at the time the pole arrester discharges, thus eliminating any tendency for the rails to discharge through the car apparatus. A second reason why arresters should be connected to the rail is owing to the fact that standard types of railway arresters require a certain amount of line current for their operation. Without the rail connection the ground resistance in many instances becomes so high that the flow of line current following the discharge to ground is just too small to operate the circuit opening device, so allowing the arc to maintain and the arrester to be destroyed. The one possible disadvantage resulting from connecting arresters to the rail as well as to the ground may be classed under the head of electrolysis. The trouble experienced from this source is, however, so small compared with the advantages to be secured by so doing that it is negligible in comparison.

(12). Dig hole 2 ft. square and 8 ft. deep. Put in layer of charcoal 6 to 8 in. deep, put ground plate of copper 2 ft. square, No. 16 gage on top of charcoal, and have wires from arrester soldered securely to ground plate. Cover ground plate with charcoal or coke to a depth of 6 in. Wherever possible ground to rail, providing the rail has good and permanent earth contact at place where connection is to be made. This serves two purposes—first, it gives more ground surface to carry away the discharge; second, should the wire become disconnected from ground plate there would still be ground at rail.

(13). In connection with the installation of pole line arresters we believe that a pipe 10 ft. long, driven into the soil, is a sufficient ground and would strongly recommend the grounding of the arresters to the rail as well as to the pipe.

(20). Grounding arresters of the type that use magnetic blowout to the rail has cured many of the burnouts that we formerly had. The trouble was apparently caused by insufficient current flowing to operate the blowout and setting the arrester on fire and destroying it. Other types I believe will give more efficient results though not requiring the rail ground for the same reason. The ground to earth we accomplish in a variety of ways, according to the location.

(22). Connect to rail, either by rail bond or soldering to base of rail also to rod, ⅝ in. or ¾ in. by 8 ft. long, driven into earth. The best ground possible is none too good.

(26). Bonding to rail. We have not been able to secure good results by grounding to earth.

(27). Where the earth is comparatively dry, ½-in. galvanized iron pipe driven in the ground at least 10 ft. makes best ground. Where earth is moist, copper plate buried in charcoal makes best ground. It is desirable to connect arresters to rail as well as ground on suburban lines.

(38). A lightning arrester should not be grounded on the rail. There are two effects of this connection which may render the arrester useless. Suppose the arrester to be grounded to the rail without auxiliary ground plates. The enormously high frequency of the lightning discharge together with the inductance of the rail renders this ground connection a very poor one. In the case where ground plates are used in multiple with the rail it is a probable condition that traffic current will pass over from the rail to the ground plate and then into the ground. The action of this current will be to insulate the ground plate from the earth or to destroy it altogether by electrolytic corrosion. A ground plate should always be located so that it is absolutely free from all stray currents.

(43). By the use of a flat strip connecting them to the best ground available.

(47). Use a separate ground for each as this will eliminate trouble which may arise from connecting a number of them to a common ground. We do not use pole-type arresters, but our indoor type is grounded to rail.

34. *What experience has been had with electrolytic lightning arresters for 600 volt d.c. service?*

(5). Splendid.

(13). (b) We have only used two aluminum cell-type arresters in connection with our cars and have installed one on the line. The line arrester was up two weeks and burned out.

(17). We have great confidence in the efficiency of the electrolytic, or tank, arrester for 600 volt, d.c. service. In 1907, immediately after we commenced operating our interurban line from our 600 volt d.c. power house, one lightning storm knocked out the generator in service then, and another storm soon after knocked out the other generator. Our system at that time was protected by the ordinary types of arrester installed in the power station and on poles and cars. This serious damage from lightning convinced us that more protection was needed, so we installed a tank arrester in the basement of our power house, and since 1907 no trouble whatever has been experienced from lightning at our plant. The loss of several motor armatures during severe storms last year led us to install last spring another tank arrester at our office building, near the center of our city overhead, and thus far this season no car motors have been damaged.

(22). Very good on indoor work; no experience with car or outdoor service.

(47). We have two sets of electrolytic arresters on the d.c. side of two 2000-kw, 60-cycle rotary converters, but have no record of their ever having discharged.

37. *What routine tests should be made (and how often) to determine condition of rail bonding? (a) In city service? (b) Interurban service?*

(1). As often as possible everywhere.

(5). Continual sectional tests.

(8). Every three months and oftener if possible.

(9). (a) Once a year for city service. (b) Twice a year, spring and fall, for interurban.

(11). We use an autographic test car and results show that yearly is not too often.

(13). (a) In city service where bonds are installed on the web of the rail a test once each year we consider sufficient. (b) In interurban service where bonds are installed on the ball of the rail no test is made as an inspection will show what bonds are off. Where bonds are concealed on interurban service they should be tested once every two years.

(17). Every spring each different line of track, city or interurban, on the system should be tested by selecting what per cent of the joints in that section were of higher resistance than standard. From this preliminary test would be decided the question whether conditions were bad enough to require that the entire line be tested and repaired.

(18). We believe all bonds should be tested once a year, preferably in the spring, and all defective bonds replaced. This would apply to both city and suburban service.

(22). (a) Regular inspection and tests, say, once a year. (b) Once in two years.

(23). (a) Once a year. (b) Once a year.

(25). (a) In city service, we try to test the bonds once a year.

(27). Where service is light and track structures heavy and substantial, once a year might be sufficient; while other conditions might require monthly tests. This applies to city as well as interurban lines.

(32). (a) In that portion of city track work where the current density is heavy, especially in portions near the power house, it would seem advisable to test the track either as a whole or by means of some bond tester at least once in three months, or oftener if there is any indication whatever of poor joints. This is not only to prevent heavy losses in poor joints, but also to prevent electrolytic troubles which might be developed in adjoining pipe lines. In large cities where the traffic is very dense, and where the current density in the rails would be excessive, it would seem advisable to have a competent representative testing and inspecting rail joints continuously. (b) The ordinary interurban roads should be tested for poor joints at least twice a year—in the fall and in the spring.

(36). (a) The joints in city service are tested with a portable bond tester. The most important portions of the track are tested about once a year. (b) On interurban service an inspection of the joints is made at least once a year.

(42). Twice a year, city; once a year, interurban.

(43). We do not make any routine tests such as outlined.

(44). We test our bonds about every six months.

(46). (a) All bonds should be tested electrically every three months. (b) We carefully inspect them, regularly, particularly the soldered type.

WAY MATTERS.

44. *To what extent have you practised joint grinding on old tracks? What is cost per joint, and what increase in life do you estimate will be obtained therefrom?*

(1). We replace splices when worn and do no grinding.

(2). We have been grinding joints in old track practically continually for the past two years. Costs from 25 to 75 cents per joint. Increased life depends on age of track and traffic. We believe that the saving on wear and tear of equipment and reduction of noise and jar to adjoining buildings is of as much importance as the increased life of rail and pavement at the joints. Badly pounding joints will ruin the best of pavements in a short time.

(4). We have used Atlas step joints on worn joints, grinding the joint to make it smooth.

(5). Grind with portable electric and hand grinder.

(9). Within the last year we have started to grind the joints in old track. The cost per joint varies with the condition of the old track, being from 50 to 75 cents per joint. We estimate that we get about two years additional life of the rail.

(11). We have ground possibly 100 joints and the cost ranged from 15 cents to perhaps $2, depending on amount of wear to be taken care of and how much we dodged the cars. We use a block of carborundum 2⅜ in. square and 12 in. long, set in a cast iron block with handles. The block, which was made larger than necessary to hold the carborundum, in order to give weight to the stone, weighs about 90 lb. The handles are hinged on so that block will run level. We expect 25 to 50 per cent increase life to rails. On very bad joints we cut out the joint and shift the rails.

(13). For the last two years we have followed the practice of filing all our joints with a heavy 3-in. file. It has cost us about 28 cents a joint to do this work. Cannot give the estimated increase in life of such work.

(15). We have ground, between June 28 and Aug. 10, 673 joints on Lorain Company section 95-297 rail, at an average cost of 59.95 cents per joint. The track on one line would have required renewal in 1912; I estimate that it will now last until the Fall of 1913 and regrinding may prolong the life until the Spring of 1915.

(16). When joints in old track are already pounded, the joint plates are also affected, the receiving half of the plate being also cut, and mere joint grinding will give very temporary relief as there is no support left for the receiving head. The cost of grinding depends upon the condition of the joints—from a few cents to 50 and more.

(42). Cost $1.25 per joint. Increase life of rail 30 to 40 per cent.

46. *With best type of track construction, should asphalt or any other type of sheet paving be used on streets where street railway tracks exist? If not, what is the best type of pavement, and why?*

(1). Not within 3 ft. of rails, which should be blocked.

(2). Sheet paving should not be used. Stone or wood block wears better, can be used over again and repaired by company's forces. In our climate asphalt cannot be repaired in the winter.

(4). Do not use asphalt, use cut granite blocks next to the rail on both sides of each rail, then pave with granite or brick. Reasons: (1) Vibration of the rail will loosen the asphalt from the base, admit water and destroy the sheet paving adjoining the rail. (2) Repairs to sheet pavement can only be done by a party with the proper plant. Brick and block repairs can be done with labor that can readily be employed.

(5). Use brick on account of flexibility.

(9). From the standpoint of durability, wood blocks would be the most desirable.

(11). The shear of wagon wheels and vibration in rails will soon cause any sheet paving material to disintegrate.

(12). Asphalt should not be used as ruts will soon cut in beside rail. Brick, granite or wood block make good paving for tracks, depending on class of vehicular traffic. They can be repaired without an elaborate repair outfit.

(13). We do not believe that sheet asphalt should be used in connection with paving steel railway tracks on account of the fact that it cannot be maintained next to the rail. We are having best success with the stone block pavement on account of the fact that it is easier to maintain adjacent to the head of the rail.

(15). No monolithic pavement will last as well as pavement composed of separate blocks of material, such as granite, sandstone, vitrified brick, asphalt block or ceosoted wood.

(16). In heavily traveled streets granite block paving between rails and one or two rows of blocks outside the rails would give most economical results on account of concentrated wear by teams and cheaper repaving in case of track repairs. The shoulders may be made of sheet paving.

(18). For the best type of track construction we do not believe asphalt is the proper pavement. On streets where heavy vehicular traffic exists we deem scoria block, granite block or wood block the proper pavement. There is no salvage after asphalt pavement becomes worn or decayed. With any of the other types the pavement can be taken up and possibly the blocks turned over and repaved.

(36). In asphalt paved streets the asphalt should not be allowed to come in contact with the rail. A toothing either of granite blocks or brick should be placed on each side of the rail.

(42). Brick on account of lasting qualities.

(45). I do not approve of sheet paving on track area on account of the difficulty of repairs which generally have to be made by the company laying the pavement and it is hard to get them to attend to small repairs promptly. Some form of block pavement I think is preferable.

(49). Where the type of track construction has a solid concrete slab foundation on which the track is laid there should be no fear of disturbing a sheet asphalt or other surface, but it is not recommended to lay asphalt right alongside the rails. The best material in this case appears to be granite blocks to a width of some 12 in. each side of the rail. Trouble is experienced here where the use of treated or more particularly untreated wood block is used on streets where tracks exist—due to considerable lateral pressures from the wood blocks, tending to push the rails out of line. This trouble is not experienced with other pavements.

50. *What is the best method of protecting webs and bases of rails in paved streets against corrosion?*

(1). Good bonding and absence of cinder or ashes.

(4). Use enough filler (asphaltic or cement grout).

(5). Cement grout.

(9). Have not been troubled with corrosion of the rails to any extent, although we have not taken any special precaution to prevent it except maintaining the bonding in good condition.

(13). We make no effort to protect rail against corrosion.

(15). Bond to full capacity of rail section.

(16). Packing with concrete against the web and around the foot of rail will protect the rail from oxidation to a very great extent.

(18). We have no appreciable trouble with corrosion of webs and bases of rails in paved streets.

(42). Cement filler blocking.

(45). We have not attempted any kind of protection.

(49). Have not considered the necessity of protecting webs and bases of rails against corrosion. Have found on removing old permament track webs were in fair condition but bases worn sharp on ties.

55. *Should outer rails in curves on city streets be elevated above inner rails? If so, how much as a maximum?*

(1). If possible, yes. Usually 3 in.

(4). If conditions permit elevating the rail do so. On paved streets very little elevation can be given. The amount depends on the contour of the cross section of the street.

(5). Yes. 2 in. maximum.

(9). From the standpoint of track construction the outer rail should be elevated, but from the standpoint of street construction it should not be. We have them elevated as much as 3 in.

(11). This is dependent on whether stops are made or not. We find that 5 in. is about as high as is desirable and that 3 to 4 in. will usually allow equal wear to rails. The crown of street paving will frequently determine the amount.

(12). Yes, if any speed is desired. Paving will rarely permit more than 2 in.

(13). We elevate the outside rail on all our curves in city service, both inside and outside curves. 2 in. is the maximum.

(16). The outer rail should be elevated. This gives more life to the curve and greater safety. Depending upon location and speed, even as high as 5 in. at the central radius of spiral, if spirals are used. The elevation should be gradual, starting at some distance on the tangent.

(18). We believe that outer rails on curves in city streets should be elevated above inner rails a maximum of 1½ in. on curves of 35-ft. radius. This elevation, however is often determined by the grade of the street or municipal regulations.

(36). Outer rails in curves should be elevated above inner rails as much as the width of the street and the nature of the paving will allow. In wide streets as much as 2-in. elevation may be obtained.

(42). Yes. 1¼ in.

(45). By all means where contour of street will permit or where city authorities will allow distortion of street surface. I do not recall a case where there was any danger of getting too much elevation on paved street, but believe 5 in. maximum sufficient for all ordinary needs.

(49). Outer rails need only be elevated where there is a grade which will render it difficult for cars to easily round the curve. In one instance we have an elevation of 2½ in.

57. *What is the best type of foundation for special work, particularly at intersections?*

(1). Heavy chestnut timber, well tamped. Have some in now 18 years and still sound.

(2). Concrete or crushed stone, grouted.

(4). A sub-base of Portland cement concrete to 2 in. below the ties, use full number of ties and tamp up work with concrete with very little water (so dry it will not slush up at all), then concrete for paving base and pave.

(5). Concrete with limestone surfacer.

(12). Well tamped macadam, well drained.

(13). Stone ballast.

(15). Concrete foundation is best for complicated special work. Use wooden ties and concrete to paving sub-surface. For plain curves steel ties in concrete are preferred.

(18). Concrete.

(36). All special work should be laid on oak ties, imbedded in concrete, the concrete extending at least 6 in. beneath the ties.

(42). Crushed lime stone.

(45). We use crushed stone but where sub-foundation is bad it is better to use concrete. It is essential, however, to suspend traffic until concrete is set.

(49). While the method of contruction depends somewhat on whether the special work junction is to be laid under traffic or not, we would prefer a slab of 6 to 8 in. of concrete under the ties, which we space 24 in. center to center.

69. *To what extent can oil be used instead of water to sprinkle unpaved tracks? Best apparatus for applying? Quantity necessary per mile of single track to last for entire season?*

(8). We use oil. Sprinkling wagon. Do not know.

(18). We believe that oil can be used to the full extent instead of water for unpaved tracks. By unpaved tracks we understand macadam is included. The best apparatus for applying would be an ordinary sprinkler car, and from information as to cost of oiling streets a strip 9 ft. wide would cost $2,346 per year. This is based on 5 cents per sq. yd. per year.

(45). We have used 40 per cent asphalt road oil the past two seasons. About one-half gallon per sq. yd. is required and three applications during the season to keep the dust down. The second and third applications do not require so much oil as the first. It has generally been applied to track area by city or township which oils balance of street. Old water wagons with suitable appliances for distributing oil make good apparatus. It is hard to keep oil off the rails and it is necessary to keep man with sand can along with oil tank.

POWER GENERATION.

76. *What is the best method of eliminating dust from the air intake where the air is to be used for cooling generators, and transformer winding?*

(1). We keep the ground surrounding our plant thoroughly oiled.

(5). Take the air from a place practically free from dust.

(22). Filtering air through first metal, and then cloth screens.

(25). We use no special apparatus for removing dust from air intakes. The intake pipe is turned downward and covered with a screen of ⅛ in. wire mesh, leaving the end of the intake about 8 ft. above the ground. The lack of dust in this section makes other apparatus unnecessary.

(26). By screening and running through a water spray.

(27). Where the room is available and the amount of dust warrants the cost, a large screen chamber may be constructed, this room to be divided into two large compartments, each fitted with screens having varying size openings and deflection plates onto which are fitted ribs to act as dirt catchers—the compartments to be used alternately, that is, while the screen and plates are being cleaned in one the other can be used and vice versa. Water sprays have been used for the cleaning of this air. At our station we use nothing but a screen having ¾ in. openings, as the dust we get contains very little matter that has not insulating qualities.

(48). We draw the air for cooling our generators and transformers through screens of cheese cloth and fine wire netting, and have also saved some dust by sprinkling the ground in the vicinity of the intake with oil.

80. *Do you burn coal of nut and slack or pea and slack grades wet or dry on stokers? If burned wet, how and where do you apply the water? What saving, if any, can be made by burning coal wet?*

(12). We burn nut, pea and slack coal on our stokers. The coal is wet. We apply the water to the coal with a spray pipe. As the conveyor buckets carry the coal under the spray the water is applied.

(22). We burn pea and slack coal wet on chain grate stokers and find at least 10 per cent saving in coal by so doing. The water is applied by hose in the coal bunker, and coal is given all the water it will hold.

(25). We burn a pea and slack grade of lignite coal on Green mechanical chain grate stokers. This coal is delivered to us the same day it is mined, and contains about 15 per cent moisture, and is placed in the power house bunkers in that condition. There is a slight loss in evaporation from using the coal wet. The principal advantage is the elimination of dust in handling coal on the conveyors. We consider the excess of moisture in our coal to be harmful, as it reduces the calorific value per lb. as fired and absorbs a certain amount of the heat of combustion.

(26). We burn a mixture of nut, pea and slack coal on chain grate type of stokers; the coal gets to the stoker carrying approximately 4 per cent moisture, the water in the coal is due to washing. Probably the greatest saving in burning pea and slack wet is in the labor, the damp coal mats and does not fall through the grate as badly as dry coal, thus lessening the handling cost. There is also, no doubt, a small saving due to the more even texture of the fuel bed, due to this matting cutting off the excess air and thus raising the percentage of CO_2, but when the cost in heat units of evaporating the moisture is taken into consideration there is probably little gain outside the labor.

(27). We use run of mine bituminous coal and crush lumps to about 2 in. or 2½ in. Burn it dry—do not consider wet coal profitable.

(48). We burn nut and pea coal (bituminous) on Babcock & Wilcox chain-grate stokers, just as we receive it from the mines, as it already contains a fair amount of moisture.

SHOPS.

82. *Describe the most practical rigging for use in removing trucks from underneath interurban cars?*

(9). Overhead crane used in connection with a yoke.

(11). First choice, overhead crane; second choice, regular car hoist using parallel I-beams on motor driven screw jacks.

(12). Four-inch screws with I-beams on top of screws. I-beams to go down flush with top of floor. Screws driven by motor. One or both ends can be raised. Any length of car can be raised without moving. No danger from falling, as all four corners raise the same. No trestles to get lost, no blocking, will remain at height stopped.

(13). Hoist body from trucks by means of four cylindrical air hoists.

(14). We use a car hoist consisting of two I-beams above the floor, 3 ft. out from gage line, each supported by two threaded studs, which pass through the floor and are raised by worm gears and wheels driven from a motor in the pit. The controller is mounted above the floor where the operator has full view of the hoist. Pieces of rail resting on the tops of the I-beams are lifted against the under side of truck frames or car bodies, raising one or both ends of car with or without trucks. We have used this device for over a year and a half without trouble or accident.

(18). We lift a car with four hydraulic jacks, operated by oil compressed with an electrically driven pump. The trucks are then run out by hand.

(27). An overhead electric crane placed on a runway the length of the truck repair section. The crane should be arranged to raise either one or both ends of car clear of trucks.

(33). By running the car over a truck turn-table, lifting the car body with a crane by means of a yoke, dropping supports upon which the side sills of the car rest. Lower the car body to the supports. Turn truck on turn-table and run the truck from underneath the car.

(34). The method most practical for use in removing trucks from underneath cars depends largely on shop arrangement, especially with reference to location of truck and motor overhauling shop, to tracks on which cars are brought into shop; for instance, on our elevated division, our overhauling shop is located on the floor below tracks on which cars are run in for overhauling, and in which case it is necessary for us to lower trucks on elevator. We remove the trucks by slightly raising the truck and car body with elevator and then swing struts under body, which will hold same in place as truck is lowered into the shop. Temporary truck is then raised up and installed under car body so that car can be moved out of the way. We find this arrangement very satisfactory. In our most recently constructed surface shops we have provided traveling cranes for lifting of car body from trucks; these cranes are so arranged as to lift the two sides of body simultaneously, and we believe that this method is the most practical, as in this way we also have the use of crane for lifting motors, wheels, etc., in connection with the overhauling.

(42). Water or air lifts—each side of pit tracks disappearing into pit space below.

(43). We use a screw lift motor-driven.

(48). In our repair houses we have two carjacks, each consisting of a pair of I-beams, one on each side of track, raised simultaneously by a set of screws operated by motor and sprocket chains in the pit below, with which we can in a few minutes raise the car body clear of trucks or lift body and trucks together clear of wheels. This outfit was made at moderate cost and is very efficient. We have also an outdoor arrangement consisting of two parallel frames about 24 ft. high, with adjustable cross beams and a set of chain blocks, by means of which we can lift a car on slings. This was originally made for loading and unloading cars, but it is also used for changing trucks.

EQUIPMENT.

86. *In a quadruple equipment of motors what will be the effect on the motors of using wheels of unequal diameter? For example, one truck has one pair of 33-in. and one pair of 34-in. and the other truck 31-in. and 32-in. wheels. What is the maximum allowable difference in diameter? Why?*

(1). Rocking car and wearing flanges to sharp edge. Not more than ⅛ in. difference.

(5). 2-10 in. Counter electro-motive force will be increased and difference in diameter absorbed.

(8). We endeavor to use same diameter wheels. Maximum is ½ in.

(11). Have a tendency to overload motors and cause cars to bind hard on sharp curves, causing heavy flange wear. ¼ in. should be maximum difference allowed.

(12). The motor on axle with large wheels will heat more than others.

(13). This causes unequal load distribution on motors. Do not think it advisable to allow a difference in diameter greater than ½ in.

(18). Most of our cars operate on under trolley and the plow is carried on the truck frame. It is, therefore, necessary for us to make sure that the truck frame is practically level.

(27). The smallest diameter wheel exerts the greatest tractive effort and likewise the greatest diameter wheel gives the maximum speed, all other conditions being equal. On the other hand, wheels of the smallest diameter are called upon to do less work than the wheels of the largest diameter. For the best results all wheels should be the same diameter or as close to the same diameter as is practical to keep them.

(34). When motors on different trucks are connected in parallel, the motors connected with the larger diameter of wheels would take a slightly larger per cent of the load. We have no standard limits between minimum and maximum diameter of wheels for use under the same car or truck, but we aim always to have the diameters of wheels as nearly alike as possible.

(43). In our quadruple equipment of motors from an electrical standpoint we find no difference. Our wheels vary in size from 29½ in. to 34 in., but we aim to have all wheels under the same car as near the same diameter as possible in order to get the proper braking results.

(48). A serious difference in wheel diameters would result in commutator trouble on the motor with the larger wheels, and a greater tendency for the other motor to slip when accelerating rapidly on series. The maximum allowable difference should be about 3-16 in. diameter.

89. *Do you press gears on axle without keys? If so, have any come loose? What tonnage do you use per in. diameter of gear fit?*

(3). We never use keys with solid gears; have never had a gear come loose; we use about 8 to 10 tons per in. of gear fit.

(9). Yes. Have not had any come loose. Gears are pressed on with about 10 tons per in. diameter of axle.

(12). Yes. No. Ten tons per in. diameter of fit.

(13). We press gears on axles without keys. They do not come loose. Ten tons per in. of diameter.

(14). We press all solid gears on axles without keys. This has been our practice for three years and we have had no solid gears come loose. We use 10 to 12 tons per in. diameter of gear fit.

(18). Yes. None loose in the last four years. Ten tons per in.

(27). Yes, standard practice. None, where work is properly done. From 10 to 12 tons per in. of diameter.

(34). Gears are pressed on all new axles without keys, no trouble has been experienced from gears becoming loose. We use approximately 10 tons per in. in diameter for pressing on gears.

(35). We shrink gears on axles. None have ever come loose. Allow .001 in. per inch of diameter for shrinkage.

(36). All gears pressed on with a hydraulic pressure of 45 tons on a 9 in. ram. All gears are keyed and no loosening has developed.

(42). No. Use keys with gear pressed on 5 tons.

(48). We press our gears on with a small key, at from 5 to 7 tons per in. diameter.

97. *What is the best method of cleaning the outside of a car at a reasonable cost without injuring the varnish?*

(1). We dissolve about ½ lb. of soap in a bucket of luke warm water and wash off the cars with a sponge. Then we use cold water, drying them off with a chamois skin.

(5). Clear water used only once from running and of course a little oil soap.

(9). Water with a small amount of oil soap.

(12). We scrub with warm water and soft soap, home made. Wash off with cold water and chamois. We believe it does not injure varnish.

(13). Wash with clean, cold water and, if necessary, use linseed oil soap.

(14). We use a good neutral oil and emulsion cleaner, using a higher percentage of emulsion for the dirtiest cars. After mixing we add 10 per cent of water (necessary to remove water marks and stains). This applied either with cotton waste or with a 5-in. flat car scrub of bristles, using the scrub brush only enough to loosen the dirt. The car is then wiped thoroughly dry with clean cotton waste and is washed each night with clear, cold water, applied with a large long-handled car washing brush. Under this method the oil and emulsion treatment is necessary at periods of 2 to 6 months, as the daily washing takes off the dust and prevents its becoming imbedded in the varnish. The oil and emulsion treatment costs about 40 cents per car and one man can take care of 35 to 40 cars, giving the oil and emulsion treatment when necessary, and the daily washing with clear water.

(18). Wash with good soap and water, then rinse off well with clean water.

(27). Oil soap diluted in proper amount of water. After application the surface must be thoroughly cleaned with clear water.

(42). Clean water and brush, drying with chamois skin.

(43). We know of no method whereby a car can be cleaned at a reasonable cost without injuring the varnish. It must be either a high maintenance for cleaning and save the varnish or low maintenance for cleaning and injure the varnish.

(48). We have obtained good results with soft brush and tubular handle, attached to hose and water supply. For washing down before painting, etc., use water with a small amount of Pearline, sufficient to soften the water.

98. *What is the best method of treatment of canvas roofs on which the paint surface has cracked and become unsightly?*

(1). We fill up the cracks if not too bad. If the cracks are too bad we remove the paint.

(3). Burn off and repaint.

(5). Put new cover on.

(8). Have had no such trouble. We keep roofs well painted all the time.

(9). Two light coats of paint will greatly improve the appearance of the roof.

(12). Scrape high edge of cracks, fill cracks with paint well thinned with turpentine, then apply one heavy coat over entire roof.

(13). The trouble is probably caused by use of too much paint on roof. In cases where roof leaks are found, these should be repaired by repairing canvas and using very little paint, as a heavy coat of paint develops cracks more easily than a thin one.

(14). If the canvas is not rotted but the paint is cracked and unsightly, a fairly presentable and lasting job may be done by applying a thin, elastic roof paint with saturated waste, rubbing cross-wise of the cracks or in circles until the cracks are completely filled. All surplus paint not remaining in the cracks should be thoroughly wiped off with the same waste. This treatment will do away with all danger of leakage but the old cracks will still show. We have been unable to burn the paint off these roofs with good results, as the canvas scorches in the cracks before the paint begins to blister, and it is practically impossible to scrape the paint off without tearing holes in the canvas over projecting nail or screw heads and bits of putty.

(27). First clean the roof with a stiff wire brush, then apply a coat of paint in semi-paste form with one-half linseed oil and one-half turpentine to the gallon and a small amount of japan dryer. This paint should be worked in well with the brush. The second coat of paint should be thinner and contain ⅔ linseed oil and ⅓ turpentine and small amount of japan dryer.

(34). Our foreman painter states that he has used linseed oil mixed with a small quantity of turpentine and dryer for filling cracked roof canvas, with good results.

(36). Scrape the old paint off with a hand scraper and repaint with ochre and raw linseed oil.

(42). Fill up cracks with several coats of good linseed oil paint.

(43). We use a thick solution of roof paint to fill cracks on canvas roofs then repaint the whole roof.

(48). We have not experienced this trouble. We paint our roofs with red lead.

100. *What is the best method of removing wrinkles and sags in thin sheet steel (16 or 18 gage) to be used for flat panels?*

(5). We roll them under boiler-makers rolls.

(14). We cut the metal panels to size and pass them through a set of plate bending rolls, breaking them first in one direction and then in the other. The panels are left slightly convex where they go against the furring strips, so that the screws or moulding around the edges pull them down flat. Lower side panels are stiffened and improved by turning the lower edge under the side sill and fastening up with screws from below. Panels finish much better for being sand blasted before painting.

(27). Metal rolls.

(28). Run the sheets through rolls (by some known as mangles); this should be done before laying off and drilling for application.

(42). Cannot be done.

(48). Use hammer and surface block.

101. *What type of lightning arrester have you found most suitable for car use, and where should it be located to give the best results? What method of inspection is most satisfactory? How can it be determined whether or not the arrester is working properly?*

(1). We use the Westinghouse style, No. 47417. We use two located on platforms of car between circuit breaker and controller. By examining after storm.

(8). Garton-Daniels. Located in motorman's cab direct from trolley cable. Use a lead pencil on wood handled screw driver.

(13). Spark gap, with choke coil gives satisfactory results. Locate in car if convenient and connect between circuit breaker and controller. Test air gap by closing with a carbon point; also test ground connection. Use lamp bank for making this test.

(17). For car lightning arrester we have always regarded the General Electric type M, form D-2, arrester as quite reliable and effective. The late styles of Garton are quite good. If allowable would place one of each on every car. We believe in locating them under platforms of cars in protected section, in accessible place for inspection. On our interurban cars we have one under platform, also one G. E. type M on roof of car, near trolley stand, with straight leads from trolley stand to the grounded whistle pipe in forward end. We inspect car arresters after big storms or at convenient times. In such inspection we remove covers for examination. We also use a test 5-light series cluster, which we shunt across the arrester terminals.

(18). We use several types of lightning arresters, and do not know which one to consider best. We believe the arrester should be placed as near the trolley as possible. On some types of arresters a test can be made by starting the arc by a piece of damp paper.

(27). There are a number of lightning arresters, but none are absolutely satisfactory. To give best results lightning arresters should be as close as possible to trolley base. Every overhauling day during summer months the arresters should be inspected—accurate and safe way to tell the working of arresters.

(34). No choice. Location underneath car body, so as to provide the shortest and straightest circuits to trolley. Lightning arrester to be connected ahead of circuit breakers or switches to ground. Inspect all parts where possible. Apply high tension test and see that adjustment is proper.

(36). The most satisfactory lightning arrester is the G. E. type MD-2. It should be located between the fuse box and controller. After all lightning storms lightning arresters are inspected and the air gap adjusted to a standard gage. A general inspection every six months is made in addition to the inspection after each storm.

(42). Garton-Daniels under car floor kept dry. Test with paper slips.

(43). We use General Electric lightning arrester. Keep the carbons adjusted to 1/64 in. gap. Lightning arresters are placed under front platform of car about 3 ft. from controller. We are not troubled with lightning in this section of the country and have no particular inspection of arresters.

(48). We use magnetic blow-out type, located underneath car, with a choke coil in main trolley line between tap to arrester and apparatus. All the inspection required is occasional examination and keeping them clean. Owing to the freedom from thunderstorms here we scarcely require them, except to protect the car from high-voltage discharge due to cross wires.

102. *Would it not be desirable to have a separate lightning arrester for lamp circuit?*

(1). Yes.

(5), (8), (18), (27), (34), (42). No.

(14). Do not think so. Lamp circuit burnouts from lightning are too rare to justify the addition of separate arresters.

(17). We do not approve of a separate arrester for light circuit for this reason: Lightning does not strike a light circuit unless it is an extra heavy discharge. In such heavy discharge the flow of current is so large at that point as materially to reduce the voltage on other portions of the line, which would have a tendency to reduce punctures, if we may use that term, at some other more vital part or apparatus. Light circuits are cheaper than armatures.

(48). Not if the main arrester is connected so as to protect the lamp circuits.

103. *What comparative results have you obtained with carbon, tantalum and tungsten lamps? State type of lamp and character of car service?*

(1). The tungsten lamp does not prove very satisfactory to us on account of film breaking through vibration caused by jolting of car.

(5). Cannot use any of these on our lines, owing to vibration.

(9). Have used Buckeye tantalum lamps on city and suburban service with a fair degree of success. Cars on which these lamps were used were on 18-ft. and 25-ft. car bodies, single and double trucks.

(17). We have used 16-cp 120-volt carbon lamps for car and general service altogether, except for one lot of 16-cp 120-volt tantalum lamps used recently. The tantalum lamps proved very unsatisfactory on account of burning out when we had realized only a small fraction of their rated life, which was represented to us as being as long as that of carbon lamps. The tantalum lamps were short-lived whether installed in the 600-volt d. c. lightning circuit of our interurban cars, or in pendent sockets in our car barn.

(27). So far tests of tantalum filaments have been unsatisfactory.

(33). Depends upon the angle at which the lamp is placed, due to the sagging of the metal filament. When placed at an angle of about 15 deg. from vertical, test showed the life of the lamp to be about the same as the carbon filament. The light of the tantalum or tungsten lamp is more brilliant and pleasing to the eye. The test shows that more lamps were taken from the cars by the traveling public.

108. *Have you experienced any difficulty in removing solid rolled steel wheels from axles? What means do you employ?*

(3). Sometimes necessary to heat hub of wheel before pressing off.

(5). No. Use a 300-ton wheel press and start with hammer blows.

(8). No. Use a wheel press.

(9). Yes. Means used to remove them was to use full capacity of wheel press, (150 tons) and in addition, the use of a sledge.

(11). Solid rolled steel wheels and cast steel centers always require higher starting pressure in backing off than in pressing on. The axles at wheel fit should be highly finished, the wheel center rough bored within .002 in. of pressing fit and then taken to size with a smooth finish. Use whitelead mixed with machine oil. These precautions overcome most of the difficulties with this class of wheels. Where we had only 150-ton press, found it necessary to rig up a pile driver and jar axles several times, after which wheels could be pushed off with ease.

(12). Yes, heat and hammer when under pressure.

(13). No. Use hydraulic press.

(14). We have had no trouble in removing steel wheels though they sometimes require 250 tons or more to start.

(27). Yes, due to improper fitting of wheel on axle. By a number of schemes, such as heating wheel hub with gasoline torch, also turn hub down, drill same, and drive taper plugs in the hub.

(34). We have experienced no difficulty in removing solid rolled steel wheels from axles. We remove these with hydraulic press.

(42). No. Heat wheel with torch, press off.

(43). We have experienced some difficulty in removing solid rolled steel wheels from axles. We heat the hub of wheel with gasoline torch before undertaking to press off.

(48). We have found in some cases a tendency for steel wheels to bind, though pressed on with lower pressure than iron wheels, but have no difficulty in removing them after heating the hub quickly.

109. *What have you found to be the most economical basis for turning rolled steel wheels, i. e., how much wear of flange and tread do you allow before turning? State method used in inspecting and cost per car mile; also character of service?*

(3). We rarely turn wheels on account of tread wear, as the flange generally wears out first. We let wheels run till flanges wear down to ¾ in. in thickness. We inspect once a week with limit gage.

(5). Allow minimum 11/16 in. flange. Interurban regular and limited urban and city.

(8). Never turn till necessary on account of sharp or double flange.

(12). By flange wear. When flange wears from 1¼ in. to ⅞ in. thick. Do not turn wheels if flanges are good and wheels are same size.

(13). We turn wheels when we find a variation in the circumferences of two wheels mounted on same axle, of ⅛ in. Other conditions, however, have to be considered, and for this reason, we have been unable to establish any positive basis. Wheels should be turned when flange is worn to a thickness of ⅝-in. at a point ⅜ in. above gage. For the last wear, this may be worn thinner. For inspection, we use a wheel tape and flange gage. Service—interurban.

(27). When flanges are less than ¾ in. or greater than 1⅜ in. in width, wheels should be turned; should have metal gages for the use of inspectors. Character of service, city and suburban.

(34). We believe the most economical basis for turning of rolled steel wheels is that which will result in the least number of turnings, and we endeavor to wear out wheels having a 2-in. thickness of rim with only one turning. We inspect wheels for thickness and height of flange on regular inspection periods by use of limit gage; also for any defects. Wheels for our elevated service are turned when the thickness of flange has been reduced 5/16 in. or when it is ¼ in. above standard height. Wheels used on our surface lines are turned when the thickness of flange is reduced 7/32 in.; the latter wheels when new have flange 1 in. wide by ⅝ in. thick. The elevated wheels have standard M. C. B. flange and tread.

(43). We allow ⅛ in. flange wear before turning. Pay no attention to tread wear. Steel wheels are inspected every 30 days.

(44). Flanges are gaged on the 1,000-mile basis.

(48). We find it necessary to remove steel wheels for flange wear before the tread has worn badly. We would not allow more than ¼ in. flange wear. We test our wheels with a gage similar to the M. C. B. gage.

118. *Is it desirable to use an unflanged brake-shoe on solid rolled steel wheels? Why?*

(5). No. Difficult to keep in place.

(6). No. Unflanged shoes are not practical with narrow tread wheels, or where there are no brake beams, and when applied on brake beams increase considerably the tendency of wheels to wear sharp flanges. A flanged shoe increases the braking effort fully 25 per cent, holds the shoe in its proper place on the wheel; diminishes flange wear; gives a more uniform braking effort and reduces the cost of maintenance.

(8). No. We get better service from wheels and shoes with flanged shoe.

(12). Cannot see any difference in flange wear since changing from unflanged shoe to flanged shoe.

(13). Yes, if brake shoes could be held in proper position without flange. Flanged shoes very often are responsible for rapid wear of wheel flange.

(14). Our experience shows a decreased braking effort with flangeless shoes on rolled steel wheels.

(17). Unflanged brake shoes on steel-rolled wheels have their advantages. They eliminate part of brake chatter, and also prevent some of the side wear on the wheel flange. The flanged shoe has its advantages inasmuch as the shoe in the start adjusts itself nicely to the contour of the flange and tread, also has a tendency to wear off the sharp edges of flange. With our equipment the flangeless shoe would not give satisfaction, as it would require rigidly supported brake hangers and heads.

(19). It is not desirable to use unflanged shoes on any wheels of electric railway trucks for the reason that the increased area due to the flange is required for braking and to reduce rapid abraiding of the shoes. By increasing the area of the shoes in contact with the wheels, we reduce the amount of metal that will be cut away by the brake application. Flangeless shoes should not be used on any trucks which are not provided with brake beams, as the flange is required to hold the shoe in position on the wheels.

(34). No; we believe it desirable to use flanged brake shoes on steel wheels as we find that this practice will prevent high flanges, with the consequent necessity for turning.

(42). No. Crowd off to one side, damages wheel.

(48). No. There should be sufficient flange on shoe to equalize with tread wear, or otherwise the flanges get too deep and injure the special work at intersections and frogs.

123. *What is your practice for squaring up various types of car trucks that have been damaged in car collisions?*

(12). Take apart, heat and straighten.

(13). Use a tram and if trucks are out of square, it sometimes is found necessary to disassemble truck, straighten bent parts and rebuild.

(14). Consider journals as being corners of a rectangle and square up the truck by pressing with jacks or by other means until diagonals of rectangle are of equal length.

(19). Cut the frames apart, then heat, straighten and re-rivet them. If only slightly bent, they can be heated with torches and pulled true with chains and turnbuckles.

(27). Center of pedestals should be squared up three ways, viz.: across frame, length of frame and diagonally.

(28). To square up truck frames damaged in collision we heat with gas flame and by using jacks and screw clamps have no difficulty in bringing back to proper position.

(34.) When trucks have been damaged in collision we square them up by measuring diagonally across pedestal centers.

(43). We tear down truck, run through blacksmith shop and square up to a gage.

(48). We gage our trucks by measuring from journal box center to center across each end, and between diagonally opposite centers.

POWER PLANT OF THE PORTLAND RAILWAY, LIGHT & POWER COMPANY

The dam of the new power plant of the Portland (Ore.) Railway, Light & Power Company is located on the Clackamas River at River Mill, 1 mile from Esclada. In place of the usual type of solid-masonry dam the Ambursen reinforced-concrete hollow design is used.

The dam is 680 ft. long, 80 ft. high and 150 ft. wide at the base. It consists of a series of parallel supporting walls, spaced 18 ft. on centers and built in the general direction of the stream, and reinforced concrete slabs span the spaces between the supporting walls to form the upstream face. An interesting feature of the construction work is the grouting of the foundation material underlying the dam, in order to secure the foundations against erosion and to prevent the waste of water by seepage beneath the dam.

The power house is built contiguous to the dam and is 173 ft. long x 60 ft. wide. Floor space for five units is provided, each unit consisting of a Victor Francis turbine developing 6000 hp, and a 3300-kw alternator. Only three units will be installed at present, but ultimately the other two will be placed. The plant will be in operation early in the fall and will furnish additional energy for the railways and lighting system in Portland and the vicinity.

The Philadelphia Rapid Transit Company has made new arrangements for the handling of coal for use in its various plants. Heretofore the coal was brought to Philadelphia by barge and unloaded at the yards of the George B. Newton Coal Company, but now the latter company has erected a large concrete and wood coal pocket along the Schuylkill River close to the Chestnut Street bridge. This pocket is erected in such a manner as to allow the freight cars of the railway company to run under chutes. Coal is carried into the pocket by means of bucket chains from barges in the river.

Discussion at Friday Morning Session of the Engineering Association

A Report of the Discussion of the Reports of the Committees on Equipment, Rules of Procedure of the Committee on Standards and the Concluding Business of the Association, Including the Election of Officers

The final session of the Engineering Association was held on Friday morning. The first order of business was the report of the committee on equipment. This report, which was reviewed by M. V. Ayres, is printed elsewhere in this issue.

EQUIPMENT

H. S. Williams, Peter Smith Heater Company, referred to the committee's comparison of various systems of car heating wherein it was stated that the cost of operating the hot-water system, including only the items of fuel and labor, was approximately the same as the cost of operating the hot-air heater. He said that this was somewhat in error, as the hot-air heater was of much higher efficiency than the hot-water heater. In fact, the hot-air heater was from 25 per cent to 35 per cent more efficient from a coal-burning standpoint. The coal consumption of 85 lb. a day for the hot-air heater as given in the report was not based on facts, but was an assumption. Where 85 lb. of coal were required for the hot-water heater approximately 60 lb. were needed for the hot-air system. So the item for coal should be $33.71 instead of $46. If the coal consumption was assumed at 85 lb. a day for the hot-water system an equivalent amount of heat could not be obtained by the use of 5 kw in the electric heaters. If the comparative costs were to be of any real value they must be made on the basis of supplying the same quantity of heat. On the basis of 50 per cent efficiency for the hot-water heater, and assuming that the heater consumed coal at one-half the rate while out of service that it did when in service, the quantity of heat delivered by the hot-water heater during the 13½ hours would be 366,000 B.t.u. This amount of heat was equivalent to 107-kw hours a day, or approximately 8 kw instead of 5 kw, as shown by the report. Consequently the cost of electric power should be $218.95 instead of $137.03. The item of $12 for insurance charge against the hot-water and hot-air systems was not applicable to general conditions. This was a situation peculiar to the city of Chicago, which was not under the jurisdiction of the National Board of Fire Underwriters. The first cost of the hot-air heater of the capacity required for the 32-ft. car should be $135 instead of $155. The item of depreciation on the hot-air system was too low, and it was fairer to assume 10 per cent depreciation instead of 7 per cent. Consequently the estimate for heating costs should be corrected as outlined, and with these alterations the estimate should be as follows:

COMPARATIVE COST OF HEATERS.

	Electric.	Hot Water.	Hot Air.
Cost of power	$218.95	.....	8.22
Repairs and maintenance	1.00	54.35	2.00
Interest and depreciation	8.80	18.75	20.25
Coal	..	47.76	33.71
Labor of attendance	.....	8.70	8.70
Hauling	20.00	60.00	20.00
Total	$248.84	$139.56	$93.78

Secretary Litchfield said that most people in talking of the design of cars for light weight seemed to have confined their attention largely to the side frames, as if the side frame were the whole car. On the last car his company had built he had made a very careful advance detailed estimate of every part of the car. He had had each part listed, first dividing the whole car into various classes of parts, then listing each part carefully, checking them off from the drawings, then checking back after the car was built. The estimate came out very close to the final car. He thought that it might be of some interest to note the short list of percentage weights. He would not give any figures for actual weights, because all cars varied so. This particular car was built for a peculiar service, that is, for use in the New York subway, where they run ten-car trains with a motor-car weight in the neighborhood of 73,000 lb. or 74,000 lb. and running at an average of about 45 m.p.h. So they felt that the floor frames ought to be connected just as stiff and strong as possible. They did not make very much of an attempt to lighten the floor frame. The floor frame and the floor constituted 39.2 per cent of the total weight of the car body; the side frame, taken from the sill right up to the letter board, was only 14 per cent of the total weight of the car. That was the point that struck him very forcibly. He had had all kinds of side frames talked about to him in the reduction of weight, yet it was only 14 per cent of the total weight of the car. The sash and doors constituted 6 per cent to 10 per cent; interior framing 3.2 per cent, bulkhead 4.4 per cent, vestibules 5.5 per cent, and last, but not least, a miscellaneous item of 17 per cent. They had taken every possible thing out of that car they knew how. If others would subdivide their cars that way into percentages they would find something of interest.

Referring to requirement No. 5 for interurban couplers Mr. Litchfield asked for information regarding the amount of the strains for which provision should be made in designing couplers.

F. G. Grimshaw, Pennsylvania Railroad said that the committee had not attempted to consider the stresses which couplers ought to withstand and had not gone into the details of the design. The committee thought it was wise to outline general requirements before attempting to specify definite dimensions or details of the design.

George L. Fowler, New York, said that it was practically impossible even to estimate the stresses in parts of a car when it was in motion. He referred for example to the stresses in bolsters. He had found in one case with a static load on a bolster of about 45,000 lb. the actual stresses while the car was running 27 m.p.h. on smooth track varied from 60,000 lb. to 70,000 lb. If he were to make a guess he would say that the stresses in street railway cars when running were something more than 100 per cent greater than the stresses when the car was standing still.

W. H. Evans, Anderson, Ind., thought that there was a fine field for investigation of the stresses in couplers when cars were pulled around curves of sharp radius. He thought the manufacturers of couplers would be glad to co-operate in such an investigation.

M. V. Ayres called attention to the fact that under the heading of requirements the committee had included one statement regarding the desirability of having the shank of the coupler of such dimensions that it could be replaced readily by an M. C. B. passenger coupler. This, he thought, was put a little too strong. It was a desirable feature rather than a necessary requirement.

Rodney Hitt, Electric Railway Journal, asked if any couplers were now being made for interurban service which were arranged not only to permit of uncoupling without going between the cars but which would also permit coupling without compelling the operator to go between the cars and open the knuckle. Nearly all M. C. B. couplers of

recent design included this feature of a knuckle opening device.

W. H. Evans replied that a number of couplers had been designed for interurban service which embodied that feature.

H. H. Adams brought up the question of "squealing" of brakeshoes on steel wheels. A great deal of trouble had been experienced in New York and the problem seemed to be a particularly difficult one to solve. The squealing was especially severe where new rails had been laid. His company had studied the problem and had finally been able to work a considerable improvement by using a type of flanged brakeshoe containing an asphaltum lubricant compound placed in a pocket in the flange. This remedied the "squealing" but Mr. Adams was not altogether satisfied with it as a means of permanent relief.

George L. Fowler, New York, said that he had given this subject considerable study. He had obtained data which would prove that the "squealing" was due to the brakeshoes, to the wheels or to the rail. He proposed to begin a complete investigation this winter in which he intended to use a telephone apparatus for locating the origin of the squeal.

W. Thorn, Chicago, said that considerable "squealing" had been noticed in that city. In one case it was thought to be due to excessive sprinkling of the street which caused the rail to be constantly wet. He thought that the type of truck had something to do with "squealing."

W. H. Evans, Anderson, was of the opinion that "squealing" might be due to the location of the brakeshoes on the wheels, the play in the brakeshoe hangers and possibly to the manner in which the brakes were handled by the motormen.

On motion, the report of the committee on equipment was accepted and its recommendations were approved.

RULES OF PROCEDURE OF THE COMMITTEE ON STANDARDS.

Rodney Hitt, Electric Railway Journal, presented the report of this committee. He called attention to the fact that the committee had inserted two amendments to the rules as printed in the advance copies sent out. The first of these was an addition to section 3, making the secretary of the Engineering Association secretary of the committee on standards. A new section, numbered 9, was inserted in the rules and covered the powers of the committee on standards to lower a proposed recommendation from standard to recommended practice.

The report of this committee, including the amendments presented at the convention, is printed on another page in this issue. On motion, the report of the committee, as amended, was adopted.

STANDARDS

H. H. Adams presented the report of the committee on standards, which will be found elsewhere in this issue. He called attention to the fact that the committee had reduced a number of the recommendations of the standing committees from standard to recommended practice because it felt that it was not wise to adopt them for the first time as standard. The report of the committee on standards was then taken up, section by section.

The recommendations of the committee, sections A and B, were approved.

A. T. Clark, Baltimore, objected to the gage for mounting wheels recommended by the committee for adoption as recommended practice. Mr. Clark's objections related to the dimension of the height between the base line and the gage line, shown as 17/64-in., which did not correspond to the standard dimension of ¼ in. He also desired to have the word "maximum" struck out in the dimension showing the wheel gage. The radius of the throat of the flange was shown on the drawing as ⅜ in., whereas it should be ½ in.

W. H. Evans also raised objections to the type of wheel gage shown in the report and made a motion that the design of this gage be referred back to the committee on equipment for further investigation. In his opinion it was a very crude form of wheel gage, and he thought that a very much better gage could be devised. His motion was carried and the gage was referred back to the committee.

N. W. Storer, Westinghouse Electric & Manufacturing Company, objected to the taper for pinions recommended by the committee for adoption as standard. The standard taper for pinions of Westinghouse motors was 1.213 in. to 1 ft. He did not know how this unusual taper had been adopted originally, but speaking for the Westinghouse Electric & Manufacturing Company, he said that company did not propose to change its own standard on the old types of motors. He did not see any necessity for adopting the proposed standard taper until such time as a complete design for standard pinions could be prepared. If any new standard were adopted, he would suggest a taper of 1 in 10 which corresponded to 1.2 in. in 1 ft. Such a decimal taper could be used equally well with the English or metric systems of measurement.

On motion, the recommendation of the committee on standards that a taper of 1¼ in. diameter to 1 ft. of length be adopted as standard, was carried. All of the other recommendations of the committee were then submitted to vote and approved.

GENERAL BUSINESS

The first subject discussed under this head was the disposition of the "Question Box," which is published in abstract elsewhere in this issue. Owing to the lateness of the hour, there was no discussion on the "Question Box," but a motion was made and carried that the "Question Box" be accepted and printed in the proceeding with such additional answers to the questions as might be received up to the time of printing the proceedings.

H. H. Adams presented to the association a copy of the Electric Railway Dictionary, to be kept in the secretary's office.

A motion was made that a vote of thanks be given to all of the association committees for their excellent work during the past year, and also a vote of thanks to the secretary. The motion was carried.

ELECTION OF OFFICERS

The next order of business was consideration of the report of the nominating committee, which had been presented earlier in the morning. The following named gentlemen were nominated for office to serve during the coming year:

President, E. O. Ackerman, Columbus (Ohio) Railway & Light Company.

First vice-president, Martin Schreiber, Public Service Railway, Newark, N. J.

Second vice-president, L. P. Crecelius, Cleveland (Ohio) Railway.

Third vice-president, John Lindall, Boston (Mass) Elevated Railway.

Secretary-treasurer, Norman Litchfield, Interborough Rapid Transit Company, New York City.

Members of the executive committee: J. H. Hanna, Capitol Traction Company, Washington, D. C.; E. J. Burdick, Detroit (Mich) United Railways; E. R. Hill, Pennsylvania Railroad, New York City; H. A. Mullet, Milwaukee (Wis) Electric Railway & Light Company.

On motion, the secretary was instructed to cast one ballot for these nominees.

E. O. Ackerman, the new president, was escorted to the chair, and in a brief speech he said that it gave him a great deal of pleasure to accept the office to which he had been elected. He considered it a very high honor and wished to assure the members that he would use every effor to further the interests of the association during the coming year.

A motion to adjourn was then made and carried.

GERMAN STREET RAILWAY STATISTICS FOR THE YEAR 1909

Official statistics for the fiscal year ended March 31, 1910, show that there were 259 street railways in Germany operating 4277 km (2652 miles) of route, of which 3047 km (1889 miles) were located in Prussia. The total increase in mileage over the preceding year was 6.07 per cent for all Germany. The largest company is the Grosse Berliner Strassenbahn and its subsidiaries, operating 344 km (213 miles) of route. The largest ratio of route to population is possessed by the Rhine provinces, which show 1.46 km (0.91 mile) per 10,000 inhabitants.

The great majority of the lines are either of meter (39.37 in.) gage, or 1.435 m (4 ft. 8½ in.). The meter gage lines constitute about 60 per cent and the standard gage lines about 20 per cent of the total. About 83 per cent of the railways are electrically operated, the remainder being served by steam, cable or horses. On 174 Prussian lines, aggregating 2967 km (1840 miles), there were 59 steam locomotives, 54 electric locomotives, 7676 electric motor cars, 13,513 trailers and 1731 miscellaneous cars for freight, mail, etc. The average seating and standing capacity of a trailer is given as 33.4 and the average load of a freight car as 5.2 metric tons. The German railways, outside of Prussia, operated 12 steam locomotives, 14 electric locomotives, 3166 motor cars, 5283 trailers and 558 miscellaneous cars. The average seating and standing capacity of these passenger trailers was 35 and the average capacity of a freight car 6 metric tons. The Grosse Berliner Strassenbahn operated 2563 cars, which had a total seating and standing capacity of 87.885, or 34.2 passengers per car. It should be stated that the capacity of a car is based on the number of seats and the legally permitted number of standing places on the platform. Passenger transportation exclusively was the business of 68.7 per cent of the Prussian lines and of 77.3 per cent of the other German lines.

The Prussian railways had 41,115 employees, 12,394 of whom were employed on the Grosse Berliner Strassenbahn alone. In Prussia 93 systems and in the rest of Germany 30 systems were privately owned and operated; for the preceding year the corresponding figures were 97 and 41. Most of the privately owned lines are confined to single systems, but one company owns seven railways in as many cities, aggregating 123 km (76 miles).

During the year 2,136,738,595 passengers were carried for 597,120,042 car km (370,214,246 car miles), 75 1/6 per cent of which was motor car mileage. There were carried 1,429,824 metric tons of freight over 2,788,226 car km (1,728,700 miles). The corresponding figures for the preceding year were 352,896,439 passenger car miles, 1,308,531 metric tons and 1,613,218 freight car miles. The total gross earnings of all lines (except 56 miles) were 220,741,177 marks ($55,185,294), an increase of 5.9 per cent over the preceding year. The total operating expenses for all lines (except 134 miles), including taxes and welfare work for employees, were 138,759,293 marks (34,689,823), an increase of 4.1 per cent over the preceding year. This was the first time in many years that the operating expenses did not increase in greater proportion than the income.

The largest street railway gross income according to unit length of route was obtained by the Grosse Berliner Strassenbahn, which earned 152,164 marks per kilometer ($60,865 per mile), bnt this was greatly exceeded by the Berlin elevated subway system, which earned 369,286 marks per kilometer ($147,714 per mile). The Hamburg Street Railway obtained the highest average fare per passenger, namely, 12.8 pfg. (3.2 cents). The average annual earnings per kilometer on all systems in Germany were 52,785 marks per kilometer ($21,113 per mile) and the income per passenger 10 pfg. (2½ cents). In general the average earnings per unit length of route increased 1.8 per cent over the preceding year.

The actual operating expenses of all companies constituted 86½ per cent of the total gross income. There was a slight average improvement in net earnings. Of 159 Prussian street railways, 21 declared no dividend, 4 paid up to 1 per cent, 15 between 1.1 per cent and 2 per cent, 7 between 2.1 per cent and 3 per cent, 23 between 3.1 per cent and 5 per cent, 63 between 5.1 per cent and 10 per cent, and 10 paid dividends of more than 10 per cent. Of the 52 non-Prussian railways, 5 paid no dividends, 4 paid up to 1 per cent, 5 between 1.1 per cent and 2 per cent, 8 between 2.1 per cent and 3 per cent, 9 between 3.1 per cent and 4 per cent, 3 between 4.1 per cent and 5 per cent, 16 between 5 per cent and 10 per cent, and 2 paid dividends of over 10 per cent.

The accident statistics show that 10 employees and 218 non-employees were killed and that 102 employees and 918 non-employees were severely injured. The number of deaths decreased almost 11 per cent, but the number of severely injured increased 2 per cent as compared with the preceding year.

REPORT ON STREET RAILWAYS IN AUSTRALIA AND TASMANIA

The report of G. H. Knibbs, Commonwealth statistician of Australia, for the year ended June 30, 1910, shows a total tramway mileage on that continent of 442 miles as compared with 389.75 miles at the end of June 30, 1909. Of this total 275 miles are operated electrically, an increase of 23.75 miles over the preceding fiscal year. New South Wales has 112 miles of electric traction and 58 miles of steam traction; Victoria still has 46 miles of cable traction, in addition to 40 miles of electric, 1 mile of steam and 13 miles of horse railway. Queensland and Tasmania are the only states using electricity exclusively, the former having 30 miles and the latter 9 miles. South Australia has 30 miles operated electrically, 3 miles by steam and 23 miles by horses. In Western Australia 53 miles are electric and 23 miles horse. The Commonwealth of Australia has 213 miles under government control, viz., 165 miles in New South Wales, 5 miles in Victoria, 20 miles in South Australia and 23 miles in Western Australia. Municipally owned tramways are peculiar to South Australia, which has 30 miles so controlled, and the total of privately operated lines comprises 199 miles, of which New South Wales has 5 miles, Victoria 95 miles, Queensland 31 miles, South Australia 6 miles, Western Australia 53 miles and Tasmania 9 miles. Further particulars with regard to energy requirements, passenger business, mileage, cost, employees, revenue and expenses are given in the accompanying table.

	Kw-hours.	Mileage Open.	Car Miles Run.	Passengers.	Capital Cost.	Gross Revenue.	Operating Expenses.	No. of Cars.	Employees.
New South Wales	45,611,000	112	19,426,000	187,537,000*a*	£4,248,170	£1,094,861	£890,882	946	6,074
Victoria, *c*	2,314,000	39	1,930,000	7,889,000	275,458*a*	54,727*a*	40,087*a*	97	317
Queensland	5,441,000	31	3,524,000	32,419,000	*b*	214,265	*b*	119	654
South Australia	4,227,000	29	2,839,000	23,647,000	866,732	168,818	123,445	100	778
West Australia	3,952,000	50	2,304,000	13,580,000	1,018,548	144,320	98,236	101	366
Tasmania	749,000	9	490,000	2,772,000	90,824	27,502	15,682	25	105
Total	62,294,000	270	30,513,000	267,844,000	£6,499,732*a*	£1,704,493	£1,168,272*a*	1,388	8,294

a Incomplete. *b* Not available. *c* Exclusive of Prahran-Malvern line, opened May 31, 1910.

Papers Presented Before the Claim Agents' Association

Abstracts of Some of the Principal Addresses Made Before the Annual Convention at Atlantic City—Selection and Instruction of Trainmen and the Prevention of Accidents

During the sessions of the American Electric Railway Claim Agents' Association at the annual convention, held at Atlantic City, N. J., on Oct. 9 to 13, papers were presented on several topics of interest. In the following abstracts it will be noted that the same subjects were assigned to two members.

THE PREVENTION OF ACCIDENTS

BY F. J. WHITEHEAD, SECRETARY AND CLAIM AGENT WASHINGTON, (D. C.) RAILWAY AND ELECTRIC COMPANY

Upon first approaching this subject, the thought seems to go immediately to the trainmen and flagmen. This is due to the fact that these men are concerned in a very large majority of the cases and, while it is necessary, of course, to increase the interest of employees in all branches of the company's service, it should not be forgotten that extreme caution should be exercised by platform men.

To make effective a plan of education for employees of the roads, its patrons and the public in general would, no doubt, do a great deal toward protecting both the transportation companies and the public. Publicity regarding rules and regulations should become of such interest that it would lessen the number of accidents and, judging by the articles which have appeared in the public prints during the past year on this subject, it would seem that many of the companies throughout the United States are adopting such a policy. To post short rules and notes of instruction in the cars would be a step in the right direction. By the use of big type and a heading to attract attention, such rules and notices would be read by thousands of persons daily and bring squarely home to them the thought of danger. Hundreds and perhaps thousands of women step off street cars in the wrong direction and in a dangerous manner every day, and a simple note of explanation might correct the danger.

In conducting a campaign of publicity it might be well to use columns of the more prominent daily papers occasionally and, if necessary, have an instructor or demonstrator on duty at certain points during certain hours or on special occasions to give warnings and instructions to the public.

Offer a prize or souvenir for the best suggestions affecting protection of persons from injury while on or about the company's cars or tracks, and thousands of persons will probably compete, getting the question before the public in a way that will do an incalculable amount of good.

METHODS OF INCREASING INTEREST OF EMPLOYEES

To increase the interest of all the employees of the railway companies is a problem. It may be possible, however, to establish an efficiency rating in all of the departments of the service; not alone for the men handling the rolling stock, but also for the office force, track men, shop men, carhouse men—everybody in the service of the company. Make it worth while for the employees. Let them have something to look forward to each year and you will have just so many more persons taking a greater interest in the company's welfare. As platform men are so largely concerned, it might be well to offer them some special inducement. Adoption of exceedingly great care and judgment would be absolutely necessary, however, if such a policy were put into effect, in order to avoid dissatisfaction on the part of the man charged with an accident which could not possibly have been avoided by him.

Passengers might also be encouraged to look after the interests of the companies because of the additional protection it means to them. To call the conductor's or motorman's attention to a spot of grease inadvertently left on the car by a careless shopman or by a workman may save the passenger some embarrassment and considerable annoyance, and the company the cost of a suit of clothes or a dress. Proper recognition of public interest will invariably lead to its growth, the result being that the road acquires a large number of friends who become competent inspectors unrewarded by company funds. The conductor or motorman who does not accept with every show of sincere courtesy suggestions made to him in this way should be sent immediately to the instruction room for further education as to his duty in this regard and, if needs be, reprimanded to such an extent that he will promptly become concerned for the safety of his job.

All employees might be called upon at stated intervals to make suggestions to improve the service and prevent accidents. Small blank forms for such a purpose could be distributed where they would be available at any time.

SUGGESTIONS FOR EFFICIENCY

Certainly the officials would accomplish much good by addressing the employees occasionally. It would be well for them to talk on subjects of vital importance to the road, telling the causes of many accidents and suggesting remedies. In order to improve the efficiency of employees it is suggested that these plans be followed:

1. Some substantial inducement for efficiency higher than the general average.
2. Issue general daily notices showing accidents occurring the day or week previous, giving the causes and calling for greater caution.
3. Require prompt and full reports of all accidents.
4. Commend platform men when the occasion warrants and post on bulletin boards all letters from the public commending men for efficiency or thoughtfulness.

In order to bring more forcibly to the attention of those who are responsible what accidents mean to their employers, it is well to forward a memorandum showing the amount of money the accident has cost the company, setting forth fully the cause and what might have been done to avoid it.

TALKS WITH THE EMPLOYEES

Heart-to-heart talks at the meetings of the employees should be the means of getting employer and employee closer together. At these meetings about two persons, one from the claim department and one from the transportation department, should be designated to give the principal talks, after which the meeting should be thrown open for general discussion. These meetings should be as informal as it is possible to make them, and trainmen should be encouraged to take part in them. Attendance should not be necessarily compulsory, but employees should be given to understand that the meetings are in the company's interests and that their interests are necessarily involved. In order to make the meetings more attractive and informal, some form of entertainment should be provided. If a platform man has an accident which requires a rigid investigation by the claim department the investigator should not start out with the presumption that the employee was at fault, but should bear in mind that by kindness and a little patience much more information can be obtained. Employees should be impressed at all times with the re-

sponsibility that they owe, as the agents of the company, to the public in the protection of life and limbs of persons committed to their keeping and who are unable, to a large extent, to protect themselves while in their care. They should be constantly taught that they have a selfish interest in operation and that accidents always result in the lessening of profits that would and should go to the company and from it, logically, to some extent to the employee.

HOW CAN THE PUBLIC BE EDUCATED IN THE PREVENTION OF ACCIDENTS?

BY B. F. BOYNTON, CLAIM ADJUSTER PORTLAND (ORE.) RAILWAY, LIGHT & POWER COMPANY

The subject is one that can be treated from a great many standpoints; but from my own observation, the most vital one and the one that will bring about the greatest amount of good is the education of the children in our public schools on what to do to protect themselves from all kinds of accidents. The rising generation can be taught easily; now, if the girls in our schools were taught to carry their books, purses or whatever they might have in their right hand or arm, their left hand would always be free and then it would be absolutely impossible for them to get off a car backward.

Three years ago we were having a great many accidents to children. We interviewed our Board of Education and requested the privilege of delivering lectures in the schools on the prevention of accidents. This was readily granted, and since that time all our city schools have been covered by lectures twice in each school year. Upon observing the success of the school work here in Portland, the companies in Seattle, Spokane and Los Angeles adopted the same method, and if any of the representatives from these cities are present they can speak for themselves as to the results obtained.

Since we have taken up this school work we have had very few accidents to children. We have found that after talking to the school children they go to their homes and relate to their fathers, mothers, brothers, sisters and playmates what the speaker has said about protecting themselves when on the city streets. Any of you who have children of your own well know the impression it makes on you when your children come home from school with something to tell which is of great interest to them. I cite this to show you that we are not only reaching the school children but also that by talking to the children we reach all members of the family; the other members of the family will listen to the child when they would not listen to you or me. We are preparing, for this season, a series of pictures to illustrate the stories told them.

I have communicated with the Board of Education in nearly every city in the United States, calling attention to the fact that, while we are educating the children of today along many important lines, we are sadly neglecting the very essential matter of teaching the child to protect its life and limbs. Now, gentlemen, the best way to prevent the numerous accidents all over our country is by this education, and the most far-reaching work that could be done would be to get every school teacher to devote at least five minutes each day to a talk to the pupils on what to do to prevent injury while on our busy streets. This in my opinion will accomplish more good than anything else that can be done.

METHODS OF REACHING ADULTS

To reach the adults in another way in our city, we are now contemplating the use of a moving picture machine to display on the side of a building on one of our prominent thoroughfares various pictures dealing with the prevention of accidents. On each picture there will be a few words to describe how the accident portrayed was brought about.

The day has passed when a claim agent's work consists only of caring for the accident after it has happened. We must direct our greatest efforts toward prevention.

SELECTION AND INSTRUCTION OF TRAINMEN IN ORDER THAT COMPLETE AND INTELLIGENT ACCIDENT REPORTS MAY BE OBTAINED

BY E. A. BECK, CLAIM AGENT BRITISH COLUMBIA ELECTRIC RAILWAY COMPANY, LTD., VANCOUVER, B. C.

The selection of trainmen should be placed in the hands of one particular official. When the term of instruction is completed the same official who originally selected the man for service should examine him as to proficiency. The responsibility for the appointment thus will rest upon one man. The claim agent of the line should personally, so far as is practicable, impart to the new employee, with responsibility and dignity, the final instructions, as it is to this official that the trainman must eventually make his excuses in case of errors resulting in accidents.

The methods usually adopted in securing accident reports are by formal question and answer or by narrative. Prominence should be given to the narrative form, especially in primary investigation, as in this manner the trainman will, in his own way, best tell his story. The majority of trainmen object to being catechized and usually respond to questions with monosyllabic replies which do not bring out the full facts of the case. The narrative form should, however, always include questions relating to date, time, place, speed, name of person or owner concerned and witnesses.

THE ACCIDENT REPORT

The formal accident report should contain a few direct questions for stated answer, chiefly covering the specific points mentioned as necessary in the preceding paragraph. The form of the report should be such as to encourage the trainman to tell the whole story clearly and concisely, although not with the brevity of "Dog crossing track. Dog hesitated. Dog gone." It is often found that the general education of the average trainman has been neglected and the inclusion of a long list of questions on the accident report frequently confuses him and leads to his submitting a report which does not give the assistance or information needed by the claim agent.

It is not expected that a report from a trainman will be a literary production, but it is always to be expected that the statements will be truthful and in strict conformity with the facts of the case. To give assurance on this point the trainman should make certain to obtain the names and addresses of the greatest possible number of witnesses in any case where his own actions or the management of the line by which he is employed is liable to be called to account for any cause.

"Were you afraid to obtain witnesses?" "It was your duty to thus protect your company, yourself and your mate." "Others must be your judge." "An unjust claim may be made against your company." "You or your mate may be reprimanded and, possibly, discharged on account of this affair." "Every passenger is a witness, either directly or in corroboration." "Protect your company, yourself and your mate." "Observe and note carefully remarks, conditions and distances at the time of an accident."—Questions, suggestions and advice such as are noted might well be used by a claim agent when dealing with trainmen.

BLANKS FOR ACCIDENT REPORTS

Blanks for accident reports should, like the book of rules, be always "on the job." They should have printed thereon rules to be observed in case of accident and a number of pointed "Don'ts" and "Hints" for trainmen in preference to a long list of questions, many of which are superfluous. Space should also be left on the blank for a

diagram which will give full information as to the exact location of an accident.

Accident reports should be made out as promptly as possible and handed to the division superintendent or inspector, who should in turn transmit them without delay to the claim agent.

SELECTION AND INSTRUCTION OF TRAINMEN IN ORDER THAT COMPLETE AND INTELLIGENT ACCIDENT REPORTS MAY BE OBTAINED

BY E. P. WALSH, ATTORNEY UNITED RAILWAYS COMPANY OF ST. LOUIS.

As between selection and instruction of trainmen, to my mind the former is the more important. With a proper selection the instruction that is later given will prove more effective and productive of better results than if the selection be an unwise one. In fact, no amount of instruction can compensate for an improper selection. I think this fact is every day being more forcibly impressed upon those in charge of street railway affairs in this country, with the result that greater care than ever before is now being exercised in the selection of trainmen.

When it becomes necessary to add a new trainman to the service, my judgment is that the raw recruit is the preferable selection, unless the applicant be one who has worked with the same company before and left under excusable circumstances with a good record and has not been away sufficiently long to become out of tune with the system's ways of operation. There are, of course, exceptions, but as a general rule the experienced man, with such experience gained in another locality and under different management, is very likely to have ideas of his own about railroading and will not so readily accommodate himself to the ways of his new employer, if there be any essential difference in methods.

The official who selects trainmen should also be competent to instruct in every feature of the work. This means that he must to a certain degree have a knowledge of the workings of the claim department, and between his office and that department there should exist the most friendly and cordial relations together with a thorough understanding of methods. In fact, there should exist the friendliest possible relation between all of the various departments of a successful system and this same feeling and principle should be imparted to and absorbed in turn by the trainmen.

THE FIRST INSTRUCTION

As a part of the first instruction given an applicant should be the information that accidents are to be expected; that the officials realize that at times they are unavoidable. He should be made to understand that he and his associate on the car are operating a large and dangerous machine over streets whereon are thousands of other vehicles and that the safety of life and limb of the passengers is dependent every moment upon their skill and fidelity to duty. Their manhood should be appealed to by impressing upon them a sense of the responsibility of their work and the importance of ever being alert and vigilant. However, they should be made to understand that the officials realize that with the greatest care on their part accidents are ever likely to and will sometimes happen, without any fault of theirs, and no blame will attach to them unless they are culpably negligent. Should an accident occur from any cause it should be reported honestly and fully and the names of all possible witnesses secured. The instruction should be sufficiently comprehensive to disclose the reason for and the importance of the report and witnesses. The trainmen should be made to realize that to the traveling public they are the company, that what they do in the course of their employment is the act of the company. Instruction with relation to accidents should be imparted in such a way that effort will constantly be made to avoid them not because of fear of reprimand or dismissal, but because of absolute loyalty to the employer.

The first effect of fear for consequence of an accident is felt in the claim department in the form of unreported claims, which have ever been the bane of the claim agent's existence. They come like a stab in the dark from a dagger in an unseen hand and from the wound thus made there is often a copious flow of the treasury's blood. I realize that at times, because of apparently wilful violation of well established regulations, it would seem necessary for purposes of discipline and example to discharge an employee; yet in discussing this matter from the viewpoint of the claim department it has long been a question with me if it is advisable to dispense with the services of an experienced man because of an accident. The right sort of man will hardly have the same accident twice, and the hazard of training a new man involves not only his likelihood to have the same sort of accident the other man had, but a thousand others as well of which his lack of experience affords him no knowledge. This is important as affecting the instruction the trainman is to have along other lines than that of imparting fear of dismissal for accidents. He should be taught to expect them always and be ever alert to avoid them.

THE ACCIDENT REPORT

The accident report itself should be sufficiently comprehensive to elicit, by its interrogatories, an explanation of every important phase of the occurrence, couched in plain, simple language and containing no more questions than are necessary to a clear understanding of the essential details. Before a man is permitted to "turn in" for work he should be required to make out an accident report under the tutelage of the employing official or some one in the claim department, and the instructor should be satisfied the trainman understands not only the report in all its details but the reason therefor as well. It should be made plain to him that the report is not only to furnish to his foreman or superintendent knowledge that he had the accident, but that in making it out properly and in securing all the witnesses possible he is in fact laying the foundation of the evidence for defense of a damage suit. He should be impressed with the idea that a lawsuit is not only the possibility but the probability of every accident and that it is incumbent upon him, whether motorman or conductor, to do all in his power at its inception to get the case in proper form for a successful defense; that the very first and most valuable effort in this connection is an intelligent, complete and honest report with witnesses. If the accident be one for which he feels himself to blame it is necessary to report it just as fully and get witnesses that the company might know at the earliest possible moment with certainty of its liability and get out of the difficulty as early and easily as possible.

Of course, to the new applicant there is so much instruction given that it is sure to prove confusing, and the necessity of following up the work is apparent. Some one has said that the greatest inheritance a boy can have is a good father. I might paraphrase this and say that in my judgment the greatest boon to the right-thinking trainman is good and intelligent superiors, especially superintendent and supervisors.

It has frequently been advocated that the claim department, by oral or printed means, should furnish instructions to the trainmen. I rather incline to the opinion that the instruction in what is desirable from the claim department's standpoint should be given to the superintendents and by them imparted to their men along with the instructions in regard to other requirements of the service. The superintendents should be thoroughly informed and be impressed with the importance of the instruction from the claim department viewpoint and not slight that feature of it. The

superintendent should know his men. He should read every accident report before it goes to the claim department and its defects, if any, should be called to the attention of the trainmen and they be instructed how to correct them. When a new man is put to work he should be called to the superintendent's office every two or three days for a considerable period and questioned about his experience and, in the light of that, again instructed in detail with reference to the things he has already been told about by the employing official but much of which perhaps has by this time escaped him or its application had not been properly appreciated. In this way the instruction will serve the purpose of teaching the beginner how to avoid accidents as well as how to take care of one when it happens. If started properly and taught to avoid accidents rather than to fear punishment for them, the trainman usually continues in that manner, especially if talked to occasionally and brought into personal contact with his superintendent, whom he learns to know and respect for the interest he sees manifested in him.

The superintendent should be in close touch with the claim department and its work and be quick to note and follow any change in its methods. Between his department and the claim department there should also exist the most cordial and friendly relations, and the work of both departments should be conducted, as indeed they are, as part and parcel of the same institution. The successful operation of one should not result in a disparagement of the other.

CONCLUSION

In conclusion, I should say that a selection of trainmen should be by an official especially adapted to that work, who should impart the first instruction in all branches of the service. He should devote his whole time to the task, see that suitable records are kept and in a way maintain general supervision over the trainmen. The claim department should furnish all necessary information to this official and to the superintendent, the latter to continue the work of instruction when the trainman is sent to his division. The claim agent should be in frequent consultation with the officials of the operating department and all information should be accorded them. I feel, however, that the best results can be accomplished in obtaining complete and intelligent accident reports by a more thorough education of the superintendent in all that is needed therefor, and that information thus acquired by him should be continuously, insistently and persistently communicated by him to the trainmen.

THE PREVENTION OF ACCIDENTS

BY ELLIS C. CARPENTER, CLAIM ADJUSTER INDIANA UNION TRACTION COMPANY

Reflect for a moment and see what a field broadens before you. There is no limit to its possibilities; its paths are many, with numerous fingerboards pointing to lands of promise. Go where you will, problems and possibilities will be found which will warrant your best efforts.

INCREASE OF INTEREST OF EMPLOYEES

(a) *"What can be done to increase the interest of employees of all departments in the work?"*

Do accidents affect all departments?

Can we interest the employees of each department?

Let us see.

In order to make it possible to have accidents on a railroad or electric line, we must first provide the means for them to occur. Accidents do not "happen," they "occur."

The superintendent in charge of this department should realize the advantage of good organization. He should select carefully his division engineers, bridge and section foremen, section men and others under his control. In conferences with his division engineers, he should outline the importance of careful inspection at stated intervals of every foot of track in the system. Special work, curves and all places subjected to extra wear and hazard should have more frequent inspection. Materials to be used must receive close attention before being placed in use. Defective parts should be cast aside and never used and worn portions replaced before the danger point is reached if safety is to be the watchword.

The division engineers, in turn, should meet with their section foremen and other subordinates, covering the same points in the way to impress best upon them the importance of each man feeling the individual responsibility necessary for him to strive to make his work the best and safest. A friendly rivalry among section foremen will increase interest and bring good results.

Many a car has been derailed or overturned at a curve where the rails have spread on account of spikes failing to hold in ties that were left in a little too long, when a few new ties, properly spaced, would have made the curve perfectly safe. Every tie, every spike, every bolt—in fact, all materials—as they pass the eye of the men who are to use them in the places for which they are intended should undergo this last and most important inspection. The men must realize that they share in the responsibility for the proper use of these materials.

With the track and roadway in proper condition, guarded by zealous gangs of men who have faith in their superiors, each one realizing that he is an important factor upon whom a share of the responsibility rests, we have taken a long step in the prevention of accidents.

MOTIVE POWER DEPARTMENT

The proper construction and maintenance of the rolling stock is vital in the proposition of preventing accidents.

Do your machinists realize that if a defect is found in material attention must be called to it at once and before it is placed in service? A slight defect in a flange, discovered while truing, may if the wheel is put in service cause a serious wreck. Inspect; report; do not take a chance. If material is unsafe, scrap it.

Do your carpenters realize that with every joint made, and every nail driven, should go the best effort of the workman? No job is done until it is well done.

Do your blacksmiths understand, as they form a weld, that upon that very weld may rest the responsibility of a collision or the prevention of one? The smith whose welds withstand the strain is the one in whom there is placed most confidence.

Do your inspectors care whether a car is in safe condition, or will they pass it with "I guess it will do for another day, if everything goes right"? Which kind of inspectors do you want?

For all of the various avenues leading to trouble the superintendent of motive power should sound a warning, either directly or through his foreman. So instill in the minds of the workmen that care and attention to details are necessary that each may be impressed that his work is just as important as the work of any other. Thus, when a job is completed it will embody the very best that is in the workman and bear the very impression of the souls of its builders.

POWER AND ELECTRICAL EQUIPMENT

In the production and distribution of the electric current much machinery and labor are required. Careful instruction of the employees of each class of labor is necessary. Each should understand the duties and dangers incident to his employment. No green hand or unskilled workman should be taken from one class of employment and placed in one more hazardous until he has been instructed as to the dangers and requirements of the new place.

I have thought that the very nature of the work of linemen tends to the reckless. They become so accustomed to the dangers that they fail to give full credit to what may happen to innocent persons. Linemen usually are expected to do their work with much dispatch. They go to trolley

breaks with horses on the run, and in their anxiety to get cars going they are apt to overlook placing proper safeguards so the innocent bystander and persons passing will not get tangled up with a live wire. Their familiarity with the dangers of a live wire should cause them never to leave a low hanging wire or an unsafe condition. These places should be guarded as they would if they were expecting their own wives or children to be kept from danger.

Carefulness and caution must be instilled into all of his employees by the head of the power and electrical department.

TRANSPORTATION DEPARTMENT

In the selection of men for train service, as well as the employees of the other departments, the steam roads have the advantage of the electric systems; they have been engaged in their business long enough for the sons and grandsons of men employed in the various departments of the service to grow up surrounded by an atmosphere impregnated with the railroad spirit. It is not so with the employees of the electric systems. Many a motorman and conductor has taken his car with only a few weeks' training, having absorbed what he could while being "tried out" or "broken in." Systems have developed so rapidly, and the demand for competent motormen and conductors has been so great, that it has been next to impossible to supply its needs. For this reason a great responsibility rests upon the man who passes upon the applicants for the positions of motormen and conductors. He should be quick to discern the qualities necessary for each. Seldom is a man fitted for both ends of a car. A man with the qualifications required in a motorman will not make an equally good conductor, and vice versa.

By far the greater number of accidents on electric lines are directly traceable to some act of a trainman, or come directly to his notice for immediate attention. If we are to enlist the trainmen in the campaign to prevent accidents, we must keep before them the seriousness of the accident features and many of the results thereof.

It behooves the management to see that close inquiry is made concerning the ability, integrity, personal habits and environments of all applicants for motormen and conductors; and that they are thoroughly instructed not only with reference to the proper handling of the equipment, but as to what to do to prevent and how to handle accidents from the standpoint of the claim department. Each applicant should be required to pass a written examination touching matters relating to accidents.

Occasional talks to the men, where they, too, may have the opportunity of giving their views upon the matters under discussion, should be had. Many good suggestions will be made by them.

By meeting with the trainmen, talking over with them the problems that confront us, taking them into our confidence, instilling in them a spirit of carefulness, co-operation and loyalty, we will get splendid results.

(b) *"The best means of promoting greater caution on the part of platform men."*

I would suggest taking these men into the confidence of the claim department. Keep close to them, through personal contact, meetings, entertainment, bulletins, etc. Show these men the large expenditure incident to accidents; the cripples who have to fight life's battles under adverse conditions; the widows and children who mourn the loss of loved relatives; all because some motorman "forgot" his order and was not attending strictly to business.

Men respond to proper appeals. Do not be too ready to criticise. Hear both sides of a question before passing judgment. Let the men understand that where they are right you will fight for them; that where they are wrong you cannot protect them. Stimulate in the platform men the desire to save every accident possible.

Many boarding or alighting accidents may be prevented if the conductor will shout a warning, block the way of the passenger about to alight and not open the door on the pay-as-you-enter cars until the car stops.

Keep the men posted by bulletin or circular letter on general results. Keep them interested by asking for suggestions for lessening accidents. Indicate from time to time how certain classes of accidents may be avoided. All will have a tendency to better the service, as well as to reduce accidents.

AUDITING AND TREASURY DEPARTMENTS

The work of the auditing department will decrease in proportion as accidents and troubles decrease. By a careful checking of baggage reports, preserving and filing for reference all daily reports of trainmen, the auditing department can materially assist in preserving important records and data for use by the claim department when needed.

Upon the treasurer the effect will be more noticeable in proportion as the percentage of the gross receipts necessary to meet the requirements of the claim department decreases, and you will discover his smile broadening as he greets you with a glad hand.

CLAIM DEPARTMENT

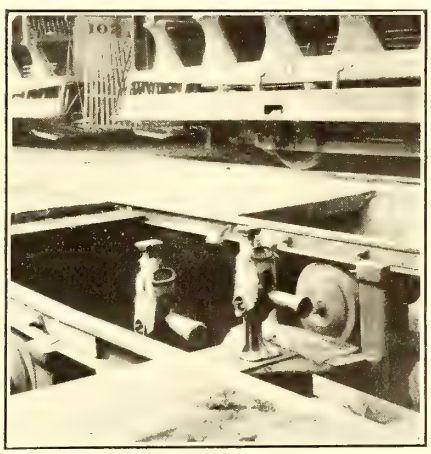
See that all of the other departments are permeated with the desire to prevent accidents.

Reduce your litigation and expenditures to a minimum.

Spend your leisure time at home with the baby, enjoying the rest made possible by the prevention of accidents.

WHEEL GRINDER AT SALT LAKE CITY

An effective method of wheel grinding without removing the wheel or axle from the motor is in use at the repair shops of the Utah Light & Railway Company, at Salt Lake City. The work is handled by a pair of emery wheels mounted on a frame set in a pit and belt-driven from an old motor, the rails immediately above the grinders being sectionized. The scheme of operation is as follows: A car is run into the house over the pit and the body is jacked up sufficiently to take the weight off the motor. The rail sections are then removed, the grinders raised to the wheel peripheries, and the motor is disconnected from the cast grid resistance beneath the car and connected with a water-barrel rheostat in the pit. The motor and car wheels are then run on the first notch of the controller, the grinder being run by its motor in the opposite direction. In this way the wheel can be ground in from twenty minutes to two hours, according to the conditions, whereas formerly the company had to take off the wheel and throw it away when the tread reached an unsatisfactory condition. A blower is provided in the pit and driven off the grinder shaft, to remove the dust caused by the grinding and throw it out of doors through a discharge pipe. All new wheels are ground to a true circumference by the company, with the result that the life is greatly increased and the troubles from flats reduced.



Pit Grinder

The Bay State Street Railway had an interesting exhibit at the Chamber of Commerce Industrial Exposition in the Mechanics' Building, Boston, Mass. One of the features was a special plat of its lines.

Physical Valuations

The Author Discusses the Services Rendered by the Promoter, the Ways in Which Profits in Public Service Enterprises Have Been Limited, and Some Merits of Watered Stock

BY O. T. CROSBY, PRESIDENT WILMINGTON & PHILADELPHIA TRACTION COMPANY, WILMINGTON, DEL.

You have been told in able papers heretofore presented how to make a physical valuation of a public utility property. It remains that now we need consider only this—why make a physical valuation of these properties? Is any good purpose served thereby? And we may also consider the almost identical question, When shall a physical valuation be made? The inquiry may be further subdivided; who is interested in physical valuation—stockholders or creditors, or the general public, or all these?

We must weary a little those who are impatient with rigorous definitions by pointing out that the term "physical value" may have two widely different meanings, leading to much confusion of argument, unless agreement at the outset be clear as to the exclusion of one or the other of these two meanings. Thus, shall we, or shall we not, include the cost of the several possible rebuildings of a given plant? Or is replacement value the true and only physical value? Merely for the sake of clarity let us in this discussion take the words in the former sense. When we thus include the honest and riskful expenditures for things that were good in their day and were then thrown away, we might well use the term moral value instead of physical value. He who would treat the early risks of capital as though they never existed is a repudiator and a kill-thrift.

INVESTMENT IN AN EXISTING PROPERTY

So far as the interests of the investors are concerned a sharp distinction exists between the case of a new enterprise and an old one as to whether or not strict attention need be paid to the physical (or moral) value of the thing that is to operate. Thus, if a long-established property, having a known and relatively stable earning capacity, should go into the market for $1,000,000 or $5,000,000, the money would be lent (or otherwise invested) chiefly on the basis of the known earning capacity and a reasonable assurance that the new funds are to go to the betterments, not to be wasted.

It would not be very important to go at length into the question of the replacement value of the property as it exists at the moment or closely to investigate the past with a view to determine how much money may have been spent on what is now the scrap heap. A going concern, by presumption, has sufficient plant to earn so much net profit. Additional funds are required for some specific purpose which, at worst, cannot be thought to diminish and in fact will probably increase this net profit. A given factor of safety satisfies the investor. This factor of safety must always rest upon earning capacity and can never be guaranteed by the mere brutal fact that such a sum of money has been spent. One dollar wisely spent and wisely managed may earn many times more than $2 in the hands of fools.

INVESTMENT IN A NEW ENTERPRISE

In a new enterprise, however, the investor wants to know, as nearly as possible, the real cost of the venture. He wants to know how much profit is probably to be had in order to determine the degree of his risk and to settle the terms of his partnership with the originators and administrators whose work alone (or whose work and capital) will be combined with his own capital. The necessary cost may of course include money paid for rights of various kinds which are "physical" only in an indirect way. But such rights as may be necessary to the use of physical property may be taken, for the purposes of the venture, as part of the material structure and, as your early papers show, the cost of such necessary rights generally is, and must be, considered as integral with the cost of iron or cement.

Both investors and administrators desire also to establish the costs of their material property in order to be furnished with a convenient formula for expressing an insidious and sometimes neglected element of operating expense. I mean the cost of depreciation. It is true that the formulas which express depreciation as a percentage of present physical value are often enough erroneous; yet they should not be discarded. They offer helpful suggestions. It is probable that in the long run they will be replaced by formulas based upon some unit of operative work, as upon a car-mile movement, rather than upon the mere cost of material constituting the operating system. Naturally we shall not have a perfectly accurate expression without including an impossible number of factors. The task need not here be essayed. We, and our allied financiers, have recently been keener about the matter of depreciation than heretofore.

WHAT CONSTITUTES INVESTMENT?

The relation which is now most puzzling—which in some cases is almost baffling—springs from the fact that a street railway is not a private enterprise so far as its conduct is concerned, though it is strictly private from the point of view that money invested in it is wholly risked by the investor. It is this relation which I shall to-day endeavor to analyze. From this point of view the question of physical valuations becomes the whole question of our fiscal relations to the State. We must now ask ourselves, "For what purpose are various commissions seeking to establish replacement values?" And out of this flows the general question, "What treatment are we to expect in all respects from the public authorities?" It is this large aspect of the matter which shall control my remarks to-day.

The present status is abnormal and necessarily temporary. It cannot be permanent. In effect the public now says to the investor in a public utility: "You shall operate your investment as I may determine. I refuse to guarantee any return on your money, but I shall fix at my will and from time to time as suits my pleasure the percentage of profit which may be declared on——" On what? On the whole investment, including past and gone experiments? Or on replacement value? Or on outstanding securities? The utter confusion in which the subject lies may be best understood by referring to the decisions which have been given in cases not controlled by a rate fixed in the basic contract (or charter) of the public utility. It has actually been necessary to go to the courts to obtain a ruling that the rate-fixing power shall not be used to confiscate a threatened investment. The courts, in some well-known cases, have gone further and stated that rates should, if possible, be maintained at such figures as would give a so-called reasonable return on the capital invested. Whether, in such rule of so-called reason, there should be taken into account years of no dividend in the past with a view to giving some so-called "reasonable" return on an average of many years and whether or not experimental expenses and party replacements are to be always taken into account—as to these important questions we have no clear rule.

Legislators are groping, many of them in an honest en-

*Abstract of paper read before the American Electric Railway Association, Atlantic City, Oct. 9-13, 1911.

deavor to be fair; others are groping only to do the thing that will be popular at the next election. Commissioners are embarrassed by the possession of vague powers. If they go too far the courts may check them; if they go not far enough the public, necessarily ignorant of the specific rights of corporations, will demand prosecution which may rapidly deteriorate into persecution. And investors are groping.

INDEFINITE FRANCHISES

The trouble arises from the fact that at the very beginning of public utility enterprises the bargains made with the public were not sufficiently definite. All who have had experience in working over a European concession will remember how at first the American, accustomed to the quick and easy-going methods that were in vogue twenty years ago, rather shies at the long, precise and apparently embarrassing provisions which go to make up a contract with the public authorities. Some of us would be glad now to be able to fall back on anything specific rather than to be buffeted by the caprice of official guesses as to what sort of returns should be permitted to money ventured in the public service. Even in Europe, however, there has not been any very general settlement of the question as to just what the public is willing to permit in the way of profit to private money invested in public utilities. If there were no limit expressed in the rate of dividend or imposed by way of fixing rates the subject, of course, would scarcely need treatment. And it was this point of view which prevailed among many who went into public utilities thirty or forty years ago. It may be taken as perfectly certain that few of these enterprises would have attracted a dollar of capital if it had been known that the implied ratemaking power of the State would be afterward used to limit the returns of capital thus invested to 6 per cent or 7 per cent or 8 per cent or 10 per cent.

Every one over forty can remember when all these things went, only because a certain "hurrah" could be created and a hope of large profits held out to those who ventured their funds. That the public, through its officials and through the general assent of the whole body of people and through the known advertisement of such stock when presented for subscription, became a party to this theory cannot well be doubted.

Of course it is now easy to state that everybody must have known that there exists always, and must exist always, in the State the power to fix rates so that a "reasonable" return (and perhaps only a reasonable return) should be allowed to capital. But such was not the theory then. That this is evident is due to the facts above mentioned and the further fact that, in order that such a theory should have any practical application, it must be determined as to whether the implied limitation of dividend shall be on replacement value fixed at any particular time or on the total investment, much of which may have been lost. And it would also be necessary to determine whether or not an average or an occasional dividend was contemplated. With rare exception we know full well that this subject was not so much as broached in the charters out of which were born a great majority of the public utilities of this country. Furthermore—and this is very important—it would be necessary to express a rule to guide in condemnation proceedings or to guide in the liquidation at the end of a fixed-period franchise. We all know that the State may take the hats off our heads, provided a due compensation be made. But that due compensation should not be a matter of *ex post facto* judicial determination. Let us know beforehand whether earning capacity or physical value only shall be considered. Investors therefore are entitled to say, "If there was an implied limitation, what was it, exactly? At least, what were its elements?" To this question there is as yet no answer.

RATE MAKING AND REPUDIATION

If, therefore, the rate-making power be now so employed as to make an extremely narrow possibility of profit it is a very plain case of repudiation. The word is an ugly one, but I use it advisedly. At the same time I use it quite without bitterness and with full recognition of the fact that no State can exist without occasionally exercising the sacred right of repudiation.

Every conquest over wrong has been made by repudiating "recognized rights" that have degenerated into wrong. The French Revolution was a bloody repudiation of rights that had been fully acknowledged for 1000 years. But the word is ugly because it represents a kind of act that should be done even by the State only in the direst necessity. If a supreme and sovereign remedy, as that of electrocution or repudiation, be too commonly applied, then madness lies that way.

LIMITATION OF PROFIT AND RATES IN NEW FRANCHISES

We can avoid even the probable necessity for such an act in respect to new franchises if we but clarify some of the doubtful points about which so much contention is now raging. Let us suppose that the public, you and I and John Smith, make up our minds that we shall not permit more than 20 per cent profit to be made as an average return to the cash investment made in a public utility. Let us say that when this point is reached operative companies must recognize our partnership in the enterprise by diminishing rates, but that while working within this allowed limit an operative company shall be left to carry the burden of working out the best way of producing traffic..

It goes without saying that this becomes at once a permanent rate regulation. It also goes without saying that few enterprises would be found making such a profit, even when allowed. And it again goes without saying that it will often be easier to make 10 per cent or 20 per cent by having a relatively low rate rather than a relatively high rate. The electric light company which might to-day try to charge 25 cents per kw-hour, if permitted to do so, or the ordinary street railway company which should try to charge a 15-cent fare, if permitted to do so, would, in both cases, become heavy losers and wind up as bankrupts without any assistance from the public commissions.

What would be secured by this limitation would be this, that only a certain maximum rate, found to give most nearly the maximum return on the investment within the agreed limit, would ever be charged by the operating company.

It should be borne in mind that any such limitation at once differentiates a public utility investment from a private investment. There it is not 20 per cent, but 2000 per cent or 20,000 per cent which is the possible return on the investment.

REASONABLE RETURN

It would be probable, however, that, in spite of a limitation at some such figure as that suggested, a sufficient amount of money could be obtained to make the needed development of public utilities. Indeed, it may safely be stated that the promoter who endeavors to borrow, in the usual classical way, all the money required for his project in the shape of a bond issue, will be able to get the money, other things being equal, if he can demonstrate to bankers the high probability that his enterprise will earn say three times the interest charges on the actual cash invested.

Fifteen per cent to 20 per cent may seem a high margin for those who have not tried this very often, but when it is remembered that it is the fashion for bond houses to require a showing from established companies of at least twice the bond interest in net earnings it will be seen that the relative conservatism of to-day would probably demand of an entirely new venture estimates indicating a good deal higher earning capacity than two to one over the bond interest. This is quite reasonable, since estimates, after all, are only estimates. Hopes are only hopes. But bond interest is hard cash. It will not be necessary on

this occasion, however, to sharpen our pencils in an endeavor to fix exactly what would be an inviting rate to cover cases of entirely new ventures.

I want particularly to urge, however, that we should always and always cry out for something *definite*, something precise in regard to limitations which the public desires to place upon the earning capacity of money invested in public utilities. This limitation should then be further defined as to whether or not it shall cover honest mistakes of the pioneer in regard to the purchase of plant and that necessary obsolescence which must be faced, even if the highest wisdom be used in plant purchase. Let us once for all have a definition in our charters of "physical valuation" in that sense; let us find out what this yardstick of "physical valuation" is intended to measure. It is not improbable that in clarifying this subject it would be quite reasonable to establish a different percentage of return for money going into new ventures as compared to that which goes to increase an existing or prosperous public utility.

The public is, of course, a partner with the investor and administrator of every public utility. If by its growth it has given a firm establishment to the outstanding securities of a given concern, if those securities have earned 5 per cent or 6 per cent on their average market valuation during say the preceding four or five years, then the partnership interest of the public may express itself by limiting additional profits to such amounts as are necessary to assure only a comfortable margin beyond the payment of 5 per cent on all fresh capital required for extensions and betterments.

REPUDIATION INVOLVED IN LIMITING RETURN

I am aware that there is some suggestion of repudiation from the point of view above indicated, even in such treatment of such existing companies, but the practical wrong done would not be great if the market value during the four or five years previous to any new regulation should be taken account of when dealing with outstanding stock and on the average of such value should be placed a limit of future stock dividend.

It might be questioned that such a rule could be constitutionally applied. As a matter of fact it would not be, in legal effect, different from the rate regulation that is now resorted to in all such cases. It would be, in fact, a rate regulation applied with far greater simplicity than is now done through the various commissions operating in this country.

And it is not improbable that numerous companies would be glad to waive any technical objection which they may be able to set up to the fixation of such definite limits in order to be free from the vexatious inquiries and valueless determinations which must be made in the effort of society to exercise its share of the partnership if that exercise be done only by the present methods.

METHODS OF LIMITING RETURN

I need not remind you of the fact that endeavors will be made to extend transfer privileges which may mean a substantial lowering of rate. There will also be endeavors made to extend the length of ride covered by the charter rate of fare and there will be endeavors made to impose construction charges of various sorts on street railway companies, all of which endeavors will be in the end, when successful, of like effect as if the traditional 5-cent piece which should be rendered unto Cæsar were clipped to 4 cents or 3 cents.

Many theoretical rights of difficult application might be traded off with advantage to us and to the public for some perfectly definite understanding with the public in respect to our possible profits. And if, in fact, no great progress be made toward an actual and formal redrafting of contract relations with the public we may the more successfully resist some of the unjust attacks which will be made against us if by constant public discussion and occasional formal adoptions of definite rules there shall be finally established a tradition more just and more definite than that which now surrounds the subject when it reaches the court.

We should also have in mind the fact that in some cases even those charter rights in respect to fares which have been accepted for years as indisputable may be challenged and by some unexpected judicial inspiration perhaps actually set aside. The possibility of finding ourselves in the position of utilities whose rates are now subject to regulation requires us to familiarize ourselves with conditions that would then have to be met. We have also to consider that a number of street railway franchises are of limited duration, expirations are occurring from time to time, and at times conditions become so embroiled that it is found best on both sides to take out a new charter if the old be not definitely ended.

We should, therefore, from every point of view, be prepared with some fairly definite ideas as to what would be a proper relation to establish between a public utility and the public. This is best had by considering a new case. Let the modification and the complications arising in the older case be set aside, and let us remember that they can be the more readily solved if we agree upon some ideal relations which would govern a new case.

PERMISSIBLE PROFITS IN NEW COMPANIES

As indicated above, I should consider that a definite statement of the allowed average percentage of profit should be one of the fixed elements of the contract and the thing upon which that profit is to be calculated should be definitely stated. Such an agreement in regard to a limiting profit, it must always be pointed out, is, in fact, a substantial rate regulation, free from the petty complexities surrounding the effort to regulate rates by those who cannot possibly have the familiarity with them which comes only through the experiences of operation.

Let our stand be this, that men will not work as men must work in public utility ventures without the expectation of liberal rewards; that we prefer to have the upper limit of these rewards made definite rather than to be continually in contention with public authorities because they are indefinite and, before giving up the convenience of the modern share capital company with bonus stocks, let us demand that something better shall be contrived by virtue of which it will be possible, as it will also be desirable, to represent capital in any capacity either separately or combined. And if finally the public rules against liberal rewards, and also against convenient methods for their distribution, let all of us, as citizens, recognize that such ruling must inevitably result in making the strong stronger, the weak weaker. Every new construction must then be but an extension of an old and prosperous company.

In a rigid régime of 6 per cent there is no place for the daring promoter who risks all to gain or lose much. And I venture to say that when his voice shall no more be heard in the land many there will be to deplore his departure. Good and bad he is, like prophets and presidents, like winds and waves, like dogs and drinks, but in the main, whether dreaming a transcontinental line or a modest intervillage trolley, he is a true empire builder, personification of the hope and vigor of our race. He is the Ponce de Leon of commercial progress. He ventures into a thousand hardships, makes a thousand discoveries, while seeking a perennial spring whence shall flow rejuvenating streams watering the stock born of his undying hope and his prophetic vision. The source of the stream indeed is ours, but 'tis he who discovers it. Let him bottle it legally; let him sell it under the pure-food law, specifying its contents—giving a statement of what is in it. He can then go to a person and say: "There you are; there are the facts. This paper represents money. This paper represents work." And, after all, what is capital but the fruit of work performed yesterday? Let the work of to-day and to-morrow also be watered into fruit.

Overhead Charges*

A Discussion of the Elements of Value of a Non-Physical Nature Which Are Properly Included in the Appraisal of a Public Utility Property

BY PROF. MORTIMER E. COOLEY, DEAN OF THE UNIVERSITY OF MICHIGAN

In the valuation of the property of public service corporations aggregating $1,100,000,000, I have had the honor to serve both the public and the corporation. By far the greater part of my work along these lines has been done for the public; and having in the beginning and for about seven years worked exclusively for the public I naturally approached the problems from the side of the public and, it might be said, as against the corporation. It very soon became apparent, however, that either the contentions of the corporation were sadly at variance with the facts or the public was densely ignorant of the true state of affairs; and henceforth the real problem was to discover as nearly as might be the common ground upon which there could be no serious disagreement.

It must be said at the outset that the responsibility for misunderstanding rested largely if not wholly with the corporations. Their business is of a technical character and not readily understood by the layman without explanation, and the corporation official had not in the past felt called upon to make explanations, at least not of the kind inspiring confidence in the public mind. This is now seen to be true, and while not too late for correction the failure to comprehend its importance, even its necessity, at an earlier date has led to the very serious controversies of today, wars they might be called, between the public and the public service corporation. The public is fighting for what it honestly believes its rights and the public service corporation is fighting for existence.

Setting aside the mistake which has been made in the past of keeping the affairs of the corporation in a sealed book, any fair-minded man who will make a study of the problem with all the information now available must inevitably reach the conclusion that the present attitude of the public toward the public service corporation is as much at fault and quite as blamable as was the secretiveness of the corporations in the past. The public, slow to wrath, is a mighty force when once aroused and can no more be resisted than the ocean tide. It, however, reaches its height and begins to ebb in due course, and it remains to be seen whether in the future we shall profit by the experience we are now having and establish conditions far more stable, so stable in fact that a similar situation cannot again arise. Much swifter progress could be made in bringing the war to an end if the fight could be carried on by the master minds on both sides. History reveals that unfortunately that is not the way wars are conducted. Politics has prolonged many a war and delayed the re-establishment of peaceful conditions after the war itself was ended. The political charlatan thrives at such times and seeks to maintain the conditions necessary to his nefarious existence. But he is not the only parasite; there is also the unprincipled expert, scientific expert he calls himself, whose expertness lies in being able to set up an array of figures in apparent proof of any result desired or required of him by his boss. If anything he is more dangerous than his boss, because his weapons are figures juggled to suit his purpose, and only to be refuted by an expert on the other side, who, however honest he may be, is sure to be considered by the partisan equally unprincipled.

OPPORTUNITY FOR THE ACCOUNTANTS AND ENGINEERS

The real forces effective to end this conflict between the public and the public service corporation are the accountants and the engineers—not to end it, perhaps, but to point the way so that the man who really desires to be fair may have before him the facts upon which to base his judgment. The public as a whole is honest and fair—it is only individuals who are dishonest and unfair—and once the ignorance of the public has been dispelled the true and correct solution will be in sight. But the engineer and the accountant, while in the main honest enough, are not to escape responsibility in some measure for their ignorance.

The engineer has not always dared to tell the whole truth, fearing it would not be believed, and that his reputation would thereby suffer. He has therefore told but a part of the truth, and now when the necessity for the whole truth is imperative his task is much increased, he being obliged to explain his earlier position. In many, and it is to be hoped in most, cases this earlier position of the engineer was due to ignorance of the real facts, or more likely to knowledge of only a part of the facts. It is only comparatively recently that the engineer has been called upon to work with the accountant and the financier in the development of all the facts in the creation of the property of a public utility corporation. Is it therefore to be wondered at that the public has remained in ignorance?

The accountant's share of the responsibility cannot be said to be due to ignorance or to any fear that his reputation might suffer from a disclosure of all the facts. It is repugnant to the average mind to wrestle with the mass of figures required in setting up the details of accounts. It should be possible for the man of average intelligence to enter an account and find there the essential things required in comprehending the cost and the value of a property and the expenses of operating and maintaining it. It should not be necessary for an expert accountant to spend months digging through accounts for the necessary data upon which to base costs and values. This criticism does not bear today with the force it did in earlier years, because of the study and effort on the part of accountants for a number of years past to devise methods or systems of accounting which will afford almost at a glance any particular kind of information desired. The accountant has rather been the custodian of facts, the keeper of the storehouse as it were, but now he must perform the additional task of preparing the facts for consumption. The facts required by the public at this time are in themselves simple enough; the difficulty lies in devising means to disclose them so that they can be easily comprehended.

APPRAISALS OF PROPERTY

The public desiring to inform itself as to the cost and value of a public utility property requires an appraisal to be made, that being the simple and obvious way to go about it. Prior to 1900 the principal appraisals of this class of property were of water-works. In practically all cases this investigation was made to discover the *value* of the plant with a view to taking it over from private to municipal ownership, the condition for the transfer being usually set up in the franchise. These appraisals were usually made by engineers, it being customary for the municipality and the company each to choose one or two and these to choose another who should act as chairman and cast the deciding vote in case of a tie. All too frequently the appraisers entered upon their work as advocates, each for the side choosing him, and the appraisal became a controversy,

*Abstract of paper read before the American Electric Railway Accountants' Association, Atlantic City, N. J., Oct. 9-13, 1911.

which had finally to be settled in the courts. The decisions handed down have become the law of the land which, while almost wonderfully good in the majority of cases, is not altogether applicable as precedents to many of the cases arising to-day.

The chief object in those days was to arrive at the value of the property, which included the so-called "going value" of the property. "Goodwill" was another element considered. But to-day, and since 1900, appraisals are made not alone to discover the value of the property, but the cost as well. The appraisal to-day is not so much for the purpose of transferring the property from private to municipal ownership, although that is the alleged object in a few cases, but for the purpose of taxation and rate making and to determine the extent to which the issuance of securities can be authorized. Obviously it is to the interest of the corporation to have a low value for taxation and a high cost for rate making and the issuance of securities. But of course both cannot be had except as the facts justify them. And right there is the first obstacle encountered by the public and the corporation in coming to an understanding. The public fails to see any difference between the cost and the value and argues, not without some show of reason, that if the property has a certain value for taxation it surely ought not to be different for rate making and the issuance of securities. The fact that the corporation fights to keep its figures down in the one case and up in the other no doubt contributes in no small degree to the attitude of the public toward it. It is, therefore, important to discover first if there can justly be any difference in the two cases and, second, if so, to what extent can such differences properly exist.

It is not so much my purpose in what follows to say what ought or ought not to be done as to indicate the things which must receive consideration in determining what ought or ought not to be done. The average individual thinks of the value of a public utility property as consisting merely of the things which can be found and inventoried; in other words, he thinks of the value as being made up of the physical elements only. For many it is quite a long step to add any intangible elements or to consider the capacity of the property to earn a return on the investment. The farmer, for instance, in placing a value on his land unconsciously considers how much of the different things can be raised, the first element of value being its earning capacity. Then he considers the physical structures, house, barns, fences, drainage equipment and stock and other things which he has had to add from time to time, and for which he has had to invest capital in one form or another. I venture to say that if a complete analysis of a farming property could be had, starting from the beginning, most if not all of the elements, or their equivalents, would be found the same as in a public utility property. The first thing, therefore, is to realize that the value of such a property does not lie in the physical elements alone, independent of their earning capacity.

POINT OF VIEW OF THE UTILITY

It aids materially in one's quickness of understanding to assume one's self to be the corporation and then to take the steps successively as they come in building up the property, putting it into operation and carrying it along until it becomes self-sustaining. One readily comprehends the outlay necessary to acquire the rails, the ties, the overhead work and the power plants and the labor involved in their installation. One does not, however, so readily comprehend the other outlays which, although they are not seen as tangible elements, are just as much present as the tangible elements themselves. These other outlays are in general grouped under the name of "overhead charges." The term is somewhat elastic; its scope will be greater or less, depending on the extent to which certain charges are considered as a part of the physical structure itself. For instance, the elements of contingencies and contractors' profits, if not included in the cost of the physical structure itself, would have to be considered as overhead charges; both are present and must appear in the cost somewhere. The practice of valuators is not uniform, some preferring to include those two items in the cost of the physical structure and others to separate them and add them as a percentage. Occasionally an appraisal has been made with no separate charge appearing to cover contractors' profits, but in such cases the unit costs have included them or the items have been taken from the contracts awarded on bids invited for the work. The contractor's bid includes, of course, both his allowance for contingencies and for profits.

A usual allowance for contractors' profits is 10 per cent on the cost of the work. The item of contingencies varies with the nature of the work. There should, indeed, be two items of contingencies, one a construction charge, the other an inventory charge. The former may vary in an inventory from 1 per cent to 2 per cent to as much as 20 per cent or 25 per cent. An example of a low percentage for this item might be found in the cost of a power unit the contract for which calls for the unit completely installed and operated for a time before acceptance, but in such a case the contract price includes a liberal charge for contingencies, as no contractor would think of undertaking the work without protecting himself against unforeseen expenses incident to such work. The same thing is true in the case of cars which are delivered on a contract. An example of the higher percentage may be found in a foundation or in a job of piping or station wiring. Making due allowance for varying conditions, an average charge of 5 per cent on the cost of all items to cover construction contingencies is as low as it is safe to go. In the same way and for similar reasons another 5 per cent should be added to cover inventory contingencies, making a total charge of 10 per cent for contingencies.

It has been frequently argued that little or no allowance should be made to cover omissions from the inventory, the reason given being that the work has been done and all the items can be found and listed. But such is not true in fact. When the costs were figured in the first place complete plans and specifications were available, and quantities could be taken off and the difficulties of construction studied in detail. In making the inventory almost always no plans and specifications are available and there can be no comprehensive study from the work as done which will lead to the results obtained from a study of the plans without a liberal allowance to cover contingencies. Indeed, it frequently has been found desirable if not necessary to recreate the plans from the work as done before undertaking to value the structure. Numerous instances might be cited to show that even a total of 10 per cent was an insufficient allowance to cover all kinds of contingencies. The use of a smaller percentage can be justified only when the unit costs have been determined from similar plants the actual costs of which were known, and in such cases the contingency item or a part of it will be found in the unit costs themselves. But even when the unit costs are such as to cover construction contingencies there remains the inventory contingency which must be added to complete the cost of the physical structure as it is listed in the inventory.

The charge for engineering likewise is a desirable item. Engineering usually covers the making of surveys, plans, specifications and estimates, inspection of materials and the supervision of actual construction work as it progresses. There should be added a charge for engineering in connection with each general item of the inventory which, depending on the nature of the work, may vary from 1 per cent to 2 per cent up to 10 per cent and even more. Then there should be added to the cost of construction a general item of 2 per cent or more to cover engineering not assignable to individual parts of the inventory. The total charge for engineering will in some localities not exceed 4 per cent or 5 per cent, but in other localities it will go much higher.

Many of the earlier appraisals went no further than to include the cost as determined from an inventory, to which was added an allowance for contingencies and engineering The depreciation of the physical elements due to wear and exposure to the elements was then determined usually by assigning to each element a life and considering its age at the time of the appraisal. The result thus obtained was called the physical value of the plant, and to this were added any "going value," if it could be determined, and sometimes another value, that of "good will." The appraisal was then considered complete. While such a value, an approximation at best, might have sufficed in the older days of liberal dividends and little or no scrutiny of the affairs of a corporation, it in no way meets the conditions as they exist in these days of public demand. The public service corporation is no longer free to do merely the things which its management considers advantageous to do from the standpoint of insuring dividends. It is compelled to do things which involved expenses of such variety and magnitude that in some cases not only are the profits reduced to a point of practically no dividends, but there are insufficient net earnings to pay the interest on the bonded debt. It is this condition of things which renders it all-important both for the public and the corporations that the elements of cost and of value in a public utility property be made perfectly clear. This is the great problem of the day and it is all-important in that it affects the life itself of the public utility. It is equally important whether the utility be owned and operated by a municipality or by a corporation. The public service corporation is but the agent or servant of the municipality, and what affects one must of course affect the other.

FULL UNDERSTANDING REQUIRED

The first thing necessary, therefore, for the man who would attempt to regulate the conduct of his agent or servant is to fully understand what is required of him. If a man has been successful in his own business it was due to careful study and a mastery of details. It passes comprehension that such a man should assume to direct or control a business about which he has but a smattering of real knowledge. If every man would apply or allow to be applied to a public utility the same principles which he applies to the conduct of his own affairs there would be little to complain of. What, then, are the things which the honest man should understand if he is to act wisely in the regulation of a public utility? Let that man put himself in the place of the public service corporation and see for himself the things it would be necessary to do. Imagine that he starts at the beginning. He is an active, perhaps a prominent, man in his community. He conceives that an electric street railway system would be a good thing for the community. He talks it over with some of his friends, the matter is carefully canvassed and the public sounded to discover whether there is any real demand for street cars. This may have taken several months, and required considerable time to be given to the project either by the man himself or some one employed for the purpose. Thus is a preliminary expense incurred.

It having been determined that a street car system is desirable in the interests of the public, its promoters must consider whether it would be desirable in the interests of the man who has money to invest. That is settled at once by the rate of return likely to be realized by the investment. Such a rate must be sufficiently attractive to divert money from other channels, and moreover the rate must be sufficient to meet any additional hazard not encountered in the ordinary channels of investment. A careful study must then be made of the routes, the necessary surveys and general plans worked out preparatory to obtaining a franchise. Thus a further item of expense is incurred. The franchise being obtained, it is necessary to obtain consent from property owners, which may be a very heavy item of expense. All of this work may have taken a year or several years It is the development period of the project and all items of expense legitimately incurred are proper elements of cost to be charged to the property. Such items of expense do not appear in the inventory of physical elements of a property, and they are therefore an overhead charge. The extent of this charge necessarily varies greatly with the locality. Property consents alone have been found in some localities to run as high as $2.50 per front foot; in such a case the preliminary or development charge might easily reach $20,000 or $30,000 per mile, which would represent a percentage quite beyond belief by the average man. It is not yet practicable in most cases to separate the item of the development period so as to discover whether it might fairly be represented by a percentage of the cost varying between any definite limits. This item is altogether too frequently ignored even by experienced appraisers; or if not ignored it is included in the item of organization expenses, which item also frequently includes legal expenses. When so included the combined items may vary from 2½ per cent to 5 per cent and more, depending on locality.

The items of insurance, both fire and casualty, are now quite generally recognized as proper charges, the amount varying usually from one-half of 1 per cent to 1 per cent.

Interest during construction curiously enough does not appear to have been thought of in the earlier days of appraisals, but the man of business knows without any argument that money cannot be borrowed without interest. The only question is on the time it should run. Six per cent is accepted ordinarily as the rate, and the time is one-half the construction period. If, therefore, the construction period be one year the rate would be 3 per cent of the total amount expended, assuming that the expenditures start from zero and mount uniformly to the total at the end of the year. The construction period in a street railway system is ordinarily taken as the time required to complete the power plant. This in a plant of any magnitude may be from two to three years. Along with interest the taxes must be included or set up separately, and it should not be forgotten that the interest item must also include the interest on the expenses incurred during the development period. Thus in a plant in a large city the interest charge might easily reach 9 per cent or 10 per cent.

THE EFFECT OF ELECTRIC RAILWAY OPERATION ON TAXABLE CITY PROPERTY*

BY PAUL WINSOR, CHIEF ENGINEER MOTIVE POWER & ROLLING STOCK, BOSTON ELEVATED RAILWAY

Electric railways are almost always built on one of two theories. The first is that the city in which they operate should be built up solidly and that the least mileage should be operated for the largest possible revenue, no extension being built until the company can foresee at least operating expenses and bond interest. This type of road increases the value of taxable property in the business part of the city materially, but does not assist much in the development of the city as a whole, particularly along attractive lines. It encourages high blocks, tenement houses and the accompanying drawbacks that these erections always bring.

The other policy is to build lines into new territory ahead of the population, thereby largely increasing the area available for homes and very greatly increasing the value of outside property. The electric railways of the city of Los Angeles have been managed in this second method. This policy has tended to equalize taxation by very greatly increasing the value of property which ordinarily is just outside the city limits and enjoys most of the advantages of a city without sharing its burdens.

Speaking of conditions in the city of Los Angeles, which

*Paper read at the convention of the American Electric Railway Association, Atlantic City, N. J.

I had the pleasure of visiting two years ago in company with your then president, Mr. Shaw, and a large number of other electric railway men from the East, there are cases there in which the assessed value of the property increased tenfold very soon after the construction of an electric line, and the opening of this undeveloped territory has given the laboring men an opportunity to purchase homes at reasonable prices. These homes are built on ample-sized lots, with lawns and gardens, and with plenty of fresh air for the children. The result has had a markedly beneficial effect upon the city's condition, in that where a man acquires his own home and becomes a taxpayer he naturally becomes interested in the welfare of that city, whereas in cities where tenement districts predominate unsatisfactory social conditions are usually found. What does the average man care about the upbuilding of a community in which he has no permanent interest? To some extent also these conditions are the solution of industrial freedom. It is much more difficult to persuade the laboring man owning his own home to join in strikes or to be led to destroy property.

Of the benefits derived by the city through increased valuation of property owing to street railway extensions, the city of Los Angeles affords a striking example. In a certain district in that city, the assessed value of the property before the railway extension was made was $120,000, whereas within three years after the railway company had extended its line into this territory the assessed valuation was raised to nearly $2,600,000. This certainly should show that electric railway facilities are very beneficial to taxable city property.

The first policy of railway construction, outlined in the first part of this paper, tends to immediate earning power for the company and consequent dividends. The effect of the second policy is to create a much more attractive city than could be possible in congested territory. The builder under the first system obtains a more immediate monetary benefit from his investment; the builder under the second system has the satisfaction of developing a larger property. The experience in the city of Los Angeles has been that the suburbs have developed rapidly; real estate in the central portion of the city has also increased in value but in a less marked degree.

CAR METERS IN CAPE TOWN

In a paper presented before the Institution of Civil Engineers, London, Eng., by Alfred Sharman Giles, on "Tramcar Meters and the Economical Results of Their Adoption on a Tramway System," the author described the benefits which had been obtained by installing recording wattmeters on the cars of the Cape Town tramway system.

From records taken over the tramway system prior to fitting all the cars with meters it was ascertained that the same car, driven under exactly similar conditions over the same route, showed a difference of 40 per cent in the amount of electrical energy used by one motorman and another. In order to determine the waste of electrical energy which may take place some tests were made on a portion of a route in Cape Town where in a distance of 4383 ft. the line rises 306 ft. The test car weighed 22,174 lb., and together with motormen and observers was reckoned for easy calculation as 9.9 tons. It was fitted with four recording instruments, namely, wattmeter, ammeter, voltmeter and speed indicator, the last three being specially arranged to pass 5 in. of chart per minute.

The car was driven up the hill without a stop, slowing down only on entering and leaving the three passing sidings and a 37-ft. curve. The energy used was 3.75 kw-hours. To illustrate the effect of passenger stops, the car was then driven up the hill, stopping at fixed halting places, each stop being made for five seconds. The energy consumed was then 4.25 kw-hours. The stopping, therefore, accounted for 11.76 per cent of the total energy required to run the car up this grade.

The effect of faulty starting and acceleration is shown in the following table:

	Faulty Start.	Correct Start.
Average power used, horse-power	84.3	74.1
Average loss in power, horse-power	10.2	...
Consumption, watt-hours	314	276
Energy wasted, per cent	14	...
Time to bring controller to full parallel, seconds	4	9
Maximum current, amperes	232	150
Pressure drop during acceleration, volts	85	65

It will be seen, therefore, that 14 per cent of the energy required for starting can be wasted by faulty acceleration.

The effect of the personal element in car operation was illustrated very well from some results obtained over the Wynberg section of the tramways. The energy consumed was averaged over one week for ten different motormen, when the figures ranged from a minimum of 1.2 kw-hours to 1.67 kw-hours per car mile.

About one and one-half years ago, in order to encourage economical operation, a bonus system was instituted for the motormen. It has met with some success, although there is room for still further improvement. For each section of the tramway system a reasonable kw-hour figure per car mile is fixed, and all men averaging this figure during the week receive a bonus of 2s. 6d. (60 cents). A careful log of the daily meter readings and mileage run is kept, together with the name of the motorman working the car. Two or more men may run the car during the day; the figures, mileage and meter readings are kept distinct, and at the end of the week are totaled up in the power-readings book. A list is posted each week showing the results of each man.

In Cape Town the installation of meters on all cars has had a marked effect on the power generated and the maintenance costs of the equipments. To take a few items, the average lives of various parts were increased as follows:

	Before Meters Were Adopted. Miles.	After Meters Were Installed. Miles.
Average life of armature bearings	23,450	33,766
Average life of motor pinions	27,883	31,916
Average life of axle bearings	58,750	92,333
Average life of car wheels	45,833	55,833
Expenditures on brakeshoes	£332	£196
Average power used over a period of 12 months, kw-hour per car mile	1.814	1.546

There was thus a saving of 41 per cent in the expenditure on brakes and a saving of 14.77 per cent in the average power used.

In addition, such items as the armature windings and field coils of the motors are not subject to such heavy current and high temperatures, with the consequent effect that their life is considerably prolonged, and the saving in maintenance cost of these items in the present case is approximately 33 per cent.

The wear and tear of permanent way with more gradual starting and stopping is also prolonged.

Some interesting efficiency calculations were made from the results obtained on the test hill. From the meter readings the average electrical power taken during the non-stop trial run was 54.83 hp. The theoretical power required to overcome rolling resistance, gradient and air resistance was calculated to average 44.81 hp at 9 m.p.h.* The over-all efficiency, therefore, is 81.72 per cent, the losses being accounted for in the motors and gears and slip of wheels. These losses are very moderate considering that the motors are of a type (GE-1000) designed about sixteen years ago. For these series-wound traction motors, at what is called half-speed, i. e., the motors on the cars being in full series at 250 volts, the efficiency would be about 75.3 per cent. In full parallel at 500 volts the efficiency would be about 81.5 per cent, including gear losses.

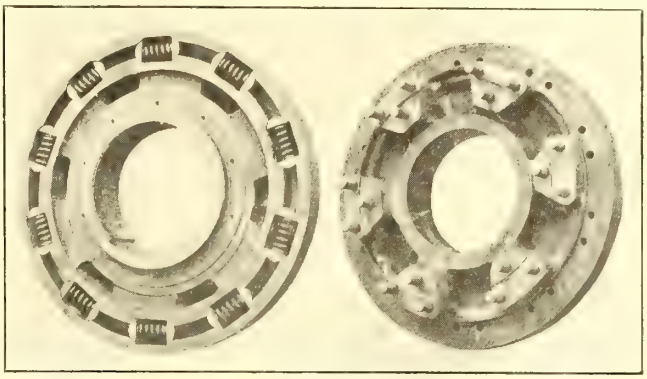
*In these calculations the rolling-resistance was taken at 30 lb. per ton, and the air-resistance allowed for was 0.0017 V^2 lb. per square foot, V being the speed in miles per hour.

HOOSAC TUNNEL SINGLE-PHASE LOCOMOTIVES

The Boston & Maine Railroad Company has had in service since the latter part of May five Westinghouse single-phase locomotives for freight and passenger service at the newly electrified Hoosac Tunnel, which was described in the Electric Railway Journal for July 1, 1911. One of these locomotives hauls each train and its steam locomotive with banked fire through the tunnel. This practically eliminates the obnoxious steam, smoke and gases incidental to steam operation. These locomotives have four geared motors, twelve wheels, and are designed for operation under an 11,000-volt trolley wire. Two are used for heavy freight service and the remaining three for combination passenger and light freight service.

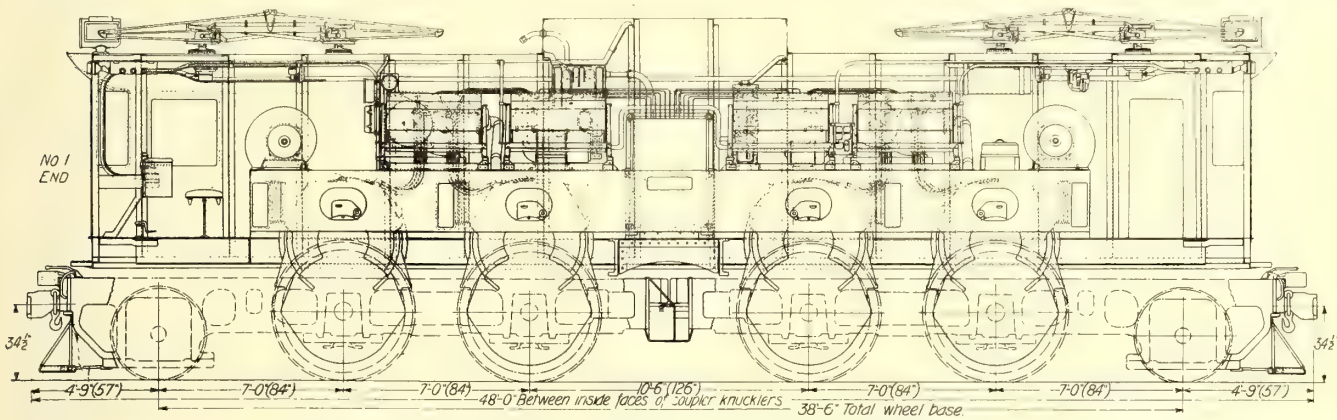
The electrified zone extends from Hoosac Tunnel Station, Mass., to North Adams, Mass., a distance of 7.92 miles, of which 4.75 miles are within the tunnel. The central zone of the tunnel has an almost level track 1200 ft. in length, with an ascending 0.5 per cent grade up to this level track from both the east and west portals. The passenger locomotives were designed to handle trains having a maximum weight of 730 tons, inclusive of steam and electric locomotives, and to maintain a schedule time of fourteen minutes between East Portal, Mass., and North Adams, Mass. The locomotives for freight service were built to handle heavy freight trains having a maximum weight of 2000 tons, including both steam and electric locomotives, and are required to accelerate this tonnage on the 0.5 per cent grade in the tunnel.

The under running gear consists of two massive trucks, known as 2-4-0 articulated trucks and fitted with 63-in. wheels. Each truck has two driving axles constituting a rigid wheel base of 7 ft. and a pilot axle arranged to swing radially. The truck side frames follow the general design of the cast-steel frames for steam locomotives, except that they are outside of the wheels. These frames are joined at each end by a cast-steel box section girder of sufficient strength to care for the stresses involved in bumping in freight service. The bumper girder at each end of the locomotive is equipped with an M. C. B. coupler mounted with a Westinghouse friction draft gear.

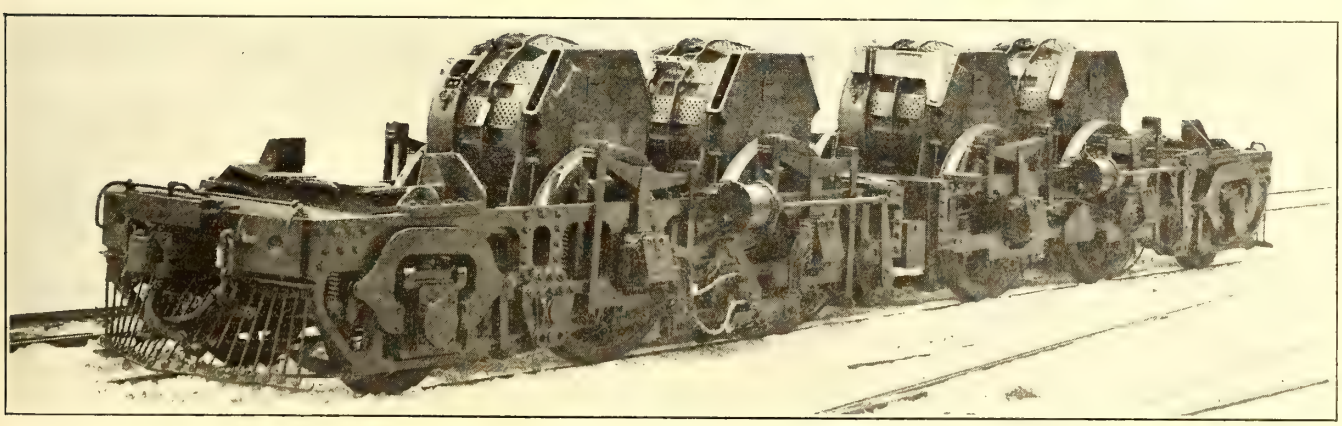


Hoosac Locomotive—Interior and Exterior of Gear Center

The adjacent bumper girders at the mid-length of the locomotive are joined by a drawbar with a pin connection at each end. The eye in this bar is elongated at one end and the length of the bar is so arranged that it is impossible for the bar to be subjected to compression under severe bumping conditions. The three wheels on each side of each truck are equalized together. The longitudinal stability of the trucks is provided by the method of mounting the cab. The cab is supported by eight spring-loaded friction plates, two plates resting on each end of each truck. This relieves the truck center pins of all the weight. This method of supporting the cab interposes two sets of springs in series between the rail and the cab and gives an exceptionally



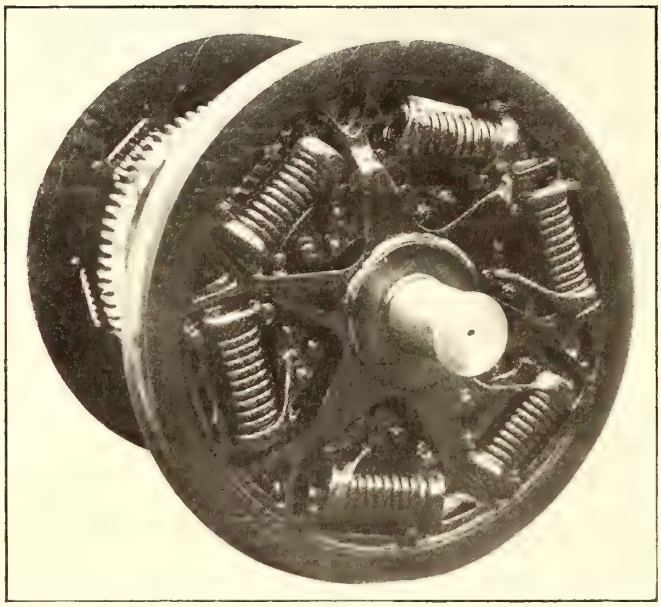
Hoosac Locomotive—Longitudinal Section and Principal Dimensions



Hoosac Locomotive—View of Trucks and Single-Phase Motors

easy riding cab. To relieve the cab from possible pulling and bumping strains the center pin of one truck is arranged with longitudinal clearance. This truck can not only rotate, but can also move longitudinally relative to the cab.

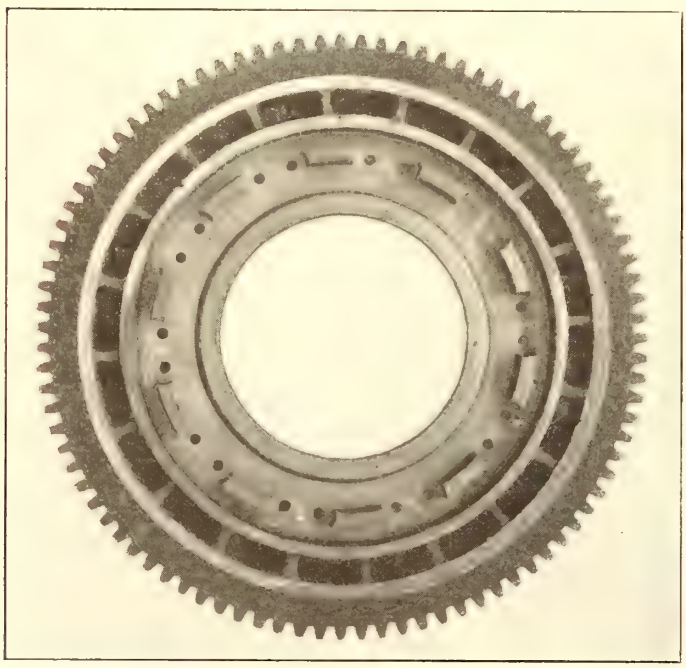
In the interior of the cab a long raised deck is built along the center line which covers the motors and serves as a stand upon which the control apparatus is erected.



Hoosac Locomotive—Pair of Driving Wheels

The central arrangement of the equipment, with the numerous side windows, affords excellent light and ample room for inspection and overhauling.

Each motor is bolted rigidly to cast-steel cross ties, and the weight of the motor is thus carried on the main semi-elliptic springs. The detail of this mounting is such that the motor can be lifted from the truck frame by a crane, after the cab has been removed, or the motor can be dropped into an overhauling pit when the trucks are in position under the cab. This method of mounting gives the highest center of gravity possible with a motor connected to the axle by single reduction gearing. It is particularly advantageous for locomotives that operate over tracks which are occasionally submerged.



Hoosac Locomotive—Gear Rim and Flange

Each end of the motor armature shaft has a solid pinion which meshes with a gear having a rim that is flexibly connected to the center. The gear centers are mounted on opposite ends of a hollow axle or quill which surrounds the wheel axle with a 1½-in. radial clearance between the inner and outer axles. The gear center is equipped with six arms arranged alternately with the wheel spokes. One end of each arm is bolted to one end of a helical spring and the other end is bolted to the wheel spoke. This spring is of sufficient flexibility to allow each wheel complete individual freedom in negotiating track inequalities.

The total weight of each locomotive is 260,000 lb., of which about 48,000 lb. is supported by each driving axle and about 34,000 lb. on each idle axle. The gear ratio for the three freight locomotives is 22:91 and for the two combination freight and passenger locomotives is 34:79. Each locomotive is equipped with four 315-hp air-cooled No. 403-A motors and with non-automatic unit switch control. The freight locomotives have a continuous tractive effort of 21,000 lb. at 21 m.p.h. and the passenger locomotives have a continuous tractive effort of 12,000 lb. at 37.5 m.p.h.

SEMI-STEEL CARS FOR HOUSTON, TEX.

The accompanying illustrations show one of the five semi-steel motor cars recently shipped to the Houston Electric Company by the St. Louis Car Company. The same builder has also furnished ten trailer cars which are of the same design except for the door arrangement in the vestibule. This type of car was designed by C. O. Birney for the Stone & Webster Management Association, which organization, the car builder states, has made it the standard city car for all of its properties. The principal features of this car are the semi-steel construction, which gives durability and light weight, the liberal inside dimensions, which help to make the cars airy and cool, and the flat-arch roof. Both types of cars have clam-shell detachable hoods and drop platforms.



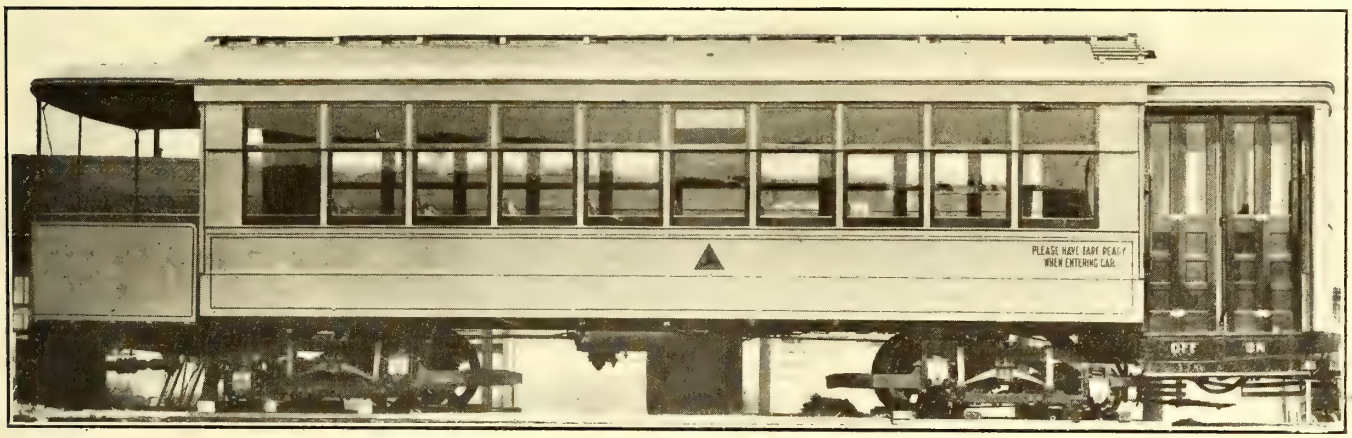
Interior of Houston Car

TRAIL CARS

The front bulkheads on the trailers are of the open type supported on 1-in. pipe stanchions. A cross pipe extends to the corner post on a line with the side window rests. The rear bulkhead has doors with a 40-in. opening

in the clear. The front platform is of the inclosed type with the opening and step on the right-hand side. This opening is 28 in. wide and is provided with a sliding door which the motorman operates through a lever without leaving his position. This sliding door is of solid mahogany with the lower part paneled up solid and the upper part fitted with stationary glass. The step is of the folding type and works in synchronism with the door. The front step is also arranged to work automatically with the back step stationary door. There are nine cross-seats and one longitudinal seat per side of car. The length of the cushions on the cross seats is 35 in.

The side sill angles extend around on the end sills in one continuous piece and are fastened together with riveted steel plates. The cross sills are reinforced with steel plate and angle iron and are bolted to the cross sill with carriage head bolts. The angles and plates are bolted to the side sill angle with countersunk head bolts, having nuts and lock washers. The tie rods have countersunk heads and turnbuckles in the center; these are placed at each cross sill. The side sill fillers are bolted to the side sill angles. The end sills are tenoned into the side fillers and are bolted to angle iron, reinforced at each end with angle iron, which is bolted to the side sill filler through the angle iron and end sill.



Flat-Arch, Semi-Steel Car for Houston, Tex.

The trap doors are of T-iron with angle iron braces in the center bolted securely to the cross timbers. The platform knee irons are bent to shape. The trolley boards extend the full length of the car and are screwed to the ribs. The base blocks are bolted to the trolley boards. The ribs are of oak, set in rubber and fastened to T-iron posts with stove bolts.

The window rests are copper flashed at the posts and fastened to the angle iron with bolts. The upper side and end panels are of No. 16 sheet steel lined with agasote on the inside. Both the lining and the sill are fastened to the post and seat rests with stove bolts and to window rests with screws. The roofing is of agasote molded to shape and fitted perfectly to the T-iron and letterboard before fastening. All top sashes are stationary in one continuous piece. The lower sashes rise 25 in. in the clear. All inside finish is solid mahogany. All wiring is placed in conduit.

MOTOR CARS

The motor cars are 41 ft. long and are of the same general construction as the trailers with the exceptions to be noted below:

The front platforms are of the inclosed type with the opening step on the right-hand side. At the right-hand opening there are two sets of folding doors equipped with horn locks and shields. These doors are operated by the conductor. The step is stationary. The back platform is of the open type. There are eight cross-seats and two longitudinal seats per car.

ALUNDUM-STEEL SAFETY TREAD

"Feralun" is a safety tread and general abrasive which has been perfected by the American Abrasive Metals Company, New York, after three years of service tests. This tread is a combination of iron or steel with alundum, one of the strongest and toughest abrasives known. Grains of alundum are embodied in and under the surface of the metal to obtain a uniformly gritty surface. Plates with this surface are made in any size, thickness or shape and in ribbed or hatched designs. The manufacturer recommends the square hatched surface with scoring extending diagonally from the nosing. The ribbed design is made only when it is specially called for, as the company believes that any surface with a rib parallel to the nosing on a step or stair tread is dangerous, particularly in catching high heels.

These treads have the anti-slip element in the very edge of the step, where people are most likely to place their feet when getting off a car or descending stairs. The sharp projecting alundum grains cut through snow and mud and will even penetrate a thin coating of ice to bite the soles of a passenger's shoes. It is also asserted that these treads have been found more durable than other designs.

An extremely light but durable form has been developed for electric car use. White oak steps are employed. A "Feralun" anti-slip nosing piece is placed in an offset extending along the entire edge 1½ in. wide. Back of this nosing piece "Feralun" buttons 1½ in. in diameter and ¼ in. thick are fastened with small brass screws into countersunk holes 2 in. on centers. This keeps the buttons close enough to prevent any appreciable wear on the wood, and as their surface is 1/32 in. above the wood at all times, an efficient anti-slip surface is presented. The buttons are not affected by moisture.

This tread is used in many other forms, as in ash and coal-conveying pipes and hoppers, crushing-machinery plates, grate bars, fire-door liners, floor plates in boiler rooms and for running boards around moving machinery where a slip would be dangerous.

Acting for the board of directors of the Lehigh Valley Transit Company, R. P. Stevens purchased from Mr. Hay, of Easton, and the Lehigh Valley National Bank of Bethlehem, the property of the Montgomery Traction Company, which runs from Norristown to Lansdale. It has a capital stock of $250,000 and is bonded for a like amount. This purchase gives to the Lehigh Valley Transit Company the last link for its proposed high-speed line from Sixty-ninth Street and Market Street, Philadelphia, to Delaware Water Gap, a distance of approximately 100 miles. The newly acquired property will be entirely rebuilt on a high-speed basis from Norristown to North Wales or Lansdale.

LONDON LETTER

The tenth annual conference of the Municipal Tramways Association was held recently in Glasgow. The delegates to the conference and their friends were received by the Lord Provost and the convener and members of the Glasgow tramways committee, in the city chambers. After J. Dalrymple, general manager of the Glasgow Corporation Tramways, presented his presidential address, a paper was read, "The Common Good of the City of Glasgow, Its Origin, History and Present Position in Relation to the Tramways Undertaking," by Councilor Walter Nelson, sub-convener of the Glasgow Corporation tramways committee. Luncheon was served in the city chambers. In the afternoon a paper was read on "Tramways Finances and Policy," by Councilor J. H. Rodgers, chairman of the Newcastle Corporation tramways committee. These papers were then discussed and the conference adjourned for the day. At the invitation of the Lord Provost and the convener and members of the Glasgow tramways committee a dinner was given in the evening in the city chambers at Glasgow to all the members of the conference. The conference was held at Newlands Depot on the second day. After meetings of the executive committee and the managers' section, a paper, "Tramcar Meters," was read by R. G. Cunliffe and J. G. Cunliffe, technical assistants of the Manchester Corporation Tramways. T. B. Goodyer, general manager of the Croydon Corporation Tramways, who has recently issued a long report on the subject of the use of tramcar meters on various systems, and W. Clough, general manager of the Bury Corporation Tramways, discussed this paper. A report, "Tramway Track: Methods of Construction and Maintenance," was read by the representatives of the Glasgow, Manchester and Leeds Corporation tramways, and a paper was submitted which gave answers to various questions which had been asked different corporations. After luncheon at Newlands Depot, the annual business meeting of the association was held, and in the afternoon a visit to one of Glasgow's beauty spots, Rouken Glen, was enjoyed by the members of the conference. The association dinner was held in the evening at Grosvenor Restaurant. As usual, the last day of the conference was devoted entirely to pleasure, an excursion having been arranged to the land of Burns. En route those in attendance were entertained at luncheon at the town hall, the luncheon being a courtesy extended by the tramways committee of Ayr.

One of the papers presented at the meeting of the Municipal Association described the Adkins-Lewis system of continuous transport, which employs a threaded shaft extending throughout the whole route and rotating at constant speed. It is intended with this system to drive a number of small cars by the shaft, the cars at stations not coming entirely to rest due to the varying pitch of the spiral. At stations the cars would travel at only 3 m.p.h., thus enabling passengers to step off and on with ease. Between stations the pitch of the spiral would increase to five or six times the pitch at the stations. The shaft would be driven by electric motors placed at intervals of about a quarter of a mile. The system has been reported upon by H. M. Hobart, of the General Electric Company of America. It is understood that the Central London Railway is considering a plan to adopt this system to connect one of its stations and the station of another tube which is a few hundred yards away.

The London County Council has been singularly immune from tramcar accidents, but a serious accident occurred recently at New Cross, when a four-wheel car was overturned at a corner, with the result that one person was killed and twenty or thirty were injured. The Board of Trade inquiry elicited the information that the magnetic brake and the car generally were in good order, and that the rails seemed to be in good condition. At present the engineering staff of the London County Council is conducting an investigation to ascertain the cause of the accident. London's most serious tramway accident occurred on Highgate Hill, in 1906, but the tramway was not at that time owned by the London County Council.

With the sanction of the Board of Trade, the London County Council is experimenting on the Euston Road and Hampstead route with a train of two cars to ascertain the possibilities of running trail cars in London. Each of the cars used in the experiment is a motor car equipped with brakes, but connected for unit operation. If the method is found to be safe the sanction of the Board of Trade is expected for the use of trail cars when traffic is most heavy.

The trackless trolley system at Bradford has proved so successful that the tramways committee has decided to extend the system 11 miles and purchase twelve new cars. The route chosen for the trial extended for 1¼ miles, and connected existing sections of the tramway system. It cost £6,000 to install the trackless trolley and supply cars. The overhead equipment erected for this experiment could be used should it ever be thought desirable to lay rails. The cost of operating the trackless system has not yet been worked out, but an estimate which includes current wages places the cost at 6½d. per car mile. After allowing for sinking fund and interest the cost amounts to about 7½d. per car mile. One of the most important corporations studying the system at present is that of Oldham, and the matter is now before the tramways committee. There are two companies in England at present which are prepared to install trackless trolleys, the R. E. T. Construction Company, London, which installed the Bradford and Leeds systems, and Trackless Trolley, Ltd., London, which is prepared to install the Mercedes-Stoll system, which is already in successful operation on the Continent.

The tramways committee of the Cardiff Corporation has been experimenting with a transfer ticket system which has proved very successful. More than 2,500,000 of these tickets have been sold during the year, and they have helped to increase the revenue of the tramway department. The committee has also established a tramways parcels express service, which is likewise proving a success. Anyone who desires to send a parcel has to buy a "parcel stamp," which is sold at the rate of 2d. for 7 lb., 3d. for 14 lb., and 4d. for 28 lb., by a district agent. The parcel, with the stamp affixed, is handed to the conductor of a car, who delivers it to the central offices, from which it is delivered by special messenger. Deliveries are not made outside the city boundary or more than half a mile from the tram line. Letters, live stock and parcels of an objectionable nature are not carried. Insurance can also be effected at a very small rate on parcels up to the value of £25. Parcels of greater value than £25 are, however, refused.

D. N. Dunlop, for many years manager of the publishing department of the British Westinghouse Company, and manager of the sales department, has been appointed secretary to the British Electrical Manufacturers and Allied Trades Association. A few years ago the National Electrical Manufacturers' Association was formed, but this association is to be reorganized and is to have a permanent official in Mr. Dunlop, with an adequate staff. Many of the important manufacturing companies which held aloof from the other association have come into the reorganized association.

The Glasgow Corporation is considering the construction of several extensions outside the city. The most important of the extensions are to Milngavie, Coatbridge and Clarkston. At a recent meeting of the tramways committee Mr. Dalrymple stated that the tramways committee and the corporation have hitherto acted on the principle that a complete tramway system cannot be circumscribed by artificial boundaries. He pointed out that the proposals now made would, if carried out, almost complete the original scheme of a comprehensive tramway system laid out by the tramways committee years ago. In defence of these outside routes, he also stated that the cost of operating a car outside the city was considerably less than in the central area. It is only necessary, therefore, to carry a few passengers to meet the operating expenses. He reiterated that a Glasgow tramway system confined entirely to the city was unthinkable. In conclusion he stated that if the tramways committee and the corporation had decided to confine the system within the city boundaries the surrounding communities would long ago have secured tramways into the city by private enterprise.

A. C. S.

News of Electric Railways

Chicago Subway Commission Ordinance Modified

The committee on local transportation of the City Council of Chicago has modified the proposed ordinance to create a temporary subway commission, and has ordered the ordinance deferred and published. The ordinance as revised by the committee follows:

"Section 1. There is hereby created a special commission to be known as the Subway Commission of the City of Chicago, which shall consist of three members to be appointed by the Mayor by and with the approval and confirmation of the City Council. The members of said commission shall be competent and experienced engineers. The city engineer of Chicago may be appointed as one of the members of said commission.

"Section 2. Said commissioners shall prepare and submit to the City Council plans and specifications for the construction of a system or systems of underground subways and tunnels in and under the streets, alleys and public grounds of the city, the Chicago River and its branches and the drainage canal, to be owned by Chicago for the operation therein of street railways, including elevated railroads.

"Section 3 provides for maintenance of an officer and employment of help.

"Section 4 provides a salary of $12,000 a year for each commissioner, except the city engineer, providing he be a commissioner, who would be paid $8,000."

Validity of Ordinance Granting Franchise Sustained

On September 26, 1911, the Supreme Court of the State of Oklahoma, handed down a decision, upholding the franchise of the Oklahoma Railway, Oklahoma City, Okla., which gives this company an indeterminate blanket franchise over all streets and alleys in Oklahoma City.

This company was granted a franchise in 1905 on certain streets of Oklahoma City. In 1909 the City Council adopted an ordinance extending this franchise over the entire city, which was ratified by a vote of the qualified electors of the city at an election called under the new initiative and referendum law of Oklahoma. The company began construction in one of the principal streets of the city. The validity of the franchise was questioned in the name of abutting property owners. Claims were made to the court that there was no authority of law warranting the enlargement of a franchise, and that, as the constitution of Oklahoma provided that no franchise should be granted, extended or renewed for a longer term than twenty-five years, and that as the franchise in question was practically a perpetual franchise, an ordinance amending this franchise extending it over all of the streets of the city was void. The decision of the Supreme Court completely sustains the validity of the ordinance of 1909 giving the Oklahoma Railway an indeterminate, blanket franchise over all of the streets of Oklahoma City.

New Rapid Transit Routes Adopted in New York

The Public Service Commission of the First District of New York has adopted new rapid transit routes for the benefit of Queens. The resolution passed by the commission must first have the assent of the Board of Estimate before bids can be asked for their construction. These new routes are part of the tentative plans which were adopted some time ago by the commission for laying out a comprehensive interborough system. These routes are in accordance with the program laid down in the report of June 5, 1911, of the committee of the Board of Estimate and of the Public Service Commission. In that report it was estimated that the line from Fifty-ninth Street to Queens Plaza would cost about $2,500,000, with 1.7 miles of subway track and 2.9 miles of elevated track; that the Astoria line would cost $1,700,000, with 4.8 miles of elevated track, and the Corona and Woodside line $2,800,000, with 7.4 miles of elevated track. Accordingly if these routes are legalized by at least one-half in value of the property owners it would be possible for the estimated sum of $7,000,000 to offer rapid transit facilities through Fifty-ninth Street over the Queensboro Bridge to Astoria and Woodside.

The Public Service Commission of the First District of New York has authorized the carrying out of the contract made by the Long Island Railroad with F. H. Clement & Company, of Philadelphia, for the removal of the grade crossings of the north side division of the Long Island Railroad Company in Flushing.

Decision Regarding Fares on Interurban Cars in Cleveland

Judge Vickery of the Common Pleas Court at Cleveland has ruled that interurban cars which enter Cleveland, Ohio, will have to be operated at a fare of 3 cents, with free transfers, and that such cars must stop at all crossings where city cars stop. The decision was made in overruling the demurrer filed by Kline, Tolles & Morley to the petition of A. G. Safford, who commenced litigation about two months ago. The court held that the interurban railways bring their cars into the city through an agreement with the Cleveland railway and that the interurban companies are subject to the provisions of the Tayler franchise. Unless this decision is reversed by a higher court the interurban railways will be compelled to abandon the 5-cent fare they have been receiving. The case will be carried to the Supreme Court. Judge Vickery said that he believes that the law should be amended to prevent city traffic interfering with the through traffic of the interurban railways.

Ford, Bacon & Davis to Report on Maryland Electric Railways.—Ford, Bacon & Davis, New York, N. Y., have been engaged to make a complete report on the Maryland Electric Railways Company.

Hudson & Manhattan Railroad Assessment Reduced.—The Court of Appeals has decided that the Hudson & Manhattan Railroad is entitled to a reduction of 11 per cent from the State tax board's assessment against the company's special franchise in the borough of Manhattan for 1908 and 1909.

Plan to Connect Albany, N. Y., and Pittsfield, Mass.—R. A. C. Smith, president of the Albany Southern Railroad, Hudson, N. Y.; J. H. Pardee, vice-president of the company; William Loeb, Jr., and C. L. Rossiter, directors of the company, were members of a party which visited Pittsfield, Mass., recently in the interest of the plan to extend the Berkshire Street Railway from West Pittsfield, Mass., over Lebanon Mountain to the New York State line to connect with the Albany Southern Railroad. This would complete connections between Pittsfield and Albany.

British Columbia Water-Powers.—In connection with the probable ultimate electrification of a portion of its line in the mountains, the Canadian Pacific Railway has acquired a water-power on the Adams River, which flows into South Thompson River near the west end of Shuswap Lake. The Adams River flows out of Adams Lake and is capable of developing 100,000 hp at two different points between the lake and its confluence with the South Thompson. It is in a heavily timbered country, where extensive lumbering operations are now being carried on. During a recent visit to the Okanagan Valley Sir William MacKenzie, president of the Canadian Northern Railway, bought the Coteau water-power and a charter for building an electric railway through the fruit-growing belt on both sides of Okanagan Lake.

Pacific Electric Railway Organization.—The personnel of the various divisions of the Pacific Electric Railway, Los Angeles, Cal., was published in the Electric Railway Journal of Sept. 30, 1911, page 546. What was formerly known as the San Bernardino Valley Traction Company is now called the San Bernardino division; what was formerly known as the Riverside & Arlington Railway is now called the Riverside division. The Pomona city lines,

which were formerly included in the northern division of the Pacific Electric Railway, are included in the Riverside division. This arrangement makes of the entire system the following five divisions: Southern division, Northern division, Western division, San Bernardino division and Riverside division.

The Barbadoes Tramways.—H. E. Chubbuck, vice-president executive of the Illinois Traction System, is quoted as follows in regard to the plans of the Bridgetown Tramway, in which William B. McKinley, president of the Illinois Traction System, and his associates are interested: "W. R. Morrison, who was general superintendent of the Wichita Light & Railroad Company, Wichita, Kan., will likely have to leave Wichita some time in October. The Barbadoes Legislature meets in November and it is expected that Mr. Morrison will be there at that time. As soon as a slight change is made by the Legislature in the charter which the company holds the work of rebuilding the system in Bridgetown will be begun. It is probable that E. W. Woodman, Portland, Maine, will accompany Mr. Morrison. Mr. Woodman is one of the largest stockholders in the company." The selection of Mr. Morrison as the representative of the McKinley interests in Barbadoes was announced in the Electric Railway Journal of Aug. 12, 1911.

Negotiations in Toledo.—At a meeting of the directors of the Toledo Railways & Light Company on Sept. 28, 1911, the action of the City Council in adopting a resolution to open negotiations on the question of fare was approved and Albion E. Lang, president of the company, was named as a committee to represent the company. The resolution of the city was adopted on Sept. 7, 1911, and provided that a committee of the City Council co-operate with a committee appointed by the company to investigate the books with a view to ascertaining what rate of fare will yield a proper return on the investment. Mayor Brand Whitlock, Councilmen Merrill, Robson and Spitzer and City Solicitor Cornell Schreiber compose the committee named to represent the city. It is understood that at the meeting in New York which Mr. Lang attended recently the committee of bondholders considered the extension of $5,330,000 underlying bonds, due Jan. 1, 1912, and $700,000 underlying bonds, due Feb. 1, 1912. Some time ago the City Council passed an ordinance assessing a rental of $250 a day on the company for the use of the streets on which franchises are claimed to have expired. The company refused to pay the accumulated rentals, amounting to $70,000. This matter is in the courts, but may not be brought up pending negotiations.

Denver City Tramway Protests Tax Assessment.—Attorney Gerald Hughes, representing the Denver (Col.) City Tramway, appeared before the county commissioners recently to protest against the assessment of $4,782,753 placed against that company by the county assessor. Mr. Hughes said that the assessor would have the company pay one-twentieth of all the taxes levied in Denver. The company did not think that it should bear that proportion of the burden. It has been assessed on a real valuation of $14,000,000, of which $10,000,000 is for franchise. The actual value of a franchise is hard to determine, but Mr. Hughes did not think that the company's franchises were worth any such sum. It had two main franchises, that of 1865, which is in litigation, and therefore of doubtful value, and that of 1906, which has only fifteen years to run. Mr. Hughes contended that a franchise decreases in value as its time limit draws near, whereas the tax commission would increase the assessed value. He thought that a fair way of arriving at a just assessment would be to use the earnings of the company as a basis. The gross earnings for the year ending April 1, 1911, were $3,200,000. The operating expenses were $1,600,000. The taxes and franchise rent was $200,000, and the depreciation on $6,000,000 worth of property at 5 per cent was $300,000, leaving a net income of $1,100,000, which, capitalized at 10 per cent, gives a value of $11,000,000. Mr. Hughes thought that one-third of this amount would seem to be the true assessed value. Subsequently at a meeting of the county commissioners Mr. Hughes asked that a reduction of $1,250,000 be made in the assessment, and the commissioners, after reviewing the data furnished by him, made a reduction of $699,969.

Financial and Corporate

Oct. 12, 1911.

In spite of the dullness of the past week, public interest in the markets is awakening as a result of the low prices now prevailing, and the prospects are imparting a more cheerful tone to the Street. While trading has exhibited no marked feature, other than irregularity in volume and prices, the market is gaining strength from the improvement on foreign exchanges, and prices were much firmer to-day than earlier in the week. Heavy withdrawals by Southern interests for financing the crops have been a feature of the local money market this week. Quotations to-day were: Call, 2¼@2½ per cent; ninety days, 3½@3¾ per cent.

Other Markets.

There was very little business transacted to-day on any of the exchanges, due to approach of the holiday.

Prices on the Chicago list were higher to-day, with few exceptions.

Trading in Philadelphia was very narrow, and price changes were unimportant.

This was also the case in Boston, sales being in small lots, with trifling changes over yesterday's quotations.

The tone of the Baltimore market to-day was greatly improved, and prices showed an upward tendency. Gains were made in Consolidated Power and United Railways & Electric Company.

Quotations of traction and manufacturing securities as compared with last week follow:

	Sept. 30.	Oct. 11.
American Light & Traction Company (common)	a295	a303
American Light & Traction Company (preferred)	a107	a108
American Railways Company	a44	a44
Aurora, Elgin & Chicago Railroad (common)	a43	*43
Aurora, Elgin & Chicago Railroad (preferred)	a87	*87
Boston Elevated Railway	a125	a126
Boston Suburban Electric Companies (common)	a14	a15
Boston Suburban Electric Companies (preferred)	a75	a75
Boston & Worcester Electric Companies (common)	a10½	a12
Boston & Worcester Electric Companies (preferred)	a51	a51
Brooklyn Rapid Transit Company	a74⅛	74½
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	*83	84⅛
Capital Traction Company, Washington	a128	130½
Chicago City Railway	a180	a185
Chicago & Oak Park Elevated Railroad (common)	3	3
Chicago & Oak Park Elevated Railroad (preferred)	6	6
Chicago Railways, ptcptg., ctf. 1	a95	a95
Chicago Railways, ptcptg., ctf. 2	a27¼	a28½
Chicago Railways, ptcptg., ctf. 3	a10	a10
Chicago Railways, ptcptg., ctf. 4	a6⅜	6⅜
Cincinnati Street Railway	a131½	a131
Cleveland Railway	a100	100
Columbus Railway (common)	83	83
Consolidated Traction of New Jersey	a75½	a75
Consolidated Traction of N. J., 5 per cent bonds	a104	a104
Dayton Street Railway (common)	a25	a25
Dayton Street Railway (preferred)	a101	a101
Detroit United Railway	a70	a73⅛
General Electric Company	149½	150
Georgia Railway & Electric Company (common)	a162	a162
Georgia Railway & Electric Company (preferred)	a93	a93
Interborough Metropolitan Company (common)	21⅛	14⅞
Interborough Metropolitan Company (preferred)	57	45
Interborough Metropolitan Company (4½s)	77½	79
Kansas City Railway & Light Company (common)	a19	a17
Kansas City Railway & Light Company (preferred)	a45	45
Manhattan Railway	135½	a136
Massachusetts Electric Companies (common)	a19	a19⅞
Massachusetts Electric Companies (preferred)	a89	a93
Metropolitan West Side, Chicago (common)	*27	*27
Metropolitan West Side, Chicago (preferred)	*75	*75
Metropolitan Street Railway, New York	a8	*8
Milwaukee Electric Railway & Light (preferred)	110	*110
North American Company	65	67½
Northern Ohio Light & Traction Company	a57	a55
Northwestern Elevated Railroad (common)	*30	30
Northwestern Elevated Railroad (preferred)	*70	70
Philadelphia Company, Pittsburgh (common)	a50	50
Philadelphia Company, Pittsburgh (preferred)	a42¼	42¼
Philadelphia Rapid Transit Company	a20⅞	21½
Philadelphia Traction Company	a83	a83
Public Service Corporation, 5% col. notes (1913)	94	*94
Public Service Corporation, ctfs.	a103½	103½
Seattle Electric Company (common)	a110	a110
Seattle Electric Company (preferred)	100	100
South Side Elevated Railroad (Chicago)	a95½	95½
Third Avenue Railroad, New York	8	9¼
Toledo Railway & Light Company	6½	6½
Twin City Rapid Transit, Minneapolis (common)	a106½	*106½
Union Traction Company, Philadelphia	a49¼	49½
United Ry. & Electric Company (Baltimore)	18	*18
United Rys. Inv. Co. (common)	31	30½
United Rys. Inv. Co. (preferred)	56	55½
Washington Ry. & Electric Company (common)	a40	a40
Washington Ry. & Electric Company (preferred)	a89	a89
West End Street Railway, Boston (common)	a85½	86⅝
West End Street Railway, Boston (preferred)	a100¼	a101
Westinghouse Elec. & Mfg. Co.	62	61⅝
Westinghouse Elec. & Mfg. Co. (1st pref.)	a111½	a115

a Asked. *Last sale.

ANNUAL REPORT

New York, New Haven & Hartford Railroad

In the report for the fiscal year ended June 30, 1911, Charles S. Mellen, president of the New York, New Haven & Hartford Railroad, mentions many matters connected with the electrification policy of the company or controlled electric railway properties. The portions of the report in which these references are made are, in part, as follows:

"Deferring to the wishes of many investors, a combined income account and general balance sheet of all companies comprised in the New Haven system have been prepared, excluding only the New York, Ontario & Western, Boston & Maine and controlled lines and Maine Central and controlled lines, your interest in which has been treated as investments.

"From this account it will be seen that had all of the surplus earnings of all of the companies for the fiscal year been turned into the treasury of your company they would have failed by only $313,288 of meeting the New Haven dividend for the year.

"The surplus earnings in the treasuries of subsidiary companies available for dividends were more than sufficient, if paid into the treasury of the parent company, to have met the deficiency of its earnings to pay its dividends, but your directors did not deem it advisable to deplete the treasuries of the subsidiary companies for that purpose.

"The expenses of the combined companies include some of an extraordinary nature, which, it is believed, may be avoided in the future. Among these may be mentioned the cost of the appraisal of the companies' properties in connection with the validation of the companies' securities claimed to have been issued in violation of the laws of the Commonwealth of Massachusetts; the trolley properties were found to have a large amount of equipment that had been carried upon their books for many years that was obsolete for their purposes, but was still in shape to be used in emergencies, the value of which has been written off to the expenses for the year; the steamboat companies have sold and broken up boats that stood upon their books at very considerable valuations, which have been also written off in the year's expenses, so that the property of the companies stands upon their books at a much more conservative valuation than heretofore.

"The interest during construction on the investment in the New York, Westchester & Boston Railway, the New York Connecting Railway, the Berkshire Street Railway, the electrification work upon the Harlem River branch, and the double tracking of the Poughkeepsie Bridge line, none of which has reached a stage to make returns in earnings, has been included in the interest charges of the companies (and not offset in any way by the securities eventually to be received, which will be available for sale), and the results from these investments and economies from these improvements, nearly all of which will be available during the next fiscal year, will be reflected in the statements for that and future years' operations.

"It will be noted that many of the items that have made up the charges to the expense accounts for the past year could have properly been charged to the profit and loss and investment accounts, and have thereby resulted in a surplus for the year instead of the deficit shown, but the net result to the property would have been unchanged.

"As yet your company has received no return from its investment in the New York, Westchester & Boston Railway, although its income has been charged with the interest upon the money required to be raised for the purpose.

"Part of this investment is represented by $16,300,000 of bonds, no part of the interest on which, amounting on June 30, 1911, to $1,238,926, has been credited to income.

"While notes have been given for this interest and for interest on advances amounting to a further sum of $58,465, or a total of $1,297,391, which will eventually be paid, your directors feel that it is in consonance with conservative accounting to defer the consideration of the crediting of this interest to the earnings of the company until the money has actually reached the treasury.

"Had this interest been available as a credit to earnings during the fiscal year of 1911, the deficit of the New York, New Haven & Hartford Railroad proper would have been converted into a surplus of $29,851 and the deficit of all companies into a surplus of $984,103.

"The New York, Westchester & Boston Railway extends from the Harlem River about Willis Avenue, New York City, through the borough of the Bronx and Westchester County to Mount Vernon, where the line diverges, one line extending north through Eastchester, New Rochelle, Scarsdale and White Plains, and the other line extending to the east through North Pelham, New Rochelle, Larchmont, Mamaroneck and Rye to the Connecticut State line at Port Chester.

"The physical property of the New York, Westchester & Boston Railway is of the best of construction known to engineering science. The road is four-tracked from 174th Street to Mount Vernon, where two tracks diverge to White Plains and two to New Rochelle. The entire line will be fenced in private right-of-way and protected with block signals. There will be no grade crossings.

"The company has obtained from the city of New York and the Public Service Commission the necessary rights to construct at 180th Street and Morris Park Avenue, borough of the Bronx, a transfer station at which interchange will be made with the West Farms branch of the Interborough Rapid Transit Company. Interchange will also be made with the Second and Third Avenue elevated lines at Willis Avenue. The plans of the company also provide for interchange with the proposed tri-borough route, either at the transfer station at 180th Street or at Westchester Avenue. The third tracking of the Second and Third Avenue elevated systems will give fast express service to and from all points in the Borough of Manhattan. The connection via the transfer station and via the Second and Third Avenue elevated lines at Willis Avenue offers rapid transit in connection with those lines to and from the west side, center and east side of Manhattan.

"The territory served forms one of the most desirable and rapidly growing residential sections in and adjacent to New York City. Between 1900 and 1910 the population of the borough of the Bronx increased from 200,507 to 430,980, or 115 per cent, and the population of Westchester County from 184,257 to 283,000, or over 53 per cent.

"By authority of the Public Service Commission of New York, Second District, the New York, Westchester & Boston Railway has canceled its old mortgages and created a new mortgage dated July 1, 1911, maturing July 1, 1946, under which the total amount of bonds which can be outstanding at any time shall not exceed $60,000,000, but no bonds can be issued in excess of the $17,200,000 at present issued, except against additional construction, betterments or improvements to the property of the railroad.

"This entire issue of $17,200,000 was delivered to the New Haven company in exchange for the old bonds held by it; your company has indorsed its guaranty of principal and interest on the bonds and has sold them at a satisfactory price.

"The most important pieces of work that have been under prosecution by the electrical department during the past fiscal year are: (1) The electrification for freight and passenger operation of the six-track Harlem River road, inclusive of yards and sidings on this line and between Woodlawn and Stamford. (2) The electrification of the New York, Westchester & Boston Railway. (3) The rehabilitation of Warren power station, with attendant increase in the capacity of the East Providence substation.

"Electrification of the Harlem River six-track road.—Beginning April 1, ground was broken for the installation of catenary piers, and the work is now well under way. Four types of electric road engines are in operation, handling either passenger or freight trains. We have received an electric switch engine based upon specifications that covered our heaviest switching practice in the Harlem River branch yards, and it is at present doing duty in the Stamford yards. Fifteen electric switching engines of practically similar type, modified only slightly in mechanical and electrical characteristics from experience received with the present engines, are on order.

"Orders for four all-steel motor cars and twelve trail cars for multiple unit service have been placed. The extension of Cos Cob station for the purpose of supplying power to the Harlem River branch and New York, Westchester and Boston Railway and for substation

plants with motor-driven street railway generating apparatus in the vicinity of our electric zone, has been authorized, it being the intention to install four 4000-kw, 80 per cent power factor, single-phase, 11,000-volt, 25-cycle turbo-generators, with necessary auxiliary steam equipment for operation.

"Your directors have deemed it advisable to join the Pennsylvania Railroad in the construction of the New York Connecting Railroad, in which your company has been a half owner from the inception of the project.

"This road is designed to be the new route for the interchange of traffic between the Pennsylvania and New Haven systems in lieu of the present passenger and freight ferry service between the Pennsylvania system on the west bank of the Hudson River and the New Haven system at Harlem River and Oak Point.

"For the present water haul freight service from the west bank of the Hudson River via the East River to your company's terminals at Harlem River and vicinity, a distance of about 14 miles, it substitutes a short water haul of about 4 miles from Greenville, N. J., to Bay Ridge, borough of Brooklyn, a rail haul of 11½ miles from Bay Ridge to Fresh Pond Junction to Port Morris via the New York Connecting Railroad, or a total distance of approximately 23 miles.

"Provision is also to be made for access to the New York passenger station of the Pennsylvania Railroad at Thirty-second Street and Seventh Avenue by means of a connection from Bowery Bay Road on the New York Connecting Railroad to the Long Island tunnel terminal at Sunnyside yard, a total distance from Port Morris to the New York station of about 9¼ miles.

"The present float service is subject to delays and dangers due to fog, tides and the crowded condition of the Hudson and East Rivers, which will be almost entirely eliminated by the new route; besides, the populous territory of the Long Island Railroad will be opened up to the New Haven lines and access afforded to the Pennsylvania's New York passenger station and by that means to the benefits to be derived from a largely increased interchange of passenger traffic between the two systems.

"The New York Connecting Railroad will be operated by the New Haven company and the results shared by the Pennsylvania and New Haven systems proportionately to their respective earnings on the freight traffic interchanged.

"Your company's present investment in the New York Connecting Railroad amounts to about $2,500,000 represented by the cost of one-half of the capital stock and by advances of one-half of the total expenditures for real estate, right-of-way and engineering. The investment in capital stock, approximately $1,500,000, has been carried without any income return.

"The construction of the railroad, including bridges, will cost approximately $20,000,000, the funds for which will be provided by an issue of bonds guaranteed jointly by the Pennsylvania Railroad and the New York, New Haven & Hartford Railroad."

A statement is presented in the report showing the combined income of all the properties except that intercompany transactions are eliminated. This gives the following facts regarding the controlled electric railway properties:

The Connecticut Company operates 782.994 miles of street railway lines, of which 479.969 miles are owned and 303.025 leased.

The New York & Stamford Railway operates 33.97 miles of street railway lines, of which 20.16 miles are owned and 13.81 leased.

The Westchester Street Railway operates 28.60 miles of street railway lines, of which 22.63 miles are owned and 5.97 leased.

The Berkshire Street Railway operates 111.881 miles of street railway lines, all of which are owned.

The Vermont Company operates 20.849 miles of street railway lines, all of which are owned.

Hoosick Falls Railroad operates 7.105 miles of street railway lines, all of which are owned.

The Rhode Island Company operates 347.02 miles of street railway lines, of which 38.67 miles are owned and 308.35 leased.

Included in the new equipment purchased during the year were two freight and one switch electric locomotives.

Bartlesville (Okla.) Interurban Railway.—William H. Byers & Company, New York, N. Y., offer at par and interest $150,000 of first mortgage 6 per cent gold bonds of the Bartlesville Interurban Railway dated Jan. 1, 1910, and due July 1, 1934, but redeemable at 102 at any interest period on six months' notice.

Boston (Mass.) Elevated Railway.—The Boston Elevated Railway has petitioned the Railroad Commission for approval of an issue of $5,000,000 negotiable bonds, proceeds to be used for construction and equipment, funding floating debt, and for the purchase of such real or personal estate as may be necessary for operation. This issue was authorized by the stockholders on Sept. 29, 1911.

Lake Superior Corporation, Sault Ste. Marie, Mich.—T. J. Drummond, president of the Lake Superior Corporation, refers as follows to the Trans-St. Mary's Traction Company in the report of the Lake Superior Corporation for the year ended June 30, 1911: "The International Transit Company commenced the year with a debit balance. This has been entirely wiped out and a small profit carried forward. The Trans-St. Mary's Traction Company, with extra service now given, is expected to show increased earnings. The ferry connecting these roads shows satisfactory results."

Oakland (Cal.) Railways.—The unsold portion of the total authorized issue of $2,500,000 collateral trust 6 per cent 4-year gold notes of the Oakland Railways is being offered for subscription at 100½ and interest by E. H. Rollins & Sons, New York and Boston. The notes are guaranteed by indorsement by the Oakland Traction Company, the San Francisco, Oakland & San José Consolidated Railway and the East Shore & Suburban Railway. These notes are dated Sept. 1, 1911, and are due Sept. 1, 1915, but are redeemable on any interest date on sixty days' notice at 102 and interest.

Sedalia Light & Traction Company, Sedalia, Mo.—Undeposited bonds of the Sedalia Light & Traction Company will be received by the bondholders' committee at the New York Trust Company until Oct. 16, after which date they will only be received on such terms as the committee may direct. The committee now represents more than $500,000 par value of the total issue of $749,000. Sale under the decree of foreclosure is expected in the near future and the property will probably be bid in by the bondholders' committee. In that case bondholders who do not deposit their bonds with the committee will receive only their pro rata share of the amount bid by the committee, less expenses and receivers' obligations.

MONTHLY ELECTRIC RAILWAY EARNINGS

CHATTANOOGA RAILWAY & LIGHT COMPANY.

Period.			Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1m.,	Aug.	'11	$83,990	$50,411	$33,579	$20,333	$13,246
1 "	"	'10	77,085	43,485	33,600	18,554	15,046
8 "	"	'11	614,120	357,796	256,324	157,799	98,525
8 "	"	'10	573,925	336,656	237,569	145,986	91,583

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY.

1m.,	Aug.	'11	$440,895	$270,234	$170,661	$105,532	$65,129
1 "	"	'10	423,199	241,075	182,124	101,538	80,586
8 "	"	'11	3,507,171	2,035,826	1,471,345	831,263	640,082
8 "	"	'10	3,267,000	1,849,045	1,417,955	820,126	597,829

DETROIT UNITED RAILWAY.

1m.,	Aug.	'11	$1,001,531	$649,417	$352,114	$176,839	$175,275
1 "	"	'10	914,329	587,863	326,466	178,464	148,002
8 "	"	'11	6,829,108	4,291,990	2,537,118	1,411,494	1,125,625
8 "	"	'10	6,283,744	3,945,374	2,338,370	1,332,318	1,006,052

EAST ST. LOUIS & SUBURBAN COMPANY.

1m.,	Aug.	'11	$193,413	$111,866	$81,547	$45,739	$35,808
1 "	"	'10	215,316	117,288	98,028	46,531	51,497
8 "	"	'11	1,480,821	845,510	635,311	365,939	269,372
8 "	"	'10	1,545,513	861,612	683,901	365,939	318,451

TWIN CITY RAPID TRANSIT.

1m.,	Aug.	'11	$671,325	$317,043	$354,282	$140,079	$214,203
1 "	"	'10	660,657	298,323	362,333	140,113	222,221
10 "	"	'11	5,163,343	2,583,392	2,583,392	1,120,633	1,459,318
10 "	"	'10	4,925,516	2,365,045	2,365,045	1,121,367	1,439,104

UNION RAILWAY GAS & ELECTRIC COMPANY.

1m.,	Aug.	'11	$254,812	$142,477	$112,335	$62,402	$49,933
1 "	"	'10	232,494	132,795	99,699	57,927	41,772
8 "	"	'11	2,018,199	1,182,179	836,020	488,475	347,545
8 "	"	'10	1,895,832	1,129,077	766,755	465,429	301,326

Traffic and Transportation

Accidents in Indiana During Three Months

The Railroad Commissioner of Indiana has issued Bulletin No. 16, which contains a summary of the accidents on the steam railroads and the electric railways operated in Indiana during the three months ending June 30 of 1910 and 1911. The comparative record of casualties on the interurban railways as made by the commission follows:

	1910.	1911.
PASSENGERS.		
WHERE—		
On passenger trains	13	43
On station grounds	1	1
CAUSES—		
Collisions	4	18
Derailments	0	6
Getting on and off moving trains	8	8
Getting on and off trains after stops are made	0	0
Miscellaneous	2	12
RESULTS—		
Deaths	1	0
Fractures or dislocations	1	5
Sprains	2	3
Cuts and bruises	10	29
Miscellaneous	0	7
TRAVELERS ON HIGHWAYS.		
WHERE—		
Travelers on highways in vehicles	6	10
On foot	3	1
CAUSES—		
Struck on crossings	5	11
Teams frightened	2	0
Miscellaneous	2	0
RESULTS—		
Deaths	3	2
Sprains	1	1
Cuts and bruises	5	8
Miscellaneous	0	0
EMPLOYEES.		
EMPLOYMENT—		
Conductors	4	6
Motormen	1	5
Laborers	1	6
CAUSES—		
Collisions	3	6
Miscellaneous	1	7
Coupling and uncoupling	2	0
Getting on and off cars	0	4
RESULTS—		
Deaths	1	1
Fractures or dislocations	0	2
Sprains	0	2
Cuts and bruises	5	12
Miscellaneous	0	0
TRESPASSERS.		
WHERE—		
Trespassers on tracks	9	6
Miscellaneous	0	1
RESULTS—		
Deaths	5	5
Fractures or dislocations	1	1
Cuts and bruises	3	1
Collisions		4

Damage to property amounted to $2,295.00.
Derailments 1

Five-Cent Fare from East Bridgewater to Brockton.—The Bay State Street Railway has reduced the fare from East Bridgewater to Brockton from 10 cents to 5 cents between the hours of 6 and 8 a. m. and 4:30 and 6:30 p. m.

Brooklyn Bridge Rush-Hour Traffic Record Broken.—On Sept. 21, 1911, between the hours of 5 p. m. and 6 p. m. 364 surface cars were operated over the Brooklyn Bridge. This is the greatest number of cars ever run over the bridge in one hour.

Connecticut Company Asked to Reduce Fare on Interurban Line.—A petition has been filed with the Public Utilities Commission of Connecticut asking that the fare between Hartford and Manchester be reduced from 15 cents to 10 cents. The commission was to hear the petition on Oct. 10, 1911.

Electric Railways Within Jurisdiction.—In a decision by the Commerce Court the Interstate Commerce Commission is upheld in its decision that electric lines are amenable to the law when they do an interstate business. The case came to the court on appeal by the Omaha & Council Bluffs Railway & Bridge Company.

Chicago Elevated Railways to Control the Chicago & Milwaukee Electric Railway.—The Chicago Elevated Railways will secure control of the Chicago & Milwaukee Electric Railway, now held largely by Canadian interests represented by the Sovereign Bank of Canada, which has secured from Judge Grosscup two delays in entering a final decree of sale.

Safety Campaign in San Diego.—A campaign is being carried on in San Diego by Frederic S. Hughes under the auspices of the San Diego (Cal.) Electric Railway and the county schools to eliminate accidents which result from carelessness. Free illustrated lectures are being given before the school children and the railway employees.

Interurban Line Between Benton Harbor and Eau Claire.—Service was started on Sept. 26, 1911, on the new interurban railway of the Benton Harbor-St Joe Railway & Light Company from Benton Harbor to Dowagiac, which is an extension of the interurban railway operating between Benton Harbor and Eau Claire. Cars were run hourly to accommodate those who attended the Southern Michigan State Fair held in Benton Harbor.

Dayton, Covington & Piqua Traction Company Issue Commutation Ticket Books.—Beginning Sept. 25, 1911, the Dayton, Covington & Piqua Traction Company, West Milton, Ohio, introduced commutation ticket books, containing 100 5-cent coupons, which are sold for $4 at the ticket offices of the company. The mileage books were discontinued on the above date, but those mileage tickets which are outstanding will be honored on cars until Jan. 1, 1912.

Cleveland Railway Extension.—City Solicitor Baker has advised the City Council that the establishment of service on Central Avenue between East Ninth Street and East Fourteenth Street will not be in the nature of an extension of service, as the grant made to the Neutral Street Railway, taken over by the Cleveland Railway, called for the operation of cars on this portion of the street. The City Council may now take whatever action it sees fit upon the request of property owners in that section to establish the desired service.

Employees' Association Plans to Increase Benefits.—The Employees' Mutual Benefit Association, composed of employees of the Syracuse (N. Y.) Rapid Transit Company, plans to increase the death benefit from $150 to $200. The present time limit of ninety days for sick benefits of $1 a day will be increased to $1 a day for three months, at the expiration of which time 85 cents a day will be paid for a length of time to be agreed upon. The association had a surplus of $4,264 in its treasury when the September report was made.

Service Insignia Presented to Platform Men.—The Danbury & Bethel Street Railway, Danbury, Conn., has presented the motormen and conductors in its employ with service stars and stripes, graduated according to their respective years of employment with the company. The insignia consist of gold stars, silver stars and blue broadcloth stripes. One stripe is given each year up to five years, and when the employees have completed five full years they are given silver stars. For each ten years a gold star is given.

Traffic in St. Louis.—Statistics for eight months ended August, 1911, prepared by the auditing department of the United Railway, St. Louis, Mo., show that the density of traffic is greatest on the Grand line, while the largest number of transfers is used on the Tiffany line. Density of traffic is greatest on the Grand, Jefferson, Taylor, Laclede, Park and Vandeventer lines and lightest on the Clayton, Brentwood, Kirkwood-Ferguson, Florissant. The proportion of transfers is 67.30 per cent on the Tiffany line, 58.28 on the Taylor, 56.65 on the Marcus, 50.28 on the Hamilton, 49.65 on the Grand and 46.47 on the Union. Fewer transfers are offered on the Clayton line than any, its percentage being 9.23.

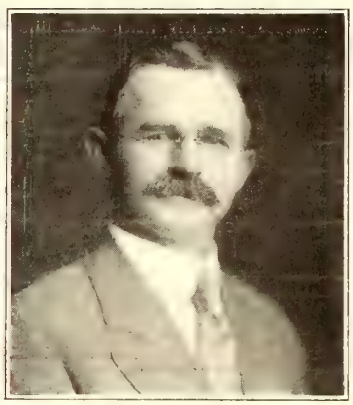
Key Route Folder.—The San Francisco, Oakland & San José Consolidated Railway, Oakland, Cal., the Key Route, has issued a very attractive folder in which the territory that is served by its lines is described and illustrated. The outside cover, which is in colors, is decorated with an illustration of one of the ferryboats of the company that ply between Oakland and San Francisco, and with an illustration showing one of the trains of the company in operation. On opening the publication there is unfolded a double-page bird's-eye view of San Francisco Bay and surroundings, showing the location of Oakland, Berkeley, Alameda, Richmond, the cities of the mainland, San Francisco and the peninsula. There is also a similar bird's-eye view in colors in the center of the pamphlet, but this is confined to the territory served by the Key Route.

New Officers of the Associations

In the daily edition of the Electric Railway Journal for Oct. 13, 1911, a portrait and biography were published of Thomas N. McCarter, president of the Public Service Corporation of New Jersey, who has been elected president of the American Electric Railway Association. Portraits and biographies are now published of P. S. Young, the new president of the American Electric Railway Accountants' Association; E. O. Ackerman, the new president of the American Electric Railway Engineering Association; H. K. Bennett, the new president of the American Electric Railway Claim Agents' Association, and J. N. Shannahan, the new president of the American Electric Railway Traffic & Transportation Association.



P. S. Young



E. O. Ackerman

Mr. P. S. Young, who was elected president of the American Electric Railway Accountants' Association at the annual meeting held at Atlantic City, N. J., this week, is the comptroller of the Public Service Railway, of Newark, N. J. He is also the comptroller of the Public Service Corporation, by which the railway system is controlled, and of the Public Service Electric Company and the Public Service Gas Company, other subsidiary companies of the corporation. Mr. Young has served as an official of the Accountants' Association and on committees during the last few years. In 1906 he was first vice-president of the association. In the last two years he has been co-chairman of the joint committee on shop accounting of the Accountants' and Engineering Associations. Mr. Young has also contributed papers before the Accountants' Association, discussing the subject of accounting for capital expenditures in one year and the accounting methods of a holding company in another year. Mr. Young became identified in 1890 with a constituent company of the United Gas Improvement Company in Omaha, Neb. He remained in that city until 1895, when he went to the main office of the United Gas Improvement Company in Philadelphia. In 1897 he went to Jersey City, N. J., as assistant agent of the United Gas Improvement Company. When the Hudson County Gas Company was formed two years later, Mr. Young was made assistant treasurer. In the following year, in addition to this office, he was elected secretary of the company. He continued in that position until 1903, when the Public Service Corporation of New Jersey was formed and acquired, among various other properties, control of the Hudson County Gas Company. Because of his connection with the various classes of public utilities in which the Public Service Corporation is interested, and his interest in the industries, Mr. Young is a member of numerous associations, including in addition to the American Electric Railway Accountants' Association, the National Electric Light Association, the American Gas Institute, the National Commercial Gas Association, the Illuminating Engineering Society and the Electric Vehicle Association of America.

E. O. Ackerman, the new president of the American Electric Railway Engineering Association, was born in 1862. He was graduated from the Ohio State University in 1884. His first engineering work was with the Ohio State Railroad Commission as inspector of bridges. Later he was appointed deputy surveyor of Van Wert County. From 1887 to 1888 he was assistant engineer on the Northern Pacific Railroad. From 1889 to 1890 he served as United States deputy mineral surveyor for the district of Montana. Returning to Ohio, Mr. Ackerman was employed in the engineering office of the Baltimore & Ohio Railroad for several years. His first electric railway experience was with the Columbus (Ohio) Street Railway. He entered the employ of this company in 1895 and has continued with the Columbus street railway since that time. His present position with the Columbus Railway & Light Company is of engineer maintenance of way.

Mr. H. K. Bennett, the new president of the American Electric Railway Claim Agents' Association, was born in Whitehall, N. Y., in 1871. He has lived in Fitchburg, Mass., for the last thirty-nine years and was educated there and was graduated from Boston University. He took up newspaper work in Fitchburg in 1891. In 1898 he entered the employ of the Fitchburg & Leominster Street Railway as carhouse foreman and dispatcher. He held this position for six years, when he was placed in charge of the claim department, publicity and advertising, which positions he has held ever since. Mr. Bennett is active in civic affairs in Fitchburg and was a member of the Common Council for the five years ended Jan. 1, 1911, and during his last year he served also as president of the Council. He began attending electric railway conventions with the Columbus meeting in 1906 and has been a regular delegate ever since. He was made third vice-president of the Claim Agents' Association in 1909 and first vice-president in 1910. Mr. Bennett's newspaper training has stood him in good stead as a contributor of papers before the association and to the technical press.

Mr. J. N. Shannahan, the new president of the American Electric Railway Transportation & Traffic Association, is railway manager of the operating department of J. G. White & Company, Inc., New York, N. Y. Mr. Shannahan has always taken a prominent part in association activities during his connection with electric railway work. He was president of the Street Railway Association of the State of New York during 1906-1907 and served as chairman of the committee on interurban rules of the American Electric Railway Transportation & Traffic Association during 1906-1907 and 1908-1909, and has been first vice-president of that association during the last year. After he was graduated from Rensselaer Polytechnic Institute in 1894 Mr. Shannahan entered the employ of the United States government as a draftsman on the Watervliet Arsenal. He served nine months in this position, and then entered the service of the New York Central & Hudson River Railroad at Rochester, N. Y., as inspector of signals. After several years' service with that company he became connected with the Fonda, Johnstown & Gloversville Railway as chief engineer. About this time the Fonda, Johnstown & Gloversville Railway was being partially equipped for electric operation and during the next four years Mr. Shannahan had charge of building the double-track electric railway between Gloversville and Schenectady for this company, and the single-track line between Amsterdam and Hegeman. On Jan. 1, 1903, Mr. Shannahan was appointed general superintendent of the company, in charge of both steam and electric operation, and at the same time was



H. K. Bennett



J. N. Shannahan

appointed manager of the Edison Electric Light & Power Company, Amsterdam. Early in 1904 he was elected president of the Adirondack Company. In 1907 Mr. Shannahan resigned as general superintendent and purchasing agent of the Fonda, Johnstown & Gloversville Railway, and as president of the Adirondack Lakes Traction Company, Gloversville, to become general manager of the Washington, Baltimore & Annapolis Railway, then under construction between Washington, Baltimore and Annapolis, and continued with the last-named company until May, 1911, when he resigned the positions of vice-president and general manager of the company to become railway manager of the operating department of J. G. White & Company, Inc., New York, N. Y.

Personal Mention

Mr. W. H. Pape has resigned as manager of the Pittsburgh & Butler Street Railway, Pittsburgh, Pa., and the Butler Passenger Railway, to engage in business for himself.

Mr. C. D. Beebe, first vice-president of the Rochester, Syracuse & Eastern Railroad, Syracuse, N. Y., has been elected president of the company to succeed L. C. Smith, deceased.

Mr. R. K. Page has resigned his position of local manager of the Portland Railway & Light Company. Mr. Page will remain in Salem and give his attention to private affairs. Mr. W. M. Hamilton, of Portland, Me., will succeed Mr. Page.

Mr. W. H. Martin has resigned as superintendent of transportation of the Orange County Traction Company, Newburgh, N. Y., to become connected with the Hicks & Johnson Company, which is doing part of the work at Cold Spring on the New York City water supply contract.

Mr. R. N. Hemming, who has been connected with the Ohio & Southern Traction Company, Columbus, Ohio, as general manager, has been appointed superintendent of motive power for the Indiana Traction Company, Anderson, Ind., to succeed Mr. W. H. Evans, who resigned Sept. 1.

Mr. Edward P. Burch, consulting engineer, Minneapolis, Minn., is spending eight weeks in Europe in a study of the application of electric traction to railroad train service, particularly on the state railways in France, Switzerland, Italy, Austria and Germany, and the steam railroad terminal electrifications in the larger cities.

Mr. Charles C. Tennis has been elected vice-president of the Pittsburgh & Butler Street Railway, Pittsburgh, Pa., and the Butler Passenger Railway in charge of operation. Mr. Tennis is a native of Juniata County, Pa., and for some years has been actively engaged in the construction and operation of electric railways in Pennsylvania, Ohio, Indiana and Kentucky.

Mr. C. E. Palmer has been appointed superintendent of transportation of the Ft. Wayne & Northern Indiana Traction Company, with headquarters in Ft. Wayne, Ind. Mr. Palmer has recently been superintendent of the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind. Prior to his connection with that company Mr. Palmer was with the Ohio Electric Railway and still earlier with the Cleveland Construction Company at Cleveland. Since the resignation of Mr. Frank I. Hardy, several months ago, Mr. A. A. Kartholl, general freight and passenger agent of the Ft. Wayne & Northern Indiana Traction Company, has been acting as superintendent of transportation.

Mr. Mason B. Starring, heretofore president of the Northwestern Elevated Railroad, Chicago, has been elected president of the United Railways Investment Company, San Francisco, Cal., to succeed Mr. Ernst Thalmann, of the firm of Ladenburg, Thalmann & Company, New York, N. Y. Mr. Starring was born and educated in Chicago and has been in the railway business since early youth. He began his career in the operating department of the Chicago, Burlington & Quincy Railroad and was also connected with the Pennsylvania Railroad. In 1888 he became connected with the Chicago City Railway as a clerk. He was subsequently transferred to the office of Judge J. S. Grinnell, general counsel of the company, and in 1894 was made assistant general counsel. On May 12, 1904, he was made general manager of the company. Later he was elected vice-president of the company. In April, 1907, Mr. Starring was elected president of the Northwestern Elevated Railroad.

OBITUARY

Charles W. Johnson, president of the Acme Indicator Company, prominent in Cleveland military circles and well known in Cleveland as an industrial promoter, is dead.

August Stavenow, traffic manager of the Grosse-Berliner Strassenbahn, Berlin, Germany, died on Sept. 23, 1911, at his home in Schöneberg at the age of fifty-one years. Mr. Stavenow was a leading authority on German city transportation problems and was also a keen student of electric railway traffic in other countries. During 1906 he made an extended tour of the larger American cities and before leaving this country wrote an article, "Tabulation of Traffic Statistics in Berlin," which was published in the Street Railway Journal for May 19, 1906. Mr. Stavenow possessed great originality in analyzing traffic conditions, and his charts and models proved interesting exhibits at various congresses and expositions. Mr. Stavenow is survived by two daughters and three sons.

NEW PUBLICATIONS

Train Rule Examinations Made Easy. Compiled by G. E. Collingwood, New York, 1911. The Norman W. Henley Publishing Company. Cloth, 256 pages. Price, $1.25.

This book, which is of pocket size, is devoted to an explanation and elucidation of the standard code of train rules for single-track operation of the American Railway Association.

Hendricks' Commercial Register of the United States. S. E. Hendricks Company, New York, 1911. Cloth, over 1600 pages. Price $10. Express charges prepaid.

Purchasing agents are naturally well acquainted with the names and addresses of the manufacturers of the more important articles used by their companies, but even the most experienced buyer occasionally has difficulty in filling requisitions for unusual material. In such cases a commercial register of this kind is a decided help. The new edition represents about 350,000 names and addresses in more than 45,000 classifications. The supplementary list of common trade names is a feature which will aid in finding the manufacturers of articles known only by such designations.

Direct and Alternating Current Manual. Compiled by Frederick Bedell, professor of applied electricity in Cornell University, assisted by Clarence A. Pierce, Ithaca, N. Y., 1911. The D. Van Nostrand Company. Cloth, 360 pages. Price, $2.

This manual contains a series of tests on direct and alternating current apparatus, selected with reference to their practical usefulness and instructive value. From the text proper are excluded specialized tests and those that are of limited application or require unusual testing facilities, but these tests are described in the appendices to the several experiments. The book is fully illustrated with charts of connections, characteristic curves, vector diagrams and other explanatory figures.

Electric Traction and Transmission Engineering. By Samuel Sheldon and Erich Hausmann, New York, 1911. D. Van Nostrand Company. Cloth, 301 pages and 127 illustrations. Price, $2.50 net.

One of the most commendable features of this book is its entire absence of trade descriptions. The authors have arranged in logical order the principal problems which the electrical engineer must solve in deciding upon the size of the generating and distributing system and the number and capacity of the car equipments. The explanations are illuminated by practical examples which will enable the reader to apply the same methods to his own problems. Simple algebraic equations are used throughout except in problems relating to wave propagation, where hyperbolic functions have been used. The comparisons of various types of d.c. and a.c. motors and control and the studies in energy consumption are especially timely.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Twin Falls (Idaho) Railway.**—Incorporated in Idaho to build electric and steam railways in the vicinity of Twin Falls. Capital stock, $500,000. Incorporators: L. B. Perraine, Twin Falls; Raymond McCune, E. S. Williams, D. B. Moorman, C. W. Smith and A. D. Stafford.

Oak Hill Street Railway, Chicago, Ill.—Incorporated in Illinois to build an electric railway in Chicago and suburbs. Capital stock, $20,000. Incorporators: Charles Pullman, I. A. Isaacson and L. S. Watts.

***Cuyuna Northern Railway, Deerwood, Minn.**—Incorporated in Minnesota to build an electric railway from Sherwood through Crow Wing County to a point on the Mississippi River. Capital stock, $1,000,000. Incorporators: Cuyler Adams, F. S. Adams and C. C. Adams, all of Deerwood.

Coraopolis & Sewickley Railway, Coraopolis, Pa.—Application for a charter has been made in Pennsylvania by this company to build an electric railway in Coraopolis, Moon and Sewickley. Incorporators: S. L. Tone, W. B. Carson, C. S. Mitchell, A. W. Stevenson and J. L. Foster. [E. R. J., Sept. 24, '11.]

Iowa, Nebraska & Dakota Railway, Pierre, S. D.—Application for a charter has been made in South Dakota by this company to build a 225-mile electric railway from Valentine, Neb., to Sioux City, Ia., via the counties of Cherry, Keyapaha, Boyd, Knox, Cedar and Dixon, Neb., the counties of Tripp and Gregory, S. D., and the county of Woodbury, Ia. It is proposed to utilize the water of the Niobrara River and the Keyapaha River for power purposes. Capital stock, $500,000. Headquarters: Pierre, S. D. Incorporators: C. H. Cornell, W. E. Haley and J. H. Bachelor, of Valetine, Neb.; Glenn W. Martens, Carl Goldsmith, J. R. McKnight and A. P. Edgar, of Pierre, S. D. [E. R. J., May 28, '10.]

***Dunbar & Wausaukee Railway, Wausaukee, Wis.**—Incorporated in Wisconsin to build a 14-mile railway from Wausaukee to Girard Junction, with a 12-mile extension to Dunbar. Capital stock, $150,000. Incorporators: J. W. Wells, Menominee, Mich.; C. B. Culbertson, Detroit, and J. A. Kenilworth, Illinois.

FRANCHISES

Phoenix, Ariz.—The Salt River Valley Electric Railway, Phoenix, has asked the City Council for a franchise in Phoenix. This 60-mile railway will connect Phoenix, Ingleside, Scottsdale, Tempe, Mesa, Chandler, Alhambra, Glendale and Peoria. F. M. Winter, Phoenix, president. [E. R. J., Aug. 26, 1911.]

Riverside, Cal.—The City Council will receive bids for the sale of the franchise for the construction of an electric railway over Magnolia Avenue, in Riverside. The Pacific Electric Railway, Los Angeles, has offered $25,000 for it.

Denver, Col.—The Denver City Tramway has received a franchise from the Council of Park Hill Heights to extend its tracks along Colorado Boulevard and East Twenty-ninth Avenue to Park Hill Heights.

Averyville, Ill.—The Peoria Northern Railway, Peoria, has asked the Council for a fifty-year franchise in Averyville. This line will connect Peoria, Mossville, Rome, Chillicothe, Sparland, Henry and Bureau Junction. H. E. Chubbuck, Peoria, president. [E. R. J., June 10, 1911.]

Averyville, Ill.—The Peoria Railway Terminals Company has asked the Board of Trustees for a franchise in Averyville. The line is to be double tracked.

Ottawa, Ill.—The Chicago, Ottawa & Peoria Railway, La Salle, has asked the City Council for a franchise to double track some of its lines in Ottawa.

Indianapolis, Ind.—The Indianapolis Traction & Terminal Company has asked the Board of Public Works for an extension of time on its franchise in which to complete the improvements of its tracks in Indianapolis.

***Vincennes, Ind.**—L. A. Meyer, C. B. Kessinger, Frank Bastin and associates have asked the Board of Trade directors for a franchise to build an electric railway from Vincennes to South Vincennes.

Beverly, Mass.—The Boston & Eastern Electric Railroad, Boston, has received a franchise from the Aldermen in Beverly and from the Aldermen in Salem. The company has asked the City Council of Lynn for a franchise to build its tracks through Lynn.

Springfield, Mass.—The Berkshire Street Railway, Pittsfield, has asked the Aldermen for a franchise to connect its Pittsfield and Berkshire lines at the south side of the park in Springfield.

Minneapolis, Minn.—The Twin City Rapid Transit Company, Minneapolis, has asked the City Council for franchises to build a number of extensions of its railway lines in Minneapolis.

Laurel, Miss.—S. M. Jones and P. H. Saunders, Laurel, have received a twenty-five-year franchise from the City Council to operate an electric railway and power plant in Laurel. Part of the stipulation of the franchise at Laurel is that this line must be in operation by April 1, 1912. The line will then be extended to Ellisville. [E. R. J., Oct. 7, 1911.]

Manchester, N. H.—The Manchester Street Railway has asked the Mayor and Aldermen for a franchise to relocate and extend some of its tracks in Manchester.

Trenton, N. J.—The franchise granted by the City Council of East Orange, giving the Public Service Railway permission to operate a line on North Park Street, has been approved by the Board of Public Utility Commissioners.

Cincinnati, Ohio.—The Cincinnati Traction Company has asked the City Council for a franchise to extend its Avondale Street line to Bond Hill.

North Dayton, Ohio.—The People's Railway, Dayton, has asked the Council for a franchise to extend its tracks in North Dayton.

Oklahoma City, Okla.—The Oklahoma Interurban Traction Company has had sustained in the Supreme Court the validity of the franchise granted it to build its tracks on any street in Oklahoma City not in use by the Oklahoma Railway.

Spartanburg, Pa.—The Greenville, Spartanburg & Anderson Railway, Greenville, has asked the City Council for a franchise over certain streets in Spartanburg.

Spring City, Pa.—The Pottstown & Reading Street Railway, Pottstown, has asked the City Council for a franchise in Spring City. This is part of a plan to build a line between Spring City and Sanatoga.

Dallas, Tex.—The Southern Traction Company, Dallas, has asked the Mayor and Commissioners for a franchise inside the city limits of Dallas. This line will connect Dallas, Waco, Hutchins, Ferris, Waxahachie, Milford, Hillsboro and Forreston. J. F. Strickland, president. [E. R. J., Aug. 26, '11.]

***Bingham City, Utah.**—Judge Watson and associates have received a franchise from the City Council in Bingham City. This is part of a plan to build an electric railway through the Bear River Valley and eventually extend it to Malad, Idaho.

Richmond, Va.—The Virginia Railway & Power Company has asked the City Council for a franchise to extend its tracks in Richmond from Robinson Street to West Street and thence to Floyd Avenue, forming a loop.

Vancouver, Wash.—H. L. Harmon and E. R. Ernsberger have asked the City Council for a franchise in Vancouver. This is part of a plan to build an electric railway from Vancouver north to the South Fork of the Lewis River, thence northeast to Klickitat Pass, a distance of 100 miles. [E. R. J., Sept. 30, '11.]

Weston, W. Va.—The Fairmont & Clarksburg Traction Company, Fairmont, has asked the City Council for a franchise in Weston.

Weston, W. Va.—The Clarksburg & Weston Electric Railway, Clarksburg, will ask the City Council for a franchise in Weston.

TRACK AND ROADWAY

Tucson (Ariz.) Rapid Transit Company.—A 1-mile extension is being planned by this company at Tucson from the University gate to the Speedway and thence down the Speedway.

Clear Lake Railroad, Lakeport, Cal.—The directors of this company have authorized the construction of 9 miles of roadbed. Contracts will be let at once for 4 miles of grading out of Hopland and 5 miles southwest of Lakeport. This 24-mile line will extend from Hopland to Lakeport, with branches through Kelseyville and Upper Lake. E. Howard, Lakeport, secretary. [E. R. J., June 10, '11.]

Sacramento & Woodland Railway, Sacramento, Cal.—Bids are being received by this company for grading on the line which will connect Sacramento and Woodland and contracts will be awarded soon. The grading bids were let in three sections.

Sacramento Valley West Side Electric Railway, Sacramento, Cal.—Preliminary surveys are being made and franchises will soon be asked for by this company for its railway between Woodland, Colusa, Willows, Orland, Corning, Redding and Red Bluff. C. L. Donohoe, Willows, president. [E. R. J., Aug. 19, '11.]

Denver (Col.) City Tramways.—This company plans to build an extension along Colorado Boulevard and Twenty-ninth Avenue in Denver.

Pueblo & Suburban Traction & Lighting Company, Pueblo, Col.—During the next few weeks this company will place contracts to build about 6 miles of new track and two concrete bridges.

Trinidad Electric Transmission Railway & Gas Company, Trinidad, Col.—During the next four weeks this company will place contracts for rebuilding about 19 miles of track.

Shore Line Electric Railway, New Haven, Conn.—This company has awarded the contract to build an extension between Ivoryton and Deep River to the Cavanaugh-McCaffrey Company, Boston. Preliminary work has been begun. It is expected that this line will be extended to Chester as soon as the right-of-way can be obtained.

Valparaiso & Northern Railway, Valparaiso, Ind.—This company's line is practically completed from Valparaiso to Chesterton and will soon be ready for operation. Some bridge work remains to be completed.

***Carrollton, Ky.**—James Gayle, general manager of the Carrollton & Worthville Railroad, with headquarters at Carrollton, Ky., is reported to be interested in a line between Carrollton and Covington, Ky., a distance of 55 miles.

Kentucky Southwestern Railway, Light & Power Company, Hickman, Ky.—This company is now making a preliminary survey for its proposed line between Paducah, Ky., and Union City, Tenn. Following the survey it is the intention to interest outside capital in the construction of the line, the estimated cost of which is $4,000,000. W. A. Calhoun is in charge of the survey. [E. R. J., Oct. 8, '11.]

Norway & Paris Street Railway, Norway, Maine.—This company has let the contract to C. E. Hoxie & Company, of Augusta, for the construction of a new concrete dam at the outlet of Pennesseewassee Lake, Norway, Maine. The dam is to be completed before the winter. The site is that of a storage dam on the largest of the three bodies of water at a distance above the power site.

Aroostook Valley Railroad, Presque Isle, Maine.—This company is said to have effected a contract with the New Brunswick provincial government for the construction of the St. John Valley Railroad along the St. John River from St. John to Grand Falls and St. Leonards. The proposed new line is to have a subsidy from the Canadian government.

Boston (Mass.) Elevated Railway.—Plans are being considered by this company to extend its line from Maplewood across the east side of Melrose through Lebanon Street to Porter Street.

Ironwood & Bessemer Railway & Light Company, Bessemer, Mich.—Work will soon be begun by this company on its 27-mile electric railway to connect Melles Falls, Ashland, Ironwood and Bessemer. F. Sullivan, Ironwood, is interested. [E. R. J., Sept. 24, '11.]

Twin City Rapid Transit Company, Minneapolis, Minn.—Work has been begun by this company on the extension of its Johnson Street line in Minneapolis to Twenty-seventh Avenue N. E.

St. Paul Southern Electric Railway, St. Paul, Minn.—This company has consolidated with the Interurban Construction Company, of Hastings, Minn., and let the contract to Hoy & Elzy Company for the construction of an electric railway to Mankato. [E. R. J., July 15, '11.]

Gulfport & Mississippi Coast Traction Company, Gulfport, Miss.—Plans are being figured on by this company for substantial improvements and betterments as well as some extensions of its lines in the near future.

West Missouri Electric Railway, Kansas City, Mo.—This company has awarded a contract to the Spitcaufsky-Wagner Construction Company to build the 3-mile section of this line from Kansas City southeasterly. It will connect Kansas City and Warrensburg via Lee Summit, Grandview, Belton and Roymore. The company will build no power house. It will purchase its electric power from the Metropolitan Street Railway and the present intention is to lease Metropolitan cars at first. [E. R. J., May 6, '11.]

Whitefish & Polson Electric Railway, Kalispell, Mont.—It is reported that this company has made arrangements to finance the line from Whitefish to Kalispell. It is expected to begin work this fall. The directors of the company have sold and assigned all their rights-of-way and franchises for an electric line through Kalispell to the Flathead Interurban, which is being backed by D. R. McGinnis, a local capitalist. [E. R. J., Feb. 4, '11.]

Binghamton (N. Y.) Railway.—This company has under construction a mile of new track in Binghamton, for which materials have been purchased.

Orange County Traction Company, Newburg, N. Y.—About 1½ miles of track are being renewed by this company on Holden Street and Water Street in Newburg. A concrete foundation and a reinforcement of brick are being laid.

***Devils Lake, N. D.**—R. F. McDougall, St. Paul, and associates are planning to build an electric railway between Devils Lake, Greenwood and Chautauqua.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.—Work has been begun by this company double tracking its Broad Street line in Cleveland.

Oklahoma Interurban Traction Company, Oklahoma City, Okla.—Work is under way by this company on its Harvey Avenue line and the downtown loop on Main Street and Grand Avenue in Oklahoma City. Plans are being considered to build an extension south and west from Fifth Street to connect with the north end of the Patterson Capitol Hill line at Hudson Avenue.

London (Ont.) Street Railway.—Extensive improvements are being planned by this company for its lines in London. It is expected that about $1,000,000 will be expended.

Hummelstown & Campbellstown Street Railway, Hershey, Pa.—The Pennsylvania Steel Company has received an order for 1000 tons of rails from this company.

Mahoning & Shenango Railway & Light Company, New Castle, Pa.—Work has been begun by this company on the extension of the Elm Street line in Warren.

West Penn Railways, Pittsburgh, Pa.—About $2,000,000 will be spent by this company in improvements and extensions of its lines in western Pennsylvania. The new extensions will include one from Greensburg to New Alexandria and another from New Alexandria to Latrobe, and a third to cover a territory between West Newton and Scott Haven. Rights-of-way have been acquired between the terminals for these projections and surveys are being made.

Somerset (Pa.) Railway.—Work will be begun shortly by this company on its 10-mile electric railway between Somerset and Rockwood. C. C. Winslow, Somerset, general manager. [E. R. J., May 13, '11.]

***Rapid City, S. D.**—Efforts are now being made by local business men who are connected with interested capital to complete plans for a forty-seven-mile electric railway from Rapid City to Newell in Butte County.

Jackson Railway & Light Company, Jackson, Tenn.—

This company has begun work on an extension from Pearl Street to Porter Street.

*Shawanee, Tenn.—It is reported that a company is being organized for the purpose of establishing a hydroelectric power plant on Powell's River, near Shawanee. The purpose of the development is to furnish power for Jellico, Tenn., and Middlesboro, Ky. It is also the plan to operate an electric railway in that territory.

Ft. Worth Southern Traction Company, Ft. Worth, Tex.—The route of this electric railway will extend from Dallas to Waco and from Dallas to Corsicana, via Ferris, the lines to diverge at Ferris, approximately a total distance of 134 miles. Beginning at Dallas, it is contemplated to have the route extend via Hutchins and Wilmer to Ferris, thence to Waco, through Rockett, Waxahachie, Forreston, Italy, Milford, Hillsboro, West Elm Mott and Day's Lake. The Corsicana line, diverging at Ferris, is to run via Trumbull, Palmer, Garrett, Ennis, Alma and Rice. G. H. Clifford, Ft. Worth, is interested. [E. R. J., Oct. 7, '11.]

Northern Texas Traction Company, Ft. Worth, Tex.—This company has placed in operation its new extension known as the Forest Park line, which extends from Forest Park to the Texas Christian University.

Galveston (Tex.) Electric Company.—Plans are being made by this company for the construction of new cross-town lines in Galveston, east of Twenty-first Street.

San Benito (Tex.) Interurban Railway.—Within the next few months this company will extend its tracks to Santa Maria. Preliminary arrangements are now being made.

Virginia Railway & Power Company, Richmond, Va.—It is reported that this company will spend $1,100,000 within the next year for enlarging and improving its lines. About $200,000 will be spent on track work.

Highland Park & Lake Burien Railway, Seattle, Wash.—Dibble-Hawthorne & Company, Tacoma, have secured the contract for constructing the 7-mile electric line from Oxbow to Lake Burien for this company. W. H. Coughlin, 302 American Bank Building, Seattle, is interested. [E. R. J., Sept. 9, '11.]

Spokane & Inland Empire Railroad, Spokane, Wash.—This company will extend its North Howard Street line in Spokane to the city limits at once.

Steubenville, Wellsburg & Weirton Railway, Charleston, W. Va.—The branch of this railway which connects Weirton and Steubenville has been placed in operation.

Fairmont & Clarksburg Traction Company, Fairmont, W. Va.—Plans are being considered by this company to build an extension to Smithtown with a spur extending to Montana. This line will eventually extend to Morgantown.

Mount Morris-Morgantown Traction Company, Morgantown, W. Va.—Stockholders of this company have decided to dissolve the company and abandon the proposed line from Mount Morris to Maidsville and Randall. Aaron Garlow, Morgantown, president. [E. R. J., Aug. 26, '11.]

Morgantown (W. Va.) Interurban Railway.—It is reported that a meeting will soon be held for the organization of this company and that surveys will be made this fall to build an electric railway between Fairmont and Morgantown, via Laurel, Point Georgetown, Arnettsville and Riversville. J. H. McDermott, president. [E. R. J., July 29, '11.]

Wheeling (W. Va.) Traction Company.—Plans are being considered by this company for the construction of an extension from Moundsville to Barton and St. Clairsville.

Milwaukee Western Electric Railway, Milwaukee, Wis.—Work has been begun by this company on its line between Juneau and Hustisford.

Badger Railway & Light Company, Milwaukee, Wis.—This company advises that its proposed line will connect Whitewater and Lake Geneva via Elkhorn. The company has not placed in operation a line between Pewaukee and Watertown as was reported in the Electric Railway Journal, Sept. 23. [E. R. J., Sept. 23, '11.]

SHOPS AND BUILDINGS

Denver City Tramway Company, Denver, Col.—This company has broken ground for the new car repair shops, paint shops and garage at Thirteenth Street and Arapahoe Street, in Denver. The divisions will be separate fireproof buildings, and will open off the new fireproof carhouse at Thirteenth, Fourteenth and Arapahoe Streets, just completed by this company.

Trinidad Electric Transmission, Railway & Gas Company, Trinidad, Col.—During the next four months this company will place contracts to build a steel-frame extension to its carhouse in Trinidad.

Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.—The plans for the new traction terminal station and arcade building have been received by General Manager T. F. Glover, of this company, and bids for the construction of the building are being advertised for. The building will be of steel, stone and brick. The station proper will be a six-story fireproof building in the rear of the Arcade. The train sheds will run through the length of the building. The basement will be finished for occupancy.

Gulfport & Mississippi Coast Traction Company, Gulfport, Miss.—Work has been begun by this company on a new repair shop in Gulfport.

Interurban Railway & Terminal Company, Cincinnati, Ohio.—Plans are being made by this company to rebuild its carhouse which was recently destroyed by fire at Coney Island. A temporary structure will be erected. The company is considering plans for a consolidation of its power plants and carhouses.

Cincinnati (Ohio) Traction Company.—This company proposes to build its new carhouse at Erie Avenue and Tarpis Street, in Cincinnati. The structure will be one story in height and of concrete construction. The cost is estimated to be about $60,000.

Philadelphia & West Chester Traction Company, Upper Darby, Pa.—A new freight station and warehouse is being built by this company at Milltown at the east end of the bridge over Chester Creek.

Virginia Passenger & Power Company, Richmond, Va.—New steel carhouses to cost $125,000 and the erection of terminals at Ocean View and Willoughby are among the improvements planned by this company in the near future.

POWER HOUSES AND SUBSTATIONS

Pacific Electric Railway, Los Angeles, Cal.—This company has placed an order with the General Electric Company for one motor-generator set, one 17-kw, 500-125-volt exciter and three WC-450-15,000:13,500-2250-volt core type transformers.

Trinidad Electric Transmission Railway & Gas Company, Trinidad, Col.—During the next four weeks this company expects to purchase two 2000-kw turbines, three 1000-kw transformers, coal-handling machinery, boilers with a capacity of 1000 hp and stokers for its power plant at Trinidad.

Metropolitan West Side Elevated Railway, Chicago, Ill.—This company has placed an order with the General Electric Company for two 2000-kw, 600-volt rotary converters, six 700-kw, 9000:430 transformers, two 20,000-cu. ft. blower sets and a switchboard for its power house in Chicago.

Des Moines City Railway, Des Moines, Ia.—An order has been placed by this company with the General Electric Company for a switchboard for its power plant at Des Moines.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Maine.—An order has been placed by this company with the General Electric Company for one 300-kw, 2--unit motor-generator set and a switchboard for its power plant at Lewiston.

Central Pennsylvania Traction Company, Harrisburg, Pa.—This company has purchased from the Hoover, Owens & Rentschler Company one Hamilton Corliss engine with a capacity of 1600 kw and one generator for same from the General Electric Company. This is now being erected in its power plant at Harrisburg. The company expects to purchase one 150-kw generator, one 150-kw booster and one engine from the Harrisburg Foundry & Machine Works.

Fairmont & Clarksburg Traction Company, Fairmont, W. Va.—This company has placed an order with the General Electric Company for three 300-kw, 1200:600-volt CW rotary converters, nine 110-kva transformers and a switchboard for its power house at Fairmont.

Manufactures & Supplies

ROLLING STOCK

Delaware & Hudson Company, Albany, N. Y., has ordered one gas-electric motor car from the General Electric Company.

Dayton & Troy Electric Railway, Dayton, Ohio, has ordered one double-truck McGuire-Cummings long-broom snow sweeper.

New York City Interborough Railway, New York, N. Y., has ordered two long-cab snow sweepers from The J. G. Brill Company.

Erie & Suburban Railway, Erie, Pa., has ordered one GE-205 four-motor equipment with K-34 control from the General Electric Company.

Stroudsburg (Pa.) Passenger Railway has ordered one 28-ft. convertible motor car body mounted on Brill 39-E trucks from The J. G. Brill Company.

Union Traction Company, Coffeyville, Kans., has ordered two 25-ft. 4-in. pay-within motor cars mounted on Brill 39-E trucks from the American Car Company.

Chicago (Ill.) City Railway has ordered three steel underframe single-truck, long-broom snow sweepers from the McGuire-Cummings Manufacturing Company.

Orange County Traction Company, Newburgh, N. Y., is to rebuild one car for pay-within operation and will be in the market for cars of this type if the experimental car meets the service requirements in Newburgh.

Clear Lake Railroad Company, Lakeport, Cal., is in the market for one self-contained car, either gasoline or storage battery, for passenger, mail and express service. Capacity twenty people and 2 tons of freight.

City & County Contract Company, New York, N. Y., has ordered one gasoline-electric equipment for construction car and control equipment for the New York, Westchester & Boston Railway, from the General Electric Company.

Salt Lake-Ogden Railway, Salt Lake City, Utah, has ordered one 30-ton electric locomotive mounted on McGuire-Cummings No. 70-A high-speed interurban trucks from the McGuire-Cummings Manufacturing Company.

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia., has ordered one 50-ft. baggage and express car mounted on McGuire-Cummings No. 70-A high-speed interurban trucks from the McGuire-Cummings Manufacturing Company. The car is equipped with four GE-73 motors and automatic air brakes.

Nashville-Gallatin Interurban Railway, Nashville, Tenn., is asking for bids, through the Fidelity Securities Corporation, Nashville, for four 50-ft. interurban steel passenger car bodies equipped for single-end operation, and one 50-ft. steel baggage car body equipped for double-end operation. H. H. Mayberry is president.

Union Electric Company, Dubuque, Ia., has specified that the six closed pay-as-you-enter motor cars ordered from the American Car Company shall be 31 ft. 1 in. long over all and 8 ft. 3¼ in. wide over all. They will be equipped with Curtain Supply Company's fixtures, pantasote curtains, National hand brakes, Consolidated heaters, United States headlights, GE 67-2 motors, International registers, Brill sanders, Hale & Kilburn seats, Mason step treads, Brill 21-E trucks and St. Louis car wheels.

Boston (Mass.) Elevated Railway has included the following details in the specifications for the fifty semi-convertible pre-payment cars being built by the St. Louis Car Company and the Osgood-Bradley Car Company:

Seating capacity.....52	Fare boxes...recording reg.
Weight (car body)...21,000	Gears and pinions.....West.
Bolster centers, length.24 ft.	Hand brakes.....National
Length of body..34 ft. 4 in.	Heaters .....Consolidated
Over vestibule...46 ft. 10 in.	Headlights .....U. S.
Width over sills...8 ft. 7 in.	Journal boxes....Symington
Over all.....8 ft. 8¾ in.	Motors 4-West-306
Height, rail to sills....30 in.	Motors .....inside
Sill to trolley base..9 ft. 6 in.	Sanders .....Kilburn
Body .....composite	Seats ...St. Louis Wakefield
Interior trim....composition	Seating material .....wood
Roof .....monitor	Trolley catchers.....Wilson
Underframe .....steel	Trolley base .....Nuttall
Bumpers.Hedley anti-climber	Trucks.....Brill 27-MCB-1
Control.....West. Type HL	Ventilators .....Perry
Curtain fixtures....C. S. Co.	Special devices,
Curtain material...pantasote	door-operating mech.
Destination signs ...Hunter	

Lehigh Valley Transit Company, Allentown, Pa., noted in the Electric Railway Journal of July 22, 1911, as having ordered ten convertible pay-within cars from The J. G. Brill Company, has specified the following details for these cars:

Seating capacity.....44	Curtain material...pantasote
Weight (car body only),	Destination sign.....Hunter
19,000 lbs.	Fenders .....Providence
Bolster centers, length,	Gears and pinions.....solid
18 ft. 6 in.	Gongs .....Dedenda
Length of body..30 ft. 1 in.	Hand brakes.....Peacock
Over vestibule...42 ft. 1 in.	Heaters.....Peter Smith
Width over sills....8 ft. 8 in.	Headlights .....G. E.
Over all.....8 ft. 10 in.	Journal boxes....Symington
Sill to trolley base.12 ft. 1 in.	Motors .....4 West 101-B-2
Body .....wood	Motors .....inside
Interior trim.....mahogany	Paint .....Ry. Co. Std.
Headlining .....agasote	Registers .....Sterling
Roof .....Brill plain arch	Sanders .....Universal
Underframe .....wood	Sash fixtures.....Edwards
Air brakes.....West. D-2	Seats .....Winner
Axles...5-in. motor bearing;	Seating material .....rattan
6-in. gear seat	Springs .....Brill
Bumpers....Brill angle iron	Step treads .....Mason
Cables .....Brill	Trolley base.....U. S.
Car trimmings ....malleable	Trucks 27-MCB-1
Couplers .....Ry. Co.'s Std.	Wheels,
Curtain fixtures..Curt. S. Co.	F. S. W. Co. 34-in. rolled steel
Ventilators .....automatic	

TRADE NOTES

Chicago Pneumatic Tool Company, Chicago, Ill., has appointed the Holden Company, Montreal, Que., as its general sales agent in Canada.

Niles-Bement-Pond Company, New York, N. Y., has appointed the Canadian Fairbanks-Morse Company, Ltd., to act as its agents in Canada.

Westinghouse Air Brake Company, Pittsburgh, Pa., has elected Morris M. Rosenwald, of Chicago, to succeed George C. Smith as a director of the company.

Brown Hoisting Machinery Company, Cleveland, Ohio, has opened an office in the Commercial National Bank building, Chicago, Ill., with A. M. Merryweather as manager.

McKeen Motor Car Company, Omaha, Neb., has shipped a seventh standard 70-ft. all-steel motor car to the Oregon-Washington Railroad & Navigation Company at North Yakima, Wash.

Johnson Fare Box Company, Chicago, Ill., has received an order from the Kentucky Traction & Terminal Company for fare boxes to be installed on the pay-as-you-enter cars which are being placed in operation.

Detroit Twist Drill Company, Detroit, Mich., has appointed Halsted Little Eastern sales agent with offices at 30 Church Street, New York, N. Y. Mr. Little was associated for many years with the sales department of Manning, Maxwell & Moore.

Wagner Electric Manufacturing Company, St. Louis, Mo., has appointed P. L. Lewis as sales representative in Texas, with headquarters in the Scollard Building, Dallas, to take the place of J. A. Gelzer, who severed his connections with the company several months ago.

Coogan Engineering Company, Milwaukee, Wis., has received a contract from the Utah Light & Railway for an extension of the Coogan system of hot-water heating, which it installed in the main plant in 1909, for the purpose of heating the machine shops, paint shops, carpenter shop, blacksmith shop and storehouse.

Lindsley Brothers Company, Spokane, Wash., has opened a Canadian office at Calgary, Alta. G. U. Bacon has been placed in charge of the new office as resident manager and will push the company's "Pole-cat Brand" of cedar

poles throughout Canada. The company is also adding to its line the "Bear Brand" of cedar posts.

Lord Manufacturing Company, New York, has acquired all title, interest, rights, etc., formerly owned by the Spencer Air Purifying Company and has purchased the Spencer company outright. It will hereafter manufacture and sell the Spencer air purifier, Spencer air equalizer and all other appliances made by the absorbed company.

Corrugated Bar Company, St. Louis, Mo., has announced the removal of its headquarters from St. Louis, Mo., to Buffalo, N. Y., to take effect the 14th of this month. It will occupy the third and fourth floors of the Mutual Life Building in Buffalo. District offices will be maintained in the National Bank of Commerce Building at St. Louis, as well as in New York and Chicago.

United States Electric Company, New York, N. Y., announces that the Atlantic Coast Line Railroad, which has had for some time 167 of this maker's Gill selectors in service in five circuits on its telephone train-dispatching and message service, has received ninety-eight additional selector equipments which are being installed in extension of the system to Jacksonville, Fla.

J. G. Brill Company, Philadelphia, Pa., has received the following foreign orders: W. R. Grace & Company for two 20-ft. 8-in. prepayment center-aisle open motor car bodies, for F. C. Urbano de Lima, Lima, Peru. Okura & Company for ninety 21-E trucks for the Osaka Municipal Railway, Osaka, Japan. Ottawa Car Company for two 21-E trucks complete, with wheels and axles, for the Moose Jaw Electric Railway, Moose Jaw, Can. J. G. White & Company for eight 27-GE-1 trucks without wheels and axles for the Manaos Tramways, Manaos, Brazil.

Ohmer Fare Register Company, Dayton, Ohio, will build several reinforced concrete, fireproof factory buildings in Dayton. The contracts have been let and work has been begun. The buildings will be located in Edgemont on a 4½-acre tract of land recently acquired by the company on the main line of the Big Four Railroad. Robert E. Dexter has prepared plans for the main building, which will be 242 ft. long, 61 ft. wide and five stories high. Part of the first floor in the south end of the building will be used for the main offices. Provision will also be made for auxiliary offices, committee rooms, salesmen's meeting rooms and rooms fitted for drafting and experimental work. The new buildings will place the company in a position to manufacture several auxiliary devices, including a stop indicator, and a machine for printing transfers.

Ackley Brake Company, New York, N. Y., has just shipped an order of Ackley adjustable brakes to the Havana Electric Railway, Havana, Cuba. This road has now been furnished with 534 Ackley adjustable brakes. Other recent orders for this type of brake were for Campinas, Brazil; Buenos Aires, Rosario, LaPlata and Quilmes, Argentina; Charleroi, Belgium; Astrakan, Siberia; Kitchineff, Russia; Skoien, Norway, and Durban, Natal. Orders have been received also through the Compagnie Française des Freins Ackley for Ackley no-staff brakes for a number of roads in France and Spain, and the Deutsche Ackley Bremsen Company, M. B. H., of Berlin, has placed orders with the local company for no-staff brakes to be supplied to some of the largest tramways in Germany. No-staff brakes have also been furnished by the British Ackley Brake Company of London to several tramways in England.

ADVERTISING LITERATURE

Standard Roller Bearing Company, Philadelphia, Pa., has issued Bulletin No. 26, which describes the construction and the saving effected by the use of roller bearings.

Chicago Railway Equipment Company, Chicago, Ill., is distributing a relief map of the Panama Canal. The map is accompanied by a profile illustration of the canal with historical and descriptive notes.

Goldschmidt Thermit Company, New York, N. Y., has published the third quarterly number of "Reactions," which contains several very interesting articles on rail and industrial welds by the Thermit process.

Brown Hoisting Machinery Company, Cleveland, Ohio, has issued a pamphlet containing 45 pages of illustrations of installations of its locomotive cranes for a variety of uses and descriptions of possible uses to which they can be put.

Hess-Bright Manufacturing Company, Philadelphia, Pa., has issued sheets 72, 73 and 38B of its loose-leaf catalog describing its ball bearings for circular saws and jointing machines, woodshaper spindles and cranehook thrust bearings.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has issued folders Nos. 4215 and 4216, which describe a.c. and d.c. switchboard meters respectively. Another folder, No. 4217, describes and illustrates Westinghouse Type C watt-hour meters.

Zelnicker Crayon Works, St. Louis, Mo., has issued a catalog describing its different styles of marking crayons for use in car marking, for marking green and dry lumber and glass. These crayons do not stain the material marked and the mark does not wash or brush off.

H. M. Byllesby & Company, Chicago, Ill., have reprinted in booklet form an address entitled "The Regulation of Public Utilities," delivered by Arthur S. Huey, vice-president of the company, at the annual convention of the League of American Municipalities at Atlanta, Ga., on Oct. 5, 1911.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued Circular 1131, describing graphic meters for switchboard service. The publication shows illustrations of the meters together with typical charts taken from same, indicating the various uses to which graphic meters may be put with advantage to the user.

De Laval Steam Turbine, Trenton, N. J., has issued a booklet entitled "A Steam Turbine for Driving Direct-Current Generators," which describes the De Laval multi-stage geared steam turbine for driving low or moderate speed machinery. It also contains a discussion of the different types of steam turbines and their comparative merits.

Sangamo Electric Company, Springfield, Ill., has issued Bulletin No. 19, which describes its ampere-hour meters for use in charging electric vehicles. Complete wiring diagrams for various types of well-known vehicles are given, and these should prove of assistance to managers who desire to equip to meet the conditions of vehicle charging service.

W. N. Matthews & Brother, St. Louis, Mo., have issued a booklet which describes the "Telafault." This instrument locates the following kind of telephone cable troubles: Dead shorts, high-resistance trouble (up to 50,000 ohms) and wet spots. It is asserted to be the only instrument that will locate grounds without "noising up" the other pairs in a working cable. It will find all kinds of faults except "opens."

Allis-Chalmers Company, Milwaukee, Wis., has issued several bulletins of interest to electric railway engineers. Bulletin No. 1068 gives an illustrated description and discussion of point of advantage of its direct-connected Corliss engine units. Bulletins No. 1070 and No. 1519 contain descriptions and sectional drawings of installations of its barometric condensers. Bulletins No. 1074 and 1083 describe direct-current motors and generators for individual machine drive and power-house units. Bulletin No. 1078 describes alternating-current generators for turbine and reciprocating steam engine use, for gas engines and belted units. Bulletin No. 1082 describes engine-driven, direct-current generators, including exciter and gas-engine units.

Green Fuel Economizer Company, Matteawan, N. Y., has issued a 94-page book entitled "Heating and Ventilating," which contains articles on the loss of head by friction through pipes, loss of head through orifices and equivalent orifices, method of determining the size of heaters to meet any given requirement and a method of calculating air resistances in parallel and series analagous to Ohm's and Kirchoff's laws, as applied to electrical circuits. There are also numerous new tables of constants which are of use in general engineering practice. The company has also published Bulletin No. 140, entitled "The Economy of Green's Economizers." Five articles reprinted from recent issues of technical journals are given which describe power-house installations in which Green's economizers are used. The bulletin also contains notes on economizer practice, giving data and formulas used in their installation.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVIII NEW YORK, SATURDAY, OCTOBER 21, 1911 No. 17

PUBLISHED WEEKLY BY

McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

JAMES H. MCGRAW, President; C. E. WHITTLESEY, Secretary.
TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1021 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Thursday, 9 a. m., of the week of issue.

Copyright, 1911, by MCGRAW PUBLISHING COMPANY.

Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, OCTOBER 21, 1911.

CONTENTS.

Overhead Charges 897
The Buffalo Plan of Reorganization 897
1200-Volt Electrification of the Southern Pacific Company 898
Direct-Connected Shop Motors 898
The Arrangement and Wording of Car Signs 899
Power Distributing System of the Oakland, Alameda & Berkeley Suburban Lines of the Southern Pacific Company.—I 900
Electric Railway Publicity Exhibits at Boston 906
Report on Los Angeles Transit Conditions 907
Letter Ballot on Engineering Association Standards 909
Hearing at Buffalo on International Traction Reorganization 910
Hearing in Regard to Eight-Car Elevated Trains in New York 914
Operation of Near-Side Cars in Philadelphia 915
Electrical Features of New York Tunnels of Pennsylvania Railroad 918
Mr. Connette's Opinion on Hand Brakes 919
Results of Tests of Fenders at Newton, Mass 919
Annual Convention of the National Association of Railway Commissioners 920
Improved Truck Brake Rigging 923
Funicular Electric Railway Under Construction Near Denver 923
Single Truck, Arch-Roof Cars for the Oklahoma City Traction Company 924
Aviation Exhibitions for Electric Railways 924
Electric Locomotive for Portland, Grey & Lewiston Railway 924
Interurban Cars for the Northern Texas Traction Company 925
News of Electric Railways 926
Financial and Corporate 928
Traffic and Transportation 929
Personal Mention 931
Construction News 932
Manufactures and Supplies 935

Overhead Charges

As Prof. M. E. Cooley was one of the pioneers in the valuation of public utility properties, he was especially well qualified to discuss the subject of "Overhead Charges" at the Atlantic City convention. His paper, as published in last week's issue, describes elements of value about the allowance for which there is not now much disagreement, although the percentages necessarily differ in various properties. It should be studied by engineers and accountants. In the prepared discussion, as well as in his supplemental remarks at the convention, Professor Cooley revealed the fact that notable progress has been made in the science of valuation. Time and study have shown the existence of real expenditures which did not appear prominently on the surface in the earlier appraisals and were therefore ignored or included only in part. The earlier appraisals were, in fact, inadequate representations of the full costs of property. For this state of affairs both parties to controversies were somewhat to blame in the past. The public for years could see no other elements of value than those of a physical nature. The corporations, with good reasons in many cases, regarded capitalization and value as synonymous, but attempted no analysis to prove their case. If there is to be further progress in recognition of the investment it will be due in large part to better records of costs which the corporations should be able to produce in the future.

The Buffalo Plan of Reorganization

In the plan advanced for reorganization of the International Railway System of Buffalo, which is described elsewhere in this issue, it is proposed to form a new company under New York laws to take the place of the present New Jersey holding company. This change would simplify the form of organization by substituting an operating company subject to the laws of the State for the controlling holding company which is now a creation of a foreign State. The elimination of the holding company is therefore a change that is to be desired. In connection with the plan thus outlined a report has been made by Bion J. Arnold which develops the claim of values underlying the position taken by the company in regard to capitalization. The basic theory of the report is that the company is entitled to a fair return on the investment from the beginning. Any shortages in this return remain in the capitalization and cumulative interest is allowed on them. Much depends, of course, upon the rate of return and the rate of interest upon early losses used in the computation. Mr. Arnold's figures are based upon a rate of 7 per cent in each case and he regards this as reasonable, particularly in view of the fact that no claim is made by the company for fran-

chise value. It is not the purpose, however, according to the plan, to retain permanently the capitalization representing early losses and superseded property. All future surplus, above such fair rate of return as may be fixed, would be applied to the amortization of the part of the capitalization or to construction, which would be another way of wiping out the difference. The theory of capitalization of early losses on a reasonable basis, on the ground that they represent a cost of establishing the business, is one that has been laid down as acceptable by the Railroad Commission of Wisconsin. It is, therefore, a theory for whose acceptance there is excellent precedent.

THE 1200-VOLT ELECTRIFICATION OF THE SOUTHERN PACIFIC COMPANY

The article in this issue on the 1200-volt feeder and trolley distribution system of the Southern Pacific Company's electrified suburban lines presents a most conspicuous example of the availability of high potential direct current for use in and near cities. In this case the problem was to electrify about 120 miles of track in the contiguous cities of Oakland, Alameda and Berkeley for maximum running speeds of 45 m.p.h. and schedule speeds of 20 m.p.h. to 25 m.p.h. As the original steam routes had no connection with the 600-volt street railways in the communities named, the Southern Pacific engineers were free to choose any method of a.c. or d.c. distribution that appeared most suitable for their requirements. Doubtless the adoption of the single-phase system would have greatly simplified the distribution layout, but a high-voltage trolley was out of the question because a great proportion of the suburban line mileage is operated over public highways. The same objection applied to d.c. third-rail operation. The advance of the art, however, appeared to offer an ideal solution in the application of a 1200-volt d.c. catenary which, with the aid of roller pantograph collectors, would satisfy the heavy energy requirements without the employment of excessive copper or numerous substations. Furthermore, it was apparent that the 1200-volt d.c. system could be readily adapted to operate in conjunction with the 600-volt d.c. lines should the future offer such occasion.

The twofold condition of high trolley voltage and high-speed train service called for the best standards in line construction. That these conditions have been amply fulfilled will be apparent from a comparison of this 1200-volt line work with similar pole or bridge catenary construction methods employed on single-phase lines which have trolley potentials of 6600 volts or over. The high factor of electrical safety appears from the fact that the messenger and feeder insulators for the 1200-volt service were specified to withstand respectively a one-minute water electrode test of 20,000 volts and 30,000 volts alternating current. Similarly, the porcelain and wood-break strain insulators used in series for dead-ending trolley and messenger wires were tested to 9500 lb. and 12,000 lb. respectively. These two instances are typical of the care which was taken to have the line fittings of the most substantial character.

A great deal of credit is due to the Southern Pacific engineers for the originality which they have displayed in designing a railway distribution system for a service which must satisfy more onerous operating requirements than preceding 1200-volt d.c. installations in this country.

DIRECT-CONNECTED SHOP MOTORS

Slowly the value of the direct-connected shop motor is coming to be appreciated in electric-railway circles, and in the planning of new shops on a large scale one occasionally finds the problem of machine driving worked out on a thorough engineering basis. It is natural that this system of operation should receive favorable consideration, primarily in the building of new and extensive shop properties, along with the close study of appliances for heating and fire protection which such establishments are now requiring. The new shops of the Utah Light & Railway Company at Salt Lake City, now approaching completion, illustrate this point, every tool which is going into the plant being planned for operation by a separate motor, with the exception of half a dozen small grinding, shaping and winding machines which are inexpensively driven together on the group plan. Although but a few tools have been set up at this writing, the total list compiled by the company covers some thirty-five motors, having an aggregate rating of 386 hp, including six of 183½-hp total rating in the forge shop, twenty-two of 139-hp rating in the machine shop and four of 28-hp rating in the carpenter shop.

Such an installation of direct-connected motors is as yet quite unusual in electric railway practice, but it is bound to be more common in the future as the requirements of forced production become more and more intense. The advantages of direct driving are an old story, but they appear conspicuous even in a half-finished installation. The absence of line shafts, belts and pulleys, the supply of power through wiring carried in iron conduit and the location of controlling starters and switches close by the driven machine in a space having practically no value from the operating standpoint are points of decided benefit even in a shop whose work bears the intermittent character associated with railway rolling-stock maintenance. The amount of clear head room and freedom of surroundings available where the tools are driven by individual motors must be seen to be appreciated to the full. Where from one to two score machines are thus driven under a single roof the absence of obstruction of light, striking cleanliness of operation and evident economy of service, which appear even to the casual visitor, are certain to work out well in routine shop administration.

The selection of motors for individual driving of railway shops covers a wide range of ratings, depending upon the extent of service to be handled. Either direct or alternating-current motors will meet the conditions, although where the latter are used the present practice largely restricts speed changes to mechanical methods. At Salt Lake City all the motors now going into the shops are of the three-phase induction type, while an installation visited recently included only direct-current motors. The former equipment will be almost if not certainly the largest of its kind in the country, taking the total number of separate motors and their combined rating into account and omitting,

of course, the already extensive use of individual motors in steam railroad-shop practice. It is interesting to note that at Salt Lake City the motor range is to be from 1 to 100 hp, the great majority of machine tools, however, being easily driven by units of from 3-hp to 7½-hp rating each. In woodworking 10-hp motors are required for the larger tools, and, as in other industrial service, hoists and transfer-table service demand motors of from 20-hp to 25-hp rating. Air compressors consume the largest amounts of power per machine.

The bugbear of first cost will always tend to daunt the company which takes up the problem of tool driving from the most modern point of view, but after all, when one considers the efficiency of the service rendered, its safety and flexibility, it is probable that less weight will be attached to the necessary investment in motors than has been given it in the past. Power is admittedly cheap when it is produced under favorable conditions in large amounts—at Salt Lake the service is hydroelectric—but so great is the economy of operation in plants where tools consume electrical energy only when in productive service that it ought to be possible to show a substantial saving in many cases through the use of separate motors. In central-station practice large motor loads have been acquired in many cities mainly through the inordinate losses in belts and line shafting occurring when the producing machines were running either idle or light. All these points, including the striking savings of the motor drive in overtime operation, have been emphasized many times in the manufacturing field and should be more generally taken into account in railway shops. The cost of maintaining old line-shaft drives and the expense of installing new rigs to meet changing conditions are frequently overlooked. At Salt Lake City special emphasis is laid by the management upon the importance of operating the machine tools by power independent of the trolley-load fluctuations, and in a large shop of this character there is little doubt that the use of a special supply circuit for the various departments is well advised and tends to maintain the speed of machines without regard to the load on the line. At the same time it is safe to say that the use of individual motors run by trolley current will give better results from the productive standpoint than the old method of running practically the entire shop belted from one or two motors of ancient design and disreputable efficiency.

The argument in favor of modern motors, presented in these columns a few weeks ago, applies just as strongly, if not more strongly, to the use of motors in shop work as to those in car operation. It is true that the aggregate power capacity of the motors used in the shop is vastly less than that of the motors used on the cars. But at the same time the cost of installing modern motors in the shop is less in the same proportion. Many an old railway motor which long ago was discarded for use on the cars because it had outlived its usefulness has been rewound as a shunt machine and is doing duty in driving line shafting in a railway shop. If the success of the individual drive in steam railroad shops teaches any lesson to the electric railway maintenance establishment, it may confidently be predicted that within another five years wide-area tool driving in plants of the latter type will be pretty well discredited.

THE ARRANGEMENT AND WORDING OF CAR SIGNS

One of the many interesting features of the Philadelphia near-side car described in this issue is the system of exterior and interior signs for the guidance of passengers. It is a strange fact that but little attention has been paid on American electric railways to the adoption of a logical system of sign location, although some companies have standardized forms and sizes of signs for various purposes. This lack of order is particularly apparent in the case of interior signs, because as a rule the advertisement racks are used exclusively for paid announcements. This practice forces the railway to use a windowpane or corner for its own statements to the public, no matter how important they may be. The new Philadelphia scheme of placing one of the three signs in the middle of each rack means some loss in advertising revenue, but this fact should not prevent other companies from using this or even more conspicuous positions. Indeed, some companies continuously reserve the end panels over the doors for their own announcements, which may take the form of traffic regulations or the advertisement of some attraction along the line. The location of the third sign in the Philadelphia cars in the arch over the front platform is of course dictated by the nature of the car design.

Perhaps the most striking features of the interior signs are that the announcements of each class will always be posted in the same place and that the text of the signs has been prepared with unusual care. Passengers are not inclined to read long notices concerning transfers and other subjects relating to traffic, a fact which is unpleasantly brought to mind through the occasional disputes between passengers and conductors. It was therefore considered essential that all text should be so clear and so briefly worded that the regulations would easily be remembered by the passengers. The type used is quite large, so that it can be read easily from all parts of the car.

The exterior destination signs, or rather those visible from the street, represent a great departure from current American practice but one which is justified by foreign experience. Many signs of this character, as ordinarily used, are of little value to anyone but the regular passenger, and even he often finds it difficult, when at a considerable distance, to tell whether the car will run to the terminal or will be turned back at some point along the route. This drawback has been remedied in the near-side car by the use of a large illuminated number in the front vestibule to indicate the route and a second sign over the entrance to indicate the terminal. The most interesting exterior sign, however, is the vertical placard which is placed in a panel alongside the platform to give the full route of the car and the location of important places along the line. This card is intended to accomplish the same object as the horizontal wooden signs which are placed on the roofs of many European cars. Such a sign is eminently suitable for Philadelphia, because on most routes the cars going up one street must return on another, a condition which puzzles all but those experienced in the car routes in Philadelphia. The same plan would be applicable to the cars of any city which operate over ziz-zag routes, or around loop tracks in the downtown district.

Power-Distributing System of the Oakland, Alameda and Berkeley Suburban Lines of the Southern Pacific Company—I

This Is the First of Two Articles on the High-Tension and Low-Tension Lines of One of the Largest 1200-Volt Direct-Current Catenary Installations in the World

The first of the series of articles which have been published in this paper upon the 1200-volt d.c. electrification of the Southern Pacific Company at Oakland, Cal., appeared in the Electric Railway Journal of Feb. 4, 1911. This was a description of the power station which had been built at Fruitvale, Cal., to supply energy for the lines. The second article, which was published in the issue for June 17, 1911, described the steel cars and repair shops, the former being characterized by their extreme length (72 ft. 10½ in. over the buffers) and their great lightness (761 lb. per seated passenger of a combined motor car and trailer). The following paragraphs give an account of the overhead construction which has been adopted to meet the requirements of three to six-car trains operated with pantograph collectors at speeds up to 45 m.p.h.

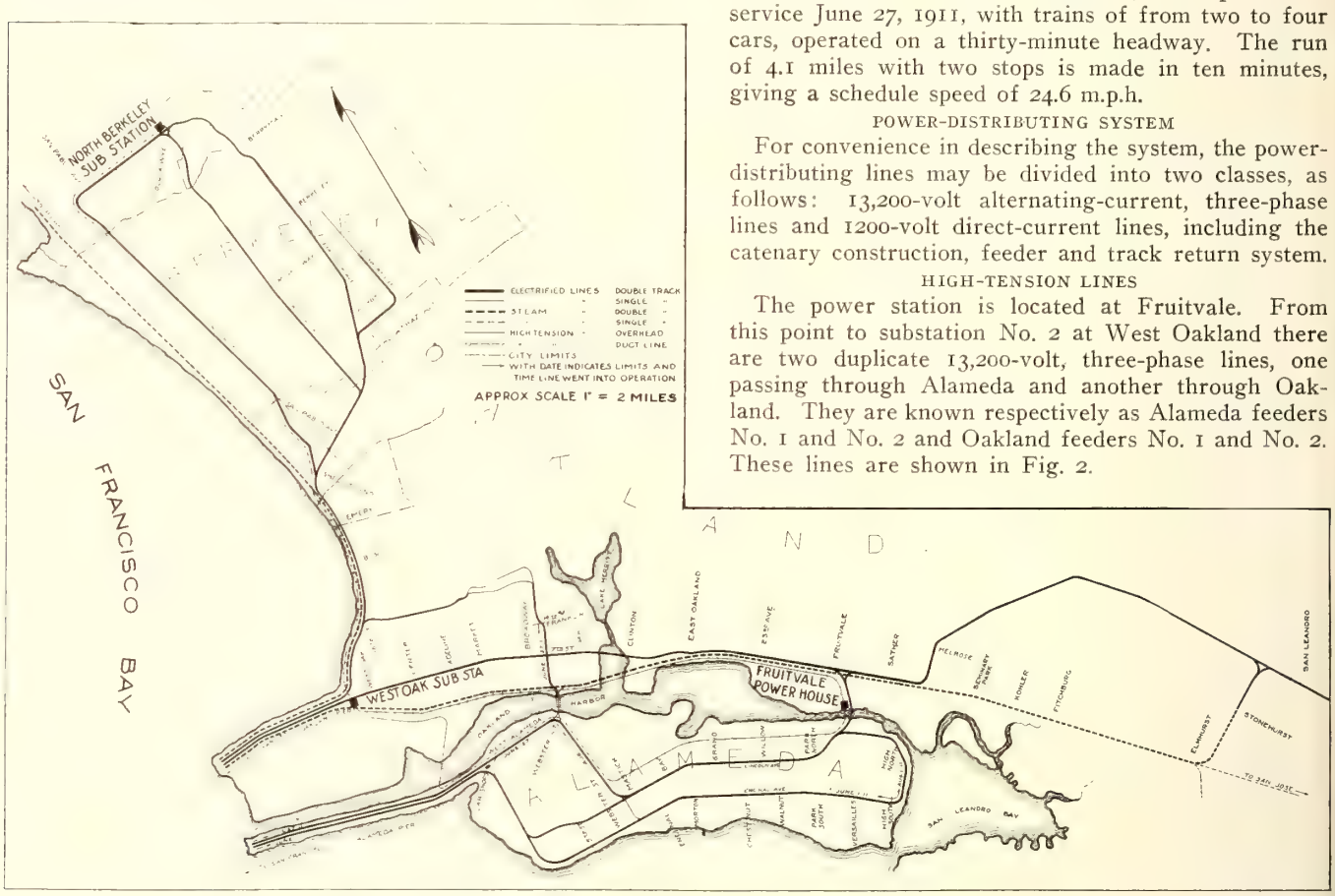


Fig. 1—Southern Pacific 1200-Volt Lines—Map Showing the Electrified Territory

PRESENT EXTENT OF THE ELECTRIFICATION

The present status of this project will best be understood by reference to the accompanying map, Fig. 1, upon which are indicated this company's electrified lines, its steam railways and its high-tension overhead and duct transmission lines in this portion of the San Francisco Bay district. The complete electrification will embrace about 120 miles measured as single track. Some 40 miles of track are now in operation. Practically all of the lines already electrified or to be electrified are double track.

The general character of these lines is indicated by the service conditions which prevail on the electrified routes. The first line to be operated electrically was one from Alameda Mole to High Street South, via Encinal Avenue, which was placed in operation June 1, 1911. On Aug. 1 this service was replaced by the Alameda Loop line, operating to Alameda Mole from Encina and Lincoln Avenues with one to six-car trains on a thirty-minute headway. This is a run of 14.6 miles with sixteen stops made in forty minutes, giving a schedule speed of 21.9 m.p.h.

The Fourteenth Street line from Alameda Mole to Fourteenth and Franklin Streets, Oakland, was placed in service June 27, 1911, with trains of from two to four cars, operated on a thirty-minute headway. The run of 4.1 miles with two stops is made in ten minutes, giving a schedule speed of 24.6 m.p.h.

POWER-DISTRIBUTING SYSTEM

For convenience in describing the system, the power-distributing lines may be divided into two classes, as follows: 13,200-volt alternating-current, three-phase lines and 1200-volt direct-current lines, including the catenary construction, feeder and track return system.

HIGH-TENSION LINES

The power station is located at Fruitvale. From this point to substation No. 2 at West Oakland there are two duplicate 13,200-volt, three-phase lines, one passing through Alameda and another through Oakland. They are known respectively as Alameda feeders No. 1 and No. 2 and Oakland feeders No. 1 and No. 2. These lines are shown in Fig. 2.

As both the Fruitvale power station and the Oakland substation are located on the north side of San Antonio estuary, it was necessary to cross the latter twice with the Alameda feeders, as indicated in Fig. 2, previously mentioned. At Fruitvale this crossing is made by means of submarine cables and near West Oakland by means of a long span which is 200 ft. above high water. Both the submarine and the aerial crossings are more fully described in connection with the 1200-volt distribution.

The Oakland feeders parallel the First Street steam line and run partly overhead and partly underground. From the West Oakland substation duplicate lines run partly overhead and partly underground parallel to one of the

Berkeley electric lines. In all cases the entrances to the substations are underground. Where a change is made from underground to overhead conductors the Davis type of outdoor terminal is used with a three-way splice at the top of the poles between the single-conductor cables attached to the terminals and the three-conductor cable. A cable top of this kind is shown in Fig. 2.

All of the overhead lines are carried on latticed steel poles, as illustrated in Fig. 4, except where they parallel

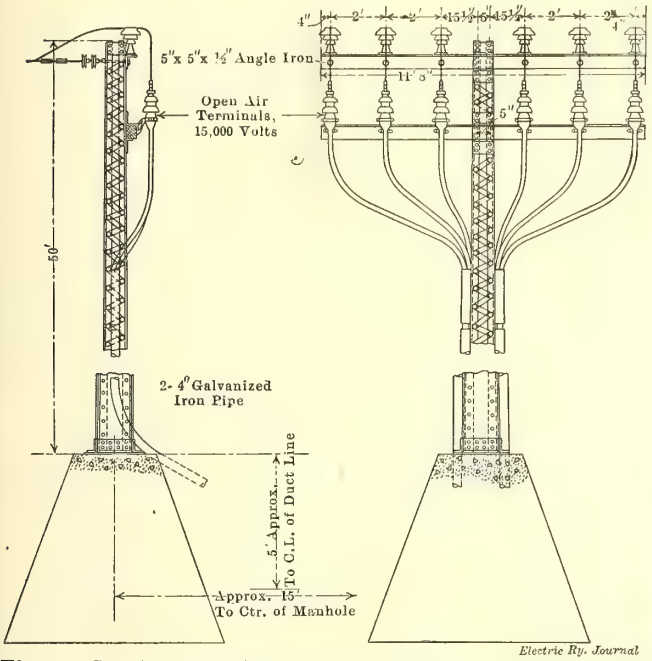


Fig. 2—Southern Pacific 1200-Volt Lines—Cable Top for High-Tension Transmission

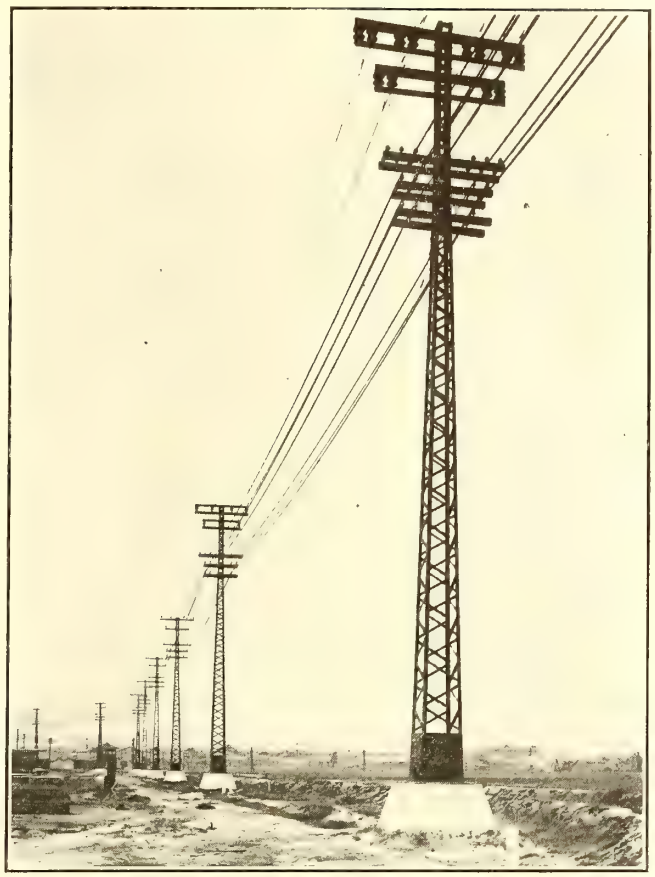


Fig. 4—Southern Pacific 1200-Volt Lines—Transmission Line at West Oakland

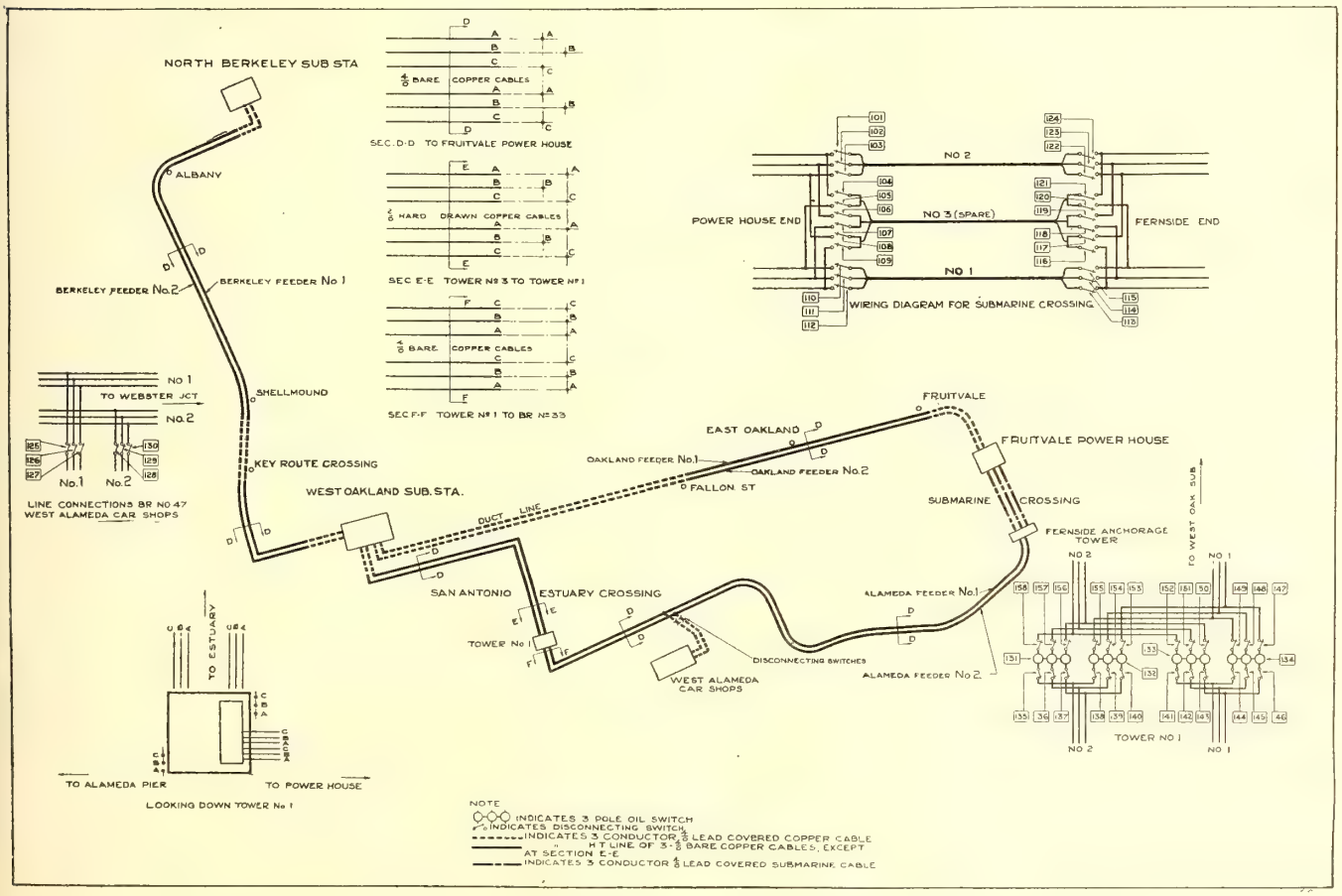


Fig. 3—Southern Pacific 1200-Volt Lines—High-Tension Transmission Feeder System

the two-track and four-track catenary bridges, where they are carried on extensions to the end supports of the bridges, as indicated in Figs. 5 and 7. Every mechanical and electrical detail of the aerial lines was worked out with a very high factor of safety to provide for the salt fogs and high wind velocities which are encountered in the vicinity of San Francisco Bay. Sleet or lightning storms, however, did not have to be taken into account.

The high-tension conductors consist of No. 0000 seven-

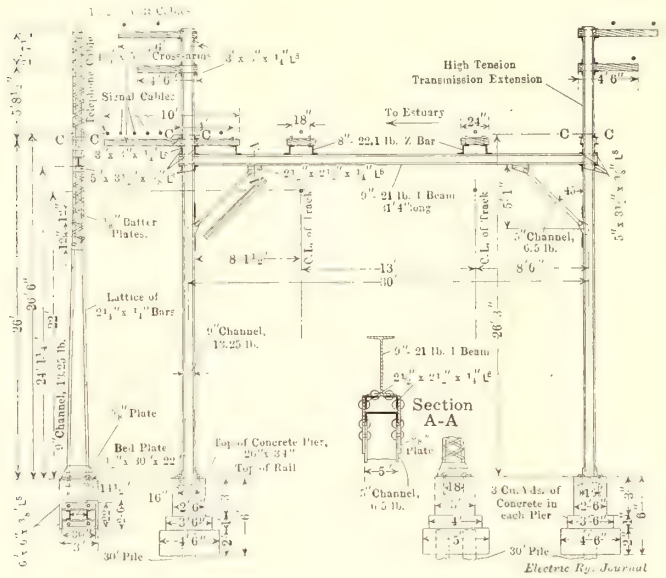


Fig. 5—Southern Pacific 1200-Volt Lines—Two-Track Intermediate Bridge

strand hard-drawn copper. The insulators are of three pieces, of the construction and dimensions shown in Fig. 6. The malleable iron galvanized pin for these insulators is shown in Fig. 8. The insulators are made of porcelain coated with a dark brown glaze. The specifications required that each part of every insulator should withstand a test of 30,000 volts and the complete insulator a test of 80,000 volts alternating current applied for one minute continuously. The electrical test was made by inverting the insulator in a shallow pan of water and pouring water into the pan, so that the two bodies of water were made to serve as electrodes. One out of every fifty assembled insulators was subjected to a mechanical test of 4000 lb

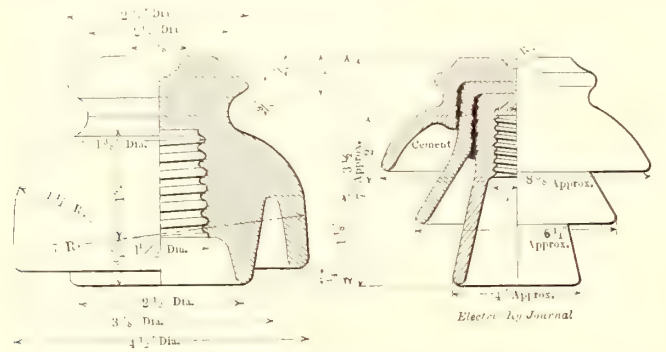


Fig. 6—Southern Pacific 1200-Volt Lines—Messenger Cable and High-Tension Insulators

applied horizontally to the tie wire groove. The insulators so tested were then broken to inspect the texture of the porcelain.

The high-tension strain insulators are of the link type and are made of one piece of dark brown glazed porcelain. Samples of this insulator when assembled with the wires threaded through the wire holes were required to withstand a mechanical test equivalent to a pull of 6000 lb. between the wires. The electrical test required these insulators to withstand 80,000 volts for one minute continuously applied between the wires. When subjected to a precipitation of ¾ in. of clear water per minute on any surface the insulators were required not to break down or arc over at less than 50,000 volts applied between the wires.

In the underground sections there is used No. 0000 three-conductor varnished cambric lead-covered cable insulated with 7/32 in. of cambric around each conductor and a

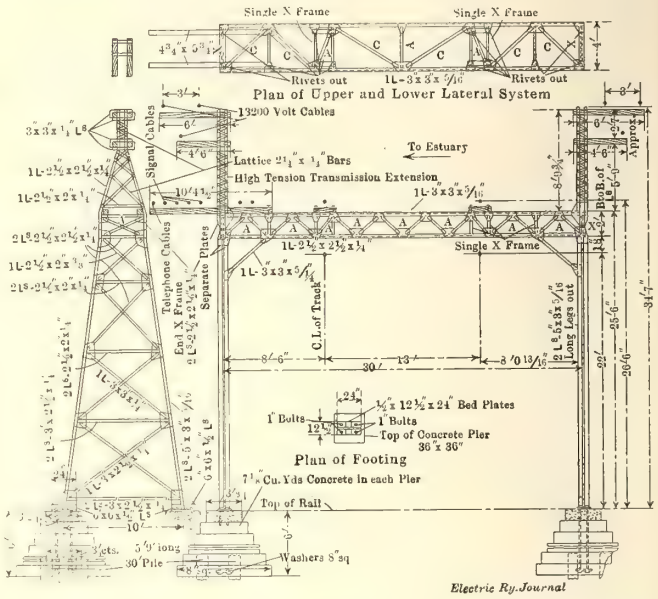


Fig. 7—Southern Pacific 1200-Volt Lines—Two-Track Anchor and Signal Bridge

7/32-in. belt of cambric around the core rounded with jute laterals, all covered with a 9/64-in. lead sheath. Among other requirements of the specifications were that the cambric should not deteriorate under the action of moisture or a continued temperature of 150 deg. Fahr.; that the sheath should consist of an alloy of lead and tin contain-

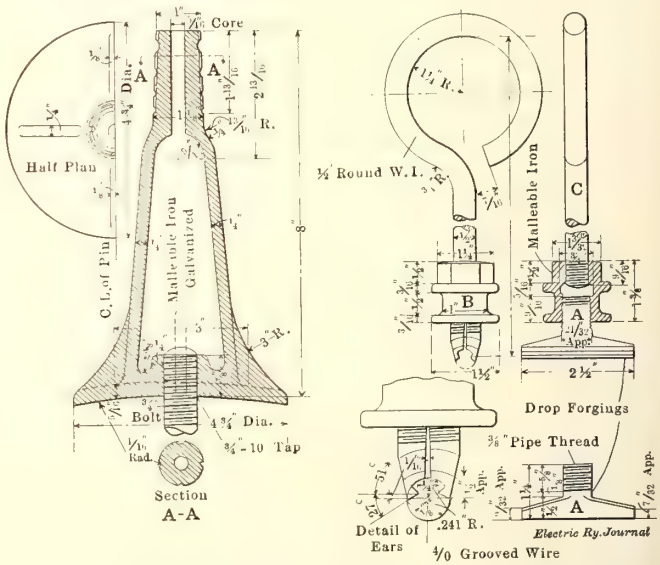
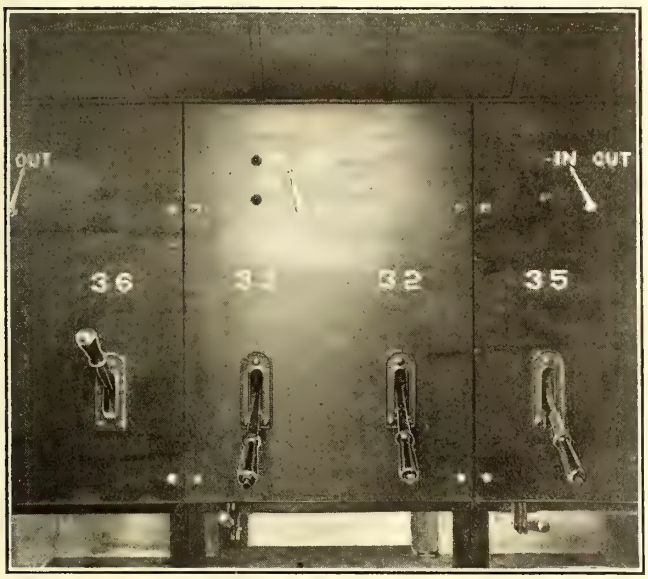


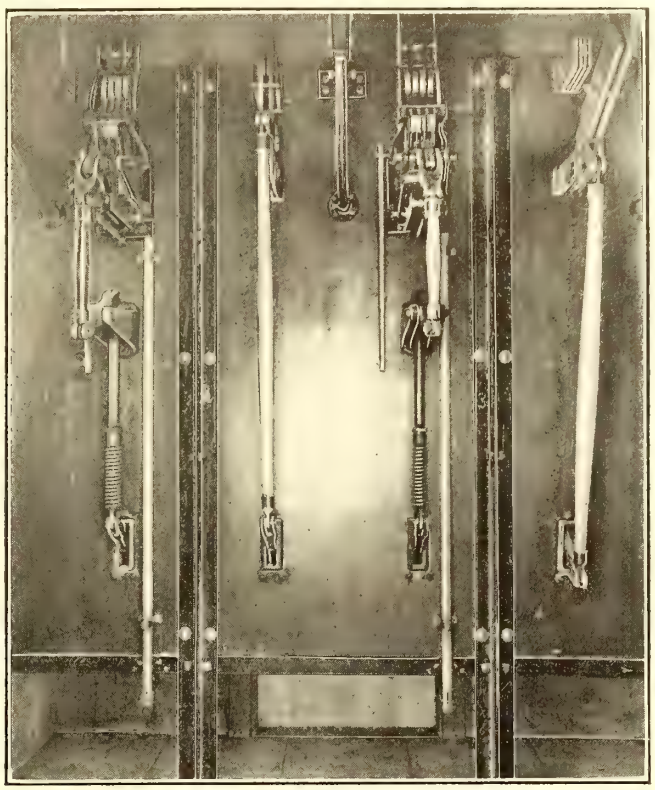
Fig. 8—Southern Pacific 1200-Volt Lines—High-Tension Insulator Pin and Eye Type Catenary Hanger

ing not less than 98 per cent of commercially pure lead and not less than 1 per cent of commercially pure tin, applied over the insulated core; that before testing each cable should pass through a submerging bath of water not less than 6 ft. long wherein it would be subjected to a 40,000-volt alternating current for five minutes between the conductors and between the conductors and the sheaths. After the cables had been drawn in and all cable terminals had been installed they were subjected to 35,000 volts alter-

nating current for five minutes between the conductors and between the conductors and the sheaths. All cable joints were incased in a lead sheath not less than 9/64-in. thick which was filled with insulating compound and joined to the lead sheath of the cable with a waterproof wiped joint. The sleeves were at least 20 in. long and 4½ in. in diameter. A grounding strip of 2-in. x 1/16-in. copper was sweated to the lead sleeves of the cables in every manhole to join the cables and sheaths and to provide for a ground connection. A lead pad was placed under all cables where



The three-conductor No. 0000 high-tension submarine cables were insulated with vulcanized rubber compound



Figs. 9 and 10—Southern Pacific 1200-Volt Lines—Front and Rear Views of Sectionalizing Panels at Alameda Mole

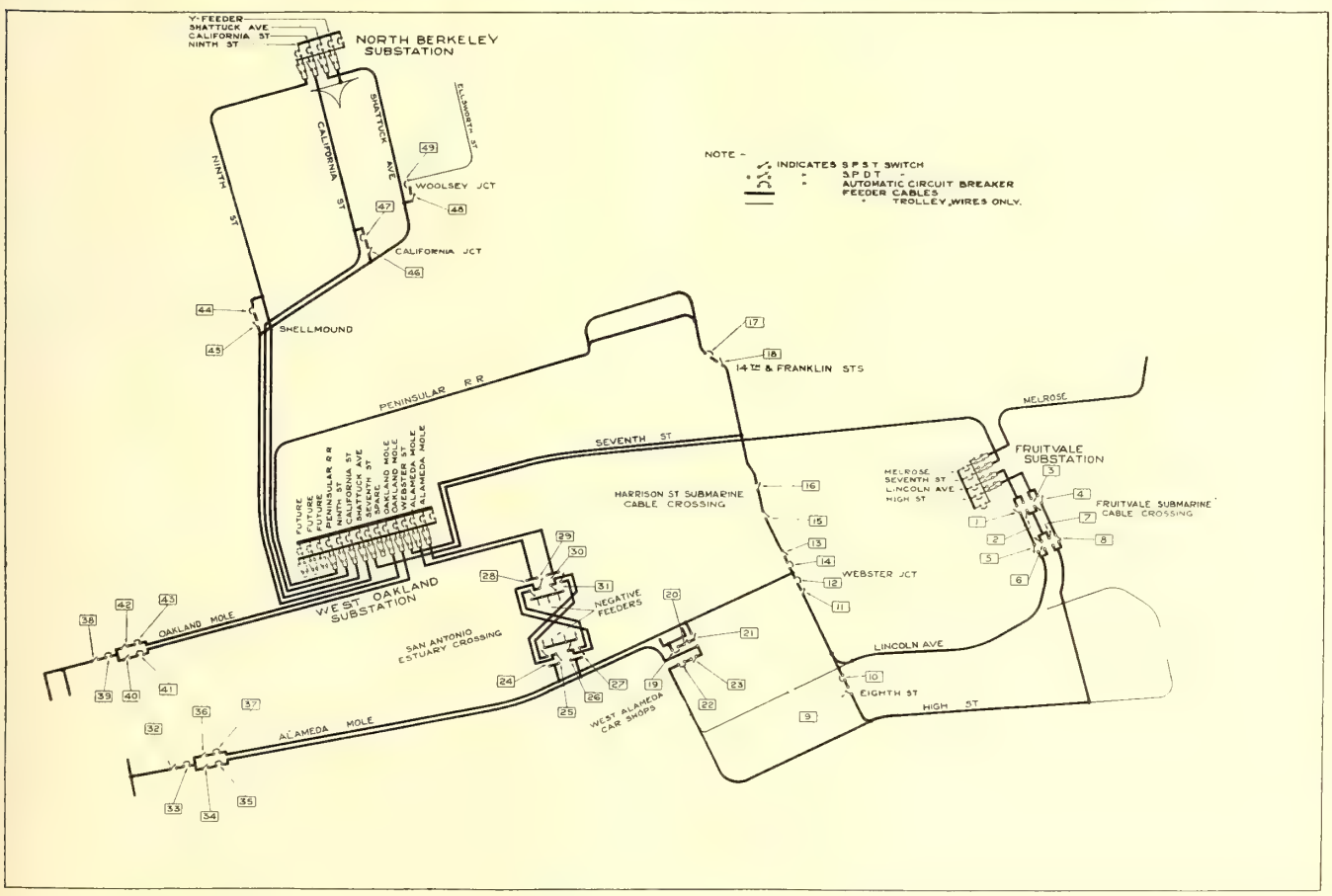


Fig. 11—Southern Pacific 1200-Volt Lines—Sectionalization of Feeder System

they left the duct in the manholes. These cables were furnished by four different companies and were supplied under a one-year term.

containing not less than 30 per cent and not more than 33 per cent of Para gum. The specifications required that the gum itself should not contain more than 3 per cent of

resinous extract and after vulcanization should contain not more than 5 per cent of acetone extract and not more than 1 per cent of sulphur. The cable consisted of three conductors, each of which had an 8/32-in. covering of the insulation specified. The lead sheath was the same as that used for the high-tension underground cables. It was protected by two layers of tarred jute which had a combined thickness of not less than 3/32 in. and an armor of not less than No. 4 Birmingham wire gage galvanized steel wire. The armor had two reversed layers of asphalted jute.

Before the test the cable was immersed in water for twenty-four hours and then subjected to 35,000 volts for five minutes between the conductors and between the conductors and sheath. The complete covering had to show an insulation resistance of not less than 1800 megohms per mile measured between any one conductor and between the three conductors and the sheath.

The following mechanical test of the insulation was specified for temperatures between 50 deg. and 100 deg. Fahr. A sample of the insulation the thickness of the insulating wall was cut from the cable. Marks were placed

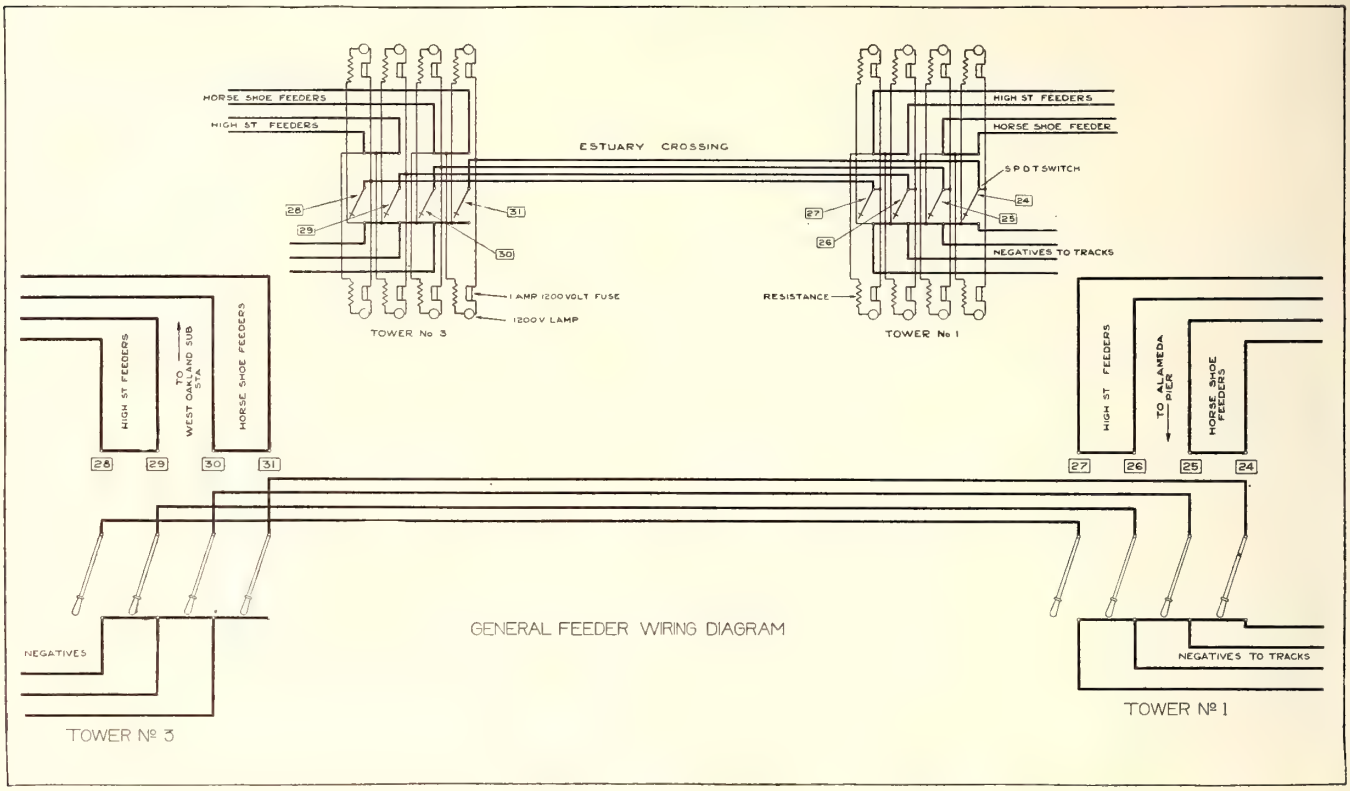


Fig. 12—Southern Pacific 1200-Volt Lines—Feeder Wiring at the San Antonio Estuary



Fig. 13—Southern Pacific 1200-Volt Lines—Towers and Cables at and Near the Crossing Over the San Antonio Estuary

2 in. apart on the sample, which was then stretched until the marks were 6 in. apart, upon which one end was immediately released. It was required that one minute after release the marks should not be over 2⅜ in. apart; also that any sample might be stretched until the marks were 9 in. apart before breaking. These cables were furnished by the General Electric Company.

D.C. FEEDER SYSTEM

In sectionalizing the 1200-volt d.c. feeders every effort was made to obtain advantage of the full conductivity of all the feeders under normal operating conditions, but still to provide for automatically clearing all sections except the one on which trouble occurred. A study of the feeder diagram, Fig. 11, will show that most of the lines are fed from both ends and that the different lines and sections of individual lines are connected through circuit breakers so that in case of trouble the affected section will be automatically isolated. This arrangement does not require that any section breaker should be closed in order to replace the affected section in service. After the trouble has been cleared these breakers are closed at the convenience of and upon orders from the chief operator. Figs. 9 and 10 are front and rear views respectively of the sectionalizing panels at Alameda Mole.

The feeders from the West Oakland substation to the Alameda line cross the San Antonio estuary on the high towers mentioned in connection with the high-tension lines. Two towers 250 ft. high are located one one each side of the estuary 1290 ft. apart and the third tower (No. 3), 35 ft. high, is located on the West Oakland side 1331 ft. from the middle tower. Four 2,000,000-circ. mil bare stranded aluminum cables are anchored at tower No. 3, carried through the top of tower No. 2, suspended from I-beam trolleys, and at tower No. 1 are attached to counterweights through chains which run from four large sheaves at the top of the tower. The counterweights are adjusted to give a sag of 50 ft. with no wind pressure. Provision is made to take up the variations due to wind pressure and temperature so that the tensions of the cables remain constant under all conditions. The lowest point in the span between towers No. 2 and No. 3 is at No. 3 and the respective lengths of spans were calculated to balance the horizontal strains in the cables of tower No. 2.

In addition to the d.c. cables there are six No. 00 hard-drawn stranded copper high-tension conductors and four No. 4 solid phosphor-bronze conductors, all of which are anchored at all three towers. At tower No. 1 all cables are carried down the tower to the switch house located within its base, where provision is made for the switches necessary to transfer both the high and low-tension tower span conductors to any of the corresponding land conductors. At tower No. 3 a similar switch arrangement is provided for d.c. cables only. The feeder wiring diagram at the estuary is shown in Fig. 12. Fig. 13 presents the three towers. Fig. 15 shows the 1200-volt double-throw switches which are located at tower No. 3, and Fig. 16 is a view of tower No. 3 alone.

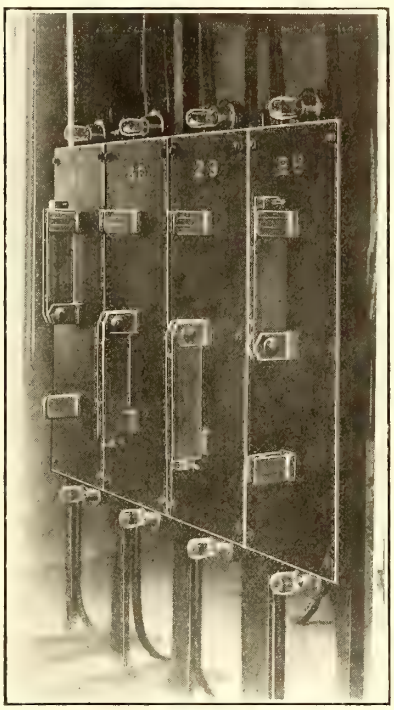


Fig. 15—1200-Volt Double-Throw Switches at Tower No. 3

At the Fruitvale power station and substation all a.c. and d.c. feeders leave the building under the ground. Those running to Alameda have an underground switching chamber where provision is made for transferring either of the two 1200-volt feeders to any one of the three submarine 1200-volt cables and either of the two three-phase feeders to any one of the three three-phase submarine cables. Similar provision is made in the switch and anchorage tower on the south side of the estuary. All the feeders leave these towers aerially.

NEGATIVE RETURN SYSTEM

It was necessary to lay out the track connections for the system through reactance bonds. The greater portion of the electrified line is equipped with automatic block signals and all junction points and crossings are protected by electric interlocking plants, which are operated by alternating current using both track rails for the circuits.

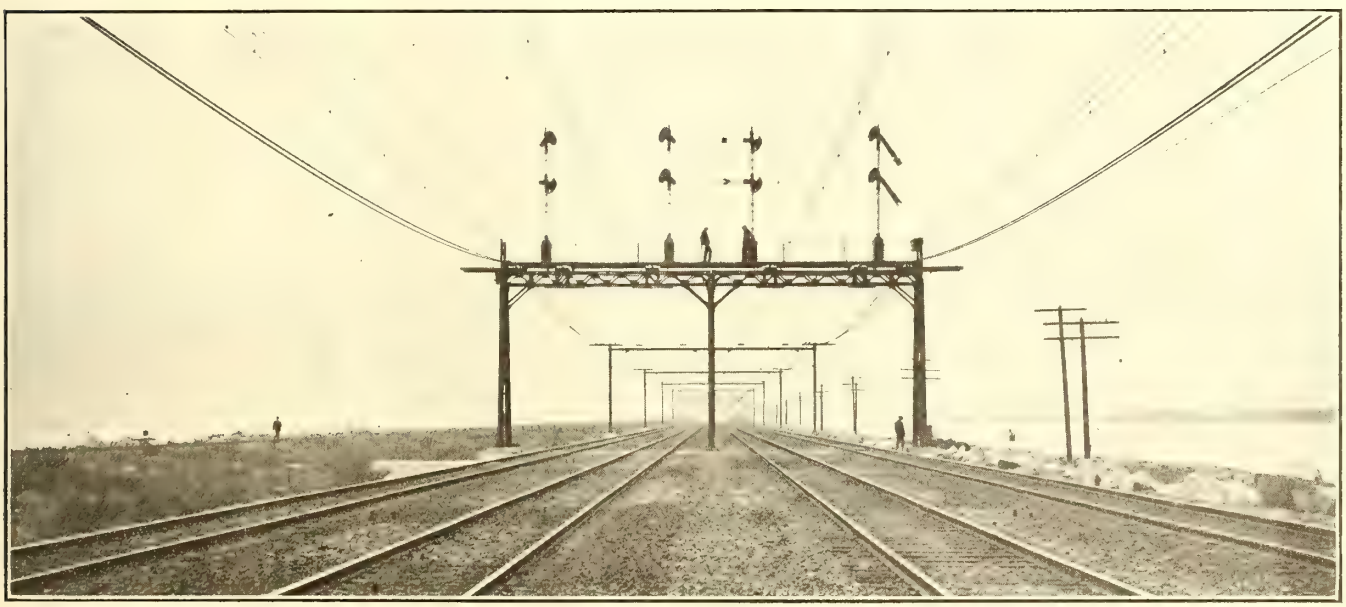


Fig. 14—Southern Pacific 1200-Volt Lines—Catenary Bridge Construction on a Four-Track Tangent Section

With but few exceptions, both rails of all tracks are used for both signal and d.c. return circuits. The exceptions, where single rail circuits are used, are in terminal yards and at certain junction points where complicated signal

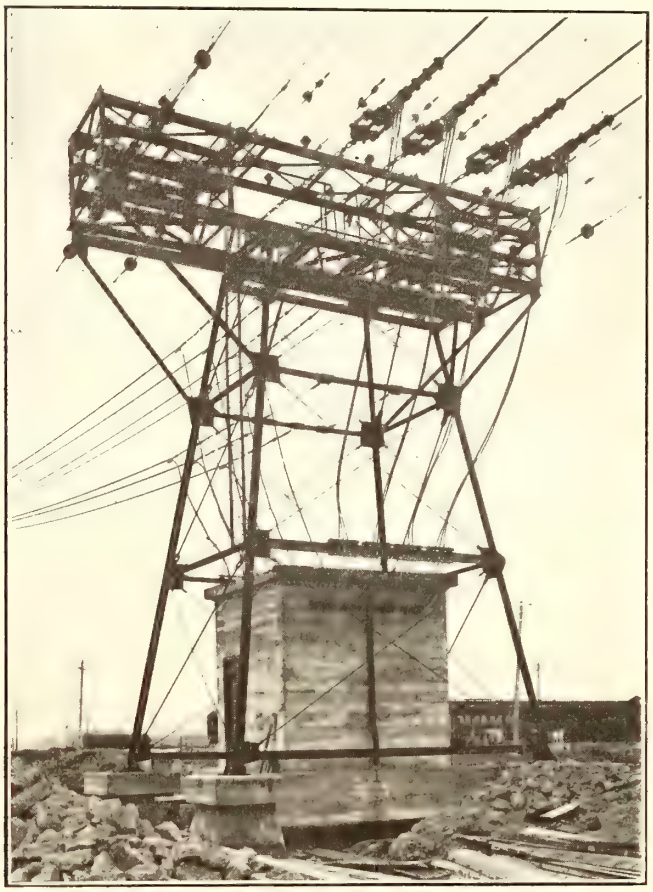


Fig. 16—Southern Pacific 1200-Volt Electrification—Cable Anchorage at Tower No. 3

track circuits make the use of both rails inadvisable. All rail joints are bonded with American Steel & Wire Company's pin-expanded terminal type bonds which are installed under the continuous joint plates. The bond is composed of two equal branches of stranded cable, having a total capacity equivalent to No. 0000 copper.

SECOND ARTICLE

The second and concluding article will describe the 1200-volt catenary system, with the standards followed for bridge and pole work and the characteristic features of insulators, hangers and other parts.

ELECTRIC RAILWAY PUBLICITY EXHIBITS AT BOSTON

One of the most striking and interesting exhibits at the "New England Products" Exposition now being held in Mechanics' Building, Boston, under the auspices of the Boston Chamber of Commerce, is that of the Bay State Street Railway Company. A large map in colors, about 12 ft. high x 5 ft. wide, shows the routes traversed by the company, extending from Newport, R. I., to Nashua, N. H. The lines used for passenger service and electric express service are in blue, and those used for the passenger service alone in red. Blue and red incandescent lamps, flashing alternately, also indicate the routes. Four transparencies showing twenty-two pictures of places on the lines occupy a side wall. These show parks, pleasure grounds and also some of the company's passenger and express cars. A large stereomotograph machine shows eighty-six scenes of handsome places along the company's lines and statistics of industries in the cities reached.

Another attractive feature of the exhibit is the display of industrial and farm products produced in the Bay State company's territory. The exhibit includes shoes from Lynn and Brockton, silverware from Attleboro, hats and woolens from Taunton, cotton cloth and prints from Fall River and Lowell, codfish and cod products from Gloucester, pianos from Wakefield and granite from Rockport and Quincy. One would find it difficult to name any other territory traversed by a single company where the products are more varied and more extensively produced.

The exhibit also contains pictures of the company's power stations, carhouses and types of cars used. The entrance to the alcove is trimmed with evergreen and surmounted by an illuminated letter sign bearing the company name. The exhibit was designed and executed by H. A. Faulkner, who has charge of the publicity for the system.



Exhibit of the Bay State Street Railway

The exhibit of the Boston Elevated Railway Company is also noteworthy and attracts much attention. Its principal feature is a miniature elevated structure consisting of two tracks with switches at either end and a semaphore signal. A model of one of the company's new-type cars travels back and forth, propelled by real motors, taking current from an energized third-rail. As the car goes over the insulated joint it sets the signals and reverses its motion. A large photograph shows the new cars for the Cambridge subway, which are 69 ft. 2½ in. in length. Eighteen photographs grouped together illustrate the evolution of rapid transit in Boston since the stage coach was in use prior to 1858. The first horse car, 1856, is shown, and the last, used on the Marlboro Street line in 1900. The first electric car, 1890, seated twenty-six persons and cost $2,100. The first two-truck car, 1892, 34 ft. 4 in. in length, seated thirty-four persons and cost $3,500. The 1903 car was 38 ft. 3 in. long, seated thirty-six and cost $4,000. The 1906 semi-convertible car was 44 ft. 8 in. long, seated forty-eight and cost $7,000. The 1911 prepayment cars are 48 ft. 2½ in. long, seat fifty-two and cost $8,500 each. Scenes reminiscent of the horse distemper of 1872, when horse cars were hauled by men, are given. The display also includes an illuminated designation sign recently adopted by the elevated company showing route number and destination. A portable air compressor completes the list of exhibits.

The Public Service Commission, Second District, has selected twenty-one cases which provide for the elimination of thirty grade crossings. The Legislature of 1911 appropriated $350,000 for this work. The estimate of the cost of eliminating the thirty grade crossings is $1,200,000, of which the State will pay one-quarter, the municipalities one-quarter and the railroads one-half.

Report on Los Angeles Transit Conditions

B. J. Arnold Finds Great Traffic Congestion in Los Angeles and Recommends the Construction of Additional Tracks by the Municipality

Bion J. Arnold has completed a partial report on the transit situation in Los Angeles, Cal. This part of the report relates to the condition of congestion existing on Main Street, Los Angeles. The report has been approved by the municipal railway committee, which was appointed by the City Council. The partial report will be followed shortly by a complete report on the entire transportation problem. The report in part is as follows:

"There can be little doubt that the first step to be taken toward improving the transit conditions in Los Angeles and vicinity is to relieve the congestion of traffic due to the operation of both interurban and local surface cars on Main Street. Fully 50,000 riders on both systems are delayed from five to forty minutes during the rush hours each day, and as many more are inconvenienced during the non-rush hours, due to the fundamental defects of the transportation arrangements along Main Street.



Los Angeles Report—Car Congestion on Main Street

"At the interurban terminal building of the Pacific Electric company at Sixth and Main Streets we find a stub end terminal arranged in such a way that the incoming track of the north division intersects the outgoing track of the south division. All of the entering and leaving tracks curve directly in front of the building upon Main Street, which carries a heavy vehicle traffic. The movement of the cars in and out of this building, therefore, is hampered constantly.

"All interurban cars using this terminal must wait their turn to discharge and load their passengers and no provision has been made, by means of storage tracks, to supply trippers or extras to take the place of delayed cars. The loading arrangements are not designed to handle crowds conveniently or comfortably. In order to take a car one must stand before a closed gate until his car is called and as the schedule becomes disarranged during the blockade there is no way of telling when any particular car is to be expected. Frequently the delays to the standing patrons become exceedingly tedious, and when the car does come there is a general scramble and contest to obtain a seat. The height of the car steps above the ground-level platform makes loading slow and inconvenient, especially to passengers with hand baggage.

"The cars leave the terminal slowly, as they must find their place in the procession of local cars and at every street intersection the entire line of mixed traffic is further delayed, either by crossing cars and vehicles or by surface cars weaving their way in or out of the file. At one place the intersecting line becomes part of the main line for a short distance, causing a double delay, which is made worse by the overhang of the cars and the spacing of the track centers on the curves, which permits only one car to pass at a time. The fact that the cars from different systems and routes are alternated prevents the moving of the cars across the intersections in lots of two and three at a time and, as it is hard to tell whether a car is going straight ahead or is to turn a corner, both the vehicle traffic and the pedestrian travel are considerably delayed at nearly every street crossing.

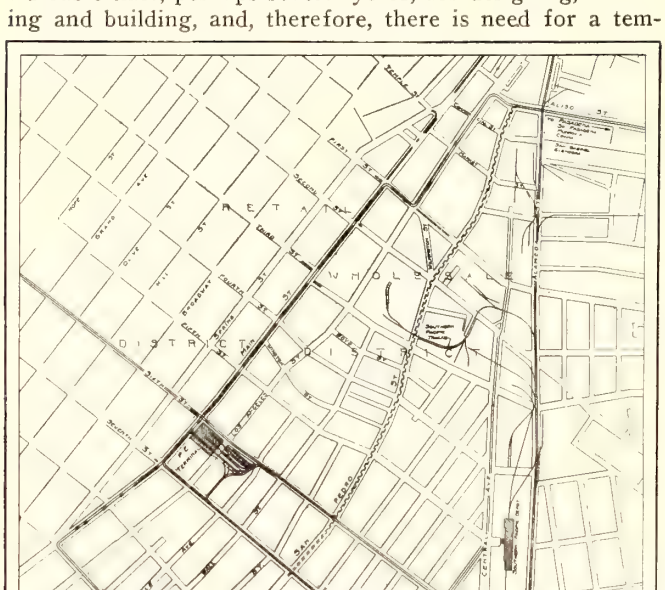
"The use of a narrow gage track by the local cars and a standard gage by the interurban system results in duplex tracks which cut up the surface of the streets.

"This description is not intended as a criticism of the designers of the arrangement or of the present management, as it is apparent that the tracks are taking care of more cars than they were intended to serve at the time the terminal was put in operation—some seven years ago. The present situation is plainly due to the remarkable growth of the city and district, which is developing much more traffic than was anticipated.

"The solution which will provide permanent relief from present Main Street conditions will be an arrangement

which will eliminate the interurban system entirely from the grade of city streets by means of either a subway, an open cut or an elevated structure.

"This permanent arrangement, however, will require considerable time, perhaps several years, for designing, financing and building, and, therefore, there is need for a temporary expedient which will at once relieve the present transit situation, which is now almost intolerable and which is rapidly growing worse.



Los Angeles Report—Map of Congested District

CONSTRUCTION OF RELIEF TRACK RECOMMENDED

"Of several streets parallel to Main Street which might be used for relief tracks, San Pedro Street, with its recently opened extension to Aliso Street, is by far the most available and desirable. The cars of the northern division of the interurban system could be diverted from Aliso Street down San Pedro Street to Sixth Street, and thence to a terminal, using the lower floor of the present Pacific Electric Building.

"The difference in levels between the front of this building on Main Street and its rear entrance on Los Angeles Street fortunately allows for a very convenient rearrangement, continuing the use of the present waiting room, which can be enlarged by opening the restaurant room in the rear.

"Seven tracks with a capacity of three cars on each track can be supplied with ample loading and unloading platforms on the lower level and the two tracks on the upper level with their platforms can also be retained. Additional waiting rooms can be secured by using some of the upper level space now devoted to express office and stores, and also by turning part of the basement, which is not being used for any purpose at present, into a concourse.

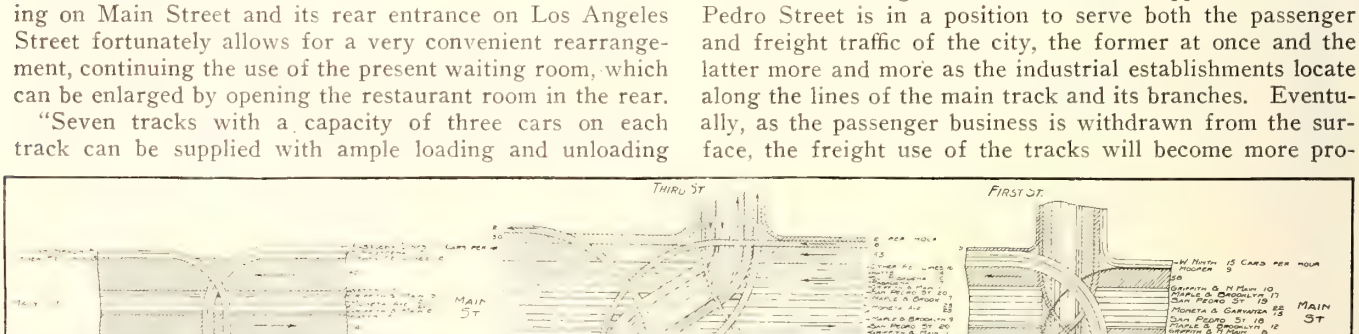
"The new arrangement will provide two improvements which will be greatly appreciated. Storage tracks will be possible on which cars can be held in readiness to take the place of delayed cars—in other words, to act as a reservoir which will allow irregularities in the schedule to be removed and the cars run practically on time. The use of more than two terminal tracks will allow the cars on various routes to be loaded slowly and it will be possible for the passengers to wait for the leaving time, seated in the cars, instead of being herded in the standing room before the gates as at present. Speed and comfort, two of the essentials for good transportation, will thus be greatly increased by the proposed changes.

"The elimination of a large number of interurban cars from Main Street, particularly during the rush hours, would at once remove the fundamental cause of considerable poor service during that time on the local surface system, and it should be possible for the Los Angeles Railway to reroute some of its cars so as to do away with the many curves at street intersections in the downtown district. The lessening of the noise on Main Street, by decreasing the number of heavy interurban cars crossing the special work at each street crossing, will not be the least advantage of the proposed plan.

"As the suggested use of San Pedro Street is only intended to be temporary, pending the working of a more permanent arangement, and is apparently the most feasible solution of the present difficulties, some way should be found by the city and the companies to bring this about.

"The double track on San Pedro Street from Aliso to Seventh Street may be considered as the first section of the proposed municipal railroad. With a connection to the tracks of the Pacific Electric Railway at Aliso Street on one end and at Sixth Street and at Seventh Street on the other, and a possible connection to the Southern Pacific Railway at Third Street, carload freight could be delivered and collected to and from any spur or siding along its length, thus opening up at once a centrally located section nearly a mile in length, particularly adapted for warehouse and factory purposes.

"The city should control this important main line in the heart of the industrial district, as it has spur track possibilities which will permit railroad connections throughout a large territory which is now dependent upon teams and trucks for its freight service. It will be apparent that San Pedro Street is in a position to serve both the passenger and freight traffic of the city, the former at once and the latter more and more as the industrial establishments locate along the lines of the main track and its branches. Eventually, as the passenger business is withdrawn from the surface, the freight use of the tracks will become more pronounced. While the interurban cars are using the tracks the freight should be hauled largely at night.



Los Angeles Report—Diagrams Showing Movement of Traffic at Congested Corners

FRANCHISE PLAN

"There are apparently two financial and franchise plans by means of which these proposed tracks on San Pedro Street could be built.

"One plan, which might be called 'the immediate municipal ownership plan,' would be for the city to construct the tracks with its own funds as part of the proposed municipal railroad and enter into an arrangement with the Pacific Electric company for the use of these tracks on a rental basis.

"The other plan, which may be termed 'the ultimate municipal ownership plan,' would be for the Pacific Electric company to build tracks under an agreement that the city is to have the right to purchase the tracks at any time at actual cost, and that as soon as a permanent right-of-way can be provided by means of an elevated or sub-surface structure the company will withdraw its interurban cars from the street surface. This latter plan would practically be an indeterminate franchise, which is a form of permit for public utilities that is rapidly growing in favor, as it combines the advantages of both the short-term franchise and the long-term franchise without their objectionable features."

ILLUSTRATIONS

The illustrations accompanying this article are from the report. The diagrams show the movement of traffic on Main Street at the intersection of three cross streets. The width of each band represents the number of cars and vehicles per hour during the rush hours. Forty per cent of the cars on the local system and 60 per cent of the cars on the interurban system are affected by the congestion on Main Street. The three principal points of congestion are at the Pacific Electric Terminal at Sixth and Main Streets, where the interurban cars enter and leave their stub-end terminal by means of double-track intersecting curves, at Third and Main Streets, and at First and Main Streets.

ACTION ON REPORT

The committee, in transmitting the partial report to the City Council, urges prompt action on the suggestions made by Mr. Arnold and indorses the plan to have the city construct the tracks with grooved girder rail construction and to permit the Pacific Electric Railway to use them until the Municipal Railway, which is planned to connect with



Los Angeles Report—One Mile of Car Congestion on Main Street

the harbor, is in operation. The committee does not condemn the alternative plan to permit the company to build and sell to the city at a fair price when the municipal system requires the tracks.

The report of the committee is accompanied by a letter from Paul Shoup, first vice-president of the Pacific Electric Railway, who concurs in the general plans recommended. Mr. Shoup states: "Mr. Arnold's conclusion that the best remedy at present available is the use of San Pedro Street is fully concurred in, though it means the maintenance of two routes of travel between Aliso Street and the Pacific



Los Angeles Report—Interurban Terminal

Electric terminal, instead of one, as at present. What the financial result to the railway will be cannot be foretold, but unquestionably the service rendered the public will be greatly improved."

The committee is distinctly in favor of the plan for the city to build and rent to the Pacific Electric Railway. If the city has not the money to build, or prefers another arrangement, the committee does not condemn it. The Council is requested to indicate which plan shall be discussed.

Some opposition to the proposal, however, developed at the meeting of the finance committee of the city from residents on San Pedro Street who object to the construction of a line on that thoroughfare.

LETTER BALLOT ON ENGINEERING ASSOCIATION STANDARDS

Under date of Oct. 6 H. C. Donecker, secretary of the American Electric Railway Association, sent out to all members a circular letter announcing the result of the letter ballot on the adoption of the proposed standards and recommended practices approved at the 1910 convention of the Engineering Association. The text of the circular letter follows:

"On Dec. 20, 1910, in accordance with a plan of procedure approved by your executive committee, a letter ballot on the subject of standards and recommended practices of our affiliated Engineering association was submitted to the member companies. Inasmuch as this was the first attempt to obtain by this method an expression of the sentiment of the members with regard to matters of this kind, we have tried by extending the date for counting the ballots from time to time to give all of the companies an opportunity to vote, with the result that the balloting was not declared officially closed until Sept. 15, 1911. The votes were counted on that day and below is given a summary of the results."

COUNT OF LETTER BALLOTS.

Submitted for Approval as Standards—	Yes.	No.	Total.	Necessary to Adoption.	Result.
Copper wire table	119	5	124	63	Adopted
No. 0000 grooved trolley wire.	119	29	148	75	"
Submitted for Approval as Recommended Practice—					
7-in. T-rail for heavy service in paved streets, Section A....	136	18	154	78	"
7-in. T-rail for light service in paved streets, Section B....	133	20	153	77	"

Hearing at Buffalo on International Traction Reorganization

The Subject Considered Was the Proposed Plan to Organize a New Company Which Would Acquire the Property of the Existing Company—The Principal Witness at the Hearing Was B. J. Arnold, Who Presented a Plan by Which the Proper Capitalization of the New Company Could Be Determined

A hearing on the proposed plan of reorganization of the International Traction Company, of Buffalo, was held by the New York Public Service Commission, Second District, at Buffalo on Oct. 18. In addition to Chairman Stevens, of the commission, who presided, Commissioners Decker, Sague and Olmsted were present. Officials of the International Railway, including Thomas Penney, the president, and Thomas E. Mitten, vice-president, were in attendance. Porter Norton and James O. Moore, of the firm of Norton, Penney, Spring & Moore, of Buffalo, and Morris Cohn, Jr., represented the new company, the International Traction Railways, which it is proposed to form. Charles K. Beekman, of Philbin, Beekman, Menken & Griscom, of New York, represented the committee of bondholders of the International Traction Company.

While Mr. Penney made an introductory statement in reference to the plan of reorganization, the principal witness at the hearing was Bion J. Arnold, who presented a detailed report on the elements of value underlying the theory of capitalization which is the basis of the proposed plan.

STATEMENT OF MR. PENNEY

Mr. Penney outlined briefly the plan to form a new corporation under the laws of New York State, the International Traction Railways to acquire the properties. He thought that it would be conceded that the management studied with care how to conserve the property and how best to serve the interests of the public. At present the company was in a position where it was difficult for the management to do what it would like to do in the matter of additions and betterments. This was not the fault of anyone now in the properties. The organization was very involved and complex. The New Jersey holding company controlled the New York operating companies. It was desired, if possible, to simplify that arrangement and do better work for the community at large than the management had been able to do in the past. There were two ways of getting money for capital expenditures. As the co-operation of practically all of the bondholders had been obtained, it was possible to return to New Jersey and, by reopening the mortgage, procure the necessary money. The other way, and the one that was desired by the interests in the company, was to come into New York State and submit all the affairs of the properties to the jurisdiction of the Public Service Commission. A great deal of help had been received informally from the commission as to the best method of procedure to effect this result. Certain steps were necessary to effect a corporate transfer from New Jersey to New York. In the first place it was necessary to organize a New York corporation. To transfer the property certain proof would have to be made. At the suggestion and with the approval of the commission the company had secured the assistance of Mr. Arnold and had had an appraisal made, which was submitted. The company did not ask any increase in capitalization. No actual sale of the properties from one to another was contemplated by the plan. It was planned simply to take from one hand to another, to take the name of New Jersey from the securities and substitute the name of New York.

Mr. Penney added that it would be noted in the appraisal that no claims were made for any values on account of the franchises owned by the company, although up to the time of passage of the public service commission law these franchises had been regarded as of extraordinary value. Almost all of the franchises had been granted in perpetuity and were still regarded as of great value. Mr. Penney believed that the management would be justified in the transfer of entity from New Jersey to New York, and the commission would be justified in approving such a transfer. That would place all the property under the jurisdiction of the commission and would give the security holders a tangible mortgage upon actual property. To a large extent the transfer would be a matter of form. The people who were now in control of the property believed in the principle of regulation and in doing things for the public.

TESTIMONY OF B. J. ARNOLD

The examination of Mr. Arnold was conducted by Morris Cohn, Jr. Mr. Arnold, upon request, described his various activities in traction matters, referring to his work for the Public Service Commission for the First District of New York and for the cities of Chicago, Pittsburgh, Providence, Toronto, Los Angeles and San Francisco. He stated also that through the company of which he was the head, or as an individual, he had acted for about 300 leading corporations of the country.

Mr. Cohn asked about the statement in the report that "the franchises as they now stand seem to assure the company a practically perpetual right to operate." Mr. Arnold said that most of the franchises were for 999 years, and those which were for shorter periods were so necessary if the system was to be operated satisfactorily as a whole that the company would have to continue to exercise these rights if the public was to have efficient service. Referring to the policy by which lines had been built freely into new territory before development assured much traffic, Mr. Arnold stated that these lines were now beginning to justify the investment in them. If the density of population was taken as a standard, Buffalo was supplied somewhat better with street railway lines than the average city. The property was maintained in the condition in which well-maintained properties were usually kept. The future would require extensions commensurate merely with the growth of the city.

In answer to a question as to the fair rate of return on the investment in a street railway property similar to the International system, Mr. Arnold said that he did not want to give a general answer applicable to all properties. Each case should be decided by itself. In view of the plan of reorganization, which included no claim for franchise value, a fair rate of return in this case would be not less than 7 per cent. A fair return had not been realized because capital was expended so rapidly in new lines that settlement did not follow fast enough to furnish the required earnings. The tables in his report giving the expenditures for operating expenses, including taxes and ordinary maintenance, but not including renewals, showed that the property was not improperly managed. The average annual increase in net earnings in the last ten years had been 9.127 per cent.

In the appraisal as submitted depreciation had not been deducted. If depreciation had been deducted it would have been necessary to add to the amount on which a fair return had not been realized, so that the net result, under the controlling feature by which the plan of reorganization was

designed to allow for a fair return on the total investment, would have been the same.

CONSTRUCTION OF EXTENSIONS

Harry D. Sanders, assistant city attorney, then cross-examined Mr. Arnold.

In discussing further the reasons for the construction of many extensions in the past Mr. Arnold said that electric lines had often built unprofitable extensions in order to keep out competition. Owing to the policy of public service commissions in preventing the duplication of existing facilities the necessity for this practice did not now exist generally. In the past, however, a company could protect itself absolutely only if it had a franchise to operate on every street should it see fit, which was never the case.

The interest on the loss as computed was compounded, Mr. Arnold said, at the rate of 7 per cent per annum. The plan provided that when the company had earned a return on the fair value, and also the past losses plus interest thereon, all the surplus should go into a fund to retire the cost of superseded property and the early losses so that in time the public would pay only for service based on the interest requirements of property actually engaged in performing the service. The surplus accumulated in this fund could be used either to retire the securities representing superseded property and early losses or to add to the value of the property by the construction of extensions without addition to the capital account until the value of the property equalled present capitalization.

If the company had made enormous profits in the past and if the records showed that it had done so, Mr. Arnold would say that the excess capitalization should be eliminated to the extent of these excess profits. But since the records showed otherwise, Mr. Arnold said, the amounts should remain in the capitalization until surplus earnings of the future provided for their retirement. If the company was not to be allowed a value for its early losses the rate of return should be higher than 7 per cent.

Referring to the cumulative excess of $11,185,908 shown at the end of 1910, according to Mr. Arnold's figures, Mr. Sanders said that if the rate of return had been computed at 6 per cent instead of 7 per cent, no cumulative excess would have been shown.

Responding to a question asked by Mr. Cohn, Mr. Arnold said that if he had included the value of the franchises in his appraisal a much higher total valuation would have been shown.

Chairman Stevens said that under the theory of the treatment of deferred returns the "investment in property" was considered as cash. The entire theory, therefore, was based on the correctness of the figures of "investment in property." Did these figures represent actual money, and from what sources were they secured? Mr. Stevens gave instances of early consolidations of properties into companies that were taken into the system afterward. According to the figures which he had, the early properties showed much lower book costs of construction than were shown immediately afterward by the companies into which they were consolidated. Mr. Arnold stated that he believed the figures he had used represented actual investment.

Chairman Stevens said that the commission wished to have the appraisal show full details and totals as to depreciation and present value of all elements of the property in addition to the cost of reproduction new.

Mr. Arnold said that he was prepared to furnish these figures if asked to do so.

Mr. Cohn stated that it was the desire of the company to furnish to the commission all the data requested. If, however, the theory on which the report was prepared was sound no reduction for depreciation was necessary.

Mr. Arnold said he thought that the theory was a reasonable one as the rate of interest used was so low. He referred to the allowance in capitalization for early losses made by the Railroad Commission of Wisconsin in the case affecting the Antigo Water Company. A provision for future amortization of the value of superseded property and of early losses, which he had introduced in this report, was a good one, and this was the first time that he had been able to persuade a company to agree to a provision of this nature.

Chairman Stevens said that the commission would not pass any opinion on the plan advanced, but that it wanted an estimate of the actual depreciated value of the property. The hearings might be suspended until these figures were prepared. Mr. Arnold said that he could compile such a report.

Chairman Stevens said it was apparent that the correctness of the results depended on the correctness of the figures showing the investment in the property. The commission would require evidence by the production of the original sources of information showing how the figures were determined. Another hearing will be held when the figures desired by the commission are ready.

REPORT OF MR. ARNOLD

The introductory chapter of the report of Mr. Arnold says in part:

I. SCOPE OF REPORT

"This report includes a determination of the value of the physical investment in the property of the International Traction Company, together with a statement of the loss that has accrued in the operation of the property from the time of the organization of the constituent companies now included in the International Traction Company to Dec. 31, 1910. which serves as a basis for the determination of a fair value of the capitalization to be used in the reorganization plan now proposed by the International Traction Railways.

II. INTERNATIONAL TRACTION COMPANY'S PROPERTY

"The International Traction Company is a holding company which has acquired a group of properties operating in Buffalo, Niagara Falls and adjacent territory, the life of those considered dating from 1850 to the present. These various constituent corporations have had the usual experience of starting as separate companies, and of gradually building up their various properties, those in Buffalo being operated as horse car lines from 1860 until 1890, in which year electrification was started and completed in 1893. Additional companies were organized to operate in Buffalo at this time, and extensive additions were made to the mileage, both by the companies then operating and by the new companies.

"During the period from 1890 to 1902 consolidations occurred on various properties, the final result being that in 1902 the International Railway Company was formed and became possessed of the properties, franchises, rights, exemptions and privileges of its constituent companies. The property as it now stands includes the street railway systems of Buffalo, Niagara Falls and Lockport, together with a number of interurban lines, including a line running from Buffalo to Niagara Falls, N. Y.; a line running on the Canadian shore from the Falls to Queenstown; the two bridges crossing the Niagara River, one at Niagara Falls and the other at Lewiston, a line running from Buffalo through Tonawanda and Lockport to Olcott Beach; and a line running from Buffalo to Lancaster. The total mileage of the property now operated is 370.912.

"In the city of Buffalo there are 219.64 mlies of track. For over 174 miles of this trackage franchises were granted for a period of 999 years, or without restriction as to time, and for the remaining 45 miles franchises are limited; about 14 miles being granted for 25 years, 11 miles for 40 years, and 19 miles for 66 years. The routes of the suburban or interurban lines are secured by franchises from the various cities, towns and villages in which the railway operates, or by ownership or lease of private right-of-way. The franchises as they now stand seem to assure the company a practically perpetual right to operate.

"During the life of the property from 1860 to date many changes have necessarily been made in the equipment. As previously stated, the lines at Buffalo were originally operated as horse car lines, electrical operation being installed from 1890 to 1893. Since this time a large amount of rehabilitation work has been required on account of changes of equipment, and because of the introduction of more modern apparatus and equipment required in supplying to the public a service continually increasing in quantity and character. The mileage of the company was rapidly extended, lines being constructed in the suburbs of Buffalo in order to meet the demands for services required by the city. The amount of such construction was somewhat higher than for cities of the same population, due to the relatively small density of the population in Buffalo. These various demands, however, have been met by construction from time to time, entailing a higher investment in the property than was warranted by the immediate returns from the operation of the system. This comparatively large investment at an early date in the history of the property was dictated by the general policy of the company, which was to supply adequate service to the territory in which it operated, on the theory that the returns from the operation of the property built up by this liberal policy would at a later date fully repay the owners of the property for all investments made during this development period.

"The entire period from the organization of the first of the constituent companies to the present may well be considered as a development period, during all of which time the expenditures in the property have been comparatively large, and during which time the relative returns from the property have been slowly but steadily increasing. The territory is now reasonably well covered with lines, and the service is furnished by modern equipment throughout. For the future, additional extensions of the property will be commensurate with the growth of the city, and the returns from the operation of the property should increase at a higher rate, providing for the company a fair return on the capital invested, and should, in addition, provide sufficient funds to offset in a measure the losses that have occurred in the operation of the property up to the present time.

"The mortgage under which the bonds of the International Traction Company were issued provided only $5,000,000 for extensions, but on account of the rapid growth of the property since that time an amount of money considerably in excess of $5,000,000 has already been expended for this purpose. In order that additional money may be available for future extensions, a reorganization now becomes necessary, which will provide for the refunding of the present securities, and also authorize a flexible bond issue under the regulation and control of the Public Service Commission ample to cover the property extensions that must be made during the coming years in order to furnish adequate service to the territory. Reorganization is necessary, not on account of any fault in operation or in the receipts from operation, which have shown a consistent increase throughout the life of the property, but only on account of the fact that more bonds are not available for the purpose of providing money to meet the normal extensions that must be made to such a property.

BASIS OF REORGANIZATION

"The reorganization proposed consists of the formation of a new operating railway company to be called the International Traction Railways. The company proposes to acquire all the holdings of the other companies and to issue securities which in general shall be exchanged par for par for the securities now outstanding. It is proposed that the new company authorize a bond issue to provide for this exchange and for the future needs of the property.

"The following premise is adopted for the purpose of determining the fair value of the capital account that should be used as the basis for the proposed reorganization.

"It is assumed that the International Traction Company, the selling company, should receive full value for all moneys expended in the property from the time of its inception to date, together with the cost of reorganization, carrying charges, contingencies, and brokerage for bond discount.

"It is further assumed that the selling company is entitled to receive a fair interest return upon all moneys referred to in the above paragraph, invested in the property from year to year.

"Since the net returns from operation from the inception of the property to date have not been equal to a fair return on the capital as invested from time to time, it is assumed that the purchasing company will reimburse the selling company for the amount of capital expenditures to date, together with the sum of deferred earnings to Dec. 31, 1910, due to the company's not having actually received an amount sufficient to pay a fair return upon the actual cash which has been put into the property.

"While it is fair that the International Traction Railways should pay the International Traction Company for the actual cost of its physical property plus the deferred earnings above mentioned, it is but right to the public that the securities to be issued for these deferred earnings, which consist of the losses (in the sense of money not received) incurred in the early operation of the company (amounting in this case to the difference between a fair return upon the actual capital invested and the smaller amount the company actually realized), as well as the securities to be issued to cover bond discount, and value of superseded physical property, together with interest upon these three items, should be eventually amortized and retired so that the public will eventually be paying a fair return upon the actual value of the physical property then in use. In other words, the new company proposes to reimburse the old company for the cost of the property now existing and the property that has been superseded, as well as for bond discount and the deferred earnings that have accrued from the operation of the property to date, and proposes to include the sum of these amounts in its capital account at present, but acquiesces in the recommendation that, if this is done, it will eventually amortize all such amounts as are not actually represented by physical property as soon as the results of operation of the property provide an excess over a fair return, as may be hereafter agreed upon between the Public Service Commission and the company, all of which excess will be used for this purpose until such items have been completely eliminated from the capital account of the company.

BASIS OF REPORT

"To serve as a basis for this work an appraisal showing the cost to reproduce new the physical property of the International Traction Company as of April 1, 1911, has been made.

"The premises upon which the appraisal is made are such as to arrive at the actual investment in the property, including all construction charges, general organization, legal expenses and carrying charges, together with discount paid in financing the property.

"The cost of the property as shown in the appraisal includes no promoter's profit or development charges. The appraisal covers only the property that is found in place as on April 1, 1911.

"An appendix to the appraisal contains a statement showing the 'cost new' and the 'scrap value' of those parts of the property that have been superseded, and which, therefore, are not included in the appraisal. Such property has either been worn out in service or supplanted by property of later design or of different type, or has been removed on account of city ordinances or because of street improvements. From the appraisal proper, including all items now found, and from the appendix to the report, including all

items that have been superseded, the total capital expenditure which has been made on account of the property, but not including profits of promotion, if any, can be determined.

"In determining this capital expenditure deduction has been made for the amounts realized either through sale or through use as second-hand material of those items that have been superseded. The appendix also contains a statement of the investment in the property by years, this statement having been made up on the basis outlined above from the recapitulation sheets showing the investment in the property by years, including the 'cost new' of both the present and superseded property, together with the scrap or salvage value of the superseded property.

"As a basis for determining the loss that has accrued from time to time, a statement has been compiled showing the net income from operation for the entire period considered. For the period from 1867-82 the reports of the State Engineer of Railroads have been used. For the period from 1883-99 the reports of the Board of Railroad Commissioners have been used. For the period from 1899-1910 the records of the International Traction Company and associated companies have been used. By means of these reports a continuous statement has been prepared showing the gross earnings, the operating expenses, including taxes, and the net income.

"These figures indicate that the operating ratio has steadily decreased, the averages for the various groups of years being as follows: 1867-70, 94.1 per cent; 1871-80, 78.5 per cent; 1881-90, 81.1 per cent; 1890-1900, 63 per cent; 1901-10, 62.2 per cent. While the operating ratio during the period of horse car operation was about 80 per cent, during the last twenty years, or during the period of electrical operation, the operating ratio has been about 63 per cent. As this operating ratio, based on an operating expense including taxes and maintenance, but not renewals, compares favorably with the operating ratio of other similar companies, it would appear that the property has not been improperly managed.

"In arriving at the operating expense all charges other than direct operation have been eliminated. In order to do this, it has been necessary to deduct from the operating statement of the company as submitted certain items which for purpose of this study should not be included in operating expense.

BASIS OF DETERMINING ACCRUED OPERATING LOSS

"For the purpose of determining the loss that has accrued during the early operation of the property, the assumption has been made that the company, if its return is to be regulated and limited from now on so that it will not have an opportunity to make liberal earnings out of which to recoup its early losses, should not only be credited with a fair return upon the actual capital invested in the property in the past, as well as given an opportunity to earn it in the future, but also, following decisions that have been made by state authorities, should be reimbursed for early losses, as well as a fair return upon them, assuming that the property has been judiciously managed.

"The rate of interest assumed is 7 per cent, which is not unfair in consideration of the contingencies attendant on the operation of public-service properties, and particularly so in this case, since the capital account on which the return is computed includes only the actual money invested in the property and nothing whatever in the way of promoter's profit or for franchise value.

"In view of the small earnings of the property in the earlier years, when necessarily large expenditures were required for construction and for expansion during the years when the territory would not in immediate returns warrant such expansion, all of which causes tended to delay the time when the company could earn a fair return on the capital invested, the rate of 7 per cent applied to the deferred earnings is considered to be fair.

"A table setting forth these accrued losses is prepared on the above assumptions and includes as its basis (1) the investment in the property year by year and (2) the statement of earnings. As seen from this table the accumulated deficit with interest existing at the end of the calendar year 1910 is $11,185,908.

"It should be noted that for the purpose of this estimate it makes no material difference whether expense of renewals is charged to capital account or is included in operating expenses for any given year. It is essential, however, that the charge be not included in both places. From the operating ratios shown in the statement it is evident that the operating expense does not include charges for renewals throughout the earlier years of the property. Also it is known that it was not the policy of companies at that time to charge renewals against operation.

CAPITAL VALUE

"In Table I the various values above referred to are collected and may under the premises assumed be taken as a fair value to be paid to the International Traction Company by the International Traction Railways for the physical property and various holdings of the company.

Table I.—Summary of Capital Value.

Cost new value of physical property now held and operated	$25,957,015
Capital charged against investment for property that has been superseded	5,677,952
Total capital charged on account of physical property	$31,634,967
Bond discount	4,574,135
*Total	$35,889,102
Accrued returns to date	11,185,908
Total capital value	$47,075,010

*$320,000 subtracted for capitalization of Erie Railroad lease.

"In this analysis no account whatever is taken of stocks that may have been issued or that are outstanding, nor of any other securities of the property herein considered, other than bonds. Bond discount, however, has been included in the statement of the final cost of the property.

"From the International Traction Company's standpoint the purchase price of about $47,000,000 is required in order that the present holders of the property should receive full value for the capital that they have put into the property during its life, together with the full value of the reasonable return of 7 per cent on the moneys expended. From the International Traction Railways' standpoint the purchase price is fair, if the net income from the operation of the property in the future will allow them to receive a fair rate of return on the capitalization and will in addition provide sufficient surplus to allow the amortization of that part now or in the future included in the capital account which is not represented by actual physical property.

"The franchises under which the company is operating are of long duration and, whereas the earlier years of the company's operation of the property have been attended with a deficit, the results of the operation with the increased growth of the territory in which the property is situated should be far more profitable and should be such as to allow the company to make up in the future years the deficit that has accrued in the past.

"The net results of operation for the year 1910 are as follows: Gross receipts, $5,985,000; operating expense, $3,964,000; net income, $2,021,000; bond interest, $1,451,900; surplus, $569,100. This is equivalent to the following dividends on present stock: $5,000,000 preferred at 6 per cent, $300,000, and $10,000,000 common at 2.691 per cent., $269,100; total, $569,100. In other words, the earnings of the year 1910 were sufficient to pay all bond interest and 6 per cent on the preferred stock and over 2½ per cent on the common stock.

"The net earnings have been increasing conistently throughout the life of the property, and should continue to increase with the further growth of the territory served. The operating ratio of the company has been decreased until in the year 1910 it was 66 per cent, including not only

taxes, but also a charge of 7½ per cent for renewals. This charge, or one approximating it, should in the future provide the funds for such renewals as are necessary to maintain the integrity of the physical property, assuming that the ordinary expenditures for maintenance are made and included in the operating expense. This being done, and with extensions to property financed by the issuance of additional bonds, the net income available from operation should within a reasonable time provide a fair return (such as may be agreed upon between the Public Service Commission and the company) upon the capital invested, and a surplus which should then be used for the amortization of that portion of the proposed capital account representing development charges, which include the value of superseded property, bond discount and the accrued losses in the property to date."

Table II.—General Summary of Physical Property.

	Cost New.
Track	$7,875,209
Paving	2,940,715
Electrical distribution system	2,081,787
Rolling stock	4,710,021
Power plant and substation equipment	1,865,011
Fixed tools and shop equipment	141,274
Stores, supplies, floating tools and miscellaneous	350,367
Furniture and fixtures	42,325
Buildings	1,810,817
Real estate	1,705,224
	$23,522,750
Legal expense, carrying charges and contingencies, 10 per cent	2,352,275
	$25,875,025
Extraordinary carrying charges	17,238
Investments	64,752
Total cost new	$25,957,015

Table II shows a general summary of the physical property.

The allowance for superseded and abandoned property includes 10 per cent on cost new for legal expense, carrying charges and contingencies.

The rates of discount on bonds range from 5.4 per cent to 24 per cent and on the total of $32,790,500 the average rate is 13.9 per cent.

The table to which reference was made in the testimony, showing the investment, income at 7 per cent, etc., gives the following data as of 1910: Investment in property, $35,889,102; income at 7 per cent, $2,458,817; actual net income from operation, $2,239,276; excess of 7 per cent over actual income, $219,541; cumulative excess, $11,185,908.

Another table shows the distribution of the 1909 operating ratio, as follows: Maintenance and repairs, Public Service Commission, 9 per cent, additional 1 per cent, total 10 per cent; renewals and depreciation, Public Service Commission, 7.5 per cent; operation of power plants, 8.75 per cent; operation of cars, 23.9 per cent; general expenses, 10 per cent; taxes, 5.85 per cent; total 66 per cent.

ORGANIZATION OF THE GAS, ELECTRIC & RAILWAY ASSOCIATION OF OKLAHOMA

As a result of a meeting of parties interested called by Prof. Harold V. Bozell, director of the school of electrical engineering at the University of Oklahoma, on Oct. 6, the Gas, Electric & Railway Association was formed, with the following officers: President, Noel R. Gascho, manager of the Alva Light & Power Company; vice-president, Fred. W. Caldwell, manager of the Shawnee Gas & Electric Company; secretary-treasurer, Prof. Harold V. Bozell, Norman; directors, Galen Crow, manager of the Guthrie Light & Power Company, and Paul M. Galloway, manager of the Tusla Gas & Electric Company, each for one year; V. H. Francis, manager of the Kingfisher Municipal Electric Light & Water Plant, and L. A. Pritchett, manager of the Marlow Municipal Electric Light Plant, each for two years.

Almost all of the large towns of the State were represented at the meeting. The annual meetings will be held alternately on the east and west sides of the State—that is, one meeting will be held in what was Indian Territory and the next in what was the Territory of Oklahoma.

According to the constitution and by-laws adopted, provision is made for three classes of members, namely, Class A, Class B and associates. The first isopen to managers and directors of companies; the second to other employees of the same; the third to anyone interested in the gas, electric or railway business or skilled therein, including the commercial men. Only the first-class members may hold office and vote. There is provision for advancement from Class B and associate membership to membership in Class A.

HEARING IN REGARD TO EIGHT-CAR ELEVATED TRAINS IN NEW YORK

The hearing before Commissioner Eustice, of the Public Service Commission of the First District of New York, in respect to the operation of eight-car trains on the elevated lines of the Interborough Rapid Transit Company was continued on Oct. 18, 1911.

Frank Hedley, vice-president and general manager of the company, said that five-car trains were the longest run on the elevated lines until electricity was installed, when six-car trains were placed in service. That was in 1903. Seven-car trains were first used in 1905 and had been continuously the maximum train since that time. Although the cars were reconstructed to withstand the strain of being operated in longer trains, instances were on record where the seven-car trains broke in two because the draft gear had pulled out or the longitudinal sills which support the draft gears and drawbars had let go. The public would not secure any increase in service with eight cars to a train as against seven cars with the present facilities.

Mr. Hedley did not concur in the view expressed by E. G. Connette, transportation engineer of the commission, that the service would be improved by a change in the present number of cars in a train from seven to eight, although fewer trains would be run. On the Third Avenue line the company had been unable to operate more trains on account of the physical limitations which were imposed. During the maximum traffic period on this line fifty-eight trains per hour were operated. The longer the interval between trains the greater the accumulation of passengers who desired to board at the center of the train, so that a frequent interval with seven-car trains accommodated the public better than a less frequent interval with the same number of cars in trains of eight cars.

The present equipment when loaded with passengers was not strong enough to be operated as eight-car units. In order to operate eight-car trains it would be necessary to reinforce the car platforms and car sills, put in new drawbars and draft gear and change the present control line. The air brakes might also have to be changed. Mr. Hedley would not assume the responsibility of running eight-car trains with present car equipment and structure.

The terminals were also all arranged for trains of not more than seven cars. There would also be trouble at the storage yards. During twenty hours out of the twenty-four seven-car trains were sufficient to provide every one with a seat. The total expense of making the necessary changes in the equipment would be about $10,000,000. From a practical railroad standpoint, without regard to the expenditure involved, the only thing to do to increase the facilities afforded the public over the East Side lines was to put in third tracks. If the city authorities would agree to abide by the decision of the Supreme Court vacating an order restraining the company from proceeding with the improvements to the elevated structure, the company would carry out the work of third-tracking the lines at once. It would probably cost $1,000,000 to third-track the Second Avenue and the Third Avenue elevated lines.

The hearing was adjourned until Oct. 24, 1911.

Operation of Near-Side Cars in Philadelphia

This Article Presents Some Observations on the Design and Operating Features of the New One-Platform Car Which Was Put in Service in Philadelphia on Sunday, Oct. 15

On Sunday, Oct. 15, the Philadelphia Rapid Transit Company placed forty-nine "near-side" cars in operation on its Twelfth and Sixteenth Street line. These cars are of the same general type as those recently installed by the International Railway Company at Buffalo, N. Y., and described in the ELECTRIC RAILWAY JOURNAL of June 24, 1911. They were built under the personal direction of T. E. Mitten, and the mechanical details were worked out by Ralph T. Senter. As described in the article on the Buffalo cars, a single inclosed front platform is used for all regular ingress and egress, while the rear of the car has an exit door for use in emergency only. This arrangement, of course, makes available for seats all the space formerly required for a rear platform, giving a seating capacity of fifty-three compared with forty in other prepayment cars of like dimensions. Other striking points which were mentioned in the previous article were the arch-roof construction, the methods of ventilation and sanitation, the safety features and the conveniences for the crew.

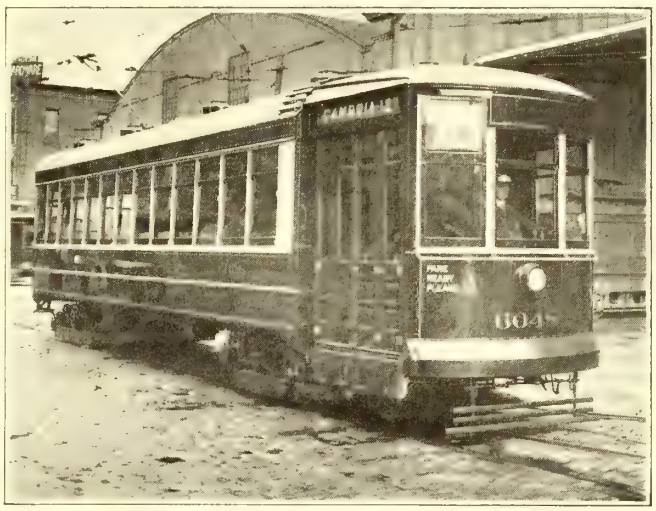
ACQUAINTING THE PUBLIC AND THE EMPLOYEES WITH THE NEAR-SIDE CAR

Previous to the inauguration of the service, about 85,000 cards were distributed to the passengers on the route where the cars would be used. These cards were handed out by the conductors during the slack hours and by special agents during the rush hours. The card presented a plan of the new car, accompanied by directions on how to use entrance and exit. The card also requested passengers to be prepared to enter and leave the car at the near side of the street, to have exact fare ready for the conductor when boarding the platform, and to wait for the next car when the "car full" sign was displayed. No advertisements were printed in the newspapers, but the latter published long and favorable reading notices.

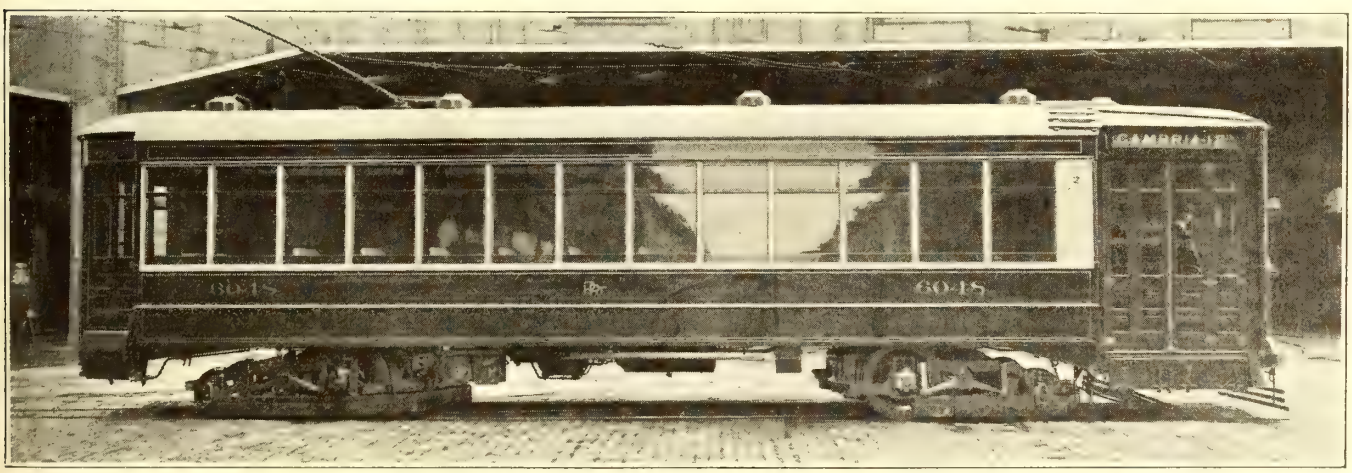
The motormen and conductors who were to handle the new cars were given a booklet which explained the principal features of the "near-side" car, the method of controlling passenger movement and the use of the special equipment. The conductors were further instructed by experts in the operation of the Dayton recording-fare registration system. This method of registration was described in the ELECTRIC RAILWAY JOURNAL of March 11, 1911. It provides for the registration of different classes of fares and prints an elaborate trip sheet, thereby relieving the conductors and the auditing department of much labor.

THE ATTITUDE OF THE PUBLIC

The new cars have not yet been in service under normal conditions for a sufficient length of time to obtain statistics on their operation. However, the Philadelphia public seems to have taken very readily to the "near-side" cars, so far as could be judged from extended observations at the principal corners and from conversations with the passengers themselves. Entrance to the car is facilitated by a long, curved grab-handle which is placed on one leaf of the entrance door and extends almost to the floor of the platform when the entrance door is open. The passenger must pass the conductor and deliver his fare before stepping into the body of the car. The longitudinal seats provided at the front for three window lengths on each side allow ample room for the entrance and exit of passengers. The fact that the aisle between the transverse seats is 31½ in. wide at hip height makes it easy for passengers to move through the car without jostling those who are standing in the aisle. The liberal aisle width is due partly to the general design of the transverse seat, the pedestal casting of which does not project more than ¼ in. beyond the edge of the seats, the car itself being no wider than the

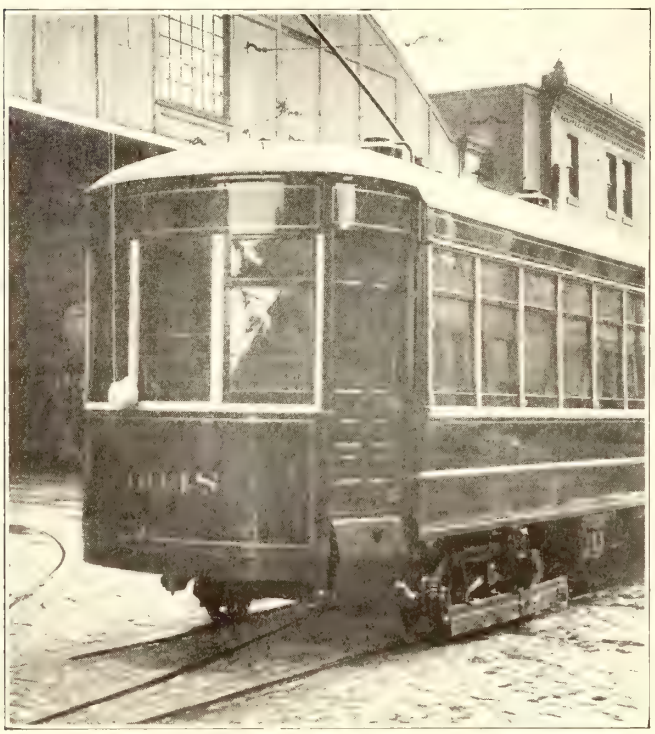


Philadelphia Near-Side Car—View Showing Route and Destination Signs



Philadelphia Near-Side Car—Side View with All Doors Closed

prepayment car formerly operated on this line. A novel feature of the seat backs is a central ridge, which effectively keeps the two passengers in a seat from crowding each other. These seats have corner grab-handles, while straps are installed over the wider areas in the front and back of the car. The transverse seats are 34 11/16 in. wide, and are stationary, since the car is used for single-end operation only. The rounded seats at the back of the car appear to be as popular with riders as the regular transverse seats.



Philadelphia Near-Side Car—Emergency Exit at the Rear

The passengers have been quick to notice such conveniences as push buttons, the placing of the lamps over the center line of each row of seats, the roominess due to the arch roof and the entire absence of register and signal rods and cords. While the seating capacity of the car is fifty-three, the large areas for standing room make it possible to handle a total load of over 150 passengers, although the intention is, under normal conditions, to limit the load to eighty-three passengers, at which time the "car full" sign will be displayed.

OPERATING ARRANGEMENTS

The railing system on the front platform accomplishes the double purpose of dividing the ingress and egress lines of traffic and of protecting the motorman and conductor from all jostling. As the motorman has an air brake, his principal manual labor is the manipulation of the entrance and exit doors. These doors are of the two-leaf type and are operated with surprising quickness and little effort. A separate handle is provided for the independent opening or closing of each passage, but by the use of a through pin the motorman can manipulate both sets of doors together. The motorman is also provided with a mirror which reflects the car interior. At night he is cut off from reflected light by a curtain. The rear exit, which is used for emergencies, can be operated either by means of a lever manipulated by the conductor from his regular position, or from the back of the car. He can do this conveniently because the exit door is not blocked by a folding seat. The emergency door is not intended for use during regular service, but only for occasions like terminal unloading, for instance, or at other times when it would be desirable to clear the car in the quickest possible time.

As a rule the conductor remains at the front of the car, but provision is made for emergency conditions which would require his presence at the rear. For instance, he can replace the trolley from the rear, although all cars are equipped with trolley catchers. An emergency air brake is installed near the ceiling at the rear of the car for the use of the conductor when the car is being operated in the reverse direction. When so stationed he can transmit signals to the motorman by means of a push button. Should a car require pushing, the motorman can transmit bell signals to the conductor stationed at the rear.

A special form of "squeegee" is being developed to take off frost on the vestibule windows.

SANITARY FEATURES

It is apparent from an inspection of the car that a great deal of thought has been given to making it as sanitary as possible. There are no recesses, shelving or beading of any kind to catch and hold dust. Wherever sharp corners could not be avoided, pieces of rounded plate were inserted to make self-cleaning corners. The curve of the ceiling and the rounded molding of the advertising racks also will not catch dust. The heater panel is continuous to avoid recesses. The straps have sleeves of celluloid. The general ventilator and heater features of the cars have been described in the article on the Buffalo cars so that no special reference need be made to them here.

SIGN SYSTEM

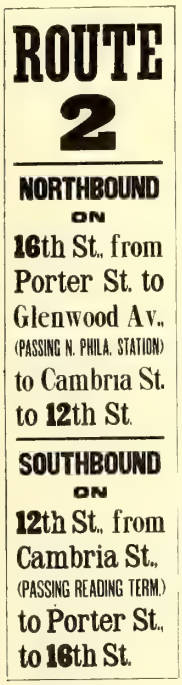
The sign system which has been developed for the "near side" car is the result of a thorough analysis which was made of the type of signs to be used and the places where they should be displayed. In making this analysis the problems of exterior and interior signs were considered separately. It was believed that there should be displayed on the



Philadelphia Near Side Car—Motorman and Conductor in Position on the Front Platform

outside of the car information which would show both route and destination. The route itself is indicated by a large single illuminated numeral on the front of the car, supplemented by a sign over the exit and entrance step which gives the destination for the direction in which the car is traveling. On this particular line, for instance, the numeral "2" designates the route. It was also considered desirable to have an exterior sign which would give a complete description of the route, including the streets traversed, names of important points, such as railroad

terminals served by the line and the names of the terminals. The most convenient place for the sign was found to be in the vertical panel of the car near the front end.



Outside Panel Sign

The position of the three exterior signs will be noted from the accompanying illustrations. The fourth exterior sign is the "Car Full" sign, which is displayed immediately below the route number. It might be added that numbers were chosen for routes in preference to letters for two reasons: First, in a large city, the number of routes would exceed the number of letters in the alphabet, and, second, certain capital letters like S and Z and T and I are likely to be confused at a distance. The text of the exterior panel sign referred to is reproduced in one of the accompanying cuts. It is divided into two sections because the line traverses different routes in going and returning.

The arrangement of the interior signs was directed by the thought that there should be a permanent place for each character of sign such that it could easily be read by every passenger without leaving his seat, and that the text of each sign should be so clear and concise that it would surely command attention and be fully understood. The interior signs are divided into three groups as follows: Information concerning route; service regulations; special announcements. The first two signs are placed in the regular advertisement racks in the center of the car while the other is placed in the arch directly above the conductor. The route sign is an exact copy of the exterior panel sign except that it is arranged horizontally. The "service regulations" sign contains in concise form the company's rules regarding the making of change, the issue of transfers and exchange tickets; safety regulations, such as that the passenger must not remain upon the platform, and should keep arms and head inside of the car; health regulations, such as prohibition of smoking and spitting. The complete sign is reproduced in one of the accompanying cuts. In this particular case the third sign, relating to special conditions, is used to describe the new system of car signs, but it may be used to make other announcements of temporary character. It may be mentioned in conclusion that the cars have the usual advertisement space except for the sections reserved for the route and service regulation signs.



Philadelphia Near-Side Car—Loading and Unloading Platform as Seen from Inside the Car

NEW SYSTEM OF CAR SIGNS.

The large numeral 2 designates the former 12th-16th St. Route.

The streets traversed are listed at side of steps upon the outside of car, and in center of advertising rack upon the inside of car.

The wording outside of car, over entrance, designates the terminus of the route.

Service Regulations

Conductors will not be required to change money of a larger denomination than two (2) dollars.
Five-cent Fare entitles a passenger to a Transfer Ticket, at certain designated points, but only if asked for at time fare is paid.
Eight-cent Fare entitles a passenger to an Exchange Ticket good for a continued ride upon certain designated lines which are not open to transfer.
Children under 3 years of age, not occupying seats and accompanied by a passenger paying fare, will be carried free.
City Ordinance prohibits spitting in public conveyances.
Cigars or Cigarettes (partly consumed, either lighted or unlighted) should not be carried into the car
Passengers must not put their heads or arms out of windows.
Passengers will not be permitted to remain upon the front platform.

Philadelphia Near-Side Car—Two of the Inside Signs



Philadelphia Near-Side Car—Seating Arrangement, Looking Toward the Back of the Car

CALIFORNIA CONSTITUTIONAL AMENDMENTS

As a result of a special election held in California Oct. 10 two amendments to the State Constitution relating to public utilities were adopted. One of these authorizes the Legislature to enlarge the powers of the State Railroad Commission and extend its jurisdiction to include all public service corporations, while the other authorizes municipalities to engage in certain utility work.

The first amendment declares that every private corporation and every individual or association of individuals owning or operating any commercial railroad, interurban railroad, street railway, canal, pipe line, telephone, telegraph or any equipment relating to such is a public utility, subject to control and regulation by the Railroad Commission.

By the second constitutional amendment any municipal corporation may establish and operate public works for supplying its inhabitants with light, water, power, heat, transportation, telephones or other means of communication.

By another constitutional amendment the Railroad Commission is increased from three to five members, to be appointed by the Governor, instead of being elective, as heretofore. The term is extended from four to six years.

ELECTRICAL FEATURES OF NEW YORK TUNNELS OF THE PENNSYLVANIA RAILROAD

On the evening of Oct. 18 a paper on "The Electrical Features of the New York Tunnel Extension of the Pennsylvania Railroad," by George Gibbs, chief engineer electric traction Pennsylvania Railroad, was presented at a meeting of the American Society of Civil Engineers held at the house of the society in New York City. This paper was printed in the *Proceedings* of the American Society of Civil Engineers for May, 1911, and was abstracted in the Electric Railway Journal of June 3, 1911, page 955.

Mr. Gibbs, the author of the paper, was detained in Europe and was unable to reach New York in time to present the paper in person. E. R. Hill, assistant to Mr. Gibbs, presented the paper in abstract in the author's absence, and illustrated the points to which he called attention by means of a large number of lantern slides. In concluding his presentation of the paper Mr. Hill gave some data on the operating features of the tunnels. The Pennsylvania began operating trains to and from the station on Nov. 27, 1910, and in the first ten months of operation the average number of train movements in and out of the station each day, including Long Island Railroad trains, was 430. The average number of locomotive movements per day was 290. The number of passengers carried by Pennsylvania Railroad trains was 31 per cent greater at the end of the ten months than during the first month after operation was begun. The increase in number of passengers carried on Long Island Railroad trains was 92 per cent. During the past seven months the passenger receipts of the Pennsylvania Railroad have increased 41 per cent, and the passenger receipts of the Long Island Railroad have increased 161 per cent. There have been no delays whatever to trains by reason of failures of the power supply in the power house or in the transmission system. There have been only three delays caused by current being off of one or more sections of the third rail. During the same period there have been only four locomotive failures causing delays to trains. The electric locomotives ran 189,000 miles per failure and the miles run per minute of train detention due to locomotive failures were 75,000.

A written discussion by J. Vipond Davies, chief engineer Hudson & Manhattan Railroad, was read in abstract. Mr. Davies called attention to the early history of the Pennsylvania Terminal Station project and its conception in the mind of Mr. Cassatt, president of the Pennsylvania Railroad. As early as 1901 Mr. Cassatt had some preliminary sketches made for a monumental terminal station to be located east of Fourth Avenue, where the local transit facilities would have been adequate. In Mr. Davies' opinion, much of the advantage accruing to the company from a direct entrance into New York City had been lost by changing the location to a site west of Seventh Avenue. There seemed to be but little hope for some years to come of providing convenient and adequate local rapid transit service to and from the station. Owing to the lack of suitable transit facilities he thought it was probable that not more than 5 per cent of the population of New York City knew where the station was or how it could be reached most quickly. Since the completion of the Newark Rapid Transit Line connecting Manhattan Transfer with the system of the Hudson & Manhattan Railroad, a quick and convenient means of transit to and from the down-town business section had been provided and the territory contiguous to the Sixth Avenue extension of the Hudson & Manhattan Railroad was reached more quickly by transfer to Hudson tunnel trains at Manhattan Transfer than by running through to the terminal station at Thirty-third Street and Seventh Avenue. The dividing line between equal running times via the Pennsylvania Station and the Hudson Tunnel trains was about Nineteenth Street.

W. J. Wilgus, formerly vice-president and chief engineer New York Central & Hudson River Railroad, sent a written discussion of the paper which was read by the secretary of the society. He called attention to a number of differences in the design of the Pennsylvania Terminal and the new Grand Central Terminal, both of which were designed to accommodate electrically operated trains. He deplored the absence of suitable rapid transit facilities to serve the Pennsylvania station and urged the construction of a subway as originally contemplated under Seventh Avenue. With reference to the plan adopted of building a large car-storage yard on Long Island, he pointed out the disadvantages from the standpoint of operating efficiency and cost of locating a storage yard such a long distance from the terminal station. He thought that large sums could well be expended for acquiring the necessary real estate for storage yards contiguous to the terminal, as had been done in the case of the new Grand Central Terminal. Mr. Wilgus compared the types of structures adopted by the Pennsylvania and the New York Central railroads for their terminal stations. The Pennsylvania terminal was a monumental structure devoted solely to station purposes and no income was obtained directly from the large investment in real estate which had to be made. One great advantage of the use of electricity in terminals was that it made possible the operation of trains on one or more levels below the ground, leaving the entire area above the surface of the ground available for any type of building which would produce an income from rentals. In his opinion the rents received from the large buildings which were being erected over the Grand Central Terminal yards would be a profitable investment and would almost pay the interest charges on the cost of the entire station improvements. One argument which had been used against the adoption of electricity as motive power was the excessive cost. To obtain equivalent facilities and still employ steam locomotives would cost a far greater sum than the change to electricity.

George R. Henderson, consulting engineer, New York, sent a written discussion on the design of locomotives for the Pennsylvania tunnels. He referred to their high center of gravity, which he considered advantageous as producing less strain on the track when running at high speeds. He described a simple method of obtaining the center of gravity of a locomotive by means of a track scale. If one side of the locomotive was elevated 6 in. or 8 in. and the weight on the other side was read from the scale beam, the height of the center of gravity could be determined with considerable accuracy by a simple trigonometrical calculation. This method was far more accurate than an analytical determination and much safer than the method sometimes employed of lifting the locomotive and determining its center of rotation.

E. B. Katte, chief electrical engineer New York Central Railroad, discussed the paper briefly. He said that the adoption of the direct-current system by the Pennsylvania Railroad was some indication that other companies which had adopted the direct-current system had not been far wrong. Referring to the section of the third rail adopted he thought that a third rail of equal carrying capacity but with a rectangular cross-section could have been rolled more easily and at less cost and that it would have afforded more convenient means for protection. The Pennsylvania electric locomotives, in his opinion, had no novel electrical features, but the use of side-rod driving connections was a novel mechanical construction about which he had some doubts as to its future efficiency. He thought it would be extremely difficult to keep the jack shafts in line after they began to wear in the bearings.

N. W. Storer, Westinghouse Electric & Manufacturing Company, described the conditions which influenced the design of the Pennsylvania electric locomotives. The entire

terminal project was predicated in the beginning on the use of electricity as motive power and safety and reliability were the first considerations. Cost was a secondary consideration, and no expense had been spared to make and maintain the locomotives as nearly perfect as possible. The record of operation of the locomotives exceeded that of any other type with which he was familiar, although they were called upon frequently to haul trains 50 or 60 per cent heavier than the trains which they were designed and guaranteed to haul. Grades in the tunnels were 2 per cent, and were equivalent to the grades encountered in mountain service. To start a 500-ton train on a 2 per cent grade required 40,000 lb. tractive effort, which was about equal to that exerted by large consolidation type steam freight locomotives. On account of the possibility of encountering bad rail conditions in the tunnel, the coefficient of adhesion had been limited to 20 per cent. This required a weight of 200,000 lb. on the four driving axles. The design of the tunnels would not permit concentrating such heavy wheel loads on a short wheel base, and an articulated type of locomotive was the final result of the attempt to meet these conditions. This type of locomotive was economical to build, as a few spare half-units were sufficient to provide for emergencies. The motors had a capacity large enough to handle trains of any weight up to the adhesion capacity of the driving wheels. In the preliminary tests of these locomotives drawbar pulls of as much as 79,200 lb. had been obtained, which corresponded to a coefficient of adhesion of 37 per cent. This was equivalent to the tractive effort of the largest Mallet compound steam locomotives. A coefficient of adhesion of 37 per cent was not unusual for electric locomotives with good wheels on perfectly clean, dry rail. The side-rod method of driving had been adopted only after careful study, as it was believed to be more reliable and safer than any other form of drive.

Personally, Mr. Storer said he was not in favor of side-rod driving, for the reason that it produced excessive stresses on the cranks and pins. In a steam locomotive each rod or pin was allowed to transmit the maximum power of only one cylinder, whereas all the power of the motor on an electric locomotive was transmitted through the connecting rod and pins on one side at certain points during each revolution. On the Pennsylvania locomotives, when exerting 79,200 lb. tractive power, it had been estimated that the crank pins were subject to a maximum stress of 120,000 lb.

COMMUNICATION

MR. CONNETTE'S OPINION ON HAND BRAKES

PUBLIC SERVICE COMMISSION, FIRST DISTRICT
NEW YORK, Oct. 16, 1911.

To the Editors:

In your issue of Sept. 23, under the heading, "Hearing on Brakes and Height of Car Steps in New York," in referring to my testimony, you say: "With the maximum traction trucks used in New York he thought that hand brakes were as efficient as air brakes."

This is incorrect; what I did say, as shown by the record, is: "The type of brakes which are used under the light double-truck cars in New York, equipped with maximum traction trucks, were probably as efficient with hand brakes as the single-truck car, but that would depend entirely on the weight of the car."

My answer was intended to cover the double-truck cars equipped with maximum traction trucks and weighing 25,100 lb. and less, which are equipped with geared hand brakes.

E. G. CONNETTE,
Transportation Engineer.

RESULTS OF THE TESTS OF FENDERS AT NEWTON, MASS.

Eight types of fenders for electric cars were tested under the direction of Commissioner George W. Bishop of the Massachusetts Railroad Commission, Oct. 10, at the Homer Street carhouse of the Middlesex & Boston Street Railway, in Newton, Mass. Seven dummies, made of canvas stuffed with rope and sand and representing, in size and weight, human beings from children to men, were placed in the positions of standing, sitting and lying upon the track, and run into at varying rates of speed. The fenders tested were mainly new devices, and all but one were of the same general type—tubing frame, with basket-like horizontal work. Several were supplied with buffers to take the shock of a person struck violently and hurled backward. The exception to the general style was a device resembling a cartwheel, suspended horizontally in front of the car. The inventor's idea was that a person struck would set the wheel revolving and so be pushed to one side of the track. The scheme worked fairly well with standing figures, but failed when the dummies were placed in a reclining position. The same may be said of a large number of the new devices. Either they were hung too low to permit of practical operation over inequalities in the roadbed, or, being raised to clear these, they rolled the dummy underneath the trucks instead of lifting it. One of the fenders was of a pattern manufactured by the Worcester Railway Supply Company, of which about 800 are in use in California. This type has in combination with it a wheel guard, which is relied upon to push the body off the track when the fender fails to lift it.

Several of the new inventions required the pressing of a lever by the motorman to drop the fender near the ground and so strike the object well below its center of gravity, but it appeared to be the general view that only an automatic device was practicable.

Among the fenders tested was one called the Libby basket fender, now in use on the prepayment cars of the Boston Elevated Railway. In conjunction with this, each of the two trucks of the car has a guard completely surrounding it. In theory this should be 2 in. above the rail, but conditions in the Boston district require it to be about 5 in. above the rail, though the roadbeds are being constructed so as to enable a fender and guard to be within 2 in. of the rail. This type of fender operated as satisfactorily as any shown. In cases where the figure was lying across the tracks and below the reach of the fender, the wheel-guard brushed it aside uninjured. President Bancroft of the Boston Elevated Railway stated:

"There are many good fenders that catch a person when directly in front of them, but few can push a body to one side, and then the wheel guard has to be relied upon to do it. Usually children playing in the streets become confused and turn about when the car is approaching. The average fender will do little in such cases, but the wheel guard such as is used on our new equipment is efficient."

Another test was to be conducted Oct. 19, when several more inventions were to be tried. The result of the investigations and trials will form a report which the Massachusetts Railroad Commissioners will make to the next Legislature. Commissioner Bishop has, the past summer, investigated the subject in European cities, and an agent of the commission is soon to make a trip West on the same errand.

Tracks of the Illinois Traction System will be connected with the two laboratories of the new transportation building at the University of Illinois for the construction of which the last General Assembly appropriated $200,000. One of these will house the locomotive testing apparatus and the other will contain the electrical testing machinery.

Annual Convention of the National Association of Railway Commissioners

This Convention Was Held in Washington on Oct. 10 to 13, and a Number of Subjects Relating to Electric Railways Were Discussed

The opening session of the twenty-third annual convention of the National Association of Railway Commissioners was held at Washington, D. C., on Oct. 10. R. Hudson Burr, of Florida, called the meeting to order.

Judson C. Clements, chairman of the Interstate Commerce Commission, in welcoming the members stated that by common consent of the people of this country and the courts, and practically by all, it was accepted of necessity by the interests to be regulated that there was constitutional authority for reasonable regulation and, in addition, a necessity for it. He said in part:

"There is a better recognition in late years of the clear distinction between meddling with private investments in a private enterprise and regulating the investment of private capital in a public-service corporation which is affected by the public interest. When a corporation takes the place of the state in any matter, it takes it subject to the principles of fairness and equality, non-discrimination in treatment and reasonable rates. There is a clear distinction in principle between that kind of regulation and that which would undertake to regulate the private business of a private investment in a concern not engaged in a service public in its nature.

"Under certain conditions to leave public-service corporations free for the most part to do as they choose results in combinations and monopolies in a service upon which every individual is of necessity dependent, not quite so much as he is for the air he breathes, but commercially absolutely dependent for transportation.

"It is a mistake, however, to suppose that the necessity for additional legislation will ever pass. There must be new laws to meet new conditions. I suppose that those who are in favor of such laws from time to time, although they advocate them with the purpose to do only that which is just, will always be characterized as unduly progressive or radical. We ought on the one hand not to be intimidated by that cry nor on the other hand to forget the right of the investor in these properties, but should go with an even hand, with a cold-blooded sense of justice, and do that which is right in the passage of laws and in their administration."

PRESIDENT'S ADDRESS

Chairman Burr, in the annual address of the president, referred principally to railway questions and to general matters bearing on their regulation. He said that when the findings of a railway commission are to pass under judicial review a local or state judge should first be called to the task and not until the judicial machinery of the state is exhausted should there be an appeal to the United States courts. He also took up the question of cost accounting and said that operating or accounting divisions of railroad companies should be made practically coincident with state lines and that even then certain terminal expenses should be projected over the state lines and made common to two or more states. A more intricate problem was presented in the division of the expenses between freight and passenger traffic. Mr. Burr thought that the only expenses which required more than common care in the division of accounts were those relating to maintenance of way and structures. President Burr recommended that the committee on classification of operating and construction expenses of electric railways be abolished and that its duties be combined with and performed by the committee on accounts and statistics of electric railways.

CONFERENCE BETWEEN SECRETARIES

At the morning session on Oct. 10 J. S. Kennedy, secretary of the New York Public Service Commission, Second District, suggested that as there had been some correspondence between the secretaries of the various commissions and several were in attendance conferences between them might be held to mutual advantage. A conference was therefore arranged.

EXPRESS RATES

The report of the committee on express service and express rates, which was read by Charles F. Staples, Minnesota Railroad & Warehouse Commission, quoted the officials of express companies who testified before the committee in reference to the general subject considered. The committee recommended for serious consideration a plan for a separation of rates so as to relieve patrons who did not care for the pick-up and delivery service from sharing in the cost of this service to the express companies. The committee believed that the low ounce rates in Section D of the classification were admittedly wrong and discriminatory, that such rates could not be justified and should be either eliminated or raised.

FUNCTIONS OF NATIONAL AND STATE GOVERNMENTS

On account of cases which are now being submitted to the United States Supreme Court bearing upon the respective functions of the governments of the states and the United States, the committee on amendment of the act to regulate commerce withheld recommendations until these questions should be settled.

DELAYS IN ENFORCEMENT OF ORDERS

The committee on delays attendant upon enforcing orders of state railroad commissions reported that there had been no serious delays in the state courts for many years and that judicial decisions and Section 17 of the Commerce Court act had minimized and measurably remedied the evil in the federal courts.

GRADE CROSSINGS AND TRESPASSING

The report of the committee on grade crossings and trespassing on railroads, presented by George W. Dickinson, Michigan Railroad Commission, stated in part:

"In some states the law permits, if it does not direct, the establishment of grade crossings. The public, when appealed to, readily agrees that something should be done, but when it comes to making that public bear a fair share of the expense of grade separation, even for its own protection, or making the unlawful use of railroad right-of-way a felony, it demurs and loses interest, and thus commissions, whose statistics continue to show great loss of life at such crossings, are impotent to effect a remedy. The people say, 'The railroads are the offenders, let them apply the remedy,' forgetful of the fact that the greater number of fatalities result from the use of railroad property by those who have no right thereon, or who fail to exercise a reasonable measure of caution in passing such crossings.

"The rapid increase in the construction and operation of interurban lines, the adoption of longer and heavier cars, and the increased speed at which they are operated in their attempt to compete successfully with the steam lines for other than local passenger traffic are operating as an added menace to human life at grade crossings; from the fact that their operation is more frequent, attended with less noise, and the sound of their whistle is not so loud and strong, the pedestrian or driver of a vehicle receives less notice of their approach and thus the crossing

at grade of electric lines is proving a greater source of danger, under ordinary conditions, than in the case of steam lines and must receive our special consideration.

"We believe that as to grade separation we should renew our efforts to have the Legislatures of our respective states pass a law requiring that each railroad operating therein should be required to eliminate a given number of grade crossings each year, and at such points as the commission having authority in such states shall direct, the expense to be apportioned between the state and county, township or village, as the case may be, and the railroad company, as the commission shall determine, believing that the varying conditions under which grades are separated do not make it advisable that any inflexible rule or statute shall govern as to the manner of division of expense; that the commission of the state in which such crossings are separated, making an inspection of the premises and being thoroughly conversant with the conditions, is in a better condition to determine the reasonableness of the apportionment of expense than any other body, legislative or otherwise. We also believe that whenever new highways are to be constructed crossing railroads, or new railroads constructed crossing existing highways, the point where such crossing shall be made and the manner of construction, whether over, under or at grade, should be determined by the commission, and that our state Legislatures should by prompt enactment so provide."

NEW OFFICERS

On Oct. 11 officers were elected for the ensuing year as follows: President, Charles F. Staples, Minnesota Railroad & Warehouse Commission; first vice-president, O. P. Gothlin, Public Service Commission of Ohio; second vice-president, H. Warner Hill, Georgia Railroad Commission; secretary, William H. Connolly, Interstate Commerce Commission; assistant secretary, William Kilpatrick, Illinois Railroad & Warehouse Commission.

TAXES AND VALUES

The report of the committee on railroad taxes and plans for ascertaining the fair value of railroad property was prepared by Edward M. Bassett, formerly a member of the New York Public Service Commission, First District. Mr. Bassett was the chairman of the committee. With one exception the report prepared by Mr. Bassett was approved by all the members of the committee. An abstract of this report will be published in a later issue.

STATISTICS AND ACCOUNTS

The report of the committee on statistics and accounts, of which Prof. B. H. Meyer, Interstate Commerce Commission, is chairman, was presented at the morning session on Oct. 12. The committee expects by vigorous action to be able to submit to the convention of 1912 a report of progress that will, if possible, embody a proposed plan relating to the division of operating earnings and expenses by state lines.

SAFETY APPLIANCES

The report of the committee on safety appliances, of which C. C. McChord, Interstate Commerce Commission, is chairman, was read by William Kilpatrick, Illinois Railroad & Warehouse Commission. The report said that recent disastrous railroad wrecks indicated the necessity of radical reforms in the practices and methods of railroad operation. In its work under the law of investigating the causes of railroad accidents the Interstate Commerce Commission could rely confidently upon the co-operation and assistance of the state railroad commissions. The committee thought that the association should go on record in favor of legislation of a general character providing for the introduction of steel cars gradually and should recommend similar legislation relating to intrastate carriers in the several states. It was recommended that the attention of railroad managers be called to the advisability of experimental trial in actual railroad operation of some of the automatic train stops upon limited divisions of the railroads with a view to working out, by service test, the best available train-controlling device.

RAILWAY CAPITALIZATION

Martin S. Decker, New York Public Service Commission, Second District, chairman of the committee on railway capitalization, presented the report of this committee. An abstract will be published in a later issue.

RATES AND RATE-MAKING

The principal subjects discussed on Oct. 13 were rates and rate-making; the powers, duties and work of state railway commissioners; the accounts and statistics of electric railways, and the report of the committee on railway capitalization.

On the subject of rates, Mr. McKnight, of Arkansas, called attention to the fact that the occasional rider, who was usually a laboring man in that State, paid about 3 cents a mile for his transportation, that commercial travelers, who required much more checking of baggage, traveled on a mileage book for 2 cents a mile, and that many lawyers and other individuals in the State traveled on passes. He considered this condition unjust. He also referred to certain freight rates which he considered discriminatory.

Mr. Watson, of Oklahoma, believed that if railroad rates were based on the value of the properties with depreciation deducted, rates could be established which would be sustained by the courts and would be satisfactory to the public and would give a proper return to the companies.

POWERS AND DUTIES OF COMMISSIONS

In the discussion of the powers, duties and work of state railway commissioners, Messrs. Hogueland, of Kansas, and Decker, of New York, mentioned briefly the scope of the powers of the commissions in those States.

In this connection the association voted to invite the representatives of the Railroad Commission of Canada to attend the next annual convention and participate in the discussions.

ACCOUNTS AND STATISTICS OF ELECTRIC RAILWAYS

When this subject was announced Mr. Bellamy, of Arkansas, said that he had originally been appointed chairman of the committee of the accounts and statistics of electric railways, but that he had been notified that the committee had been merged with the committee on statistics and accounts, so that he had prepared no report. As the Arkansas commission was strictly a steam railroad commission and had no jurisdiction over electric railways, he suggested that if an electric railway committee should be continued a chairman should be selected from among those commissions which had jurisdiction over electric railways. As there was no report on this subject from the committee on statistics and accounts it was passed over to the following year.

DISCUSSION ON RAILWAY CAPITALIZATION

Mr. Gothlin, of Ohio, in opening the discussion on this subject, said that the commission in that State was confronted with the problem of railway companies which already had a heavy burden of capitalization and required additional funds for needed extensions and wished to issue bonds. These companies had said that if the commission should require them to sell stock for full value or to issue stock before bonds were issued railway progress and construction in the State would stop.

Mr. Hill, of Georgia, said that the Georgia commission had jurisdiction over the public service corporations doing business within that State, but that several interstate railroads had declined to recognize its authority over their issues of securities.

Mr. Decker, of New York, said that most of the interstate railroads doing business in New York were New York corporations, and that the New York commission considered applications for their issues of securities. He thought that the only interstate railroad to which this statement did not apply was the New Haven Railroad, which, as yet, had not made any such application. In re-

gard to the compensation which should be allowed in the capitalization to promoters of new companies for their services, the New York commission had taken the position that promoters were entitled to compensation, but the commission had always taken testimony as to the value of these services, such as the length of time which the promoter had put on the work, what he had done and the expenses which he had been obliged to defray. These were considered as "preliminary expenses." Engineering services in preliminary surveys and the acquirement of rights-of-way were also included in the same account. He did not think that there was any wide discontent in New York with the way in which the subject of compensation for the services of promoters had been treated in that State by the commission. He added that under the law the commission was not permitted to allow the capitalization of franchises.

Mr. Benton, of New Hampshire, said that one of the difficult problems which the new public service commission of that State had to meet was that of determining the increase in capitalization which should be allowed a utility company which purchased the plant of a competing utility when a large part of the purchased plant was a duplicate of that owned by the purchaser, so that that part of the purchased plant had to be scrapped or was not of use to the purchaser.

Mr. Meyer, Interstate Commerce Commission and formerly a member of the Wisconsin commission, in replying to Mr. Benton said that the Wisconsin commission had generally taken the position that even though the aggregate of the securities outstanding might exceed the value of a plant in first-class condition, what the public required was good service, and what the company must have in order to give that service was money, and that the commission must do whatever it reasonably could do to put the company in a position where it could get money. His personal belief was that so far as possible every share of stock should stand for the amount of its face value, but it was not always possible to require that and not always in the interest of the public to do so. He asked whether it was not possible for the regulating authorities so to mold public opinion as to get out of the public mind that there was a definite and necessary connection between securities and rates. The authorization by a commission of the issue of a certain amount of capitalization carried no guarantee that the property was worth that amount of money. All that the commission could do would be to say that a certain amount had gone into the property. At any subsequent period the property might be worth more or less than that amount. On the subject of the approval of the securities of companies by the public authorities he also said in part:

"All of you gentlemen who are connected with state commissions regulating securities, I believe, act under laws that require approval on the part of public authority before the securities are issued. That is the Wisconsin law. And while I was a member of the Wisconsin commission, in common with my colleagues of the commission, I often asked the question, 'To what extent after all is it desirable that express sanction shall be given to the issuance of securities in advance? If that approval is given in advance of such issuance, does not the state thereby place a certain stamp of legitimacy and value upon stocks and bonds?'

"If in your state you value your properties, if you have a tax commission or some other authority that places a value upon that property, and you as railroad commissioners establish the rates, to what extent are you interested in the issuance of securities except as a question of public morals? You do not want fraud. You want to protect the investor as far as you can. You want to give him information in order that he may know what he is buying, but when you have given the investor the information that it is possible for you to give, can you do much more for him? If you establish rates it is within your power to see that the rates are reasonable.

"When we started out in Wisconsin we thought that previous approval was doubtless a very good thing, and it is a good thing in many respects, but I want to repeat that our doubt increased with our experience, and the greater our experience became the greater was our doubt. If you say bonds shall not be sold for less than 75 or 80, there is a great margin, a margin enough to allow all the latitude there ought to be."

Commissioner Lane, of the Interstate Commerce Commission, thought the laws which gave to commissions the power to determine in advance the figure at which bonds or stock should be sold were based upon a wrong theory. They were based upon the theory that the government had a direct interest in that matter, whereas it was the stockholder or the speculator who was interested in that question. But the government could say that the conditions of the sale and issue of securities should be a matter of public record, so that every stockholder and others and everyone who desired could have access to the records and know the amount of money obtained from such sale. The Supreme Court in the Smythe case had decided that the returns to be made to a railroad must be made upon investments made by the stockholders. Experience had shown that there was no real fixed relation between the amount of capitalization and values, but it was the duty of the commissions to know what the sales of securities yielded and whether that money went into the property which served the public. He did not believe that any state commissioner could say that a certain bond should bring say 85, or that a stock should be sold for 100, unless he knew of someone who was prepared to offer that amount for it. Hence, he suggested in the question of the control of capitalization the wisdom of going slowly and of finding, first, if it was not possible to achieve every result desired by publicity and by the exact and official ascertainment of the fact that the money which was raised went into the property.

Mr. Watson, of Oklahoma, said that the commission in that State had no jurisdiction over the issue of stocks and bonds but had the power to regulate rates. The rates were fixed after the commission had made an appraisal of the properties of the utility and had ascertained their true value, with an allowance for depreciation and interest.

INSTALLATION OF OFFICERS

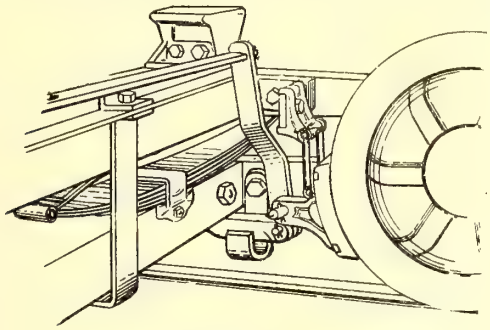
At the close of the session the officers for the ensuing year were installed.

The next meeting will be held in Washington, D. C., during the week beginning Nov. 19, 1912.

The Engineering Experiment Station of the University of Illinois, has issued Bulletin No. 49 entitled "Tests of Nickel-Steel Riveted Joints," containing the results of tests for slip and strength of 106 nickel-steel riveted joints and seventy chrome-nickel-steel riveted joints. The tests of nickel-steel joints were undertaken at the request of the board of engineers of the Quebec Bridge; and those of chrome-nickel-steel joints, at the request of the Pennsylvania Steel Company. Tests were made in tension and in alternated tension and compression. It was found that noticeable slip of rivet occurred at loads within the ordinary working stress; the slip was much greater under loads alternated in direction than under loads in one direction only, and the slip of joints seemed to depend on workmanship rather than on material. The nickel-steel and the chrome nickel-steel joints showed higher ultimate strength and much higher resistance to bending of rivet than did joints of ordinary structural steel. It would seem that in riveted joints designed on the basis of ultimate strength, the use of rivets and plates of nickel-steel may be of advantage, but that in riveted joints designed on the basis of frictional hold of rivets against slip, there is little advantage in using rivets of special steels of great strength.

IMPROVED TRUCK BRAKE RIGGING

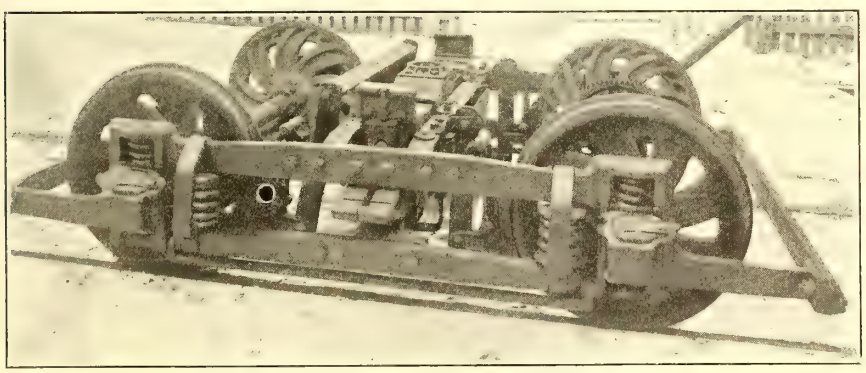
Martin A. Pahler, formerly master mechanic of the Connecticut Company at New Britain, Conn., recently has been granted a patent on an improved form of truck brake rigging which has been applied to a number of cars in New Britain. The principal advantages claimed for this improvement are simplicity and economy of construction and maintenance and a higher brake leverage. As will be



Improved Truck Brake Rigging

seen from the accompanying engravings, which show the rigging applied to a Brill No. 27-E truck, the brake shoes are inside-hung and the live levers are moved by a top brake beam at the center of which is attached the brake rod passing over the motor frame toward the center of the car body. The brake shoe hangers are attached to brackets bolted to the inside faces of the truck side frames. These hanger brackets have elongated bolt holes so that their position may be adjusted to give any desired angularity to the hangers. No release springs are used; the shoes fall away from the wheels of their own weight when the brakes are released. The live levers are bent inwardly to clear the hanger brackets and the two brake levers on each of the transoms are connected at their bottom ends by the rods to prevent the brake shoes from moving laterally across the face of the wheels. Since the point of attachment of the brake rod is closer to the center of rotation of the truck a radius bar and sheave are not required and the application of the brakes is as efficient on curves as on straight track.

By a simple modification of the rigging it can be adapted for providing a powerful hand brake entirely independent of the air brake. This is accomplished by increasing the length of the dead levers and connecting them at the top



Brake Rigging Applied to Brill Truck

with a top brake beam in exactly the same manner as the live levers. At each end of the car is mounted a long body brake lever pivoted near the center. The ends of these two levers are connected by rods under the sides of the car, and at diagonally opposite corners of the car one end of each body lever is connected to the hand brake shaft. On the same side of the pivot as the hand brake connection is fastened a rod connected to the center of the dead lever top brake beam. When the air brakes are applied the pull is toward the center of the car and the dead levers remain stationary against the transoms. When the hand brakes are applied the pull is toward the ends of the car and the live levers remain stationary. The hand brakes and the air brakes may be applied independently or simultaneously.

FUNICULAR ELECTRIC RAILWAY UNDER CONSTRUCTION NEAR DENVER

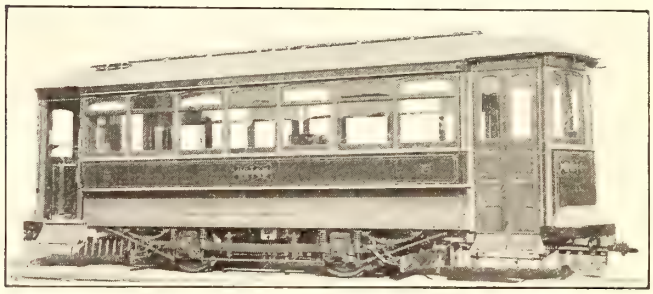
In connection with the development of Lookout Mountain Park, a new residential district and pleasure ground about 15 miles west of Denver, Col., a funicular railway to be operated by electricity is now under construction. The park is a tract of about 2500 acres lying above and south of the entrance of Clear Creek Cañon, behind the town of Golden. Its altitude is about 7400 ft., or about ½ mile higher than that of Denver, and it commands a view of the Continental Divide on the west and of the plains from Pike's Peak to Long's Peak on the south, east and north. The funicular railway begins about 1 mile from the center of Golden and in a length of 2600 ft. rises 1050 ft. The line is of the three-rail type, with a passing rail in the center, and two cars will be operated upon it. The maximum grade is 54 per cent for a distance of 300 ft., and the minimum grade is 36 per cent, this being the slope of the track at landings. The track is to be laid without horizontal curves, the rails being of 56-lb. T-section, and the track will be spiked to native ties laid 2 ft. apart on centers. At intervals of 100 ft. the track will be anchored with rods bolted to fishplates and set in concrete deadmen.

Electric power will be applied to the cars through a cable-hoisting equipment driven by a 112-hp, 2250-volt, three-phase, 60-cycle induction motor located at the top of the incline. The hoisting machinery will be provided with double-reduction gearing and will be mounted upon concrete foundations, the latter material also being used in the platforms of the stations. No belting will be used in the motor drive, and the principal drums will be two in number and each 6 ft. in diameter. Each car will seat seventy-two persons, and the two cars will be balanced sufficiently to act as mutual counterweights. The speed of hoisting will be about 300 ft. per minute, and the cars will be equipped with two 1¼-in. plow-steel cables, one of which is to be fitted with automatic grip and safety brake attachments. The cars are to be provided with grips on the outside rail, and carrying sheaves for the cable will be located at intervals of 100 ft.. The weight of each car loaded will be about 15 tons. An electric-bell system will be installed in connection with the starting and stopping of the machinery. Registers, gates and ticket offices will be provided at the landings, and it is estimated that the road can be operated by two engineers, two trackmen, two conductors and two gatemen. It is expected that the existing electric railway service between Denver and Golden will be extended to the foot of the incline and that commutation facilities will be inaugurated at the opening of the line in the spring of 1912, permitting the residents of the park to make the journey from their homes to the business center of Denver in about an hour.

The funicular railway is being built under the direction of Louis W. Vidler, civil engineer, the officers of the Lookout Mountain company being: President, Rees C. Vidler; general manager, L. F. Kimball; secretary and treasurer, W. W. Borst. It is expected that the opening of the railway will provide access to a community of mountain homes at present unrealized within practicable commutation distance of Denver. The company's headquarters are located at 620 Empire Building, Denver, Col.

SINGLE-TRUCK, ARCH-ROOF CARS FOR THE OKLAHOMA CITY TRACTION COMPANY

A rather interesting design of prepayment car is shown in the accompanying illustration of one of two cars recently delivered to the Oklahoma City Traction Company by the American Car Company, St. Louis. These cars are of the vestibule type, with flat arch roof, are 29 ft. 5 in. long over



Single-Truck, Arch-Roof Car for Oklahoma

all, and are mounted on Brill No. 21-E single trucks. The other dimensions of the cars are: Length of body, 20 ft.; width over the sills, 6 ft. 3 in.; width over all, 7 ft. 9 in.; height from rail to sills, 2 ft. 2⅝ in.; height of sill to trolley base, 8 ft. 10 15/16 in. The car body is built of wood with a semi-steel underframe, interior trim of cherry and headlining of three-ply birch veneer. Longitudinal rattan seats are used on both sides, but with a space opposite the third window on one side for a coal stove. The curtains are of pantasote and their fixtures were furnished by the Curtain Supply Company. The motor equipment of one car consists of two GE-80 motors and of the other car of two Westinghouse 92-A motors, both inside hung. The illustration shows the double folding door used on the exit side of the motorman's platform and the hinged covers for the step, the covers operating in unison with the doors.

AVIATION EXHIBITIONS FOR ELECTRIC RAILWAYS

The flights of C. C. Witner in a Curtiss hydro-aeroplane at the Atlantic City convention last week were witnessed with a great deal of interest by many electric railway managers and traffic officials who were present. David Daly, manager of the Houston (Tex.) Electric Company, was so impressed with the possibilities of such an exhibition as a means of creating traffic that he immediately entered into negotiations with the Curtiss Exhibition Company for an exhibition flight in Houston in November. During the past two weeks the Curtis Exhibition Company has contracted to give exhibition flights for the Indiana Union Traction Company at several towns along its lines, for the Salisbury & Spencer Railway, Salisbury, N. C., and for the Spartanburg Gas & Electric Company, Spartanburg, S. C.

That railway companies can profit largely by the general interest in aviation is shown by the remarkable success of the Long Island Railroad in promoting aviation meets on Long Island. The exhibitions at Belmont Park, Mineola and Garden City during the past year resulted in the railroad company carrying many thousands of people in addition to its regular traffic.

One of the reasons why aviation has not progressed more rapidly in this country is said to be the lack of suitable fields for giving exhibitions. Many of the larger cities throughout the country have had no exhibitions by aeroplanes because there was no suitable flying field in their vicinity. In several cities arrangements are being made to provide permanent aviation fields where experiments may be carried on and where flights may be made without danger to the aviators because of lack of room to maneuver their machines, thus forcing the aviators to make bad landings with resulting accidents. California is taking the lead in this matter and there is a serious effort being made on the part of the Aero Club of California to provide permanent aviation grounds not only to accommodate local exhibitions and local experimenters, but to serve also as stopping places on the great aerial highways of the future. Where there are no suitable fields for such purposes, but instead, a lake or river, the Curtiss hydro-aeroplane furnishes a fascinating spectacle for all those interested in aerial exhibitions and demonstrations of the utility of the aeroplane as a means of quick transportation in the future.

ELECTRIC LOCOMOTIVE FOR PORTLAND, GREY & LEWISTON RAILWAY

A Baldwin-Westinghouse electric locomotive was recently purchased by the Portland, Grey & Lewiston Railway Company. The locomotive is designated by the Baldwin Locomotive Works as one of Class 8-4/100, E-9. This classification indicates that there are eight wheels total and four motors per locomotive; E is a classification letter which denotes the number of driving axles; 100 stands for the horse-power of the motors, and the 9 means that it is the ninth locomotive built of its class.

Four No. 303-a Westinghouse motors with a gear ratio of 16:61 drive the locomotive and are controlled by an HL equipment. A feature of HL control that was one of the determining factors in its adoption for this service is the incorporation of a circuit-breaking device in the control equipment. The line-switch performs the functions of a circuit-breaker. The switch is controlled by a relay which operates whenever the current to the motors exceeds a predetermined value. There are several breaks in series and the arcing effect is distributed among them all, providing an effective breaking distance of several inches. This control has proved very satisfactory on a number of locomotives. The Portland, Grey & Lewiston locomotive is equipped with hand brakes and also with Westinghouse



New Electric Locomotive for Portland, Grey & Lewiston Railway

straight and automatic air brakes. It has a pilot at each end and switching steps and is equipped with M. C. B. automatic bumpers and couplers. The locomotive will be required to haul three trailers of five flat cars. The average number of cars to be handled in a train will be five, and the average weight of a loaded car will be 38 tons to 40 tons. The total length of the road is 35 miles.

The Selectmen of Brookline, Mass., have granted permission to the Boston Elevated Railway to use clean rock salt upon its ground rails, frogs and switches, and also upon rails on grades exceeding 2 per cent, during the coming winter, under such restrictions as the superintendent of streets may impose.

INTERURBAN CARS FOR THE NORTHERN TEXAS TRACTION COMPANY

The Northern Texas Traction Company, Ft. Worth, Tex., has lately received from the St. Louis Car Company four interurban motor cars of the design illustrated. The cars are single-end, straight-sided, vestibuled interurban motor passenger coaches, with the smoking compartment at the front end. A monitor ventilator roof (half-Empire type) with the regular steam coach type of hood is used, together with round-front inclosed vestibules at both ends and straight platforms with steam coach type of steps on each side of the rear and the right-hand side of the front platforms. These cars were designed for high-speed interurban service and are constructed for continuous operation at a speed of 60 m.p.h.

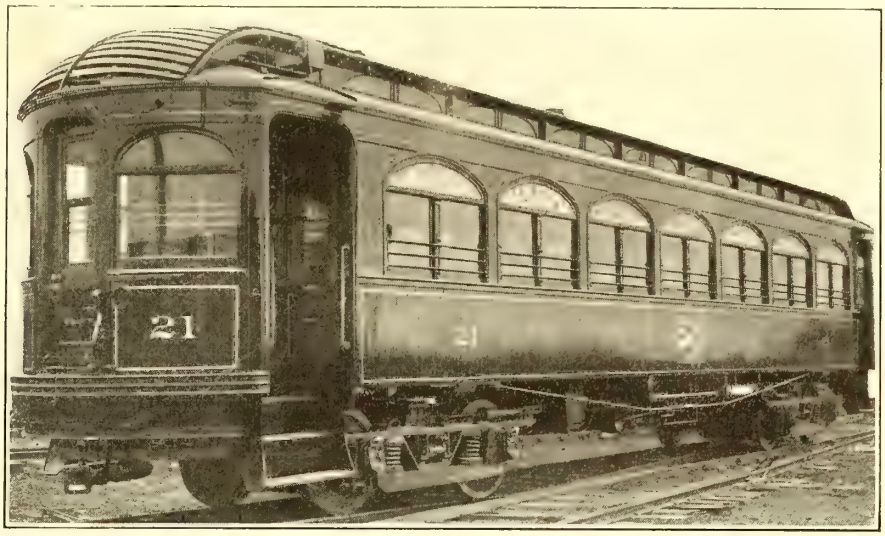
The general dimensions are as follows: Length of body over the end panels at the sills, 40 ft.; length of front platform over the dasher, 5 ft.; length of rear platform over the dasher, 6 ft.; length over the dashers, 51 ft.; over the bumpers, 52 ft. The smoking compartment seats twenty-four and the passenger compartment thirty. All seats are stationary.

There are six longitudinal sills the full length of the car without splices. The two side sills are 3½ in. x 7¾ in. in size, reinforced with 6-in. channels; inside filler of 2½ in. x 6-in. yellow pine. All intermediate sills are 4½ in. x 6 in. in size, reinforced from buffer to 3 ft. beyond the bolster and plated on one side with ⅜-in. x 6-in. steel plate. The center sills consist of 6-in. I-beams with a 2¼-in. by 6-in. pine filler on each side. The cross framing is of oak, tenoned into the side sill fillers, intermediate and center sill fillers. At each cross sill there are tie rods with turnbuckles in the centers. All cross framing wherever it comes against steel plates is fastened with angle iron. The end sills are of oak and are tenoned into longitudinal timbers, in the same manner as the cross sills, and are reinforced on the inside by "U"-irons. These "U"-irons are bolted to end sills and longitudinal timbers. The cars have a steel undertruss.



Interior of Ft. Worth Interurban Car.

The side of the car is framed for seven pairs of double Pullman style sashes per side. The oval top sash is stationary with sectional window sills, and the upper sash extends over the two lower. The windows are arranged to raise. All doors are of solid mahogany and glazed with plate glass. The interior finish is Honduras mahogany. The ceilings are semi-Empire 3/16-in. hard English agasote. The trimmings are of heavily oxidized solid bronze. There are win-



Exterior of Single-End Interurban Car for Ft. W orth, Tex.

dow guards at all side windows and end windows. The curtains are of green silk pantasote with Hartshorn rollers and Forsyth fixtures.

The platforms are a continuation of the bottom framing. The front steps are 25-in. lengths and the rear steps 36-in. The height from the top of the rail to the top of the tread of the first step is 17 in.; height from the top of the rail to the top of the second step, 29 in.; height from the top of the rail to the top of the third step, 40 in.; height from the top of the rail to the top of the platform floor, 51 in. The brake staff, which is on the front platform only, is provided with the St. Louis Car Company's 21-in. vertical bronze wheel. The drawbars are the Van Dorn type; the window fixtures, O. M. Edwards Company. Each end has a Hedley anti-telescoping buffer and a 12-in. rotary foot gong under each platform. Other equipment includes the No. 16 Wagenhals headlight, No. 5 Knutson retriever, Adams & Westlake oil signal lamps, and twenty-four Consolidated type 93 heaters per car.

The single, swing-door partition of the smoking compartment is placed back six windows from the front end of the car. Bronze guards and foot rests are provided in front of the seat next to this partition to prevent passengers from marring the interior finish. The saloon is located at the rear left-hand corner and occupies one window opening. Its door swings outward. This saloon is fitted with a Duner sanitary water closet. The flush tank is of mahogany lined with 1/16-in. copper and has a capacity for a run of 70 miles without refilling. There are thirteen heavy bronze parcel racks per car. The water cooler is of galvanized iron, nickel-plated.

All wire is placed in conduit and all switches are installed in transite-lined switch cabinets. A box for the motorman's tools is provided by utilizing the space under the removable top of a longitudinal corner seat.

An electric rack inclined railway has been placed in operation in Lago Maggiore, Italy. It rises from Stresa to the summit of Mottzrone at an altitude of 5000 feet.

News of Electric Railways

Progress Under Receivers in Kansas City

R. J. Dunham, who with Ford F. Harvey is receiver of the Metropolitan Street Railway, Kansas City, Mo., is quoted as follows in an interview in which he referred to the demands made by the city for increased service and the carrying out of certain improvements at this time:

"There is little I can say until after we hear from the court relative to the petition which has been filed by the city. I propose to do all in my power to maintain the system in its entirety so far as the finances and revenues at our command will allow. It is not within my province to dwell on the reports of a possible dismemberment of the system. We will try to avert such a thing, but we are confronted by conditions which may overwhelm us. To be receiver of a corporation that is financially embarrassed and hounded by demands that are both financial and physical impossibilities is a hard row to hoe. We want to do what is right by the public, and are bending every effort in that direction. Our policy is to do the square thing by Kansas City, and we will go to the limit. There is an end, however, to all things and we may have to seek quarter. The Metropolitan Street Railway has overreached its credit. It must be sustained by its present revenues, and it remains to be seen whether these will be ample to weather the financial storms. Personally I do not believe they will."

Frank Hagerman, counsel for the receivers of the company, is quoted as follows in regard to the plan of the commissioners of Wyandotte County and the drainage board to rebuild the James Street bridge, the elevated bridge, the Kansas Avenue bridge and the Argentine bridge, and require the Metropolitan Street Railway to pay one-half of the cost of these improvements:

"A law which makes such an arbitrary, unfair and unreasonable exaction is illegal, and the Metropolitan Street Railway could never be required to pay more than the court would say was its reasonable proportion, but if now legally required to pay one-half, or contract therefor, the receivers haven't the funds to expend for this purpose.

"The public authorities erroneously conceive, however, that without the consent of the court which appointed the receivers they can at their expense tear down the James Street bridge, which was built wholly with money supplied by the company, stop street car traffic, and after the reconstruction of the bridge keep the street railway off the structure until it pays one-half the cost.

"The receivers are acting for the court; the tracks cannot be disturbed nor the movement of the cars stopped for one moment except with the consent of the court or under such conditions as the court may prescribe. If the commissioners wish to build the bridge and take their chance of recovering one-half the costs from the street railway, there is no necessity of stopping any traffic; temporary parts of a structure can be from time to time provided for at the side of the work so cars can be kept moving at all times while the bridge is being constructed. The public need not for one moment be alarmed about the stoppage of street car traffic over the James Street bridge."

Cleveland Chamber of Commerce Approves Franchise Amendments

The Chamber of Commerce of Cleveland has approved the amendments to the Tayler franchise by the City Council, and the amendments will be voted upon at the fall election, although there were some departures from the recommendations made by that body originally. The committee on street railway franchises of the chamber had been at work on the matter for some time and there was some doubt as to whether or not the amendments would be approved. Among other things the report of the Chamber of Commerce says:

"We find that the amendments to the Tayler franchise, passed by the City Council in July, in the main, are in accord with recommendations made by your committee.

"While the committee disapproves of some departures from the recommendations submitted, it is unanimously of the opinion that under all the circumstances the ordinance should be approved at the referendum election to be held Nov. 7.

"The purposes sought to be accomplished by the amendments in a general way are:

"First—To vest power in the city to control expenditures for renewals and replacements.

"Second—To give the city the right to compel expenditures for necessary extensions and betterments until the franchise has less than fifteen years' duration.

"Third—To correct manifest and conceded errors in the ordinance in provisions relating to security of capital at the expiration of the grant. The only effect of this correction is to make the ordinance mean what the representatives of the city in the negotiations conducted before Judge Tayler have publicly stated it was originally intended to mean.

"If the amendments are approved at the referendum, the railway company will be compelled to expend immediately $2,500,000 for such extensions and betterments as the city may determine are most needed at this time. If the City Council shall decide, as we believe it will, that this expenditure should be made for the purchase of additional cars and to increase the capacity of the company's power plant, there should be available in the near future facilities which would tend to relieve greatly the present congestion."

The report is signed by the following members of the committee: F. H. Goff, chairman; D. C. Westenhaver, James R. Garfield, Warren S. Hayden, H. H. McKeehan, George B. Siddall, H. W. Stecher and Warren S. Stone.

Owing to the opposition which will be made to the amendments to the Tayler franchise at the election, a local paper has summarized the amendments and named those favorable to the city. The amendment which changes the price to be paid for the property by the city provides that the city shall pay the capital value at the end of twenty-five years, instead of the appraised value plus 10 per cent, as provided in the original grant. The changes supposed to favor the city follow:

"1. As soon as the amendments may be approved the company agrees to spend $2,500,000 on such improvements as the city shall designate. It probably would mean new cars and tracks and additional power.

"2. Under the original grant the company has the power only to initiate improvements. Under amendments the city has the right to initiate improvements so long as the franchise has fifteen or more years to run.

"3. Under the original grant the company has the sole right to determine how the maintenance fund shall be expended. The city controls the expenditure of maintenance money under the amendments.

"4. The amendments give the City Council the right to extend the city rate of fare to that part of Cleveland which was Collinwood."

Statement in Regard to Personnel of United Railroads of San Francisco

Patrick Calhoun, president of the United Railroads, San Francisco, Cal., has authorized the following statement in regard to the election of Mason B. Starring as president of the United Railways Investment Company, San Francisco, Cal., of which mention was made in the Electric Railway Journal of Oct. 14, 1911:

"The election of Mason B. Starring as president of the United Railways Investment Company in no way affects the policy or the personnel of the officials of the United Railroads of San Francisco. Nor does it affect in any way my interests in the company. Ernest Thalmann's resignation does not mean any change whatever in the control of the United Railways Investment Company, but is due solely to personal considerations entirely removed from the affairs of the United Railroads of San Francisco."

Mr. Calhoun has been elected chairman of the board of directors of the United Railways Investment Company. Thornwell Mullally, who has been assistant to President Calhoun, of the United Railroads, will, in the absence of Mr. Cahoun, continue as acting president.

Hearings on Boston & Eastern Railroad Locations in Lynn

Two public hearings on petition of the Boston & Eastern Railroad for location in Lynn, Mass., have been held in that city. At both meetings the representatives of the General Electric Company stated that the proposed route would prevent the company from making contemplated enlargements to the plant. Several citizens objected to the changes from subway to elevated structure that are called for by the plans for construction through Lynn. The road wishes to run its tracks through the eastern section of the city, at an elevation of 14 ft. above the street, entering a tunnel under High Rock, which would be 160 ft. beneath the summit of the hill. The plans call for an open cut and "semi-tunnel" through West Lynn, coming to the surface near the General Electric Company's works.

Edward B. Breed, instructor in mechanical drawing and descriptive geometry at the Massachusetts Institute of Technology, presented plans which he claimed would obviate some objections raised, and at the same time save money to the road. Mr. Breed would provide for a tunnel under Lynn Common, instead of a cut or semi-tunnel.

At a subsequent hearing a few days later Starr Parsons, counsel for the Bay State Street Railway, stated that that company intended to erect a large carhouse on property on Western Avenue, near the General Electric Company's works, but that if the route of the Boston & Eastern Railroad were granted as asked it would be unable to build as planned. Attorney Benjamin N. Johnson, for the General Electric Company, declared that his company was not opposed to the Boston & Eastern Railroad in any way, but did object to being hindered in developing its plant by having the road located on its land.

Improvements in Pittsburgh

A conference was held in Pittsburgh, Pa., on Oct. 12, 1911, in regard to proposed improvements by the Pittsburgh (Pa.) Railways, at which the officers of the company, Mayor William A. Magee and members of the Council were in attendance. Following the meeting it was announced that the plans of the company in detail would probably be made public in thirty days. J. D. Callery, president of the Pittsburgh Railways, and Patrick Calhoun, president of the United Railroads of San Francisco, were quoted after the meeting. Mr. Callery is reported to have said: "I can say that the outlook is exceedingly bright, not only from the standpoint of the city, but from our viewpoint as well. I think we arrived at a basis of understanding that will be satisfactory to everyone concerned. It will be impossible for me to announce definite plans at this time, however."

Strike on Trenton, Bristol & Philadelphia Street Railway

Practically all of the motormen, conductors, carhouse men, power house men and linemen of the Trenton, Bristol & Philadelphia Street Railway, Philadelphia, Pa., are involved in the strike of the employees of that company which was declared on Oct. 1, 1911. The men originally demanded an increase in wages of from 21 cents an hour to 25 cents an hour for conductors and motormen, 15 per cent advance for all other employees and recognition of the union, but after several conferences between committees of the men and officials of the company the men were convinced that the company was paying them all it could afford at the present time. The men received two increases in pay during the last two years, amounting in all to 2½ cents an hour. The men, however, insisted that the union should be recognized, but the company refused to accede to this demand. During the last two weeks the company has maintained the regular schedule during the daytime, but has made no attempt to operate at night on account of disorder in and near Bristol, Tullytown and Morrisville. The local authorities being unable to cope with the situation, three members of the State Police are patrolling a part of the line. On Oct. 16, 1911, the company replaced most of the strike breakers, who have been operating the cars, with local men, a number of whom are old employees who decided to return to work.

Municipal Ownership in Winnipeg Deferred.—The special committee of the City Council of Winnipeg, Man., to which the question of the purchase of the property of the Winnipeg Electric Railway by the city was referred, has decided that nothing further should be done in the matter at this time. As stated in the Electric Railway Journal of Sept. 30, 1911, page 546, wide difference of opinion existed in the Council over the terms of purchase of the property.

Validity of Oklahoma City Traction Company's Ordinance Sustained.—Through a typographical error in the item "Validity of Ordinance Granting Franchise Sustained," which appeared in the Electric Railway Journal of Oct. 14, 1911, page 885, it was stated that the Supreme Court of Oklahoma on Sept. 26, 1911, had sustained the franchise of the Oklahoma Railway. The name of the company should have been reported as the Oklahoma City Traction Company.

Railway Supply Manufacturers' Association.—A meeting of the executive committee of the Railway Supply Manufacturers' Association will be held at the Belmont Hotel, New York, N. Y., on Oct. 24, 1911, at 9 a.m. Upon the same date a joint meeting of the executive committees of the Master Car Builders' Association and American Master Mechanics' Association will be held at the same place. The joint committees will decide at that time the place for holding the 1912 convention of the two latter associations.

Des Moines Arbitrators Named.—In the Electric Railway Journal of Sept. 23, 1911, mention was made of the selection of N. T. Guernsey, of Guernsey, Parker & Miller, lawyers, to represent the Des Moines (Ia.) City Railway as a member of the board of arbitrators which is to consider the differences between the company and its employees, and the selection of A. L. Urick, president of the State Federation of Labor, to represent the men. The third member of the board is John A. Guiher, an attorney.

Geary Street Municipal Railway.—The temporary injunction granted on Sept. 12, 1910, by the United States Circuit Court in favor of the United Railroads of San Francisco, restraining the county and city of San Francisco from attempting to build an electric railway for seven blocks on Market Street between Embarcadero Street and Geary Street and for nine blocks along Point Lobos Avenue from Thirty-second Avenue to Cliff Avenue, has been dissolved by the United States Court of Appeals on the ground that the United States Court has no jurisdiction in the case.

Tunnel Being Considered in Providence.—Plans for a tunnel for street cars under Prospect Hill, in Providence, R. I., are being considered in that city and may come before the city government for action. The project is substantially the same as that proposed by a committee appointed to consider the matter in 1907. The plans call for a double-tracked tunnel 1800 ft. long, to extend from North Main Street to Thayer Street, where it is proposed to connect with the lines of the Rhode Island Company operating on Waterman and Angell Streets. The line of the bore follows that of Fores Alley, a lane owned by the city, but not maintained as a public highway. The commission believes that by pursuing that route little damage to property above ground will result. The estimated cost of the tunnel and changes in street approaches is $750,000.

PROGRAM OF ASSOCIATION MEETINGS

Meeting of Central Electric Traffic Association

The next regular meeting of the Central Electric Traffic Association will be held in Indianapolis, Ind., on Oct. 23, 24 and 25, 1911, for the transaction of routine business.

Meeting of New England Street Railway Club

The regular monthly meeting of the New England Street Railway Club will be held at the American House, Boston, on Oct. 26, 1911. Dinner will be served at 6.30 o'clock p. m. At 8 o'clock the regular business meeting will be held, after which J. H. Neal, general auditor of the Boston Elevated Railway and former president of the New England Street Railway Club, will address the club, speaking of the recent Boston Chamber of Commerce European tour.

Financial and Corporate

New York Stock and Money Markets

October 18, 1911.

United States Steel has been the center of a selling movement this week. Rumors of a government suit against the corporation were widespread on Tuesday, but a denial was made by the Attorney-General, who stated that no steps have been taken in the matter. In to-day's market Steel declined about 1¾ points. Trading in general has been irregular, largely professional, and in small volume. Advance in sterling rates took place early in the week. Quotations in the money market to-day were: Call, 2⅜@2½ per cent; ninety days, 3½@3¾ per cent.

Other Markets

The Philadelphia market was stronger to-day than it has been for some time, and general improvement in prices was made. Traction shares were prominent in the trading in Chicago to-day, and the Series 2 participation certificates of the Chicago Railways Company gained close to four points, reaching 30⅞.

Rumors that the Western Telephone Company is to be absorbed by the American Telephone & Telegraph Company were responsible for activity in these shares in Boston to-day. Trading in Western was heavy and an advance of over five points was gained by its preferred and common stock.

Prices were generally higher in the Baltimore market to-day.

Quotations of traction and manufacturing securities as compared with last week follow:

	Oct. 11.	Oct. 18.
American Light & Traction Company (common)	a303	a295
American Light & Traction Company (preferred)	a108	a106
American Railways Company	a44	a43½
Aurora, Elgin & Chicago Railroad (common)	*43	a42½
Aurora, Elgin & Chicago Railroad (preferred)	*87	a87
Boston Elevated Railway	a126	126
Boston Suburban Electric Companies (common)	a15	15
Boston Suburban Electric Companies (preferred)	a75	72
Boston & Worcester Electric Companies (common)	a12	12
Boston & Worcester Electric Companies (preferred)	a51	*51
Brooklyn Rapid Transit Company	74½	74⅝
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	84⅛	84⅞
Capital Traction Company, Washington	130½	a130
Chicago City Railway	a185	a180
Chicago & Oak Park Elevated Railroad (common)	3	3
Chicago & Oak Park Elevated Railroad (preferred)	6	6
Chicago Railways, ptcptg., ctf. 1	a95	91
Chicago Railways, ptcptg., ctf. 2	a28½	a31
Chicago Railways, ptcptg., ctf. 3	a10	a11
Chicago Railways, ptcptg., ctf. 4	6⅜	a7
Cincinnati Street Railway	a131	a131
Cleveland Railway	100	a99½
Columbus Railway (common)	83	83
Consolidated Traction of New Jersey	a75	a75
Consolidated Traction of N. J., 5 per cent bonds	a104	a104
Dayton Street Railway (common)	a25	a25
Dayton Street Railway (preferred)	a101	a101
Detroit United Railway	a73⅛	68
General Electric Company	150	151
Georgia Railway & Electric Company (common)	a162	a160
Georgia Railway & Electric Company (preferred)	a93	93
Interborough Metropolitan Company (common)	14⅞	14⅜
Interborough Metropolitan Company (preferred)	45	44
Interborough Metropolitan Company (4½s)	79	79½
Kansas City Railway & Light Company (common)	a17	a19
Kansas City Railway & Light Company (preferred)	45	a44
Manhattan Railway	a136	136
Massachusetts Electric Companies (common)	a19⅞	*19⅞
Massachusetts Electric Companies (preferred)	a93	*93
Metropolitan West Side, Chicago (common)	*27	27
Metropolitan West Side, Chicago (preferred)	*75	75
Metropolitan Street Railway, New York	*8	8
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	67½	a68
Northern Ohio Light & Traction Company	a55	a57
Northwestern Elevated Railroad (common)	30	*30
Northwestern Elevated Railroad (preferred)	70	*70
Philadelphia Company, Pittsburgh (common)	50	49¾
Philadelphia Company, Pittsburgh (preferred)	42¼	42
Philadelphia Rapid Transit Company	21½	23½
Philadelphia Traction Company	a83	83½
Public Service Corporation, 5% col. notes (1913)	*94	*94
Public Service Corporation, ctfs.	103½	103½
Seattle Electric Company (common)	a110	*110
Seattle Electric Company (preferred)	100	101
South Side Elevated Railroad (Chicago)	95½	a95⅞
Third Avenue Railroad, New York	9¼	9
Toledo Railway & Light Company	6½	*6½
Twin City Rapid Transit, Minneapolis (common)	*106½	*106½
Union Traction Company, Philadelphia	49½	51
United Ry. & Electric Company (Baltimore)	*18	*18
United Rys. Inv. Co. (common)	30½	33
United Rys. Inv. Co. (preferred)	55½	56
Washington Ry. & Electric Company (common)	a40	a41
Washington Ry. & Electric Company (preferred)	a89	a90
West End Street Railway, Boston (common)	86⅝	86
West End Street Railway, Boston (preferred)	a101	100½
Westinghouse Elec. & Mfg. Co.	61⅝	64¼
Westinghouse Elec. & Mfg. Co. (1st pref.)	a115	a120

a-Asked. *Last sale.

Property of the Erie-Cambridge-Union & Corry Traction Company for Sale

In order to close up an estate which holds a controlling interest, the entire property of the Erie-Cambridge-Union & Corry Traction Company has now been placed in the hands of H. C. Allen, vice-president, to dispose of at once. This property is said to be in shape to commence further building operations and a small cash outlay would be taken in payment, the balance to be accepted in bonds of the company.

The proposed line connects Erie, Pa., which has a population of 75,000, with Waterford, Mill Village, Miller's Station, Cambridge Springs, LeBœuf, Union City, Elgin and Corry, and is approximately 42 miles in length, 36 miles over private right-of-way, 22 miles already graded. The sum of $56,000 has already been expended upon the property and there is said to be no indebtedness against the company. There is an estimated population of 150,000 people located on and adjacent to the line.

Engineers' estimates, surveys, maps and detailed information can be had by communicating with H. C. Allen, vice-president, Erie, Pa., or by applying at the office of the company in Erie.

American Traction & Power Company, Indianapolis, Ind.—This company has been organized to finance, build and operate electric and steam railways in Kentucky and the Southern States. It is further stated that the company is a holding corporation to control the Kentucky Southwestern Railway, Light & Power Company, which proposes to build about 140 miles of line from Paducah, Ky., to Union City, Tenn. It will also control the Yazoo Valley Electric Railroad, Light & Power Company in Mississippi, which will build from Yazoo City to Canton. The officers of the company are: H. C. Brubaker, Indianapolis, president; E. F. Wheaton, Henderson, Ky., vice-president; G. E. Bruce, Indianapolis, Ind., secretary, and H. P. Dew, Blacksburg, S. C., treasurer.

Chicago & Milwaukee Electric Railroad, Chicago, Ill.—Judge Peter S. Grosscup in the United States Circuit Court at Chicago has fixed $200,000 as the maximum amount to be allowed the attorneys, trustees, and fees for counsel for former receivers of the Chicago & Milwaukee Electric Railroad. Altogether the court has been asked to allow about $235,000 in fees.

Bloomsburg, Millville & Northern Railway, Bloomsburg, Pa.—The Bloomsburg, Millville & Northern Railway has been incorporated in Pennsylvania with a capital stock of $250,000 to succeed the Bloomsburg & Millville Street Railway, the property of which was sold under foreclosure recently to D. O. Coughlin and Walter A. Hughes as a result of proceedings instituted by the Commonwealth Trust Company, Harrisburg, Pa. The authorized issue of bonds of the new company is $225,000.

Colorado Light & Power Company, Cañon City, Col.—H. M. Byllesby & Company, Chicago, Ill., who recently purchased the property of the Pueblo & Suburban Traction & Lighting Company, have acquired the property of the Colorado Light & Power Company.

Lehigh Valley Transit Company, Allentown, Pa.—The voting trust agreement of the Lehigh Valley Transit Company expired on Oct. 16, 1911, and Brown Brothers & Company, Philadelphia, Pa., as agents, are receiving the voting trust certificates for transfer for stock certificates.

Montreal (Que.) Street Railway—At a special meeting of the shareholders of the Montreal Street Railway on Oct. 4, 1911, the transfer of the company's property to the Montreal Tramways Company was approved. The Public Service Corporation, the Montreal Park & Island Railway and the Montreal Terminal Railway will also be included in the merger and transferred to the Montreal Tramways Company. The terms of the transfer provide that the shareholders of the Montreal Street Railway shall receive in exchange for each share of stock of the Montreal Street Railway $87.50 cash, $160 of 5 per cent debenture stock and $20 of common stock in the Montreal Tramways Company. An alternative proposition provided for the exchange of $250 of debenture stock and $20 of common stock for each share of stock of the Montreal Street Railway. E. A.

Robert, president of the company, announced at the meeting that $10,000,000 worth of debenture bonds bearing 5 per cent interest had been sold to N. W. Harris & Company, at 95 and interest, to take up the outstanding issue of stock.

Quebec Railway, Light & Power Company, Quebec, Que.—J. M. McConnell, Montreal, has resigned as a director of the Quebec Railway, Light & Power Company. Three residents of Paris are to be elected to the board of directors to represent the holdings of French investors.

St. Johns Light & Power Company, St. Augustine, Fla.—The property of the St. Johns Light & Power Company, which includes 10 miles of electric railway, has been sold under foreclosure to interests said to represent the Inter-City Securities Company.

United Railways & Electric Company, Baltimore, Md.—It is announced that the Safe Deposit & Trust Company, Baltimore, Md., will pay the following bonds of the United Railways & Electric Company and its subsidiaries: At maturity on Nov. 2, 1911, $2,000,000 of the first mortgage 5 per cent bonds of the Baltimore City Passenger Railway and $500,000 of 4½ per cent certificates of indebtedness of that company; $85,000 of Series B car trust certificates of the United Railways & Electric Company, and $35,000 of Series A car trust certificates of that company, which matured on Oct. 1, 1911.

Dividends Declared

Grand Rapids (Mich.) Railway, quarterly, 1¼ per cent, preferred.

Havana (Cuba) Electric Railway, quarterly, 1½ per cent, preferred; quarterly, 1½ per cent, common.

Montreal (Que.) Street Railway, quarterly, 2½ per cent.

Railways Company General, New York, N. Y., quarterly, 1 per cent.

MONTHLY ELECTRIC RAILWAY EARNINGS

BATON ROUGE ELECTRIC COMPANY.

Period.			Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1m.,	Aug.,	'11	$9,997	$6,132	$3,864	$2,042	$1,823
1 "	"	'10	9,155	5,855	3,300	1,945	1,355
12 "	"	'11	114,876	70,807	44,069	23,900	20,169
12 "	"	'10	108,202	69,974	38,228	22,893	15,335

BROCKTON & PLYMOUTH STREET RAILWAY.

1m.,	Aug.,	'11	$14,872	$8,334	$6,577	$1,474	$5,063
1 "	"	'10	16,057	7,458	8,598	1,602	6,997
12 "	"	'11	119,060	84,939	34,121	18,494	15,627
12 "	"	'10	121,870	87,016	34,853	21,038	13,815

BROOKLYN RAPID TRANSIT SYSTEM.

1m.,	June,	'11	$2,045,385	*$1,280,425	$764,959	.....	.....

CENTRAL PARK NORTH AND EAST RIVER RAILROAD

1m.,	June,	'11	$57,747	*$62,674	†$4,927	.....	.....

CONEY ISLAND & BROOKLYN RAILROAD.

1m.,	June,	'11	$154,490	*$123,943	$30,548	.....	.....

EL PASO ELECTRIC COMPANY.

1m.,	Aug.,	'11	$50,588	$30,428	$20,160	$8,342	$11,817
1 "	"	'10	46,897	30,730	16,167	8,215	7,952
12 "	"	'11	671,628	387,092	284,536	98,516	186,020
12 "	"	'10	630,070	363,810	266,260	101,256	165,004

GALVESTON ELECTRIC COMPANY.

1m.,	Aug.,	'11	$50,896	$21,681	$29,215	$8,706	$20,509
1 "	"	'10	45,667	19,724	25,943	8,026	17,917
12 "	"	'11	419,440	223,748	195,692	100,876	94,816
12 "	"	'10	367,852	230,745	137,107	82,149	54,958

HUDSON & MANHATTAN RAILROAD.

1m.,	June,	'11	$237,921	*$108,038	$129,883	.....	.....

INTERBOROUGH RAPID TRANSIT COMPANY.

1m.,	June,	'11	$2,363,079	*$1,231,835	$1,131,245	.....	.....

METROPOLITAN STREET RAILWAY, NEW YORK.

1m.,	June,	'11	$1,169,283	*$867,574	$301,708	.....	.....

NEW YORK & QUEENS COUNTY RAILWAY.

1m.,	June,	'11	$118,956	*$91,799	$27,157	.....	.....

THIRD AVENUE RAILROAD, NEW YORK.

1m.,	June,	'11	$321,829	*$167,512	$144,317	.....	.....

UNION RAILWAY, NEW YORK.

1m.,	June,	'11	$282,126	*$176,882	$105,241	.....	.....

WHATCOM COUNTY RAILWAY & LIGHT COMPANY.

1m.,	Aug.,	'11	$34,161	$16,151	$18,010	$11,000	$7,010
1 "	"	'10	32,470	21,065	11,405	8,905	2,501
12 "	"	'11	426,620	208,518	218,102	126,804	91,298
12 "	"	'10	412,022	242,330	169,692	103,200	66,492

*Includes taxes. †Defiicit.

Traffic and Transportation

How the Puget Sound Electric Railway Will Meet the Recent Fare Decision

The Puget Sound Electric Railway, operating between Seattle and Tacoma, Wash., has addressed to the public over the signature of R. T. Laffin, vice-president, the following statement regarding the policy it will pursue to meet the decision of the Supreme Court of Washington affirming the order regarding fares entered by the State Railroad Commission, and noted in the ELECTRIC RAILWAY JOURNAL of Sept. 30, 1911, page 549:

"The Railroad Commission and the Supreme Court of Washington have estimated that the Puget Sound Electric Railway will receive a 7 per cent annual return on the value of its property from the rates ordered by the commission to be established by the company. The company believes that the commission and the Supreme Court are mistaken in their estimates. It knows that the taxes which it had to pay upon its property exceeded by 100 per cent the amount estimated by the commission. It knows that its through business from Seattle to Tacoma has not reached the estimate of the commission and the court. Knowing these things, it fears that estimates which have proved erroneous in the past may likewise prove erroneous in the future.

"The company, by reason of the low rates which it first established, was unable to obtain a fair return upon its investment. This, and that the company was justified in raising its rates, the commission and the court found to be facts. The company raised its rate to a uniform rate of 2 cents a mile, with a commutation rate of 1.4 cents a mile The commission and the court hold that 2 cents a mile is a reasonable rate where water competition exists, but in the suburbs of Seattle the company can be required to carry for as little as 0.76 cents a mile.

"The company fears that this decision, if adhered to, will prove disastrous to it and to the State. It is confident that neither the commission nor the court wishes to cripple it or to retard the building of interurban railways in Washington. Acting under this belief, the company will not petition for a rehearing. It will not, at the present time, sue out a writ of error from the Supreme Court of the United States, nor apply for a stay, nor at the present time will it seek in the federal court to enjoin the carrying out of the order of the commission. On the contrary, when the decree of the Supreme Court of the State shall have been rendered, it will, under protest, comply with the order of the commission. It will give the rates ordered a fair trial, and if the trial proves that the estimates of the commission and the court were wrong and the company injured thereby, it will look with confidence to the commission of its own motion to change its order, as it has the power to do, and thereby right the wrong which it has unintentionally inflicted.

"If, however, in such case the commission offers no relief, then the company will seek the protection of the courts to prevent the confiscation of its property, and believes that in so doing it will be sustained not only in the courts, but also in the opinion of all fair-minded persons."

Letter on Courtesy Addressed to Brooklyn Employees

The following letter signed by J. F. Calderwood, vice-president and general manager of the Brooklyn (N. Y.) Rapid Transit Company, has been distributed among the conductors, motormen and other employees of the transportation department, each letter being inclosed in a separate envelope and addressed to the employee in person:

"The management desires to express its appreciation of your fidelity and the increasing spirit of co-operation, always a potent factor in the successful handling of the patrons of this company. We must not, however, overlook the fact that the details of carrying passengers on our cars are necessarily complex and must be carefully observed. Obedience and the enforcement of regulations, honesty and frankness, alertness, and especially courtesy, are but some of the requirements of the individual employee to whose

care the traveling public is intrusted, and to the matter of courtesy we wish especially to refer.

"We must remember that we are all specially trained in a business with which the public is only acquainted from the viewpoint of a passenger. Many things in connection with our duties are simple to us because they are part of our daily routine, and when we are asked a question we should not assume that the public understands it as well as we do, but we should answer it courteously.

"There are always two sides to every question and to err is human, but if you are called upon to enforce a rule, do it in a quiet, dignified and courteous manner and always avoid argument; comply, whenever possible, with reasonable requests that affect the comfort and convenience of the passenger; and if you are unable to meet the condition or satisfy the passenger politely refer him to the office of the general manager, where all such matters are acknowledged and carefully investigated.

"Courtesy is something that the public and our passengers have a right to expect from employees of this company; courtesy always pays a dividend—pays you and pays the company; it pays you because it makes you friends; it pays the company because it is judged by the conduct of its employees; and it always reflects to your credit.

"The company wants its employees to be friends with the public; it wants to be friends with the public itself, and it is through courteous consideration of the patrons of the company and of the public that this can, in a large measure, be accomplished."

Car Ticket Order in St. Joseph, Mo.—The St. Joseph Railway, Light, Heat & Power Company recently issued an order to conductors to refuse all tickets detached from ticket books so as to put a stop to the practice of newsboys selling tickets with papers.

Traffic on Chicago Elevated Line Suspended Temporarily.—Traffic on the Metropolitan West Side Elevated Railway, Chicago, Ill., had to be suspended for several hours on Oct. 9, 1911, on account of an accident in the boiler room of the company's power plant in Loomis Street.

Los Angeles-Pacific Company Appeals Fare Case.—An appeal has been taken to the Superior Court by the Los Angeles-Pacific Company, Los Angeles, Cal., from the decision of Justice of the Peace Young, holding 5 cents to be the legal fare between Los Angeles and Colegrove.

Reduction in Fare Asked in Lincoln, Neb.—The Public Service League of Lincoln, Neb., has petitioned the Nebraska State Railway Commission to enter an order to require the Lincoln Traction Company to charge not more than 3 cents for a ride of 3 miles or less from the center of the business district of Lincoln.

Accident Prevention Campaign of Indiana Union Traction Company—Letters from the Indiana Union Traaction Company, Indianapolis, Ind., calling attention to the proper manner in which to alight from street and interurban cars and the danger of crossing the tracks were read on Oct. 2, 1911, in all the schools along the lines of the company.

Reduction in Fare Between Albany and Glens Falls, N. Y.—The joint one-way fare in both directions between Albany and Glens Falls on the Hudson Valley Railway has been reduced from $1.05 to $1. The reduction went into effect on Oct. 1, 1911, by special permission of the Public Service Commission of the Second District of New York.

Winter Schedule of Detroit, Monroe & Toledo Short Line.—The Detroit, Monroe & Toledo Short Line Railway, Detroit, Mich., placed a fourteen-car service in effect on Oct. 10, 1911. Seven limited cars a day make the run from Detroit to Toledo with one stop at Monroe in two hours. Seven express trains a day make the run in two hours fifteen minutes and stop at all the towns along the way.

Reduction in Fare on Bay State Street Railway—The Bay State Street Railway, Boston, Mass., has granted a 5-cent fare between East Bridgewater and Brockton, Mass., between the hours of 6 a. m. and 8 a. m. and 4:30 p. m. and 6:30 p. m. At other times the rate will be 10 cents, which has been the regular rate for all hours hitherto. Citizens of East Bridgewater who are employed in Brockton asked for the special rate.

Complaint Against Ogdensburg Street Railway Closed.—The Public Service Commission of the Second District of New York has closed upon its records the complaint of the employees of the St. Lawrence State Hospital at Ogdensburg, directed against the Ogdensburg (N. Y.) Street Railway, as to service rendered the public. Since the filing of the complaint the company has agreed with a committee of employees that the troubles complained of will be corrected without the necessity of further action by the commission.

Denver Association Considering Loans to Members.—The officers of the Tramway Mutual Aid Association, composed of employees of the Denver (Col.) City Tramway, have under consideration a plan whereby small loans will be made to members who are deserving and in need of funds on account of sickness or some other circumstances over which they have no control. In this way it is hoped to discourage the practice of the men in arranging loans from professional money lenders who charge usurious rates.

Separate Compartments for Motormen in Indiana.—The officers of the Ohio Electric Railway have agreed to provide separate compartments for motormen on the cars which it operates in Indiana, without a formal order from the Railroad Commission. This completes the preliminary work of the Indiana Commission in ordering the construction of such compartments. William J. Wood, chairman of the commission, says that all interurban cars in Indiana will have separate compartments for motormen by July 1, 1912.

Request Made for Shelter Houses.—Citizens of Throop and Mentz, Cayuga County, have asked the Public Service Commission of the Second District of New York to require the Auburn & Northern Electric Railroad to re-establish shelter houses for the accommodation of its patrons at Stops 1 and 3 on its line. The petition alleges that in December, 1910, the shelter house at Stop 3 was destroyed by fire, that in August, 1911, the shelter house at Stop 1 was destroyed by fire and that the company has neglected to consider favorably the re-establishment of the shelter houses, much to the inconvenience of the patrons of the road. The application states that the demand for shelter houses at these points is greater now than it was when the road was first established by reason of increased travel.

Decision by Ontario Railway & Municipal Board.—The Ontario Railway & Municipal Board has rendered judgment in favor of the company in the matter of new switches and switch extensions on the Metropolitan line of the Toronto & York Radial Railway. The application had been made in pursuance of the board's former order to establish a 5-minute service between North Toronto and Glen Grove. The company's plan of switches and turnouts necessary to enable the line to give the 5-minute service ordered was shown by the evidence and by the report of the board's engineeers to be satisfactory, and, accordingly, it has received the approval of the board. The board, however, has made an alternative recommendation, to the effect that the parties endeavor to agree upon the double-tracking of the road.

New York Association to Safeguard Children.—The Street Railway Association of the State of New York is perfecting plans to educate children to the danger of accidents that they risk each hour. With the co-operation of teachers and parents, personal talks, pamphlets of warning and danger signs are to be presented in schoolroom, home and playground. Beginning with the mothers and fathers technical data showing the margin of safety about all kinds of cars and tracks are to be distributed. On blotters and other attractive souvenirs prepared for the youngsters there have been printed such maxims as "Don't hitch to a car," "Don't touch loose wires," "Don't play on tracks," "Don't jump off until the car stops," "Don't cross tracks till you look." Recent reports of the Public Service Commissions of the First and Second Districts show that accident damages have cost the street railways of New York State almost $5,000,000 in one year.

Effect of Increase in Fare on Hartford & Springfield Street Railway.—H. S. Newton, general manager of the Hartford & Springfield Street Railway, Warehouse Point, Conn., has addressed a long letter to the stockholders of the

company, reviewing the operation of the company for the year ended June 30, 1911, in which he refers in part as follows to the 6-cent fare zones adopted by the company two years ago: "The second year's experience with the 6-cent fare enables me to state positively that the inauguration of this fare has resulted in increased revenue to the road and a very satisfactory acceptance of conditions by the public itself. There are no longer protests by our patrons." Mr. Newton also offers the following explanation of the decrease in return from the park property of the company: "I regret to say that the returns in the park property this season show a falling off from last year. As the same report comes from other similar properties throughout New England, I am inclined to conclude that people are looking for other lines of amusement and are not simply tired of the particular attractions which your company's park has to offer. The falling off in returns is accounted for no doubt by the popularity of the moving-picture shows, examples of which may be found in Thompsonville and Rockville all the year round, and Windsor Locks, Thompsonville and Rockville during the fall, winter and spring."

Politeness and Courtesy in Seattle.—In commenting editorially on the letter received by the Seattle (Wash.) Electric Company from Lieutenant-Colonel Penrose, stationed at Ft. Lawton, in the suburbs of Seattle, informing the company "of the universal politeness and courtesy I have always received and observed in your conductors and motormen on the Ft. Lawton branch," the Seattle *Post-Intelligencer* said in part: "Politeness and courtesy are found almost universally among the street car men of Seattle—a fact which strangers are prone to comment upon. Of course, street car men have the weaknesses of other men. When treated with boorish rudeness they are apt to resent it, although riders on the street cars have noticed instances of rare self-restraint among the trainmen, even under such circumstances. There are, of course, some exceptions to the rule of courtesy, but it is the rule for all that. Few public servants, brought into such intimate daily contact with the public, behave themselves as well, on the whole, as do the Seattle street car men, and habitual users of the lines, which means the majority of the people of the city, witness daily instances of thoughtful kindness on their part, especially to women, to the aged and infirm. It may be considered a small thing, but it is one of the things which are of value to the city in more ways than one. The courtesy of our street car men is one thing which gives visitors here a kindly recollection of the city and inclines them to speak good words for it when they leave."

Club Rooms for Employees in Los Angeles.—Plans have been completed by the Pacific Electric Railway, Los Angeles, Cal., for converting the brick building at Seventh Street and Central Avenue, Los Angeles, having outside dimensions of approximately 100 ft. x 30 ft., into quarters for the employees to be equipped and maintained at the expense of the company. On the second floor of the building will be a reading room provided with magazines, books and current papers. There will also be a large room equipped with billiard tables and other devices for entertainment and diversion. Individual lockers will be provided for the use of the members. One of the features will be a "demonstration" room, where a model signal system, air-brake and various electrical devices will be installed to enable the men to perfect themselves in the use of this equipment. The company also expects to serve sandwiches, coffee and other refreshments, and there is to be a gymnasium and a system of shower baths. Paul Shoup, vice-president of the company, is quoted as follows: "We have had this plan under consideration for some time, but have only recently determined on the details. We propose to provide a comfortable, homelike place along club lines, with gymnasium, reading room, instruction room, places for games, bath, buffet, etc., in order that our employees may have a place they can call their own for recreation and study. Most of our employees in the course of their business congregate at the location which has been chosen, and we are fortunate in having at that point a brick building particularly adapted to club room purposes. We expect to have demonstration lectures and entertainments; in short, to make the building an all-around meeting place for our men."

Personal Mention

Mr. J. L. Sullivan has been appointed general freight and passenger agent of the Ft. Dodge, Des Moines & Southern Railroad, Boone, Ia.

Mr. Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company, New York, N. Y., has been nominated for president of the New York Railroad Club.

Mr. John F. Lambert has been appointed superintendent of the Ware & Brookfield Street Railway, Ware, Mass., to succeed Mr. D. E. Pepin, whose resignation was announced in the Electric Railway Journal of Oct. 7, 1911.

Mr. W. G. Parker has resigned as electrical engineer and superintendent of track of the Lewiston, Augusta & Waterville Street Railway, Lewiston, Maine, to become connected with the Dover & Foxcroft Light & Heat Company, Dover, Maine.

Mr. George W. Dunlap, engineer of power stations of the Worcester (Mass.) Consolidated Street Railway, has been appointed electrical engineer of the Public Service Commission of the First District of New York, in charge of the bureau of transit inspection under Mr. E. G. Connette, chief of the transportation department of the commission.

Mr. George W. Adamson has been appointed master mechanic of the Albany Southern Railroad, Albany, N. Y. Before becoming connected with the Albany Southern Railroad Mr. Adamson was with the Interborough Rapid Transit Company, New York, N. Y., for eighteen months. Previously Mr. Adamson was superintendent of rolling stock and shops of the Bombay (India) Tramways for three years and was with the London (England) County Council Tramways for two years. He was also connected with British electrical manufacturing concerns for several years.

Mr. Thomas Pumfrey has resigned as engineer of maintenance of way of the Portland Railway, Light & Power Company, Portland, Ore., to accept an interest in a railway contracting firm which is now engaged in constructing a section of the railway being built by the Harriman interests. Before severing his connection with the Portland Railway, Light & Power Company, Mr. Pumfrey was presented with a gold watch by his associates. Mr. Pumfrey was formerly engineer of way of the International Traction Company, Buffalo, N. Y., with which company he was connected for fourteen years.

Mr. John Sutherland has been appointed master mechanic of the Tri-City Railway & Light Company, Davenport, Ia., of which J. G. White & Company, Inc., New York, N. Y., are operating managers, to succeed Mr. Jacob W. Gerke, whose appointment as master mechanic of the Wilmington & Philadelphia Traction Company and the Southern Pennsylvania Traction Company was noted in the Electric Railway Journal of July 1, 1911. Mr. Sutherland has recently been connected with the Interborough Rapid Transit Company, New York, N. Y., under Mr. J. S. Doyle, superintendent of car equipment of that company. Mr. Sutherland is Scotch by birth, and about twelve years ago was connected with J. G. White & Company, London, Eng., in work which they did in Great Britain. Later he was connected with the Westinghouse Electric & Manufacturing Company in the United States.

Mr. Sidney O. Swenson, recently assistant electrical engineer of the Detroit River Terminal electrification, was appointed electrical engineer of the Kansas City Railway Terminal Company on Oct. 1, 1911. He was graduated from the University of Illinois in 1899. After a short business connection with the electrical department of the Illinois Steel Company, he became associated with the Commonwealth Edison Company, Chicago, Ill., where he remained from February, 1900, to May, 1905. He then joined the engineering department of the New York Central & Hudson River Railroad with which his work consisted principally in installing and testing the electrical equipment at the Yonkers power station and the High Bridge terminal. In September, 1907, Mr. Swenson became assistant electrical engineer of the Detroit River Tunnel electrification and remained on that work until July, 1911, when the instal-

lation was completed. Mr. Swenson is a brother of Mr. Bernard V. Swenson, formerly secretary of the American Electric Railway Association.

Mr. Charles S. Johann, chief engineer of the Lewisburg, Milton & Watsontown Passenger Railway, Milton, Pa., and sales engineer of the Allis-Chalmers Company, has resigned from the latter company to become secretary and general manager of the Morris & Somerset Electric Company, with headquarters at Morristown, N. J. Mr. Johann pursued the apprentice course at the shops of the Westinghouse Electric & Manufacturing Company at East Pittsburgh, and served in both the engineering and sales departments of that company. He was also connected with the American Railways as general superintendent at Springfield, Ohio, and designed and supervised the construction of a power house for the Springfield Light, Heat & Power Company. Later he was manager of the Baltimore office of the Westinghouse Machine Company. Mr. Johann was also connected with Dodge & Day, Philadelphia, and with E. W. Clark & Company, Philadelphia, bankers, and enlarged and rebuilt the plant of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo.

Mr. C. D. Crooks, traffic manager of the Ft. Dodge, Des Moines & Southern Railroad, Boone, Ia., since March 1911, was appointed general manager of the company on Oct. 15, 1911. Mr. Crooks was born in Iowa in July, 1874. He entered railway work in 1893 as a ticket agent for the Des Moines Union Railway, Des Moines, Ia. From 1895 to 1898 he was agent of the Des Moines, Northern & Western Railway at Fonda, Ia., and from 1898 to 1901 was agent of the Chicago, Milwaukee & St. Paul Railway at Boone, Ia. Mr. Crooks was next appointed chief clerk to the division freight agent of the Chicago, Milwaukee & St. Paul Railway at Des Moines, Ia., and served in this capacity from 1901 to 1904. He resigned from the Chicago, Milwaukee & St. Paul Railway to become chief clerk to the division freight agent of the Chicago, Rock Island & Pacific Railway at Des Moines, a position he held during 1905 and 1906. In 1907, Mr. Crooks became commercial agent of the Chicago, Rock Island & Pacific Railway at Des Moines, but resigned from this company after a short term of service to become general freight and passenger agent of the Ft. Dodge, Des Moines & Southern Railroad at Boone, Ia. He continued as general freight and passenger agent of the Ft. Dodge, Des Moines & Southern Railroad until March 1, 1911, when he was appointed traffic manager.

OBITUARY

Daniel B. Hasbrouck, who has been president of the Metropolitan Street Railway, New York, since 1903, died at his home in Brooklyn on Oct. 11. Mr. Hasbrouck at the time of his death was probably the oldest street railway official in the country. He was born Jan. 30, 1819, in Onondaga County, N. Y., but moved to New York City at an early age. He had a mercantile training, but in 1857, at the time of the establishment of the Metropolitan Police District in New York, he was appointed to a responsible position in that organization. He remained with it until 1878. In 1862 he was largely instrumental in the organization of six regiments of militia among the police force of New York City. He resigned from the Metropolitan Police organization in 1878 to become secretary and treasurer of the Houston Street, West Street & Pavonia Ferry Railway. He remained with this company until it became one of the original constituent companies of the Metropolitan Street Railway, in 1893, and soon after that amalgamation Mr. Hasbrouck was elected vice-president of the Metropolitan Street Railway. This position he retained until his elevation to the office of president of the Metropolitan Street Railway Company, which occurred soon after the lease of that company to the Interurban Street Railway Company in 1903. He also held other offices in the Metropolitan organization. Up to within a few months, and for some time after passing his ninety-first birthday, Mr. Hasbrouck was in daily attendance at the office of the company at 621 Broadway, and actively engaged in the work of the company. Mr. Hasbrouck was president of the Street Railway Association of the State of New York in 1893-94, and twice served as first vice-president of that association.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

Mobile (Ala.) Interurban Railway.—Incorporated in Alabama to build a 2-mile railway from the terminus of the Spring Hill line of the Mobile Light & Railway Company, Mobile, to Pinehurst. The company will operate gasoline motor cars. Capital stock, authorized, $25,000. Officers: P. C. Meechem, president, and C. V. Shoub, vice-president. [E. R. J., Oct. 7, '11.]

Redlands University Railway, Redlands, Cal.—Application for a charter has been made in California by this company to build a 2-mile electric railway from Redlands to the Redlands University. Capital stock, authorized, $15,000. Directors: G. S. Turrell and F. A. Moore, Redlands, and J. W. Curtis, San Bernardino. [E. R. J., Oct. 7, '11.]

Creston-Winterset Interurban Railway, Creston, Ia.—Chartered in Iowa to build a 60-mile electric railway between Creston, Des Moines, Spaulding and Macksburg. Capital stock, $500,000. R. Brown, Creston, president; C. E. Wilson, vice-president; A. S. Lynn, Orient, secretary, and W. W. Walker, Macksburg, treasurer. [E. R. J., June 3, '11.]

Red Oak & Northwestern Railway, Red Oak, Ia.—Incorporated in Arizona to build an electric railway between Red Oak and Des Moines. Capital stock, issued, $150,000. Officers: George C. Boleau, Red Oak, president, and H. W. Clovis, Red Oak, secretary. Headquarters, Red Oak. [E. R. J., May 21, '11.]

***Michigan-Indiana Traction Company, Lansing, Mich.**—Incorporated in Michigan to build an electric railway to connect Coldwater and Battle Creek, via Athens and Union City. Capital stock, authorized, $750,000. Incorporators: P. M. Dunn, Chicago, Ill., and Walter Powers, Battle Creek.

***Columbia & Northern Electric Railway, Columbia, Mo.**—Application for a charter has been made in Missouri by this company to succeed the North Missouri Central Railway, Mexico, and to build an electric railway to connect Columbia, Jefferson City and Mexico. Another line will be built from Columbia to Moberly. From Hersford a branch will be built to Fulton. Incorporators: A. J. Estes and M. G. Quinn, Columbia; E. M. Stevens, East St. Louis, Ill.; W. A. Van Diver, C. Porter Johnson and Julius Koch, St. Louis.

FRANCHISES

Los Angeles, Cal.—The Pacific Electric Railway has asked the Board of Public Utilities for permission to electrify the old Santa Monica steam road and use it for passenger and freight service.

***Pasadena, Cal.**—J. W. Goodwin, president of the Nazarene University Park Company, and others have asked the City Council for a franchise to build an electric railway in Pasadena, from Lake Avenue to the city limits, on Washington Street.

San José, Cal.—C. P. Anderson, San José, has asked the Board of Supervisors of the county of Santa Clara for a franchise to construct a single or double-track railway in the county, to be operated by electricity or gasoline. [E. R. J., Oct. 7, '11.]

Hartford, Conn.—The Connecticut Company has asked the Council for a franchise to double-track its lines in Hartford on Prospect Avenue, from Farmington Avenue to Asylum Avenue.

Gary, Ind.—The Indianapolis, Chicago & Meriden Railway, Indianapolis, has received a 50-year franchise from the Board of Public Works on Seventeenth Avenue, in Gary. The line will connect Indianapolis, Sheridan, Gary, Hammond, Monticello and Warsaw. M. J. Mooreland, secretary. [E. R. J., Oct. 7, '11.]

Topeka, Kan.—The Union Traction Company, Coffeyville, has received permission from the Public Utilities Commission to build an extension from Cherryville to Parsons.

New Iberia, La.—The Southwestern Traction & Power Company, New Orleans, has received a franchise from the City Council in New Iberia.

*West Baltimore, Md.—J. S. J. Healy, West Baltimore, and associates have asked the City Council for a franchise to build an electric railway in West Baltimore.

Boston, Mass.—The Boston & Eastern Electric Railroad has received a franchise from the City Council for the location of its tracks in Boston.

Springfield, Mass.—The Berkshire Street Railway, Pittsfield, has received a franchise from the Aldermen in Springfield.

Manchester, N. H.—The Manchester Street Railway has received a franchise from the Mayor and Aldermen to relocate and double-track some of its lines in Manchester.

*Canton, Ohio.—J. W. Whitacre and others are planning an interurban line between Canton and Carrollton, via Waynesburg and other smaller towns.

Cincinnati, Ohio.—An ordinance has been introduced in the City Council, giving the Cincinnati Traction Company authority to extend its Avondale line to the railroad crossing at Bond Hill.

Tiffin, Ohio.—C. C. Anderson and associates have obtained a right-of-way from Tiffin to Fremont for an electric railway. They have asked the Councils for franchises in Fremont and in Tiffin. [E. R. J., Sept. 23, '11.]

*Parkrose, Ore.—The Parkrose Association has received a franchise from the County Commissioners to build a 1-mile line from the city limits of Portland along Sandy Road. The County Commissioners have been asked for a franchise to extend this proposed line to Troutdale, a distance of about 9 miles. About 3 miles of right-of-way have been obtained. The investment company proposes to operate only outside of the city limits of Portland, connecting at the boundary with the Rose City Park line of the Portland Railway, Light & Power Company, which will soon be extended to the city limits. The contract to build the line along Sandy Road has been awarded. Bryon Reynolds and C. Powell are interested.

Spartanburg, S. C.—The Greenville, Spartanburg & Anderson Railway, Anderson, has received a railway franchise from the City Council in Spartanburg.

Knoxville, Tenn.—The Knoxville Railway & Light Company has received a franchise from the City Council for the extension of its Sevierville Pike line to the New Island Home Park suburb. The franchise also grants the right-of-way to double-track the present Sevierville line.

Ft. Worth, Tex.—The Northern Texas Traction Company has received a franchise from the City Council to extend its line through the southeastern section of Polytechnic Heights.

TRACK AND ROADWAY

Mobile (Ala.) West Shore Traction Company.—This company will increase its capital stock from $10,000 to $100,000. Surveys will be begun at once on its line between Mobile and Scranton. [E. R. J., Sept. 16, '11.]

Arkansas Valley Interurban Railway, Little Rock, Ark.—Surveys are being made by this company between Winfield and Wichita. It is reported that a line will be built from Wichita to Oklahoma City. A. O. Boyle, Wichita, general manager. [E. R. J., Aug. 5, '11.]

San Joaquin Light & Power Company, Bakersfield, Cal.—Work has been begun on the reconstruction of this company's lines in Bakersfield.

Monterey & Del Monte Heights Electric Railway, Monterey, Cal.—The necessary capital has been secured by this company and the line will be completed at once. It extends from the end of Broadway in Del Monte Heights to the city limits, a distance of 3 miles. Orders have been placed for the necessary material and a reorganization of the company has been effected. George W. Phelps, secretary.

Oakland (Cal.) Traction Company.—The construction of an extension of the Oakland Avenue line is being considered by this company.

San Francisco, Oakland & San José Railway, Oakland, Cal.—With the purchase of property in Oakland this company has secured the last link in its right-of-way between Oakland and San José. The surveys have been completed and material ordered, and construction will be begun at once in Oakland.

East Shore & Suburban Railway, Richmond, Cal.—This company expects to double-track 7 miles of its main line in Richmond.

Sacramento & Woodland Railway, Sacramento, Cal.—Contracts have been awarded by this company for two sections of its electric railway. The Dozier Construction Company will construct the section between Woodland and Elkhorn, while the Cooper & Hawley Company will build another section. Bids will be called for on the bridge trestle 10,000 ft. long across Yolo basin, T. T. C. Gregory, president. [E. R. J., Sept. 14, '11.]

San Diego (Cal.) Electric Railway.—During the next few weeks this company will build about 12 miles of second track in the suburbs of San Diego.

San Diego (Cal.) Southern Railway.—Work will be begun at once by this company replacing the old 40-lb. rails with 60-lb. steel rails on the electric division of its line in San Diego.

California Midland Railroad, San Francisco, Cal.—An option has been obtained by this company on the Nevada County Narrow Gauge Railroad, which extends from Colfax to Grass Valley and Nevada City. The company will change the gage of the railroad and electrify it. This is part of a plan to build an electric railway which will connect Marysville, Colfax, Grass Valley, Nevada City, and Auburn.

Vallejo & Northern Railway, Vallejo, Cal.—Right-of-way has been secured by this company for its line between Sacramento and Woodland. Contracts for the construction of the 35-mile section to connect Vallejo and Sacramento will be awarded soon. Connection will be made with San Francisco by boats.

Connecticut Company, New Haven, Conn.—Work has been begun by this company on a new bridge across the Hockanum River on its line between Manchester and Hartford.

Waycross Street & Suburban Railway, Waycross, Ga.—Plans have been completed for the organization of this company and preparations to begin operations are being made. It is expected to increase the capital stock of the company from $300,000 to $500,000. Officers: W. Deen, president; T. H. Calhoun, vice-president; H. H. Burnet, secretary, and L. J. Cooper, treasurer. [E. R. J., Sept. 9, '11.]

Freeport-Madison Electric Railway, Freeport, Ill.—W. T. Rawleigh, Freeport, advises that he is no longer interested in this railway, as reported in the ELECTRIC RAILWAY JOURNAL for Sept. 30, 1911.

Freeport Railway & Light Company, Freeport, Ill.—Plans are being made by this company for the construction of an extension in Freeport.

Hillsboro Electric Light & Power Company, Hillsboro, Ill.—This company advises that at present matters are only in a preliminary stage for this proposed electric railway between Greenville, Hillsboro and Collinsville. [E. R. J., Sept. 30, '11.]

Pekin (Ill.) City Railway.—The contract has been let and the rails ordered by this company for the construction of its extension from Pekin City to East Bluff. J. E. Melick, Springfield, president. [E. R. J., Sept. 9, '11.]

Northern Illinois Industrial Company, Waukegan, Ill.—This company, which expects to build an electric railway between North Chicago and Waukegan, has elected the following officers: Carl E. Sayler, North Chicago, president; J. P. Arthur, Waukegan, vice-president; W. B. Smith, Waukegan, secretary, and Theo. H. Durst, Waukegan, treasurer. [E. R. J., June 10, '11.]

Evansville (Ind.) Railways.—Within the next two months this company will begin work on the electrification of the Illinois Central Railroad tracks from Evansville to Henderson, crossing the Ohio River, which tracks have been leased by this company. It has organized a new company known as the Evansville, Henderson & Owensboro Railway and this line will be operated by the Evansville Railways. The length of the line is 10 miles and it is expected to have it in operation by April 1, 1912. A steel hull car ferry boat will be used to ferry the interurban cars across the Ohio River at a point half way between Evansville and Henderson.

Vincennes, Washington & Eastern Traction Company, Vincennes, Ind.—This company has awarded a contract to the Brindley Construction Company, Vincennes, for the construction of its 33-mile electric railway between Vincennes and Loogootee. The Brindley Construction Company proposes to sublet part of this contract. Bids will be opened and contracts awarded Nov. 8. Bids are also asked for overhead material. [E. R. J., Aug. 19, '11.]

Indiana & Northwestern Traction Company, Monticello, Ind.—Work on this company's line through Newton County has been completed between the Kankakee River and Mt. Ayr, a distance of 18 miles. The plan is to extend this line north to Chicago and south to Lafayette. Eugene Purtelle is in charge of the work. [E. R. J., Sept. 9, '11]

Des Moines (Ia.) City Railway.—The Scott Street line in Des Moines will be rebuilt by this company.

Topeka (Kan.) Railway.—Construction will be begun at once by this company on an extension of its tracks in Topeka, from Buchanan Street and Seventeenth Street to the Country Club.

Berkshire Street Railway, Pittsfield, Mass.—Plans have been filed with the Massachusetts Railroad Commission for an extension of this line in Great Barrington and for a line over private land in Otis, near Becket. The company has received local franchises.

Benton Harbor-St. Joe Railway & Light Company, Benton Harbor, Mich.—On Oct. 5 this company placed in operation its extension from Benton Harbor to Dowagiac.

Electric Short Line Railroad, Minneapolis, Minn.—This company has awarded a contract to George Turnham & Company for grading 3 miles of its line beyond Medicine Lake. It will connect Minneapolis, Medicine Lake and Wayzata.

Winona Railway & Light Company, Winona, Minn.—This company will expend about $20,000 in improvements on its lines in Winona.

Interstate Railway, Kansas City, Mo.—During the next two months this company will award contracts to build an extension from Kansas City to St. Joseph.

Schenectady (N. Y.) Railway.—This company has asked the Public Service Commission for its approval of the franchise to build extensions of its tracks in Schenectady.

Piedmont Railway & Electric Company, Burlington, N. C.—This company has placed in operation its 8½-mile electric railway between Burlington, Graham and Haw River. George W. Hatch, Burlington, general superintendent. [E. R. J., July 15, '11.]

Bartlesville (Okla.) Interurban Railway.—About $50,000 is being spent by this company on improvements. It has just paved 1 mile of track with cement base and brick outside.

Johnson (Pa.) Traction Company.—This company has placed in operation its 1½-mile extension to the East Tennessee State Normal School in Johnson.

Middletown & Elizabethtown Street Railway, Middletown, Pa.—This company advises that it will begin construction within the next twenty days on its 10-mile electric railway between Elizebethtown and Middletown. The company will operate four cars. Capital stock, authorized, $350,000; bonds, issued, $350,000. Officers: M. K. Blaugh, Elizabethtown, president, and F. H. Alleman, 218 Essex Building, Newark, N. J., vice-president. [E. R. J., Aug. 12, '11.]

Philadelphia (Pa.) Rapid Transit Company.—Construction on this company's extension in Philadelphia of its South Nineteenth Street line to Nineteenth Street and Porter Street, via the Girard estate, has been begun.

Philadelphia & Western Railway, Philadelphia, Pa.—This company has begun the construction of a line from Strafford to Norristown to connect with the Montgomery Railway. Another spur will be built to North Wales to connect with the Lehigh Valley Transit Company's tracks.

Stroudsburg & Water Gap Street Railway, Stroudsburg, Pa.—A 5-mile stretch of track between Portland and Water Gap was completed recently by this company.

Sioux Falls & Southern Minnesota Traction Company, Pierre, S. D.—This company has contracted for the right-of-way to Blue Earth, Minn., a distance of 110 miles, for its projected electric railway between Albert Lea, Minn., and Sioux Falls, S. D. H. W. Knight, Chicago, is interested. [E. R. J., May 6, '11.]

***Greenville, Tex.**—J. F. Nichols and associates are considering plans to build an electric railway from Greenville to Clarksville, via Enloe, Cooper and Deport.

San Antonio (Tex.) Traction Company.—An extension of the lines of this company is now under way to Los Angeles Heights, in northwest San Antonio. Hagelstein & Dickinson Company have received the contract for the work.

Sherman, Tex.—Plans have been decided upon whereby the necessary money will be raised to secure the surveys for the construction of an interurban railway between Sherman, Paris and Clarksville. J. F. McReynolds, Paris, is interested. [E. R. J., Aug. 26, '11.]

Salt Lake & Ogden Electric Railway, Salt Lake City, Utah.—During the next few weeks this company will award contracts to build 4 miles of double track in Salt Lake City and will wire all industrial sidings for electric operation. The company will also award contracts in the near future for the construction of several concrete bridges to replace old wood bridges. It will erect one large heavy-timber bridge.

***Great Falls, Va.**—Surveys are under way for the construction of an electric railway between Great Falls, Bethesda and Chevy Chase. This line, it is said, will connect with the Capital Traction Company's line at Chevy Chase.

South Morgantown Traction Company, Morgantown, W. Va.—Plans are being considered by this company for an extension along the east side of the Monongahela River to connect with an extension of the Fairmont & Clarksburg Railway at the county line. Most of the right-of-way has been secured and financial backing has been assured.

Chicago & Wisconsin Valley Railroad, Madison, Wis.—It is reported that this company will build a line around Lake Monona. A. T. Russell, Chicago, general manager. [E. R. J., Sept. 30, '11.]

SHOPS AND BUILDINGS

Kokomo, Frankfort & Western Traction Company, Kokomo, Ind.—Plans are being made by this company to build a new interurban station at Russiaville. The structure will be one-story, with basement, and of brick construction. The cost is estimated to be about $3,000. The company will also build a depot at Frankfort. The building will be two stories and basement and of brick construction. The cost will be $10,000. George J. Marott, Kokomo, president. [E. R. J., Aug. 19, '11.]

New Orleans Railway & Light Company, New Orleans, La.—Plans are being made by this company to build new central carhouses in New Orleans.

Boston & Eastern Electric Railroad, Boston, Mass.—This company will build stations in Boston as follows: At Post Office Square near Porter Street; near Prescott Street, between Bennington Street and Saratoga Street, and at the northwesterly end of Breeds Island. The order will go before the joint Board of Railroad and Boston Transit Commissioners for approval.

Detroit United Railways, Detroit, Mich.—This company is reported to have taken options on land in Greenfield, including a 13-acre tract located about two blocks beyond the city limits, on Grand River Avenue. Should the company exercise its option on any of these tracts of land it is supposed that it will build turning loops and carhouses for the Grand River-Jefferson line, as these cars have all been housed at the east end of the line in the past.

Gulfport & Mississippi Coast Traction Company, Gulfport, Miss.—This company has purchased equipment for its new machine shop to be erected in Gulfport. The structure is 40 ft. x 44 ft.

Northern Ohio Traction & Light Company, Akron, Ohio.—Grading has been begun by this company previous to the construction of the company's new carhouse at North Main Street in Akron. [E. R. J., Aug. 19, 11.]

Bartlesville (Okla.) Interurban Railway.—A new carhouse will be built by this company at Bartlesville.

Fairmont & Clarksburg Traction Company, Fairmont, W. Va.—This company has awarded to T. L. Burchinal the contract for the construction of its new freight station and storehouse on First Street, South Side, in Fairmont. The structure will be three stories high and a basement, and of brick construction. The first story will be utilized for the freight depot; the basement will be the storehouse, while the two upper floors will be made into flats. The depot will have a floor space of 35 ft. x 65 ft. Work has been begun. [E. R. J., Sept. 2, '11.]

POWER HOUSES AND SUBSTATIONS

Metropolitan West Side Elevated Railway, Chicago, Ill.—Bids are being asked by this company for the construction of a new substation at 259 South Franklin Street, in Chicago. The structure will be one-story and basement and of brick, steel and concrete construction.

Freeport Railway & Light Company, Freeport, Ill.—Plans are being made by this company for several improvements at its power plant in Freeport.

Louisville (Ky.) Railway.—This company is constructing some new concrete coal bins at its power house. The company has let a contract for the installation of coal-conveying machinery to the Mead-Morrison Manufacturing Company, of New York. The plant will have a capacity of 40 tons an hour. The Babcock & Wilcox Company is completing the installation of two boilers with 600-hp capacity in the plant.

New Orleans Railway & Light Company, New Orleans, La.—Bids are being received by this company for new generator sets for its new substations.

Menominee & Marinette Light & Traction Company, Menominee, Mich.—This company will soon purchase one 1900-hp water turbine, one 1100-kw, 2200-volt, 3-phase, 60-cycle generator, switchboard instrument and three 675-kw, 2200-33,000-volt transformers, for its power plant in Menominee.

United Traction Company, Albany, N. Y.—This company has ordered one HC-8-600-kw, 600-600-volt CW rotary converter from the General Electric Company.

New York, Westchester & Boston Railway, New York, N. Y.—This company has ordered from the General Electric Company two 3-unit, 67-kva motor-generator sets, six H 25-30 transformers and switchboard.

Cape Breton Electric Company, Sydney, N. S.—This company is now installing a 500-kw Allis-Chalmers turbo-generator and auxiliaries at its power plant in Sydney.

Ohio Electric Railway, Cincinnati, Ohio.—Work has been begun by this company on its new substation at Herr's crossing in Urbana.

Tri-State Traction Company, Steubenville, Ohio.—It is reported that this company's power plant at Steubenville was partly destroyed by fire on Oct. 6.

Bartlesville (Okla.) Interurban Railway.—A new power house is now being built by this company at Bartlesville, and the company is installing one 500-kw Allis-Chalmers turbine set with type C condenser.

Northampton Traction Company, Easton, Pa.—This company has recently purchased from the General Electric Company three 200-kw, 30-unit motor-generator sets and switchboard for its power plant in Easton.

Sherbrooke Railway & Power Company, Sherbrooke, Que.—This company is now building a new substation at Derby Line, Vt. It has purchased equipment for same.

Salt Lake & Ogden Electric Railway, Salt Lake City, Utah.—During the next few weeks this company will purchase a 500-kw, high-pressure steam turbine for its power plant in Salt Lake City.

Virginia Railway & Power Company, Richmond, Va.—This company will spend nearly $250,000 to build a new power plant in Richmond. The structure will be located on Twelfth Street, near the present power station. As soon as the building is completed a unit of 12,000 hp will be installed. There will be plenty of room to install additional machinery, and the plant will finally have a capacity of 30,000 hp. The company is now further developing its water-power plant at Petersburg.

Union Utilities, Morgantown, W. Va.—During the next few weeks this company will install motor-driven pumps at its water-works pump station in Morgantown.

Manufactures & Supplies

ROLLING STOCK

Bartlesville Interurban Railway, Bartlesville, Okla., is in the market for one double-truck, double-end car.

New Orleans Railway & Light Company, New Orleans, La., is in the market for thirty single-truck trailer cars.

Bangor & Aroostook Railway, Bangor, Me., has ordered one gas-electric motor car from the General Electric Company.

Cleveland (Ohio) Railway has ordered two snow sweepers and eighteen Brill 27-FE-1 trucks from the G. C. Kuhlman Car Company.

International Railway, Buffalo, N. Y., has ordered four Brill 39-E trucks, without wheels, from The J. G. Brill Company.

United Traction Company, Coffeyville, Kan., has ordered one 20-ft. 8-in. pay-within closed car from the American Car Company.

Western New York & Pennsylvania Traction Company, Olean, N. Y., has ordered four Brill 27-G-1 trucks from The J. G. Brill Company.

Twin City Railway, South Bend, Wash., has ordered three Brill 21-E trucks through Sanderson & Porter from the G. C. Kuhlman Car Company.

Gary & Interurban Railway, Gary, Ind., has ordered one steel underframe, single-truck snow sweeper from the McGuire-Cummings Manufacturing Company.

San José Railway, San José, Cal., has ordered twelve GE-216 two-motor car equipments with type K-36 controllers, from the General Electric Company.

Waterloo, Cedar Falls & Northern Railway, Waterloo, Iowa, has ordered two GE-73 quadruple equipments with type M control, from the General Electric Company.

Saginaw-Bay City Railway, Saginaw, Mich., has ordered one 28-ft. pay-as-you-enter car body mounted on Brill 62-E-1 trucks, from the G. C. Kuhlman Car Company.

Philadelphia & Garretford Street Railway, Philadelphia, Pa., has ordered one GE-74, quadruple motor car equipment with K-34 control, from the General Electric Company.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has ordered four double-truck, long-broom snow sweepers from McGuire-Cummings Manufacturing Company.

Third Avenue Railroad, New York, N. Y., has ordered fifteen 18-ft. closed storage-battery car bodies, mounted on a special design of single trucks, from The J. G. Brill Company.

East St. Louis, Columbia & Waterloo Railway, St. Louis, Mo., has ordered five 33-ft. 4-in. closed motor car bodies, mounted on Brill 27-M.C.B.-1 trucks, from the American Car Company.

Fitchburg & Leominster Street Railway, Fitchburg, Mass., has purchased one 30-ft. 8-in. semi-convertible pay-as-you-enter motor car body, mounted on Brill 39-E trucks, from The J. G. Brill Company.

New York, New Haven & Hartford Railroad, New Haven, Conn., has ordered four alternating-current, single-phase railway motors from the Westinghouse Electric & Manufacturing Company.

Sheridan Railway & Light Company, Sheridan, Wyo., has ordered two GE-216, two-motor car equipments, with K-36 control, and two CP-27 straight air-brake equipments, from the General Electric Company.

Susquehanna Railway, Light & Power Company, New York, N. Y., has ordered three quadruple equipments of direct-current motors, with K-28-B control, from the Westinghouse Electric & Manufacturing Company.

Connecticut Company, New Haven, Conn., has ordered six CP-27-A straight air-brake equipments, four GE-80-A, 40-hp motors and four CP-27-A compressors, from the General Electric Company. The company has also ordered one flat car body and one snow plow from the Wason Manufacturing Company.

Cincinnati (Ohio) Traction Company, has ordered forty-five double equipments of No. 318 motors, with K-40-A control, from the Westinghouse Electric & Manufacturing Company.

TRADE NOTES

Woodmansee, Davidson & Sessions, Chicago, Ill., have opened a branch office at 629-630 Wells Building, Milwaukee, Wis.

Wason Manufacturing Company, Springfield, Mass., has received an order from the General Electric Company for six steel car bodies.

Sangamo Electric Company, Springfield, Ill., has received an order for a sufficient number of trip-reading car meters to equip the cars of the El Paso Street Railway.

Corrugated Bar Company, Buffalo, N. Y., formerly located in St. Louis, Mo., announces its removal, Oct. 14, to the Mutual Life Building, Buffalo. The change has been made in order to place the company in closer touch with its source of supply.

Railway Steel Spring Company, New York, N. Y., has issued $3,500,000 of first mortgage 5 per cent gold bonds of $1,000 denomination. These bonds are redeemable Oct. 1, 1931, interest payable semi-annually. They are offered for sale at 97 and accrued interest.

Calumet Car Company, East Chicago, Ill., has filed articles of incorporation. It will manufacture, rebuild and repair cars and industrial equipment of all kinds. Capital stock, $75,000. Directors: Thomas C. McCalla, Arthur N. Eroe, Walter L. Lytton and Daniel W. Rodgers.

General Electric Company, Schenectady, N. Y., has received an order from the McGuire-Cummings Manufacturing Company, Chicago, Ill., for four GE-80 four-motor car equipments, one GE-80 two-motor car equipment, one GE-80 railway motor, three GE-205 four-motor car equipments, four CP-27 straight air equipments and three CP-28 emergency air equipments.

Titanium Alloy Manufacturing Company, Pittsburgh, Pa., announces that the American Iron & Steel Association has published statistics of the tonnage of steel treated with various alloys during 1910, which show that the output of titanium steel for 1910 was 300 per cent greater than the next largest alloy steel—nickel—and was greater by 84,813 gross tons than the output of all the other alloy steels combined.

Gano Dunn, whose resignation as first vice-president and chief engineer of the Crocker-Wheeler Company was noted in the Electric Railway Journal of Aug. 26, 1911, has been elected a director and a vice-president of J. G. White & Company, Inc., New York. Mr Dunn has just returned from abroad, where, as a representative of the United States government and as president of the American Institute of Electrical Engineers, he has been attending the International Electrical Congress at Turin.

The J. G. Brill Company, Philadelphia, Pa., has received the following orders for export: Bagnall & Hilles, Yokohama, Japan, for Owari Electric Railway, six Brill 21-E trucks; E. G. Long Company, New York, for Tatsano Electric Railway, Japan, one Brill 21-E truck; Camacho, Roldan & Van Sickel, New York, two first-class coaches mounted on trucks; Noyes Brothers, for Brisbane Tramways, Australia, four Brill 21-E trucks; Siemans & Halske, New York, for Japan, thirty Brill 21-E trucks, complete with wheels and axles; Thomas Barlow & Sons, for Durban Corporation Tramways, Durban, Natal, five Brill 21-E trucks without wheels or axles.

Western Electric Company, Chicago, Ill., has experienced a most satisfactory revival in orders billed out of its factories in September. After four months of comparative declines, shipments last month showed the largest increase of this fiscal year. The gain was 12 per cent, and September sales were the largest for that month in the company's history. For the nine months to September 30 Western Electric Company's gross earnings were 4 per cent in excess of the same period last year, and total sales for the full twelve months of $66,000,000 are promised. The company by Jan. 1 will occupy about 200,000 sq. ft. of new floor space at its Hawthorne (Chicago) plant. Among other additions this space includes a new general merchandise building.

ADVERTISING LITERATURE

American Ship Windlass Company, Providence, R. I., has issued a new 40-page illustrated catalog which is devoted to the Taylor stoker.

Robert W. Hunt Company, Chicago, Ill., have issued a card describing the methods and codes used by the different rail-manufacturing companies for stamping the heat number on the rails.

New York Air Brake Company, Watertown, N. Y., has issued an illustrated booklet describing its plants on Beebee's Island and on Pearl Street. This book also contains a historical sketch of the expansion of the company since 1890.

Ingersoll-Rand Company, New York, N. Y., has issued, as Form No. 3109, a bulletin describing Class NF-1 steam-driven, single-stage, straight-line air compressors; twin flywheel, center crank, inclosed type, with steam and air cylinders arranged in tandem. The bulletin shows several views of these machines in section, and gives tables of cylinder diameters, dimensions and capacities.

Union Switch & Signal Company, Swissvale, Pa., has published Bulletin No. 57, which contains a general explanation of the principles of automatic signaling for electric railways, together with descriptions of the application of these principles to typical signal installations. The bulletin deals particularly with installations of signals for single-track roads. The several systems presented are designed not only to afford complete protection but also to provide means for making proper meets with minimum delay at passing sidings. The text is illustrated with numerous diagrams of circuits and signal locations and views of the different pieces of apparatus used.

Electric Storage Battery Company, Philadelphia, Pa., has issued Bulletin No. 134, under the title "The Chloride Accumulator vs. Feeder Copper in Electric Railway Transmission Systems." The bulletin contains an analysis of the advantages of storage battery installations and an outline of the calculations necessary to determine the number and capacity of the cells required for a given set of conditions when installed with and without a boosted feeder. Appended to this outline are descriptions of typical installations of storage batteries on the Gulfport & Mississippi Traction Company and the Slate Belt Electric Street Railway.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued Descriptive Leaflet No. 2371, which treats of type Q, engine-driven, direct-current interpole generators. It contains illustrations of type Q generators assembled and of the important component parts. Folder No. 4184, entitled "Westinghouse Railway Equipment," describes the spider armature construction used by the Westinghouse Company, its railway motor brush holders, its armature and axle bearings, and its unit switch control systems for 600 and 1200 volts. The comparative advantages of interpole and non-interpole railway motors and of box-frame vs. split-frame motors are also discussed.

Carnegie Steel Company, Pittsburgh, Pa., has issued a booklet entitled "Standard Forged and Heat-Treated Axles, Shafts and Similar Parts." This book gives the results of tension tests, torsion tests and bending tests on two grades of steel, each treated with four different heat treatments. Increased life of an axle may be gained by increasing the ratio between the elastic limit and the fibre stress and the results of the tests given show how the elastic limit and consequently the ratio between elastic limit and fiber stress may be increased by various heat treatments. The company has also published the fourth edition of its "Shape Book," which contains sections, tables and data relating to plates, bars, rails and track accessories. This book supersedes and cancels the issue of 1903, together with all supplements thereto.

NEW PUBLICATION

Air Brake Catechism. Compiled by Robert H. Blackall, New York, 1911. The Norman W. Henley Publishing Company. Cloth, 384 pages. Price, $2.

This book is a practical treatise on the operation and construction of all the parts of air-brake apparatus and contains a practical method of locating and remedying any trouble which may arise.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVIII NEW YORK, SATURDAY, OCTOBER 28, 1911 No. 18

PUBLISHED WEEKLY BY

McGraw Publishing Company

JAMES H. MCGRAW, President; C. E. WHITTLESEY, Sec'y and Treas.

239 WEST THIRTY-NINTH STREET, NEW YORK

TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1021 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Thursday, 9 a. m., of the week of issue.

Copyright, 1911, by MCGRAW PUBLISHING COMPANY.

Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, OCTOBER 28, 1911.

CONTENTS.

Plan of Settlement in Detroit..... 937
Experiments in Car Building..... 937
Company Libraries of Engineering Books..... 938
Interurban Terminal Problems..... 938
Capacity of Motors for Trailer Operation..... 939
Power Distributing System of the Oakland, Alameda and Berkeley Suburban Lines of the Southern Pacific Company—II..... 940
Budget Exhibit of the Public Service Commission, First District.... 947
The Use of an Appraisal..... 948
Fare Agreement in Detroit..... 950
Observations on "Near-Side" Cars in Buffalo..... 954
Illuminated Sign for Yard Tracks..... 956
New Substation at Kansas City..... 957
Data on Single-Phase Locomotives..... 957
Hearing on Transfers in New York..... 957
The Kansas Workmen's Compensation Act..... 958
Individual Induction Motors for Salt Lake City..... 958
Portable Drill Clamp..... 958
Gasoline Car No. 2 at Point Shirley..... 959
Brake-Shoe Adjuster..... 959
New Steel Cars for Philadelphia Elevated Service..... 960
News of Electric Railways..... 961
Financial and Corporate..... 963
Traffic and Transportation..... 965
Personal Mention..... 967
Construction News..... 968
Manufactures and Supplies..... 971

Plan of Settlement in Detroit

The tentative plan proposed for the settlement of the Detroit franchise situation, published elsewhere in this issue, may cause considerable surprise to those companies which find it difficult at present to make a profit on a 5-cent fare, and the question will naturally arise "How is it possible for a railway company in a city of the size of Detroit to carry passengers at a profit for such low rates?" The assent to this plan which has been wrung from the Detroit United Railway may be quoted as a precedent in demands for other fare reductions or in opposition to requests for fare increases, and the facts in the case should be thoroughly understood. We shall not attempt to analyze the entire situation here, but we should point out that in some respects the situation in Detroit is more favorable for electric railway operation than it would be in most other cities. The city is not only flat, with broad avenues leading from all sides to the center business district of the city, so that car service is direct and easy, but the area within which the low fare will prevail is small. It approximates a semi-circle having a radius of about 4 miles with the business district near the river front as a center, so that the average ride should be short. Moreover, under the proposed new franchise, the company is relieved entirely from the cost of paving and from all forms of taxation other than an ad valorem tax. This, also, should be borne in mind. The Detroit United Railway includes in one property a city railway system and an interurban railway system which is much greater in mileage than the aggregate of the track operated within the city, and it is not difficult to understand how the company, when its interurban terminal rights had become seriously imperiled, as in this case, and with its entire property in jeopardy, might be willing to accept almost any measure which covered only a part of its system in order to keep the whole intact. The plan has not yet been finally adopted, as it still has to be accepted by the City Council and by the electorate in Detroit, but it is hardly to be conceived that they will reject a franchise in which the city has so much to gain. The financial results to the company from its acceptance are a matter for far greater conjecture.

Experiments in Car Building

The art of electric railway car building has been going through a process of evolution for the past five years. Almost every lot of new cars built has embodied one or more innovations either in the general design or in the details of construction and equipment. The adoption of the prepayment principle of fare collection, the attempts made to reduce the weight of cars, improvements in heating and

ventilation and other details of equipment have brought about many changes. Some of these innovations have proved very successful when applied to the cars of one company, but when they have been tried by another company operating under different conditions they have been expensive failures. Too often the experiments have been conducted on a large scale and new and untried features have been incorporated in an entire lot of cars before their worth has been demonstrated by extended trials on one or two cars operated under the prevailing conditions. Observation of the results of experiments in other cities is seldom sufficiently convincing to warrant the adoption of a radically different type of car without a preliminary trial at home. Usually it is possible to foresee the necessity of purchasing new cars far enough in advance to carry out experiments with new ideas on a sample car or cars, either new or rebuilt. Thus, if there was a question whether the use of inclosed platforms with doors would delay the schedule, an old car could be so equipped and operated for several months on different lines while accurate observations of the loading and unloading time were made. If the design of the car framing was in doubt a sample car operated for a period long enough to determine the probable maintenance cost would settle the question of whether the proposed design was strong enough for the purpose. Many little mistakes in design which cannot be avoided in the drafting room can be discovered and rectified during the construction of a sample car, with resulting economies of construction and maintenance when the remainder of the cars are built.

Company Libraries of Engineering Books

Access to a good library of technical books is as valuable to an engineer actively engaged in his profession as access to complete files of court decisions and codes of state and national laws is to a lawyer. Few engineers in the electric railway industry have ever possessed an adequate collection of reference and text books of their own, either because they could not afford to buy them or because their frequent migrations from place to place discouraged the accumulation of a bulky library. When an electric railway company undertakes a large engineering work it furnishes all the necessary facilities to its engineers in the way of drafting-room equipment, instruments, paper and supplies, but usually leaves to the engineers the expense of buying such books as they may need to supplement their knowledge and experience. The result is that reference books are not bought or consulted in the way they should be and the work sometimes suffers as a consequence. The engineers can hardly be blamed for this condition of affairs. They cannot be expected to spend $10 to $25 for books which they may never need again, yet that amount would be well spent by the company doing the work because it would be benefited directly and permanently. The Detroit United Railway has established a company library of more than 300 engineering books, which are available to all employees when required. This library represents an investment of about $1,000, which is small, considering its usefulness, but is many times larger than any of the individual engineers of the company could afford or would buy. Information on a wide variety of engineering subjects can be obtained from this library without loss of time. New books are added from time to time at the request of department heads, so that the collection is not allowed to become obsolete. The library also has proved of value in stimulating men in subordinate positions to read and study along lines which benefit them in their work. A company library of this kind is not beyond the means of even a very small system, to which it can be of as much value as to larger companies.

INTERURBAN TERMINAL PROBLEMS

The increasing development of interurban electric railway service in many populous centers of the country introduces important terminal problems to the attention of managers. The volume of traffic which can be successfully handled daily in and out of the business center by the use of every evident resource at the place where the car or train routes terminate depends upon local conditions to no small extent, yet the efficiency of a terminal as a piece of transportation machinery depends largely upon the skill with which the flow of travel by foot and wheel is maintained. The avoidance of congestion, on tracks as well as in passageways, is a prime requisite.

To a constantly increasing extent cities which enjoy a fast and frequent interurban service are approaching the point where the great majority of high-speed cars coming into town from remote points must be routed through a special station so as to provide for a centralized control of operation. The larger the system the more important the terminal problem becomes, and only in degree is the provision of facilities for expeditiously handling passengers and cars different in smaller but rapidly growing centers of population. Not a few lessons may be drawn from the terminal practice of the Middle and Far West in this respect. Many smaller companies may not at first see any parallel between their conditions and those prevailing in such cities as Denver, Indianapolis, Milwaukee and Los Angeles, yet it is noteworthy that some of the best features of interurban terminal design as found in large centers may be turned to account in smaller communities with little additional cost.

Where the number of cars handled per day is very large, it appears profitable to provide waiting-room accommodations in considerable measure separated from the tracks. The general practice of requiring passengers to purchase tickets before entering cars at such stations calls in many cases for the location of ticket-selling windows opposite the track gateways or entrances, leaving the intervening space to be traveled as short as is consistent with a liberal aisle and avoiding the congestion which tends to accumulate where tickets are sold immediately beside the doorways leading to the tracks and loading platforms. The Pacific Electric Railway station at Los Angeles typifies this design, and as nearly 750 train movements per day are handled in and out of this station, the separation of traffic into streams mainly independent of one another is a vital consideration. The employment of train announcers is a matter of necessity in such a station, and the use of a supplementary signing system in the inner and main waiting rooms greatly facilitates the flow of travel to particular car lines. It is worthy of note that where

the volume of traffic is large enough to justify the employment of train announcers and the separation of the waiting room from the loading platform the plan of requiring passengers for a given destination to enter the common platform via a specified and signed gateway or door is remarkably effective in reducing congestion and exceedingly inexpensive in operation, since one or two announcers can handle six or eight gateways, even in the rush hours. The plan of keeping passengers off the loading platform until their particular car arrives leaves the platform free for loading cars marked for other destinations and contributes wonderfully to the maintenance of the highest standards of service.

The control of car movements in and out of a space set aside as an interurban terminal is a problem with many variants. Where the routing is in and out of a large tract of land comparatively free from immediate contact with the car movements on local tracks passing the station, the signaling requirements tend to become extremely simple. In large cities, however, the entrance and egress of cars and trains made up of multiple-unit or motor and trailer combinations is a serious matter when all interurban traffic is obliged to pass over local rails for one or more blocks outside the terminal station. Under conditions such as these the establishment of interlocking signal and switching equipment is generally necessary for the prompt and safe handling of the service. The schedules are bound to be upset at times through street obstructions, and immediate advantage must be taken of temporary gaps in the street travel by cars about to enter and leave the terminal property. Late cars must be switched past those on or ahead of time, provision for emergency inspection and adjustment of equipment must be made, and close connection must be maintained between the points of massing of patrons near the loading platform and the approach tracks. In this way no time need be lost in waiting for loading to begin, once a car has reached its berth. Seconds count heavily here, and experience shows that electrically operated signals and switches are both quicker and more reliable than the older types.

The opportunities for publicity work in an interurban terminal are so numerous that only passing mention need be made of the possibilities. They include a liberal system of direction signs, sub-letting of space within the station to organizers of side trips and personally conducted tours, the display of large and attractive photographs of scenery on the walls, and the location of the information bureau with its printed matter close to the main entrance. The larger the terminal the more nearly it may approximate the conveniences of the great trunk line stations, but no terminal should be without the sources of free and conspicuous information concerning travel on the system urgently desired by the public.

When planning a terminal station it is always wise for a company to acquire plenty of ground to allow for the future expansion of the station. From past experience it seems hardly possible to be too sanguine of the growth of the traffic to be handled, and a little extra property is usually a good investment if purchased before the improvement. Later the company may be compelled to pay heavily for the same land.

CAPACITY OF MOTORS FOR TRAILER OPERATION

The critics of trailer operation for city service usually lay great stress upon the danger of the motors becoming overheated and thereby damaged unless the motor cars when operating singly are considerably over-powered. They claim, with some reason, that if a motor car is equipped with motors of just enough capacity to propel itself at the schedule speed and with the usual number of stops, the additional weight and number of stops caused by the addition of a trailer during the rush hours will put an undue strain on the motors unless the schedule speed is considerably lowered. The advocates of trailer operation, on the other hand, urge that if the motors have been at rest for some hours before trailer operation is commenced and are thoroughly cooled off, a motor car with reasonably adequate capacity for single-car operation should be able safely to haul a trailer from one to two hours without dangerous rise in temperature. Thus they virtually admit that if the trailer is hauled when the motors are warm, or if it is hauled longer than two hours, damage is likely to result. To add such limitations for trailer operation to those inherent to the service, such as the inability of the trailer to move itself, seems greatly to circumscribe its usefulness.

As a rule the roads which depend upon trailers for their rush-hour service are apt to use them at other hours and for more than one or two trips. Special events, such as baseball and football games, automobile races, theater traffic, state fairs, etc., are likely at any time to call for every available car, and it is pretty certain that the operating officials will use the trailers as long as they may be necessary for traffic reasons without giving much thought to the heat limitations of the motors.

When the officer in charge of operation has large crowds of people to be moved within a limited time and finds that nearly all of the motor cars are already in regular service, he will probably utilize trailers for as long a period as may be necessary rather than invite public criticism of the service given and permit the nickels to escape. For these reasons there has been a tendency to over-motor the equipment upon those roads that contemplate the occasional use of trailers or that have used them intermittently, as, for example, during the summer excursion season. Those roads that deliberately plan the use of trailers as their standard practice will be very apt to provide motors of sufficient excess capacity to pull continuously the trailers required in the rush hours.

It would seem, therefore, that if a road proposes to adopt trailer operation as its standard practice and expects to realize the full advantage of this service operation, excess motor capacity must be provided for all cars that are expected to pull trailers. The amount of such excess motor capacity should be calculated with the same care and precision as that generally used by electrical engineers in selecting the size of motors for any given service where all the conditions are clearly set forth. In a matter of so much importance no rule-of-thumb calculations should be followed, because the life of the equipment, as well as the cost of maintenance, must depend upon its careful adaptation to the work to be done.

Power-Distributing System of the Oakland, Alameda and Berkeley Suburban Lines of the Southern Pacific Company—II.

This Is the Second and Final Article on This Subject—It Describes the 1200-Volt Catenary Construction for Bridge and Pole Suspension, Including Specifications of All Insulating Material and Detailed Descriptions of Special Features of Construction

SYNOPSIS OF FIRST ARTICLE

The first article on the power-distribution system of this branch of the Southern Pacific Company was published in the issue of the Electric Railway Journal for Oct. 21. It referred to earlier articles on the power station and rolling stock and described the present extent of the electrification, the character of service, the principal features of the high-tension transmission line, the details of the 1200-volt feeder system and of the negative return system. The first article also contained a map, the principal wiring diagrams and the specifications covering the high-tension insulators and cables of the transmission system.

1200-VOLT FEEDER DISTRIBUTING LINES

The overhead catenary construction presents several unusual features. It is built to provide for the operation of a roller type pantograph at speeds up to 45 m. p. h. with an upward pantograph pressure ranging from 25 lb. to 36 lb. In the design of the supporting structures for the catenary bridges spaced 240 ft. apart are used, while on public streets center pole and side pole span construction has been adopted acording to conditions.

its points of support on the bridges, thus steadying the trolley so that no steady braces were required for tangent track. On curves bridle wires are run the entire length of the curve and from it all necessary pull-off attachments are made. The side sway of the cars and pantographs distributes the wear on the surface of the rolling collectors and does not convey to the trolley wire sufficient side movement to affect the satisfactory operation of the collectors.

The standard spans for center pole and cross span construction are as follows: 120 ft. for tangent track and curves up to 3 deg.; 90 ft. for curves from 3 deg. to 6 deg.; 60 ft. for curves from 6 deg. All catenary bridge spans are 120 ft. apart. Fig. 17 shows typical catenary spans and hanger spacings for all types of suspension both on the highways and on the right-of-way.

Figs. 5 and 7 show respectively the construction details of a two-track intermediate bridge and a two-track anchor and signal bridge. The intermediate bridges are built up of latticed channel columns and 8-in. I-beam carriers. The I-beam is 31 ft. 4 in. long and gives a clear roadway width

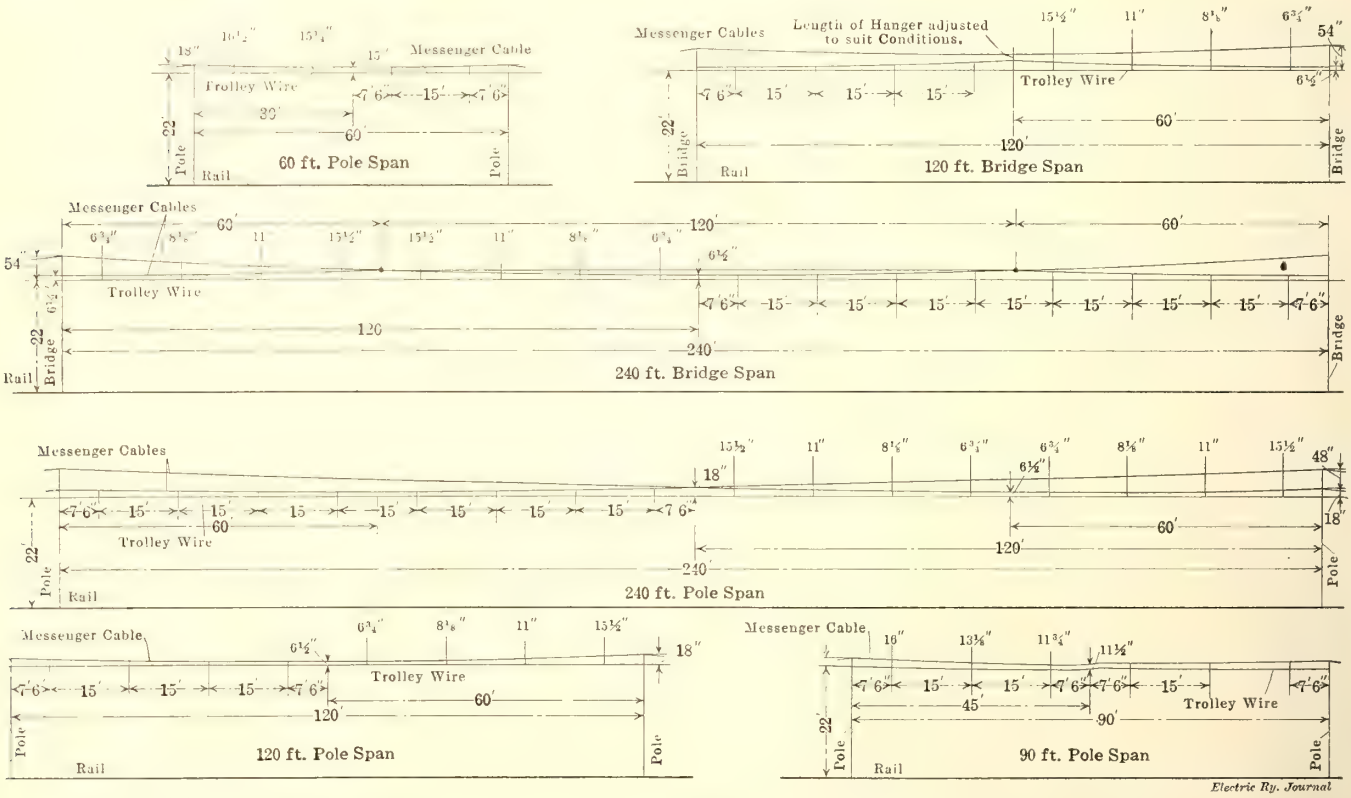


Fig. 17—Southern Pacific 1200-Volt Lines—Typical Catenary Spans and Hanger Spacings

As the standard span on both the center and side pole construction was 120 ft., it was decided to install an auxiliary messenger on the 240-ft. bridge span and to pick up the main messenger 60 ft. from each side of the bridges. This form of construction not only decreased the number of hangers required, but had the additional advantage of lowering the center of gravity of the line with respect to of 30 ft. The messenger cable insulators are set on wooden blocks mounted on Z-bars which are attached to the I-beam carriers. The height from the head of the rails to the trolley is 22 ft. and from the top of the rails to the messenger 26 ft. 3 in. The anchor and signal catenary bridges are built up of towers and trusses as shown, with the same clearances and overhead arrangements as the intermediate

bridges. The drawings show the positions of the wooden cross-arms for carrying high-tension transmission lines, signal cables and telephone wires, etc., with provision for carrying a duplicate high-tension line on the opposite side. Figs. 14 and 18 respectively are views of a four-track anchor and signal bridge at a curve and of a four-track intermediate bridge over tangent track. The bridges were

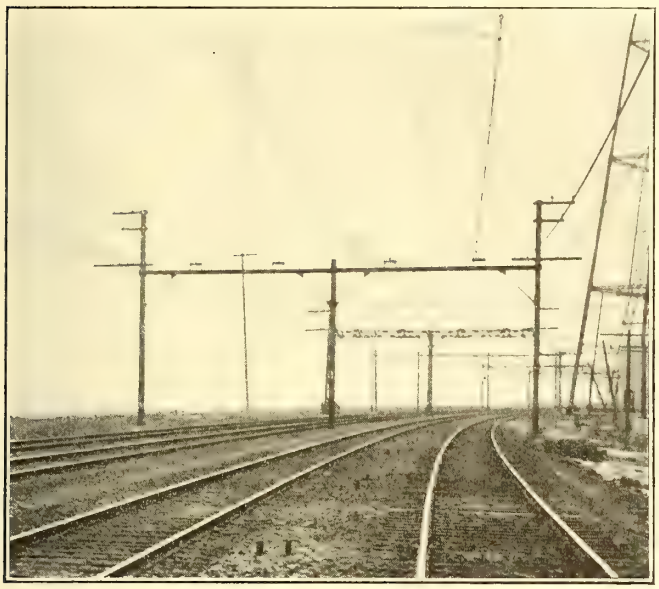


Fig. 18—Southern Pacific 1200-Volt Lines—Four-Track Intermediate Bridge at Curve

fabricated by the American Bridge Company from Southern Pacific designs.

Figs. 19 to 26 show the several types of steel pole span side and center construction which are used in operating over public streets. The clearance between the top of the rail and the trolley is 22 ft. throughout. The poles for side construction are 34 ft. long and for center pole construction 30 ft. long, but 34-ft. poles are used for double cross-arm and auxiliary mesenger cable sections.



Fig. 19—Southern Pacific 1200-Volt Lines—Center Pole Construction on Tangent Track in City Streets

POLE DETAILS

The general construction of the several types of pole work is clearly shown in the drawings, but it may be of interest to give further particulars about different equipment details.

The standard tubular poles are made of three sections of lap welded tubing, the sections being hot-swaged together with not less than 18-in. overlap at the joint. The specifications required that the poles satisfy the following operating conditions: Pole spacing, 120 ft.; pole length, 30 ft., with 6 ft. set in concrete on two pieces of 2-in. x 12-in. x 24-in. redwood; diameter of steel messenger, 7/16 in.; diameter

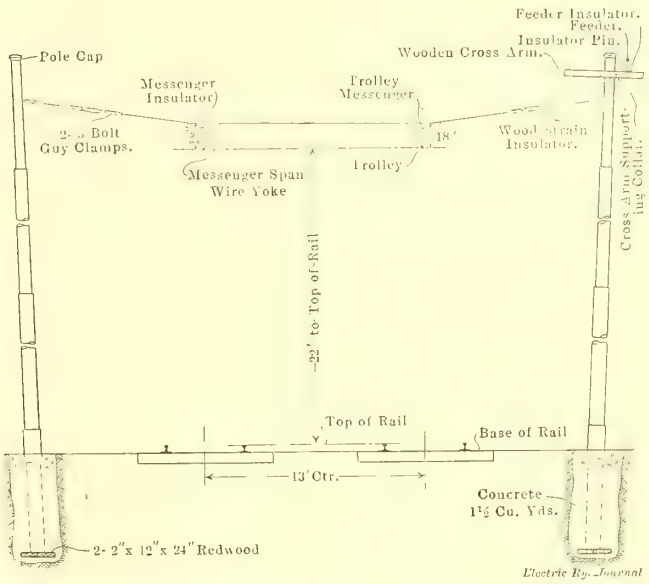


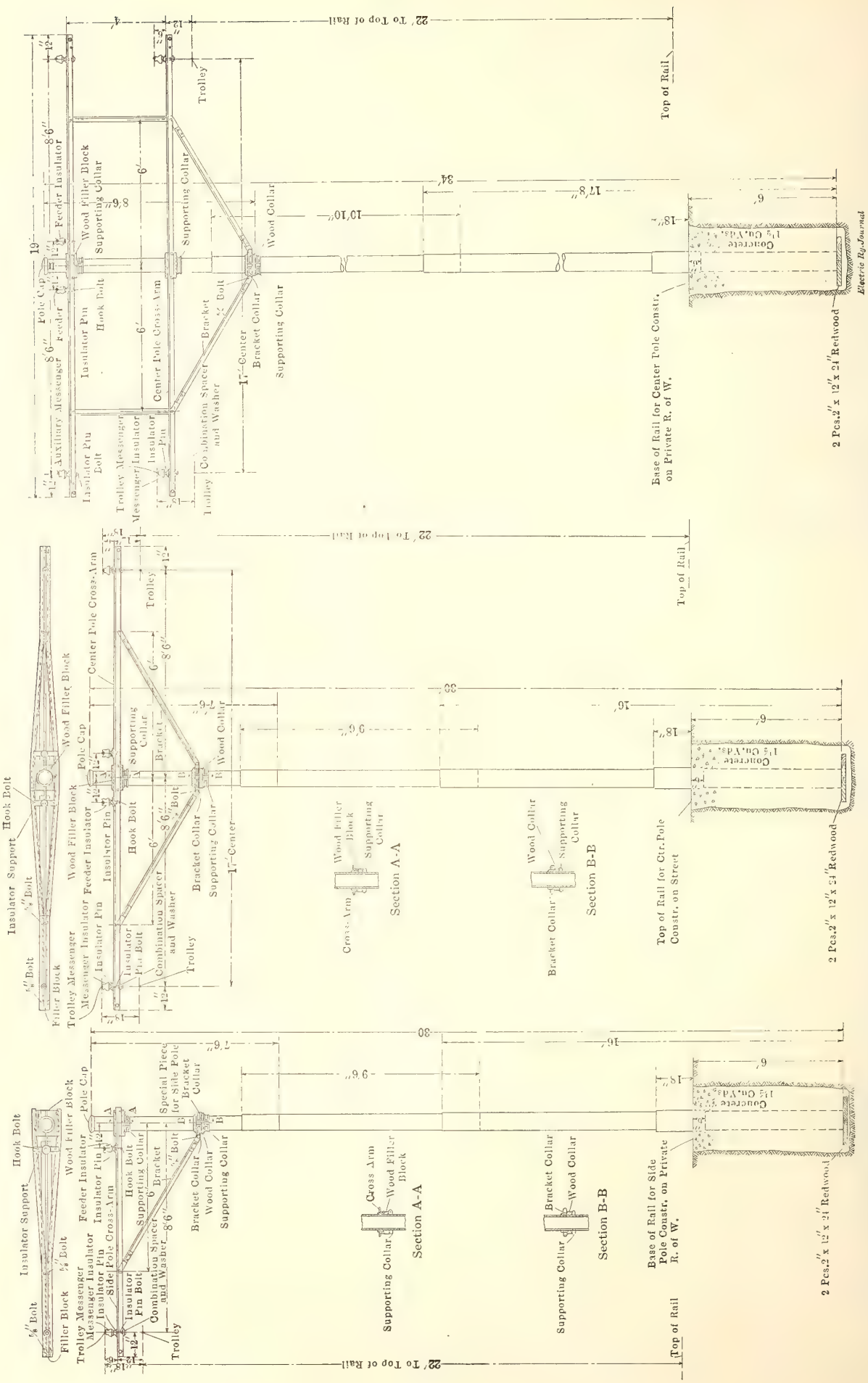
Fig. 20—Southern Pacific 1200-Volt Lines—Standard Double-Track Span Construction

of feeder, 1⅞ in.; size of trolley wire, No 0000; approximate weight of messenger, trolley wire and hangers, 1½ lb. per foot; approximate weight of feeder, 1½ lb. per foot. Each pole has a protecting sleeve at the ground line. This sleeve is 24 in. long and 6 in. of it extends into the concrete foundation. It was specified that in a 60 m.p.h. windstorm at right angles to the track these poles must not have



Fig. 21—Southern Pacific 1200-Volt Lines—Cross-Span Construction on Tangents

more than 1½ in. deflection at the top when carrying an installation of the weights noted. When set 6 ft. in concrete each pole was to withstand a pull, applied at a distance of 18 in. from the top, of the calculated amount due to a windstorm of 60 m.p.h. Under this pull, placed at 600 lb., the pole was to show a deflection of not more than 1½ in. All poles were given one coat of red paint be-



Figs. 22, 23 and 24—Southern Pacific 1200-Volt Lines—Assemblies of Side Pole, Center Pole and Center Pole with Double Cross-Arm Construction

fore shipment. Similar specifications were issued to cover the longer poles. The poles were furnished by the National Tube Company.

The following pole fittings were fabricated in the shops

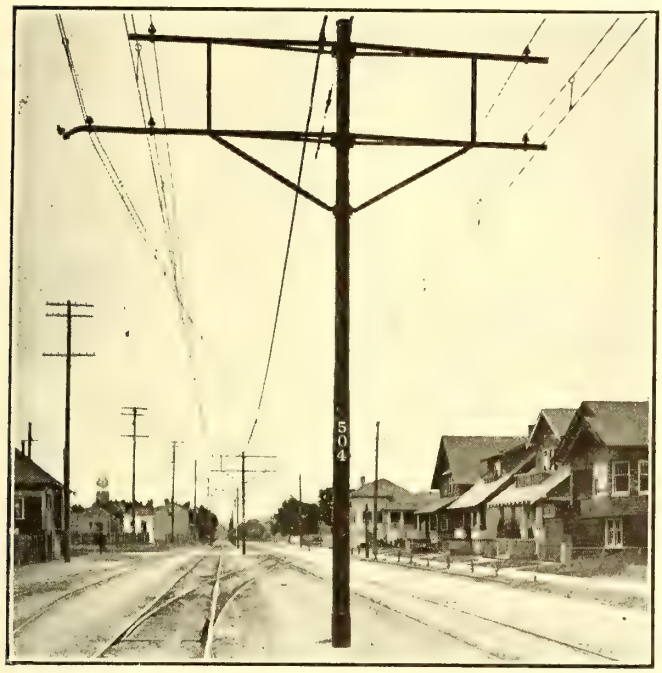


Fig. 25—Southern Pacific 1200-Volt Lines—Overhead Construction at Cross-Overs

of the Southern Pacific Company: 2-in. x 2½-in. x 5/16-in. angle-iron cross-arms and brackets; Oregon pine filler blocks and collars boiled in tar; feeder insulator supports and hook bolts and cast-iron combination spacer and washer. The malleable-iron brackets and supporting collars were furnished by the National Malleable Castings Company from the Southern Pacific Company's designs.

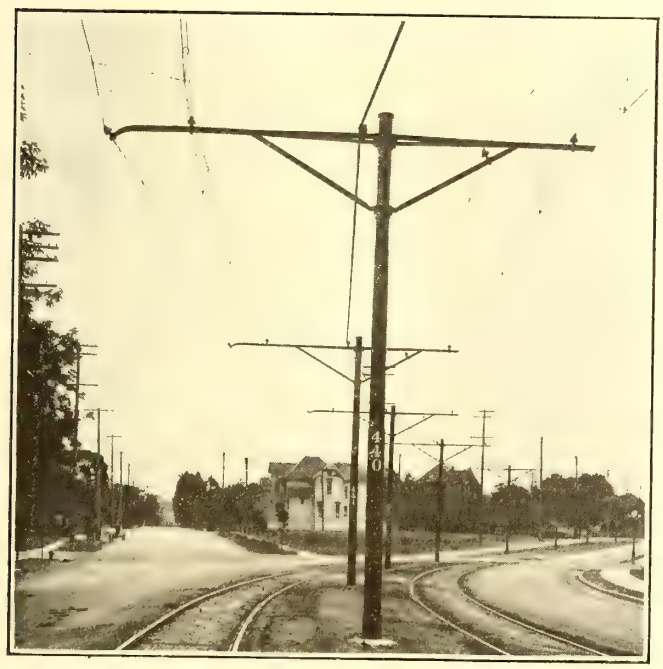


Fig. 26—Southern Pacific 1200-Volt Lines—Center Pole Construction on Curved Track in City Streets

The malleable-iron galvanized messenger insulator yokes shown in Fig. 27 were furnished by the H. W. Johns-Manville Company. Details of the cross-arm and center pole pins are shown in Fig. 28.

WIRE REQUIREMENTS

The span wire in the cross span construction is of 7/16-in. seven-strand galvanized steel cable with a breaking strength of not less than 6500 lb. The wire used for all pull-off attachments is of 5/16-in. seven-strand galvanized steel cable with an ultimate breaking strength of 3800 lb. or more. The messenger wire is a 7/16-in. seven-strand high-strength galvanized steel cable with an ultimate breaking strength of not less than 15,000 lb. All 1200-volt feeders are of stranded aluminum with triple cotton braid and of the following lengths and sizes; 65,000 ft. of 800,000 circ. mil; 60,000 ft. of 1,000,000 circ. mil; 95,000 ft. of 1,192,500 circ. mil; 170,000 ft. of 1,590,000 circ. mil.

All joints in cables were made by means of single piece, cast aluminum sleeves installed in the field with a special

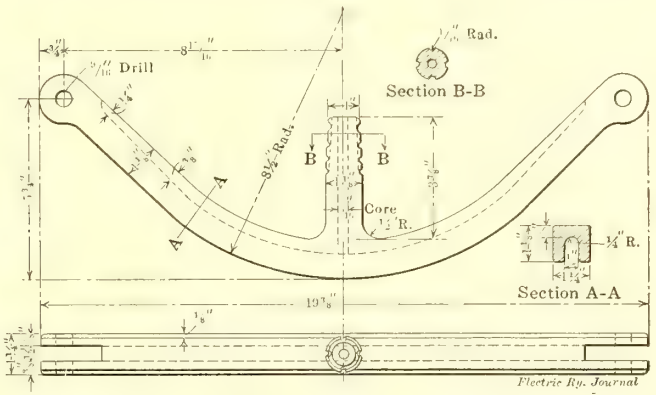


Fig. 27—Southern Pacific 1200-Volt Lines—Messenger Span Wire Yoke for Translator

10-ton hydraulic compressor. All feed-in taps to the trolley wire are No. 0000 thirty-seven-strand bare copper cable jointed to the aluminum feeders through parallel grooves with aluminum clamps molded in place.

DETAILS OF 1200-VOLT INSULATORS

The 1200-volt messenger and feeder insulators, as shown in Figs. 6 and 29, were furnished by the Locke Insulator & Manufacturing Company. The messenger insulators consist of a single piece of dark brown porcelain, that part of the insulator which is above the wire groove being fitted with a Clark clamp for holding the messenger to the insulator. The general specifications required that when cemented this insulator should withstand a mechanical test equivalent to a horizontal pull of not less than 4000 lb. applied at the tie wire groove. This test was applied to one out of every fifty insulators, upon which the porcelain

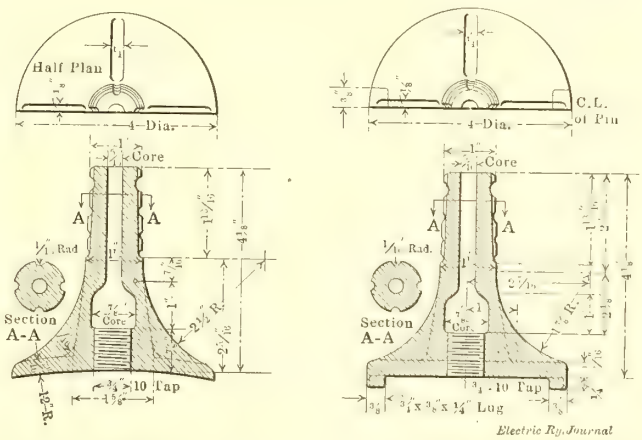


Fig. 28—Southern Pacific 1200-Volt Lines—Cross-Arm and Center Pole Pins

was broken for inspection. The electrical requirements were that the insulators would withstand the usual shallow pan water test of 20,000 volts for one minute continuously.

The feeder insulators are made of a single piece of dark

brown glazed porcelain. They were required to answer the same mechanical requirements as the messenger insulators, but they were to withstand a test of 30,000 volts instead of 20,000 volts.

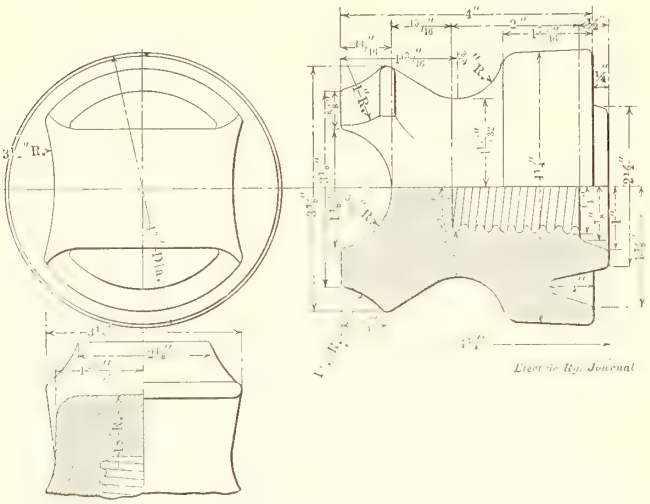


Fig. 29—Southern Pacific 1200-Volt Lines—Insulator for Feeders

CATENARY HANGERS

Before deciding upon the type of catenary hangers to be used preliminary bids accompanied by designs and samples were submitted by several manufacturers of line material. After a careful study of the several patterns the Southern Pacific Company made final drawings upon which bids were requested. The eye top design of hanger shown in Fig. 8 was found most acceptable for avoiding excessive wear and arcing at the trolley cars. This hanger lifts and tilts as the pantograph approaches and passes under the ear. Other features of this hanger are its simplicity, only four parts being required, and its freedom from rust pockets. The special coupling is of malleable iron, the ear jaws are of dropped forgings and the rod is of wrought iron. All the parts of the hangers are thoroughly galvanized.

The hangers were made by the Westinghouse Electric & Manufacturing Company in accordance with the following requirements: After being subjected to the zinc coating process, 1 per cent of every lot of hangers was to be cleaned, dried and immersed for one minute in the test solution hereinafter described, then washed and wiped dry. This immersion and drying were to be repeated four times while the temperature of the test solution was maintained between 62 deg. and 58 deg. Fahr. Immediately after their immersion the samples were to be washed in clean water of the same temperature as the test solution and dried with cotton waste before the next immersion. Samples that showed a bright metallic deposit after the foregoing test had been made were considered defective. The cleaning and drying test as set forth in the original specifications follows:

"(a) Cleaning and Drying: All samples shall be cleaned before the test, first with benzine or turpentine and cotton waste, (not with a brush), and then thoroughly rinsed in clean water and wiped dry with clean cotton waste.

"(b) Test Solution: The standard test solution shall consist of commercial copper sulphate crystals dissolved in cold water, about in the proportion of thirty-six parts, by weight, of crystals, to 100 parts, by weight, of water. The solution shall be neutralized by the addition of an excess of chemically pure cupric oxide, (CuO), as shown by the



Fig. 30—Southern Pacific 1200-Volt Lines—Details of Overhead Crossing with a 600-Volt Line

sediment of this reagent at the bottom of the containing vessel. The neutralized solution shall be filtered before using and shall be brought to a specific gravity of 1.186 at 65 deg. Fahr. at the beginning of every test. When the filtered solution is too heavy its density shall be reduced by adding clean water, and when it is too light its density shall be increased by the addition of filtered solution of higher specific gravity. Whenever the heavier solution is taken from the vessel which contains the unfiltered neutralized stock solution additional crystals and water shall be added to the stock solution, plus any cupric oxide that may be required to maintain the excess of this reagent in the unfiltered stock solution.

"(c) Quality of Solution: All samples shall be tested in a glass or earthenware jar in which shall be at least one-half pint of the standard solution for every sample tested. This portion of the solution shall not be used for more than one series of four immersions.

"In making the test, the samples shall not be in contact with each other but shall be kept well separated in order that the action of the reagent shall be uniform upon all immersed portions of the samples."

WOOD-BREAK STRAIN INSULATOR

In dead-ending trolley and messenger wires there are used in series one Ohio Brass Company's porcelain insulator and one wood-break strain insulator having a minimum stick diameter of 1¾ in. and a minimum distance of not less than 12 in. between the ends. The porcelain strains as tested at the Southern Pacific shops showed a breaking strength of 9500 lb. The wood-break strain insulators were given a factory test of 12,000 lb. before shipment.

CROSSINGS OF 600-VOLT LINES

Rather severe conditions were imposed in the crossings of the 1200-volt trolley by the 600-volt lines of foreign roads, as many of these crossings are located near station stops where the trains collect very heavy starting currents. Two wood-break section insulators are installed in the 1200-volt line on each side of a 600-volt crossing. These insulators have connected between them a short piece of trolley which is grounded to a switch located on an adjacent trolley pole. Normally this switch is closed, but it is opened by the linemen when necessary to work on this portion of the line. As shown in Fig. 30, wire brush contacts are attached to catenary hangers on the 1200-volt side of the section insulators. These brush contacts, through secondary contact on the pantograph frame, energize a time-limit potential relay on each motor car. The operation of this relay opens the motor circuit and prevents the heavy arcing

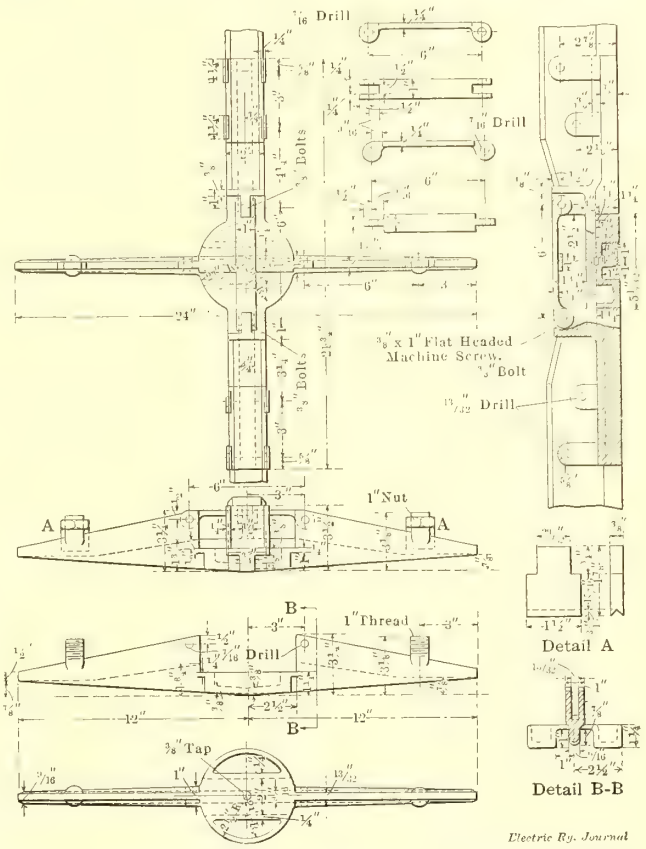


Fig. 32—Southern Pacific 1200-Volt Lines—Adjustable Trolley Crossing

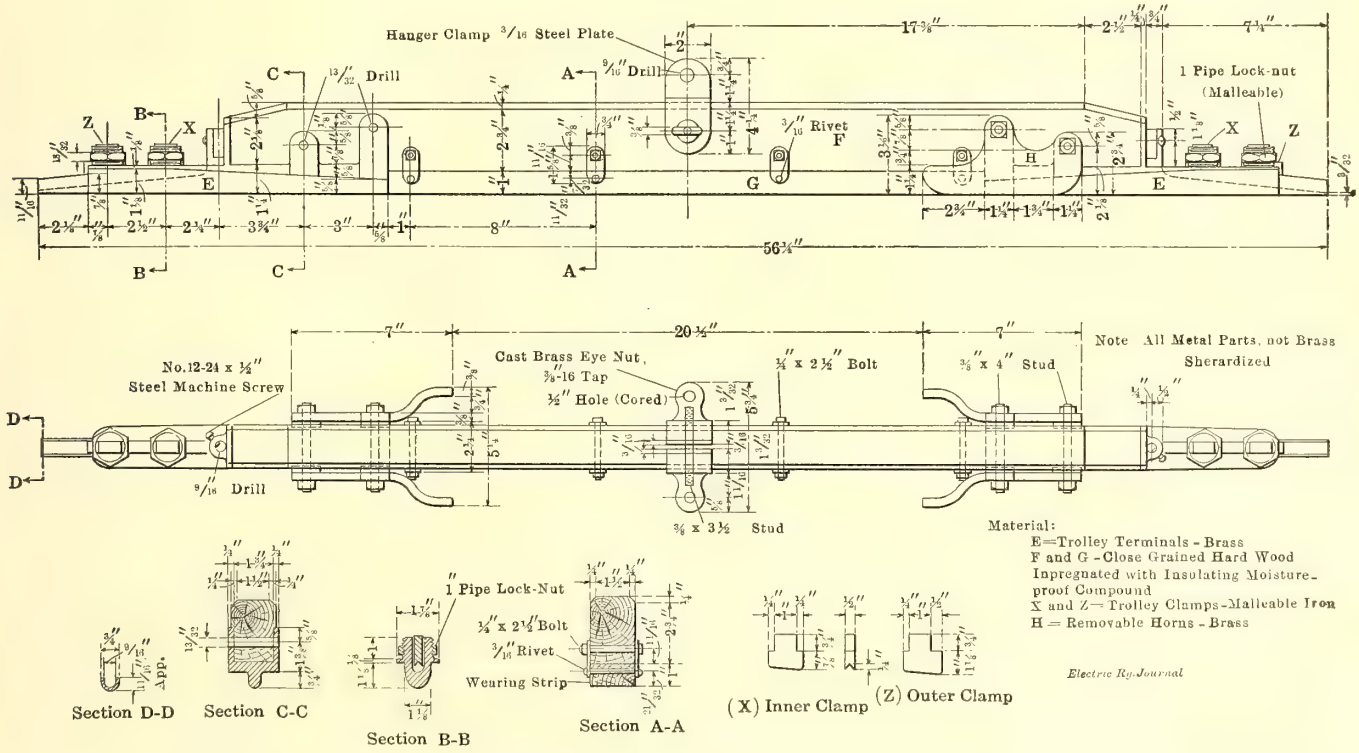


Fig. 31—Southern Pacific 1200-Volt Lines—Trolley Crossing with Section Insulator of Air-Brake Horn Type

that would otherwise occur when the pantograph passes under the section insulators.

Fig. 31 shows the details of an air-break, horn-type section insulator, Fig. 32 an adjustable trolley crossing and Fig. 33 a wedge-type splicing shield for the No. 0000 trolley wire.

GENERAL SUMMARY

The bonding of the tracks was commenced in May, 1909, and progressed slowly with the necessary construction of the roadway and tracks. The erection of catenary bridges and poles was started in the fall of 1909 and was likewise carried along with the roadway and street work. No effort was made to hurry the operations because the delivery of the cars was not expected until the spring of 1911.

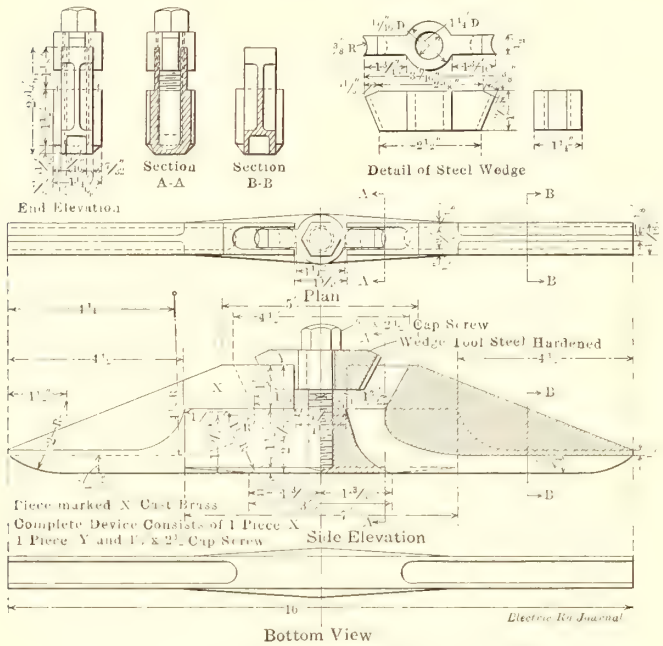


Fig. 33—Southern Pacific 1200-Volt Lines—Mechanical Splicing Shield for No. 0000 Wire

The mileage of the various types of overhead construction is to be divided approximately as follows: Catenary bridge construction, 15 miles of single track; center pole construction, 55 miles of single track; cross-span construction, 50 miles of single track. The total numbers of the spans of various lengths, exclusive of shop yards, are approximately as follows: 3700 120-ft. spans, 1400 90-ft. spans, 800 60-ft. spans. The large proportion of 90-ft. to 60-ft. spans is largely due to sharp curves and necessary adjustment of pole locations to avoid cross streets.

The total quantities of material used for the present electrification may be of interest. They were approximately as follows:

Forty two-track intermediate bridges.

Ten two-track signal and anchor bridges.

Thirty-five four-track intermediate bridges.

Thirteen four-track signal and anchor bridges.

Three thousand three hundred and eighty-five steel tubular poles.

Three hundred and forty-one steel transmission poles.

Three steel towers.

Eleven circuit breakers and switching houses.

Six hundred and sixty thousand feet No. 0000 trolley wire.

One million one hundred and twenty thousand feet 7/16-in. messenger cable.

Three hundred and sixty-five thousand feet span and guying cable.

Four hundred and ninety thousand No. 0000 seven-strand copper high-tension conductors.

Seventy thousand No. 0000 track-rail bonds.

Four thousand five hundred feeder insulators.

Fourteen thousand messenger insulators.

Three thousand five hundred high-tension insulators.

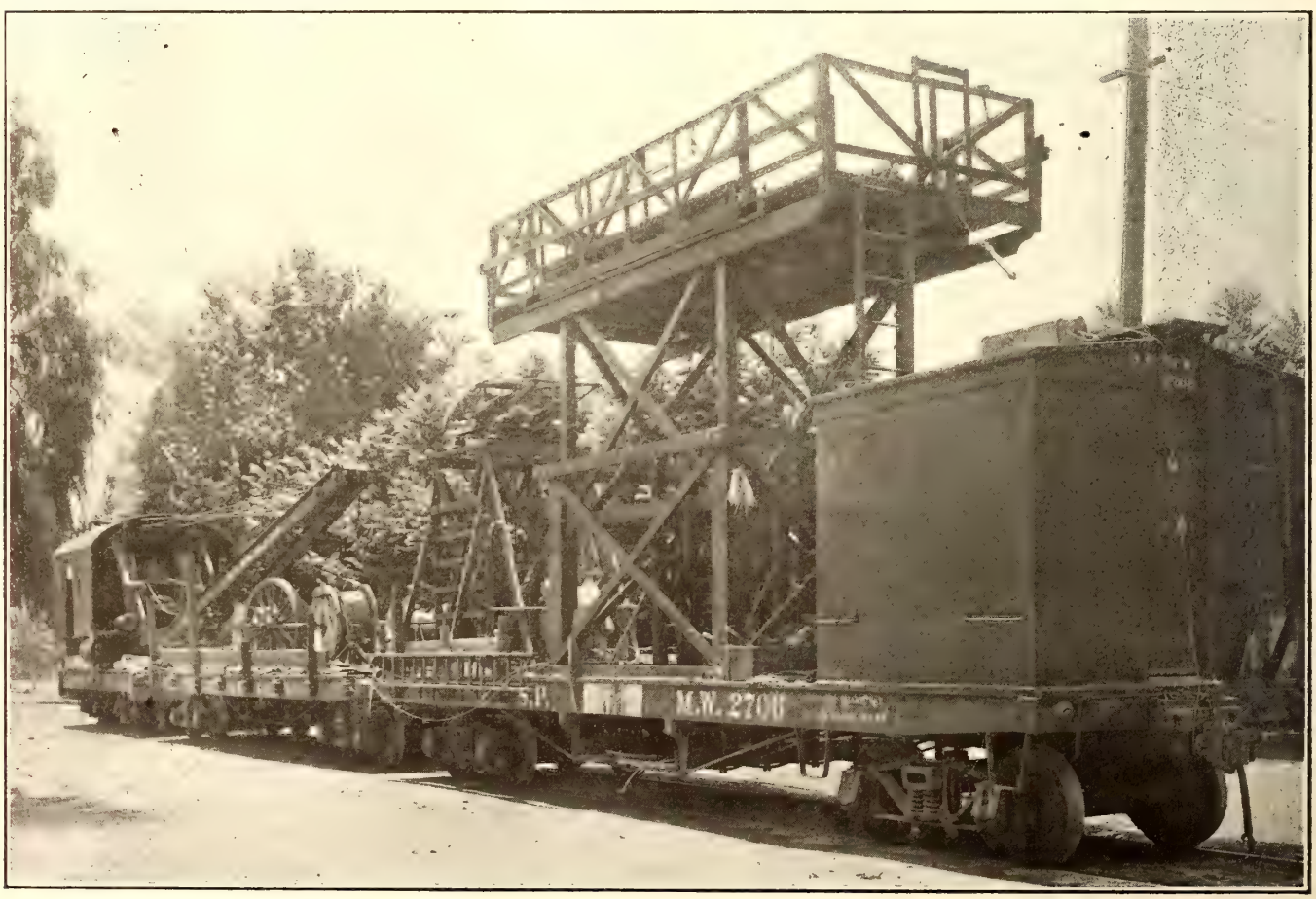


Fig. 34—Southern Pacific 1200-Volt Lines—Standard Construction Train Installing Overhead Work

The half-tone illustration, Fig. 34, shows the special work train which was assembled for erecting poles and catenary lines. This train consists of a locomotive crane geared to run up to 12 m.p.h., a flat car and a tower car equipped at the company's shops with a tool house and adjustable tower. The use of this outfit saved $45 a day compared with a work locomotive, as it was operated for not more than $10 a day. Aside from the saving and rental of equipment the crane was found particularly useful in handling poles, cable reels, etc.

ENGINEERING

The several features of the power distribution system and line construction described in the foregoing paragraphs were designed and installed under the direction of A. H. Babcock, electrical engineer, by H. W. Clapp, engineer of electric car equipment, assisted by B. C. Edgar.

EXHIBIT OF THE PUBLIC SERVICE COMMISSION, FIRST DISTRICT, NEW YORK

At the annual budget exhibit of the city of New York, which has been conducted during October at 330 Broadway, the Public Service Commission of the First District has had an exhibit. Among other things the commission exhibited a series of photographs and charts showing the progress of the work on the Fourth Avenue subway in Brooklyn, views of the wheel guard tests conducted by the commission and a map of the present rapid transit lines in the city, showing the comparative ticket sales during the year at the different elevated railway and subway stations.

Another chart shows graphically the expenses of the Public service Commission by years since it entered office on July 1, 1907, and the expenses of the preceding board of rapid transit railroad commissioners. The expenses of the Public Service Commission are subdivided into those of public service regulation and those of rapid transit planning and construction, the purpose being to prove that the latter have been less during the past four years than in the years immediately preceding and that the expenses of public service regulation comprised only a small part of the total expenses of the commission. Another diagram shows graphically the relation between the population of the present city for each decade since 1860 and the number of surface railway passengers per annum for each year. Still another illustrates diagrammatically the number of fatal injuries on the surface railroads for each of the four past fiscal years, with the number of passenger car miles and passengers carried. Still another diagram shows the expenses per capita for public utility service within the city. This division of expenses, gross and per capita, in Greater New York, is shown in the following table:

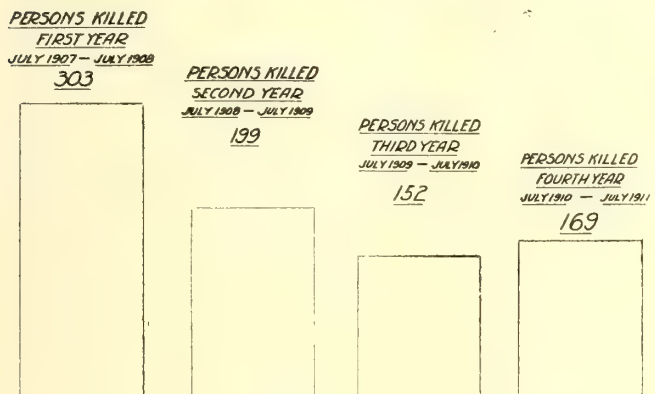


Diagram Showing Statistics of Fatal Accidents

Electric Light and Power.		
Per capita	$5.32	
General consumers	$22,658,006	
Municipal lighting, etc	2,724,817	
Total		$25,382,823
Gas.		
Per capita	$6.68	
General consumers	$31,040,152	
Municipal lighting, etc	803,120	
Total		$31,843,272
Transportation.		
Per capita	$16.35	
Stage coach line	$616,073	
Surface car lines	37,944,753	
Elevated railways	22,854,043	
Hudson tunnels	2,142,008	
Subway	13,443,805	
Staten Island steam railroad	943,090	
		$77,943,772
Total	$23.55	$135,169,867
Supervision by Public Service Commission.		
Per capita	$0.08	
Total	$23.63	$135,546,867

Another chart shows the results of tests of gas meters from July 1, 1907 to July 1, 1911. Of the meters tested 44 per cent were found fast, 46 per cent were found correct and 10 per cent were found slow.

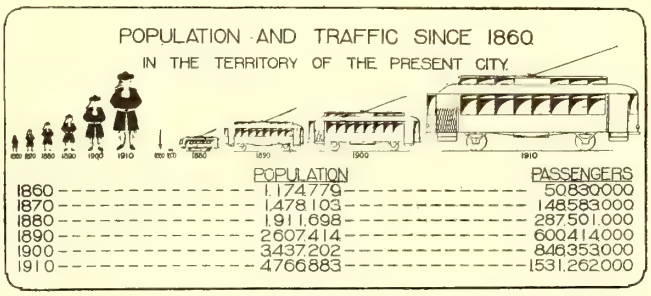


Diagram Showing Growth of Traffic

Another chart was entitled "Where the Nickel Goes—Distribution of the 5-Cent Street-Car Fare." It presented the following statistics:

	All Street Railway Companies.*	Subway Only.
Wages of conductors and motormen	$0.7525	$0.3350
Other wages and salaries	0.9255	0.8020
Other operating expenses	0.9650	0.4500
Taxes	0.3370	0.0840
Rent due city	....	0.8120
Interest, etc	1.0000	0.8920†
Surplus for dividends	1.0200	1.6250
Total	$5.0000	$5.0000

*Including subway and elevated lines.
†6 per cent on estimated investment of lessee.

Another tabulation shows the fatal accidents on the surface lines by months.

The Adrian (Mich.) Street Railway operates a "loop" line serving the two most important steam railroad stations in the city. These stations are located at a considerable distance from the business district and the street cars pass the railroad stations at twelve-minute intervals. This street-car service is in competition with public horse and automobile vehicles, but a substantial amount of depot traffic is obtained for the street cars by use of a simple indicator installed close to the car tracks at each station. The indicators resemble large clock dials surmounted by a sign announcing "The next car will arrive at —." The hands of the clocks are moved forward by each car conductor to show the arriving time of the succeeding car. Thus a stranger getting off from a steam train at once receives definite information as to the time of arrival of the next street car.

The Uses of an Appraisal

The Author Describes Twelve Uses to Which the Appraisal of an Electrical Property May Be Applied and Draws Distinctions Between the Values of the Property for Different Purposes

BY HALBERT P. GILLETTE, CONSULTING ENGINEER, NEW YORK

Appraisals are generally regarded by electric companies as being a necessary evil, forced upon them by public service commissions and tax commissions. However, it will soon be apparent that an appraisal may be so used as to pay a handsome return on the cost of gathering the data.

There are at least twelve uses to which an appraisal of the property of a public service corporation may be put, namely:

1. As a basis for taxation.
2. As a basis for rate making.
3. As a basis for the sale of the property.
4. As a basis for issuing bonds and stock.
5. As a basis for insurance.
6. To show the public that the net earnings are moderate.
7. To assist the accounting and engineering departments by correcting past errors, by preventing future errors arising from incorrect charges to plant account and to maintenance, and by providing a correct plant distribution at all times.
8. To determine the amount of existing depreciation.
9. As a guide in estimating maintenance expenses, thus providing a criterion by which to judge the efficiency of management and to show true net earnings.
10. As a basis for a complete analysis of unit costs of production with a view to effecting economies.
11. For comparing similar plants and interpreting their operating costs.
12. As an inventory, to disclose inadequately remunerative pieces of property and to detect property losses arising from theft, carelessness, etc.

TAXABLE VALUE

Eventually it will be seen that all property taxes should be based upon net earning capacity. At present, however, the public inclines strongly toward the appraisal of public service corporation property as a basis for taxing such property. Hence appraisals of the cost of reproduction have been used in several states for taxation purposes. It is demonstrably unfair to tax certain property on its cost of reproduction when other property is taxed on values that are guessed at and public service corporations are justly becoming aroused over their rapidly rising taxes wherever public service appraisals have been made. Land is said to be taxed upon its value, but its value depends entirely upon the net income derivable from it.

To estimate net earnings correctly it is necessary first to ascertain the detailed cost of the plant so as to determine accurately the average annual repairs and depreciation. Hence an appraisal of the physical property should precede every attempt at fixing values for taxation. This will eventually lead to the scientific appraisal of all property, although at present such appraisals are confined to public service corporation property.

At first thought it seems incongruous that there should be one value for taxation and another value for rate making. Brief study suffices to show that any other scheme leads to absurd results. In this State [Washington] there is a railway whose appraised cost of reproduction is $3,000,000 according to my estimate. It is entitled to make net earnings of at least 7 per cent or 8 per cent on its cost of reproduction, but it does not earn any such return. Capitalized at its annual net earnings (by dividing them by 7 per cent) the value of the property is about $2,000,000, which is about the value assigned to it by the Public Service Commission. Any higher valuation for taxation purposes would ruin the company, which is already weak. Yet for rate-making purposes that railway is entitled to a valuation of $3,000,000, so that it may earn a return on its $3,000,000 investment if it can do so without charging rates that will drive away its already meager business.

RATE-MAKING VALUE

Values for rate making should also include not merely the cost of reproducing the physical plant, but the cost of building up the existing business, in so far as each element of cost is reasonable. This cost is best measured by ascertaining the accumulated deficits below a fair return on the investment up to the time that the plant begins to earn a fair return. This is called development expense or going value, and two public service commissions have recently adopted this theory, namely, the Wisconsin Railroad Commission and the Public Service Commission of the First District of New York. The Supreme Court of the State of Oklahoma has upheld the deficit theory of development expense.

SALE VALUE

The sale value of a property is ascertainable by the method used in ascertaining its taxable value—by capitalizing net earnings—with the additional element of present value of probable future increment in net earnings. In other words, future growth in net earnings is discounted and added to the capitalized present net earnings. Future growth is more or less problematical, as a rule, but may be prognosticated with some accuracy by the use of curves showing the growth of the property as compared with the growth of similar properties.

VALUE FOR ISSUANCE OF SECURITIES

The issue of bonds is generally limited to the cost of the physical property in its new condition and often the mortgage limits the bond issue to about three-fourths the appraised cost of the physical property. It is likely to become the practice of all states to limit the issue of stocks and bonds to an amount that shall not exceed the cost of reproducing the property and business of the public service corporations. The first state appraisal of railways, that of Texas, was made for the express purpose of restricting the issue of railway securities.

INSURANCE VALUE

Little need be said at this time on this phase of the subject of appraisal, but it may be noted that the possession of a complete appraisal of a public service property often discloses the desirability of taking out much more insurance than had been previously carried.

PUBLICITY OF VALUES

If the owners and managers of public service properties had realized the effectiveness of publicity of the facts and of all the facts about their business we should not be to-day in a season of hard times. Concealment of data has led to public suspicion; suspicion has led to muckraking; muckraking to unjust ordinances and attacks on public service property, and attacks have finally culminated in great timidity on the part of capital. I am confident that this timidity is itself born of ignorance, and will soon begin to vanish when capitalists see that it can be shown that rarely

*Abstract of an address delivered before the Seattle (Wash.) Electric Club Sept. 26, 1911.

does a public service property show net earnings of more than 6 or 7 per cent on its cost of reproduction. I predict that within two years a wave of popular revulsion against attacks on public service corporations will occur. My appraisal of all the railways in the State of Washington first opened my own eyes as to the meager net returns secured by railway companies, and I hazard little in risking the prediction that it will be found that when all the public service property in America shall have been appraised the net earnings will be less than 7 per cent of the cost of reproducing the properties, including therein the cost of building up the business, and that the average net earnings are very likely to be less than 6 per cent.

As a means of publicity alone, therefore, appraisals of public utilities will be worth incalculable sums, both to the public and to the corporations.

ASSISTANCE IN ACCOUNTING

Accounting should be so conducted that an appraisal of the cost of reproducing new the existing plant will check with plant account as shown on the ledgers of the company, provided the same unit costs are used in the appraisal as were actually incurred in the construction, and provided the appraiser ascertains the quantities according to the history of the construction. By correct accounting methods when an existing structure or machine is replaced with a new one the original cost of the old structure or machine, less its scrap value, should be charged to maintenance, and the difference between the cost of the new structure or machine and the amount thus charged to maintenance should be charged to plant or capital account. The data of an appraisal can be used to great advantage by the accounting department in estimating amounts properly to be charged off for plant renewals.

DEPRECIATION AND MAINTENANCE

An appraisal should show the age of all classes of plant and of as many plant elements as possible. This will throw great light on the proper sums to be set aside for depreciation reserves and the like. It will also disclose where renewals are urgent or likely to be necessary in the near future. Indeed, if a complete card record is kept of every element of the plant that can be readily distinguished from other elements, such as poles, with date of installation, cost of materials and cost of labor, it becomes possible to predict with great accuracy what the maintenance costs should be for the ensuing year. From a calculation of the weighted age of each class of plant units it is possible to interpret the maintenance accounts with far greater accuracy than now obtains, and thus it becomes possible to tell whether the management is truly efficient or only seemingly so.

The units in which maintenance of electrical properties are now recorded are frequently, indeed, usually, very unsatisfactory and often misleading to an astonishing degree. Take, for example, the car mile, which is a common unit for measuring maintenance of electric cars. This unit has its uses, but they are small when contrasted with the percentage method of measuring car maintenance. By the percentage method the cost of maintenance for the year is divided by the cost of the car, and the percentage thus secured is used as a gage of the maintenance cost. A motor car costing $4,000 will cost about one-third as much for maintenance as a motor car costing $12,000 if they are of equal age. If in each case the maintenance cost is 10 per cent for a given year and if each car travels 30,000 miles during that year we have $400, or 1.33 cents per car mile, as the maintenance cost of the $4,000 car and $1,200, or 4 cents per car mile for the $12,000 car. A person who did not know the cost of the cars would make a serious error if he should take the car mile as the sole unit in which to measure the cost of car maintenance.

There are almost innumerable examples of this sort that might be cited to show the use of appraised values as the basis for estimating or interpreting maintenance costs. In passing I wish to emphasize the grave danger of estimating maintenance costs as a percentage either of gross income or of operating expense.

BASIS OF ANALYSIS OF UNIT COSTS

We have just considered the use of appraised values in analyzing maintenance costs. Every unit cost contains the element of interest on the investment in the part of the plant used for producing the unit in question. Hence no complete cost of production can be ascertained without a complete knowledge of the cost of the part or parts of the plant involved in the production. Self-evident as this statement is, it is a fact that many owners and managers of public utilities have often ignored its import. Thus, it is not uncommon to see rates of charge for service that are so low as not to yield an interest return on the increment in plant value necessitated by the service rendered.

The foregoing consideration relates to rate making, but it is perhaps of even greater importance to consider investment values for the purpose of reducing costs of production. Any careful analysis of the appraised value of a large plant will almost invariably disclose the possibility of economies in maintenance expense and interest charges to be effected through a reduction in the amounts invested in certain classes of plant elements. Thus, it may be found that instead of several tracks serving a given section of a city one track can be so located as to perform every reasonable service. This might be seen without an appraisal, but an appraisal thrusts the fact before the managerial eyes so prominently that it must be seen.

COMPARISON OF SIMILAR PLANTS

Without a complete appraisal it is exceedingly difficult always and often impossible to compare the results of the management of different electrical properties. True efficiency is indicated not by large investment in plant, but by the least investment consistent with adequate service. Were appraisals made of all publicly owned and all privately owned waterworks, I doubt not that it would be found that the investment of capital in privately owned works is so much less than in municipally owned works giving equal service as to be amazing. The public usually forgets that efficiency is not measured by operating expenses alone, but that interest charges on large public utility plants often exceed operating expenses and are always a very large part of the total cost of production. Not only for the purposes of comparing private plants with one another, but for comparing public with private plants, is it highly desirable that all be appraised.

Socialism will not find a check to its advance until published appraisals and unit costs of production furnish the irrefutable evidence of the greater economy of private management of public utilities. Nor will political economy cease to be a science of qualitative analysis by guesswork and become a quantitative analysis by science until unit costs are taken as the universal criteria of efficiency in political as well as in business life.

Rapid progress is being made in the construction of the Oakland & Antioch Railway, a new high-speed electric railway which is being built to connect Oakland and Antioch and the intervening territory, extending about 40 miles eastward from San Francisco Bay. The new road is to connect with the San Francisco, Oakland & San Jose Consolidated Railway, the "Key Route," and is to be operated by direct current at 1200 volts with four 150-hp motors to a car. The cars are to be about 60 ft. long and will be run at a maximum speed of 50 m.p.h. Service is already being given in the so-called Valley district of the line, and a tunnel is being built in the hills east of Oakland to shorten the connection with that city. Catenary trolley construction is being installed, and power is purchased from the Great Western Power Company, San Francisco, substations each of 100-kw rating being located at present at the tunnel 4 miles from Oakland and at Concord.

Fare Agreement in Detroit

Details Are Published of the Plan Just Accepted by the City Authorities of Detroit and the Detroit United Railway to Settel the Franchise Situation in That City—It Has Still to Be Approved by the City Council and Will Then Be Referred to the Voters

A tentative arrangement for settlement of the franchise situation in Detroit has been made between the officials of the Detroit United Railway and the city of Detroit. The arrangement has been under discussion between officials of the company and the city for the last six months, but public announcement of the fact that settlement had been reached on the main points of controversy was not made until Oct. 21. At that time the full details of the plan outlined were given to the newspapers and they are now receiving informal consideration pending their submission to the vote of the people.

In general, the plan is to consolidate various terms of city ordinances granting franchises to the railway system through the enactment of a new measure which shall be supplemental to the ordinance granted to the Detroit Railway in 1894. Under the proposed arrangement all the franchises are to expire on the same date as the Detroit Railway franchise, Dec. 4, 1924. Certain provisions which are of unusual interest deal with conditions which have developed since the year in which the Detroit Railway ordinance was passed.

RATE OF FARE

Two of the main provisions of the arrangement, as tentatively concluded between the officials of the company and the city, relate to the proposed rates of fare on the city lines and the treatment of paving. It is proposed that within thirty days after the acceptance of the agreement by the people the rates of fare on all city lines and to and from Palmer Park, a place of amusement located just outside of the city limits, shall be as follows : Eight tickets for 25 cents from 5 a. m. to 8 p. m., six tickets for 25 cents from 8 p. m. to 5 a. m. At the option of the passenger a single fare of 5 cents may be paid. An effort will be made to restrict city traffic to city cars by a charge of 5 cents for passage on the interurban cars within the city limits. This arrangement is similar to that which prevails on the various interurban cars operated in the city of Cleveland.

The provision regarding fares in the Detroit Railway franchise may be restated, as that clause was substantially the determining factor in the treatment of this question in the proposed new franchise. The Detroit Railway ordinance was granted to Henry A. Everett and others. Under this franchise an electric railway system was constructed in Detroit about fifteen years ago as a competitor of the existing properties. Later all the properties were consolidated and they are now part of the extensive system of city and interurban lines operated by the Detroit United Railway Company. While the rates of fare on the lines composing the original Detroit Railway have remained at the figures stipulated in the ordinance, the rate of fare on the other lines of the Detroit United Railway in the city of Detroit is 5 cents.

The 1894 ordinance granted to the Detroit Railway provided that the rate of fare for a single ride for a continuous trip any distance in one direction, over any one of the routes, should be 5 cents, for which the passenger should be entitled to a ride and a transfer. At the same time the company was required by ordinance provision to keep on sale on the cars in service between 5:45 a. m. and 8 p. m. of each day tickets to be sold in strips or packages of eight tickets for 25 cents. Each of these tickets was to be accepted for a single fare for any distance on a car on which it was presented between 5:45 a. m. and 8 p. m. and transfers given thereon. It was further provided in this ordinance that the company should keep on sale on the cars in service between 8 p. m. and 5:45 a. m. tickets to be sold in strips or packages of six for 25 cents, each to be good for a ride and a transfer. It will be noticed that the hours are changed slightly in the new proposed arrangement.

It was expressly stipulated in the 1894 ordinance that the rates of fares should not be reduced without the consent of the grantees, their successors or assigns, and that the rates of fare should not be exceeded during the period of the ordinance, either with or without the consent of the city.

PAVING TO BE MAINTAINED BY CITY

Another provision of the ordinance of 1894, the terms of which are included in the proposed agreement affecting all lines, relates to paving, which is to be maintained by the city. The original provision relating to this subject stated that all paving or repaving or repairing of pavement upon any of the streets upon which the grantees, their associates, successors or assigns should thereafter construct, maintain and operate a street railway should be done wholly at the expense of the city of Detroit, both within and without the rails of said tracks, and after being paved or repaved by the city the same should be maintained and kept in repair by the city, and there should be no charge whatever against the company for repavement and repairs of the streets and pavements. It was also provided that the company should not disturb the pavement or foundation except upon permission of the Board of Public Works, and that when the company should tear up or disturb the pavement of streets or their foundation, or disturb the foundation of any street which the city was repaving, the company should pay to the city all expenses of the Board of Public Works for supervision of the work and for repair and replacement as before it was so disturbed, and of maintenance to the satisfaction of the board thereafter until the street or trackway was repaved, provided that such maintenance should not exceed a term of three years if the street was not repaved by that time.

The proposed arrangement includes an agreement by the city by which it will maintain the pavements and foundations on all lines.

TAXATION

Another important feature of the settlement arrangement as prepared tentatively is a further amplification of the clauses of the 1894 ordinance protecting the company against taxation. The draft of the agreement made public by Mayor Thompson of Detroit states that the tax clause of the Detroit Railway ordinance is to remain intact, with the addition that no tax is to be laid upon any investments in paving and foundations and no tax other than the ad valorem tax specified in the Detroit Railway ordinance shall be laid by the city—that is to say, no fees for licenses, express cars, interurban cars or rented cars, etc., shall be imposed. The clause in the 1894 ordinance relating to taxes provides that the grantees shall pay taxes on real estate and personal property, including rolling stock, tracks, wires, poles and motors, the same as an individual; but it is provided that in consideration of the reduced rates of fare fixed by the ordinance and other valuable considerations the franchise and earnings of the railway shall in no manner be subject to taxation.

MUNICIPAL OWNERSHIP PROVISION

The agreement as framed provides for possible municipal ownership. The city is to have the right to purchase the system within the city limits at any time upon six months' notice. The company on its part is to obligate itself to

give a clear title to all the property within the city limits in case of purchase. This feature of the arrangement has caused discussion regarding the ability of the company to segregate its city property from the interurban lines in the event of purchase by the city in the future. Bond issues of the company are secured in some cases by mortgages which cover property lying both inside and outside of the city limits. In fact, in track mileage the city property of the Detroit United Railway is much smaller than the outlying part. The company owns and operates about 200 miles of track located within the city limits, while its total track mileage in all parts of the system is about 800 miles. The Detroit city system therefore constitutes in track mileage about one-quarter of the total. In view of this situation a question has been raised regarding the possible attitude of the bondholders toward the agreement. No definite statement has been made, however, on this point.

The provision relating to the city's right of purchase which is contained in the 1894 ordinance is now of course to be modified in part by the proposed agreement that the city shall have the right to purchase at any time within six months. The provision framed in 1894 stated that the city should have the right to purchase at the expiration of the franchise period of thirty years all tracks, cars, motors, wires, poles, electrical appliances and apparatus, together with the power plant and other equipment necessary for the operation of the lines, at a price to be fixed by a board of arbitration of nine members. It is proposed in the amended plan to reduce the number of arbitrators to five, two to be selected by the company and two by the city and those four to select the fifth person. Failure by these four to agree on the fifth arbitrator shall be followed within thirty days by the appointment of an arbitrator by the Circuit Court of Wayne County. The 1894 ordinance provided that the city should give written notice of its intention to make the purchase at least one year before the expiration of the thirty years and should proceed with and complete the arbitration.

The provision regarding value in the 1894 ordinance says that in arriving "at a fair price at which said purchase shall be made by said city of Detroit, such board of arbitration shall not take into consideration the value of this franchise or grant, but shall allow for the property to said grantees, their associates, successors or assigns its fair value for street railway purposes, taking into consideration the cost and natural depreciation." The 1894 ordinance provided further that the price, terms of sale and times of payment agreed upon by the board of arbitration or a majority of the members thereof should constitute the basis of the sale, and both the city and the grantees should be bound to abide thereby. It was also provided that the property should remain in possession of the company until the terms of purchase should have been complied with by the city and the company would be responsible for the continuous operation thereof under the terms of the grant until the terms of purchase were complied with.

In the new arrangement there are some changes in the details of this feature of the contract, as for instance in the provision which is proposed in the amended agreement that the decision of the board of arbitration shall be binding upon the company but shall not be binding upon the city until ratified by the voters. It is also provided that while no value is to be allowed for the new grant the value of all existing franchises at the time of purchase shall be computed to the date of expiration, which is to be in no event later than Dec. 24, 1924. Other details in reference to these features of the arrangement are published in the abstract of the plan given herewith.

EXTENSIONS

Definite provisions are made for the construction of extensions to the city system. Certain extensions upon which an agreement was reached early in the present year are to be completed during the year 1912. Other new lines stipulated in the agreement are to be constructed in the same year. Thereafter, the plan is to construct extensions at an average rate annually of not less than 5 per cent of the total city track mileage.

During the negotiations between the representatives of the company and the city the conferees were J. C. Hutchins, president; F. W. Brooks, general manager, and Attorney Donnelly, representing the Detroit United Railway, and Mayor Thompson and Corporation Counsel P. J. M. Hally, representing the city of Detroit. A. B. du Pont was called into the conferences as adviser for the city.

So far as has been announced no definite date for submission of the plan to the voters has been fixed. Corporation Counsel Hally is preparing an ordinance based on the terms of the tentative agreement. The natural course is the presentation of the ordinance to the City Council. If that body approves the measure the plan then goes before the public. To be ratified, a plan of this nature, if submitted to the voters, must receive the vote of 60 per cent of the voters.

GENERAL PROVISIONS OF THE PLAN

This agreement provides that the city shall have the right to purchase the street railway system within the city limits at any time upon six months' notice served upon the company.

This right to purchase is a continuing right, and one or more failures to purchase after notice shall not exhaust it.

The company obligates itself to deliver a free-and-clear title to all its property within the city limits to the city in case of purchase.

The purchase price shall be agreed upon, if possible, between the city and the company. If this it not possible, the city shall appoint two arbitrators, and the company two arbitrators. These shall select a fifth arbitrator. If they fail to do so within thirty days, the fifth arbitrator shall be selected by the Wayne circuit bench as constituted at the time of the negotiations. It shall be the duty of the arbitration board so constituted to fix the purchase price and terms of purchase.

The decision of this arbitration board shall be binding upon the company, but shall not be binding upon the city until submitted to a vote of the people and ratified by them.

In the event of purchase the company agrees as follows:

(a) No value is to be placed upon this grant.

(b) The value of all existing franchises at the time of purchase shall be computed to the date of their expiration, but in no event after Dec. 4, 1924.

(c) In order to prevent assigning values to the company for work done on paving and foundations by the city, all existing pavements and foundations constructed by the company are to be valued in 1912, and paid for at this price without interest, in case of purchase.

(d) All future grade separation work and foundations which are to be laid at the expense of the company are to be sold to the city in the event of purchase at cost, plus 10 per cent for the use of tools and equipment.

RATES OF FARE AND TRANSFERS

Within thirty days after the approval by the people the rates of fare shall be as follows on all city lines and to and from Palmer Park:

Eight tickets for a quarter from 5 a. m. to 8 p. m. Six tickets for a quarter from 8 p. m. to 5 a. m. or, at the option of the passenger, a single fare of 5 cents.

The rates of fare on interurban cars within the city limits shall be 5 cents in order to reserve the interurban cars for interurban passengers.

The company will give universal transfers to and from all lines.

EXTENSIONS, NEW LINES AND BETTERMENTS

(a) The company shall provide adequate street car service to and from the new Michigan Central Railroad station as designated by the Common Council.

(b) In 1912 the company shall finish any uncompleted

portions of the extensions agreed upon in the spring of 1911.

(c) In 1912 the company shall pave between its tracks from Artillery to Home Street on its west Jefferson line, and from Hillger to Gray Streets on its east Jefferson line.

(d) The company shall build new extensions each year at an average of not less than 5 per cent of its total city track mileage for that year.

(e) In 1912 the company shall build a north and south line in the western portion of the city as designated by the Common Council, and shall connect its Myrtle Street line on the west side with its Mack Avenue line on the east side, upon some street in the neighborhood of Bagg Street, as designated by the Common Council.

The provisions of the Detroit Railway ordinance as to service shall remain in force, with the further provision that the company shall provide such service as the Common Council may ordain and the traffic demands, and the cars shall be designated as to route and destination.

The company may, for the convenience of the public, change existing routes, but if the new route proves unsatisfactory the right is reserved to the Common Council to order the restoration of the old route.

CITY TO MAINTAIN PAVING

The city agrees to maintain the pavements and foundations on all lines, in accordance with the terms of the Detroit Railway ordinance.

All franchises shall expire on Dec. 4, 1924.

The tax clause of the Detroit Railway ordinance is to remain intact with the addition that no tax is to be laid upon any investments in paving and foundations, and no license fee or express car fee, interurban car fee or rental car fee, nor any other tax than the ad valorem tax specified in the Detroit Railway ordinance, laid by the city.

The company agrees hereafter to separate its grades on demand of the Common Council in accordance with the plan now existing between the city and the steam railroads for the separation of grades and to pay its proportion of grade-separation expenses in accordance with that general plan.

OTHER FEATURES OF THE AGREEMENT

In the event of purchase interurban and passenger cars are to be operated over the city's lines until 1924 as follows:

(a) The city is to man, collect and retain the fares collected on the passenger cars and to pay the company 2½ cents per car mile for the use of the cars.

(b) The company is to man the express cars, load and unload the cars, conduct the express business and pay to the city for the use of the tracks and equipments and the privilege of operating over the city's lines 15 cents per car mile.

All pending controversies and all claims and demands in dispute between the parties are to be canceled and discharged by each side.

It is expressly understood that this agreement is indivisible, and in the event of any section being judicially declared void, the whole agreement is to fall.

This agreement shall be supplemental and amendatory to the Detroit Railway ordinance.

It shall be submitted to the people at an election, and shall take effect thirty days after its approval by them.

STATEMENTS OF MAYOR THOMPSON

Mayor Thompson of Detroit in a formal statement issued on Oct. 21 said in part in reference to the settlement:

"The primary purpose of this tentative settlement is to enable the city to own and operate its own street railway system. This purpose is accomplished under the right guaranteed to the city to purchase the entire street railway system within the city limits at any time upon six months' notice to the company that it desires to do so.

"While much has been said about the desirability of municipal ownership, little or nothing has been said by way of practical suggestion as to its achievement in this city. In order to get possession of the street railway system we must either litigate, build or buy. Let us consider the comparative feasibility of these three plans.

"Litigation. By this I mean that the city shall attempt to enforce a right of eminent domain over the property of the Detroit United Railway in condemnation proceedings. It is apparent that such a lawsuit would be fought through the United States Supreme Court. It is also apparent that the question of the public necessity for condemning the property of the Detroit United Railway would be a close one. As the right of eminent domain can be exercised only by the state upon a showing of public necessity for the taking of private property, the ultimate outcome of the condemnation proceedings would be doubtful. The state cannot take private property merely because it is profitable or advantageous to do so, and undoubtedly it would be claimed on behalf of the street railway company that, as it was rendering the transportation service required by the public, the state, in condemning its property, would be inspired, not by any public necessity, but by consideration of profit and advantage. At its best, therefore, the litigation route to municipal ownership is long-drawn-out and tedious, and, to say the very least, uncertain.

"Parallel construction. Another way in which the municipality could embark in the street railway business would be to build lines parallel to those already in existence. It goes without saying that we need street car service. When the men went out on a strike last month and street car service was suspended, our industries were temporarily paralyzed because their thousands of employees could not get from their homes to their work. Assuming, therefore, that street car service is a commercial necessity, it is apparent that it would not be prudent to drive the street cars from the streets and tear up the tracks of the company because this would involve a suspension of service, with the consequent paralysis of commerce and industry that would necessarily follow. In order to embark in the municipal ownership of a street railway system by construction, therefore, we would have to build alongside of the Detroit United Railway lines, or else on contiguous parallel streets. It would hardly be practicable to build alongside of the Detroit United Railway tracks on such main arteries of travel as Jefferson Avenue, Woodward Avenue, Michigan Avenue and Gratiot Avenue, as all the space outside of the car tracks is now needed for the congested travel and vehicles incident to the tremendous growth of our city. When it comes to building parallel lines on streets continguous to the Detroit United Railway lines, two objections immediately present themselves: First, that residents upon the contiguous streets would object strenuously to having their streets torn up for a duplicate street car system; second, the number of available duplicate streets with proper advantages is comparatively limited. I am afraid that if we attempted such a program, it would result in a makeshift system not conducive to the best interests and needs of the traveling public.

"The third method is by purchase. This method is the most direct route to municipal ownership, provided the Detroit United Railway is willing to sell its property at a fair price. Up to this time we have been unable to make a bargain with the Detroit United Railway for its property, because it takes two people to make a bargain, and the Detroit United Railway would not deal. But under the tentative plan of settlement the Detroit United Railway agrees to deliver to us, free and clear, its entire property within the city limits at any time when we give to it six months' notice that it is our intention to acquire it.

PRICE OF ACQUISITION

"The only other question involved in the achievement of municipal ownership by purchase is the acquiring of the property at a fair price. What safeguards have we thrown around that proposition?

"1. The city authorities and the company will endeavor to get together upon a price.

"2. If they fail to do so, each will appoint two arbitrators who shall select a fifth to fix upon a fair price. If these several arbitrators fail to agree upon a fifth arbitrator within a reasonable time, the judges of the Wayne circuit bench shall select the fifth arbitrator.

"Now the result of this arbitration as to the price is binding upon the company, but it is not binding upon the city until it is submitted to a vote of the people. If the people think the price is too high they can reject it and the deal is off.

"Necessarily the negotiations looking toward the achievement of municipal ownership will take some time. There will be 'dickering' between the city and the company as to the price. Possibly there will be arbitration; time will be consumed in appraisals and the taking of the testimony. Then, when the arbitrators agree upon a price, the deal will have to be submitted to the vote of the people. All this will consume time and hence it was important to get some concessions from the company pending these various preliminaries looking to the achievement of municipal ownership. So I say that the primary purpose of this agreement is to get municipal ownership in the near future.

"The secondary purpose is to get a cheap rate of fare, universal transfers and much needed extensions now. The negotiations looking to municipal ownership may go on. Meanwhile the public will ride on all the lines at an eight-for-a-quarter rate and will have transfers to and from all lines, besides which we will secure a north and south line on the west side and a line connecting the Myrtle Street line on the west side and the Mack Avenue line on the east; also 10 miles of extensions each year, to be laid on the streets designated by the city.

"This, therefore, is the whole settlement in a nutshell: that the city has an immediate right to buy, either upon an agreed price or an arbitrated price, to be approved at an election by the people, merely upon giving formal notice of its desire to do so six months in advance. This, in my judgment, brings municipal ownership within the reach of our people; but while municipal ownership is being worked out we get universal 3-cent fares and transfers and extensions that are vital to the growth of our city.

"It is distinctly agreed that the company shall not raise a finger to secure the adoption of this agreement by the people. I shall not be a party to any pulling-and-hauling, 'log-rolling,' proselytizing campaign. If such a thing is attempted I shall go to the extent of denouncing it; yes, even to the extent of fighting the adoption of the agreement.

"For myself, I shall make no campaign for the adoption of the agreement. I considered it of sufficient importance to present for public consideration, but the people must judge for themselves as to its merits. Beyond seeing that the people are correctly informed as to the purpose and meaning of the agreement, my labor is done when I submit it to them.

"It is the people's matter, and it is for them to adopt it or reject it as they see fit. It must stand or fall on its own merits.

"This agreement is not be considered final or binding on my part. Until the proper ordinance is framed by Mr. Hally to express the agreement, and accepted by the company, the agreement is tentative only."

SUPPLEMENTAL STATEMENT BY MAYOR ABOUT PAVING

A supplemental statement in reference to the paving feature of the agreement was made by Mayor Thompson on Oct. 23. The Mayor estimates that $200,000 annually is an outside estimate of the expense to which the city will be put for paving under the agreement. The Mayor has recently employed John McVicar to examine the paving between the tracks and the foundations and make a report on the matter.

STATEMENT OF A. B. DU PONT

A. B. du Pont, of Cleveland, in an interview published in the *Detroit News* of Oct. 21, said in part:

"The result of the negotiations in Detroit is that the company has agreed to the drawing of an ordinance allowing the city to buy its property at any time on six months' notice, and pending the purchase by the city the terms of the old 3-cent Pingree-Detroit Railway franchise are to be in force on all the tracks in the city.

"I consider this is the best settlement that has yet been made between a municipality and a street railway corporation in the United States for the following reasons:

"1. It enables the city to purchase the property at any time it desires without lawsuits. This especially appeals to me for the reason that the late Tom L. Johnson had to fight fifty-seven injunction suits, cause a competing railway to be built involving an expenditure of several millions of dollars and carry on a ten-year litigation against the Cleveland Railway before that company would sell to the city.

"2. During the interval between the passage of this ordinance and the time the company is ready to sell the public will have the benefit of a street railway ordinance which, in my opinion, is better for the public than the present Cleveland situation, for the following reasons:

"Under the Thompson plan the maximum rate of fare that can be charged is the rate of the old Pingree 3-cent lines, while under the Cleveland plan they can charge seven tickets for a quarter and 4-cent cash fares and an additional penny for the privilege of transferring. The stockholder of the Cleveland Railway being assured 6 per cent on his investment, and no more, has no interest in the economical management of that railway. In fact, some of the larger stockholders, through their interest in other railways, have a direct financial interest in making the operating expenses of Cleveland as extravagant as possible in order that the rate of fare may be raised to the maximum allowed under the ordinance. While the people of Cleveland are at present riding for 3-cent fares, there is no assurance that this fare will not be increased to seven for a quarter with 1 cent for transfer. In fact, unless the city can better control the waste in the expenses of operation the fare will soon reach the maximum. The proof is that in the year 1907, prior to the passage of the present ordinance, when the stockholders of the Cleveland Railway Company had a direct financial interest in any waste of money, the item of superintendence of transportation was $32,687, while in 1910 it reached $145,000. In the total increase in operating expenses in the year 1910 only one-fifth was due to increase in conductors' and motormen's wages, the other four-fifths being used in increasing the wages of others than motormen and conductors and employing many useless men.

"Again, the Thompson plan allows the city to purchase the property at any time it desires. The Cleveland plan only allows this after a period of eight years have elapsed. The Thompson plan proposes to limit the franchises to 1924. The Cleveland plan is for a twenty-five-year grant, which the city must renew for twenty-five years, at every ten-year period and on the same terms, or the grant goes into full possession and control of the company and supervision by the city is denied, and the company has a perfect right to change the maximum rate of fare and make much more than 6 per cent on its property."

ACCEPTANCE BY THE COMPANY

President J. C. Hutchins, of the Detroit United Railway, accepted the terms of agreement in the following letter addressed to Mayor Thompson on Oct. 21:

"I thank you for a copy received this morning of your official communication to the Common Council, outlining in brief the terms of settlement upon which we have tentatively agreed after some months of discussion; and I beg to state that, should the people adopt an ordinance embodying these terms, we will accept same."

Observations on "Near-Side" Cars in Buffalo

These Include the Rates of Unloading and Loading These Cars and Comments on Their Operation—A Copy of the Rules Issued to Trainmen in the Operation of These Cars Is Appended

The near-side car was introduced on the Grant Street line of the International Railway of Buffalo on Sept. 17, and on the Clinton Street line on Oct. 15. On the former line, which extends through a good residential neighborhood, thirty-six cars of this type have been placed in service. On the Clinton Street line, which reaches a section settled principally by the homes of workingmen, twenty-five cars are used. The one-way mileage on the Grant Street line is 5.3 miles, and the scheduled running time is thirty-four minutes into the business district and thirty-two minutes to the outlying terminal, or sixty-six minutes for the round trip. The one-way mileage on the Clinton Street line is 4.1 miles, and the scheduled running time is twenty-eight minutes each way, or fifty-six minutes for the round trip. The headway on the Grant Street line is one and one-half minutes during the evening rush hour, and five and five and one-half minutes during the day. On the Clinton Street line the evening rush-hour headway is two minutes, and the headway during the day is six minutes. The Grant Street line is the heavier traffic line of the two named. Neither line, however, ranks in density of traffic with the heaviest lines of the system. It is apparent, therefore, that the experiment has been tried first upon lines where comparatively light resistance to the innovation would be offered by the traffic conditions. While the car loads at the down-town terminals are not as heavy as on other lines, the other conditions of traffic are such as to reveal quickly the advantages or disadvantages of the car.

SPEED OF LOADING AT DOWN-TOWN TERMINALS

The down-town terminus of the Grant Street line is at an island sidewalk at Niagara and Main Streets. There is just enough room at this sidewalk for two cars to receive loads at the same time. The Niagara Street line, one of the heaviest in the system, uses the same loop and the schedules are so arranged that usually one car of the Niagara Street line and one car of the Grant Street line load at the same time. As pay-as-you-enter cars are operated on the Niagara Street line, an opportunity is afforded for a comparison of the two types in close operation. Over the conductor's stand on the Grant Street line these notices are published: "Passengers After Paying Fare Will Not Be Permitted to Remain on Platform"; "Conductors Will Not Be Required to Furnish Change for Bills of a Larger Denomination than $2."

The following loading records, showing the time required by passengers to board the cars, were made last week on the Grant Street line at Niagara and Main Streets during the evening rush hour. They were not taken with a stop watch, but are reasonably accurate.

No. of Passengers Boarding Car.	No. of Seconds Required.	No. of Passengers Boarding Car.	No. of Seconds Required.
25	40	18	30
16	25	10	25
22	55	29	55
35	75	25	40
19	40	21	30
49	90	45	100
16	28	46	82
26	40	12	20
19	30	20	40
19	32	21	35
23	45	14	30
16	30	21	45
30	75	42	70

In the instance given where seventy-five seconds were required for thirty persons to board the car there was a delay because a woman found, after reaching the conductor, that she was on the wrong car and forced her way out through the boarding passengers. In several other cases delays arose from the necessity on the conductor's part of making change, but as a rule there was little delay on this account. The foregoing observations were made from 5:05 to 6:17 p. m., and included most of the cars. A uniformed inspector stood at the car steps to assist any who needed help in boarding the cars. He gave the signal to start and frequently assisted in closing the doors. Passengers reaching this terminal left the car by the front exit door, but as soon as they had alighted this door was closed and all passengers boarding the car did so by the entrance door on the front platform. No effort was made to compile similar loading records of passengers boarding the adjoining pay-as-you-enter cars.

On some of the near-side cars it was especially noticed that the first passengers boarding at the terminal walked to the rear seats, leaving the later passengers to take the seats nearest the platform. On other cars the reverse practice was followed, so that without a complete observation of this point it would be impossible to state just how the long-haul and short-haul passengers respectively distributed themselves.

CLINTON STREET LINE

The Clinton Street line has its principal down-town terminus at Washington and North Division Streets, one block from Niagara and Main Streets. After receiving the load at this point the car turns from North Division to Washington Street and one block further into Eagle Street. On account of the congestion on Washington Street, the near-side crossing stop was not made at Eagle Street. The stop for passengers at this corner was made after the car had turned into Eagle Street. This was the only point observed where the near-side stopping rule was not followed. The Clinton Street cars have printed over the conductor's stand the words, "Move quickly, please." At one grade crossing on this line a derailer is operated by a watchman before cars can pass.

CARE OF TROLLEY

No trouble was experienced with the trolley at any point, at railway or other crossing, switch or tangent line, while the representative of the Electric Railway Journal was on the cars.

LOADING AND UNLOADING ON THE TRIP

The use of longitudinal seats at the platform end of the car appeared to facilitate unloading as, without interference from cross-seats, it permitted a number of persons to congregate at the front end of the car for the purpose of alighting. Of course a large standing load at this place would prevent rapid unloading by blocking the passage of those who desired to leave the car. At nearly all the loading points the motormen were able to bring the car to a stop at the center of the cross-walk so that passengers had to take only a few steps to board the cars. Practically no delays, therefore, resulted from the running of the cars past the cross-walk. During the trips on the cars unfamiliarity with the new arrangement led to one case of delay where a man attempted to find his way in at the rear end. At points of junction with other lines on which the cars of the rear-platform type were operated, the old familiar practice of intending passengers standing at the corner until the car stops and then hurrying to the rear end was observed.

The platforms of the near-side cars do not hold as many persons as the pay-as-you-enter car platforms and there is, therefore, a delay at loading points that is to be measured by the extra time required for the excess number of persons to board. On the other hand, at points

where there were not over four or five persons, there seemed to be a saving due to the fact, as stated, that the platform step was practically at the street crossing where the people stood. It also appeared that the use for exit purposes of but one end of the car, which is always before the eyes of seated passengers, encourages rapidity of movement and thus leads to unloading in normal time except in places where there is a heavy exit movement. In such places, of course, two exits would naturally permit more rapid unloading than one.

ACCIDENTS

One important claim made for the near-side car is that it will reduce the number of boarding and alighting accidents for which the company would be liable because of negligence in starting. Obviously this claim is one more easily proved through records than by observations made during a few trips. Nevertheless, observations show that the car almost completely segregates the duties of the motorman and the conductor. Unless the trolley should leave the wire or conditions should require the conductor to signal the car to proceed at a railway crossing, responsibility for the movement of the car rests entirely on the motorman. By means of the mirror he can watch the interior of the car so as to see whether all who desire to alight have done so. It is also, undoubtedly, an advantage that the motorman is not obliged to wait for a starting signal, for which in cases of blockage or heavy movement of passengers he frequently has to signal the conductor.

FARE REGISTERS

The near-side cars in Buffalo are equipped with the fare recorders of the Dayton Fare Recorder Company.

COMPARATIVE SPEED OF LOADING AND UNLOADING

Observations of the speed of loading and unloading these cars made for the International Railway, and based on the actual length of stops, are stated to have shown a decrease in time of stops per passenger of from 15 to 20 per cent compared with the present pay-as-you-enter cars. In the calculations men who jumped on or off the latter cars while the cars were in motion were not counted.

CONDITIONS IN COLD WEATHER

The near-side cars have not yet been run in Buffalo during winter weather. The officials of the company believe, however, that with only one door there will be no objectionable draft. Extra heating capacity is provided on the platforms to care for this contingency.

CONCLUSION

In conclusion it should be said that the officials of the International Railway Company believe the near-side car to be a logical development of the prepayment, closed-platform idea in car designs. They are well pleased with the results so far. Thorough experience will demonstrate the applicability of the car to the varying requirements of different communities. It may, for instance, be adapted better for long-haul than for short-haul business. If such be the fact, it will be revealed by actual operation.

RULES FOR "NEAR-SIDE" CARS

The International Railway Company, of Buffalo, has issued a booklet giving information and instructions to conductors and motormen regarding the near-side car. The booklet bears this motto: "Knowing Why Makes Doing Easier." It says, in part:

"In order that all conductors and motormen may intelligently co-operate with the management in making the near-side car a success it is essential that a thorough understanding of the objects to be attained be made clear at the outset and that the necessary instructions be set forth.

"Following a careful observation of the shortcomings found by experience to exist in present methods, and taking into consideration the suggestions of conductors and motormen, looking to such improvements as would lessen the liability of accident and increase the comfort of the men, the near-side car has been developed to the end of providing an added measure of safety, comfort and convenience.

"The entrance and exit of the near-side car are both by way of the front platform, enabling passengers to enter and leave the car directly at the cross-walk on the near side of the street, instead of walking the entire length of the car to gain entrance by way of the rear platform, which has often been most objectionable, due to the muddy condition of the streets, and has been productive of accidents because of the inability of the conductor to see approaching passengers from his position on the rear platform.

"The use of the front platform for both entrance and exit makes possible a better division of duties between the motorman and the conductor, in that the motorman may be given entire responsibility for the starting and stopping of the car and the safety of passengers boarding and alighting, the conductor's duties then being confined to the collection and registration of fares, issuance of transfers and calling of streets. The duties of conductor and motorman are by this means more equally divided and each is rendered more efficient.

"The conductor is provided with a seat within a guarded space, directly opposite the entrance to the front platform. In this position he is able to control the entrance passage into the body of the car, and is amply protected from the weather, so that he may at all times be clothed in a way best suited to the rapid performance of his duties.

"When the car is at a standstill, taking on passengers, the conductor has only to collect fares and issue transfers. This he is able to do much more rapidly than heretofore, as he is now relieved of the necessity of watching the step and giving the go-ahead signal. The entrance portion of the front platform will accommodate from ten to fifteen on-coming passengers, which under these conditions will be amply sufficient.

"When the car is in motion the conductor, in either seated or standing position, is directly facing the passengers. Thus placed he can most readily observe the signals of those passengers who cannot conveniently reach the passengers' signal push button. Having no other duty to perform while the car is in motion, the conductor is able to call the streets as required, and as he is facing the passengers the names of the streets announced will be much more easily heard and understood.

"The exit at the rear end of the car, to be used in case of emergency or at points where the car is to be entirely emptied, as at baseball games, etc., may be readily operated either from the rear end of the car or by the conductor from his position on the front platform.

"The motorman is provided with a seat, and in the operation of the controlling devices is protected from interference by a dividing rail. His vision is guarded against reflected light by means of an adjustable curtain. He controls the entrance and exit by a convenient lever, operating both the in and out folding doors and steps separately or simultaneously at will.

"While the car is at a standstill the motorman can plainly see the passengers entering and leaving the car, and is thus able to act promptly and safely in operating the folding doors and steps, getting the car under way without the loss of time heretofore encountered through the necessity of waiting for the bell signal.

"When the car is in motion passengers are not permitted to remain upon the platform. The motorman's attention is not, therefore, diverted, as heretofore. This serves to assure more certainly his seeing persons signaling from the street, and results in a greater alertness on his part in the avoidance of accidents by collision.

"Passengers alighting from a car by way of the front platform and passing across in front of it have a direct view of cars or automobiles approaching them from the opposite direction. Should they desire to pass behind the car from which they alight they must necessarily await its forward movement. These conditions serve to prevent the accidents which have heretofore occurred because of pas-

sengers alighting from the rear end of a car and passing directly behind it and into the path of a car or automobile approaching from the opposite direction.

"The ventilating system is automatic, and therefore not dependent upon the action of the conductor or the whim of the passenger. The fresh air is brought in over the electric heaters, which are controlled by a thermostat guaranteed to regulate automatically the degree of heat, thereby insuring an even temperature during the winter months. The impure air is discharged through registers placed in the ceiling directly over the seats. These registers are connected with ventilators placed at intervals on the roof of the car. The vacuum created by the motion of the car draws out the impure air with such rapidity as to insure an entire change of air within the car during each three-and-one-half-minute interval, this being slightly in excess of health department requirements.

SPECIAL INSTRUCTIONS

"1. Near-side stop.

"Cars will be stopped at the near side of street intersections, bringing the entrance on front platform as nearly as possible directly at the crosswalk, but without interfering with persons crossing the street.

"2. Fares collected on front platform.

"Fares will be collected and registered on the front platform before passengers enter the interior of the car.

"3. Front platform kept clear.

"In order that conductor and motorman may give undivided attention to the proper performance of their respective duties, passengers will not be permitted to remain upon the front platform. A careful observance of this rule will serve to prevent the numerous accidents heretofore occurring, due to the attention of the motorman being taken from his work by the conversation of passengers.

"4. Extreme overloading of cars.

"The policy of this company is against the extreme overloading of cars.

"The conductor will therefore display 'car full' sign whenever a maximum load of eighty-three passengers has been reached. The display of this sign will explain to would-be passengers the reason why the car is not brought to a stop for them. Conductor, when asked regarding this action, will courteously explain to passengers the company's purpose, and by this means endeavor to secure the goodwill and co-operation of the public.

"The greatest measure of success in the use of the near-side car depends upon the keeping of a clear passageway in the forward end of the car. Whenever passengers are unnecessarily obstructing the forward part of the car conductor will courteously request them to 'please step to the rear,' and as opportunity offers, the conductor should explain that what the company is here endeavoring to do is to provide a safe and pleasant means of transportation.

"5. Furnishing change.

"The requirement limiting the amount of change required to be furnished to passengers by the conductor to $2 is posted in each car for the information of passengers and the protection of conductor. Change in excess of this amount should, however, be supplied by the conductor whenever the supply will permit it to be spared safely.

"6. Starting, stopping.

"Motorman will keep close lookout for prospective passengers, and will stop car so that the entrance on front platform is as nearly over the near-side crosswalk as possible without interfering with pedestrians. Platform doors will not be opened before car has been brought to a full stop. As soon as both doors have been completely closed motorman will be ready to start car without further signal.

"Motorman will stop the car at first regular stopping place after receiving push-button signal. As the conductor, in either seated or standing position, is directly facing the passengers he will readily observe the signal of those passengers who cannot conveniently reach the signal push-button. Thus placed the conductor will announce the names of streets, as required by the rules, so as to be easily heard and understood by all passengers.

"7. Rear door.

"When the rear door is to be used, which will only be in case of emergency or at points designated by special instructions, the conductor will announce, 'please leave by rear door.'

"8. Reverse operation.

"When car is to be operated in reverse direction conductor will take a position inside of rear door and will then give motorman starting and stopping signals by means of the auxiliary push-button signal circuit, and operate emergency air-brake valve if necessary to prevent accident.

"9. No smoking or spitting.

"Health department requirements make necessary the stopping of smoking and spitting in street cars. The attention of passengers spitting in the car must be called to the requirement of the health department, as posted in each car, and the attention of the police directed to such passengers as continue such offense. The above applies to all parts of the car.

"10. Route and destination signs.

"Each route or line of cars will be numbered as well as named. The large illuminated white number on black background occupying the upper half of the front vestibule window will always be displayed in accordance with the number of the line upon which the car is operated. This number is sufficiently large to be visible by day or night for a distance of several blocks.

"The side destination sign over the entrance and exit doors at the curb side of the front vestibule is so worded as to designate each terminus of the line. Conductor will be particularly careful to change this sign at both ends of the line, so that the name displayed will always show the terminus of the line toward which the car is moving."

ILLUMINATED SIGN FOR YARD TRACKS

A simple but exceedingly effective track sign for yard service has been installed in Salt Lake City recently at the new shops and carhouses of the Utah Light & Railway Company. The sign is designed to facilitate the accurate approach of cars to switches of ladder tracks branching from the main yard track to the various building sections. It consists of an inverted box of wood, about 3 ft. long x 6 in. wide x 8 in. high, with open bottom and transparent front carrying the track number designations. The sign is supported at the side of the track by a bracketed pole which rises about 8 ft. above the ground.

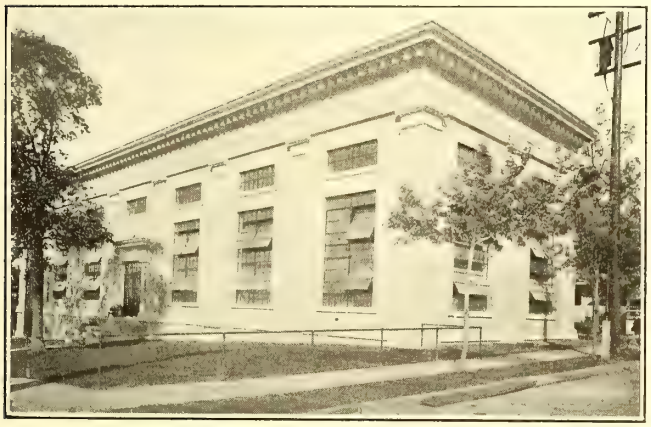


Illuminated Sign for Yard

The interior has a 16-cp, 110-volt incandescent lamp wired in pipe conduit and supplied with alternating current from the regular shop circuit. At night these signs save both time and accelerating current, because the motorman knows just where the switches are located and can run or coast up to them without unnecessary use of current. The circuits are turned on aud cut off by the yard watchman.

NEW SUBSTATION AT KANSAS CITY

The Kansas City Railway & Light Company has just completed a new combination railway and lighting substation installation in the attractive building shown in the accompanying engraving. This substation is located at Fortieth and State Streets on the state line between Kansas and Missouri. It is in a residential district and close



Combination Railway and Lighting Substation at Kansas City

to an important railway and lighting load center. The building is 133 ft. by 40 ft. in plan and has a steel and concrete framework and roof and exterior walls of sand-lime brick with concrete trimmings. The interior is served by a 25-ton electric crane. Shelter at one end of the building is provided for a line car which can be run directly into the building through double doors.

The railway equipment in this substation includes two 1000-kw rotaries of General Electric manufacture and complementary sets of air-blast transformers. The erection of this substation is part of a general plan of power improvements at Kansas City, which includes an installation now being made of a 15,000-kw Curtis steam turbine which will supplement the marine engines and 5000-kw turbine units in the Grand Avenue generating station.

DATA ON SINGLE-PHASE LOCOMOTIVES

The Siemens-Schuckert Works, Berlin, Germany, have recently compiled the data presented in the accompanying table to cover 15-cycle, single-phase locomotives built or under construction for governmental railway lines in Baden, Prussia and Sweden. The Wiesental (Baden) and Prussian locomotives are for 10,000-volt service, while the Swedish locomotive will take 15,000-volt current from the line.

DATA ON SINGLE-PHASE ELECTRIC LOCOMOTIVES.

	Baden State Railways	Royal Prussian Railways				Royal Swedish Railways	
Number of locomotives	10	1	1	1	1	13	2
Driving axles	3	2	4	3	4	6	2
Leading axles	2	3	..	2	2	..	4
Axle arrangement	1-3-1	2-2-1	0-4-0	1-3-1	1-4-1	0-3-3-0	2-2-2
Wheel diameters in mm	1,200/850	1,600/1,000	1,050	1,600/1000	1.150/850	1.200	1,570/970
Total weight in metric tons	65	72.25	60	71	79.5	99	70
Tons available for traction	42	30.25	60	45	56	99	30
Axle loads in tons	14-11.5	13.75-14.05 14.4-15.85 14.2	15	15-13	14-11.75	16.5	15-10
Over-all length between buffers in mm	13,160	12,500	10,500	13,100	12,800	15,920	12,900
Total wheel base in mm	9,500	9,000	4,800	9,600	10,900	11,750	9,900
Rating of motors in hp	C-650 at 70 km H-1,050 at 70 km	725 at 110 km 1,000 at 110 km	475 at 40 km 800 at 40 km	1,100 at 90 km 1,800 at 90 km	1,500 at 70 km 2,500 at 70 km	1,100 at 50 km 1,660 at 50 km	740 at 100 km 1,250 at 100 km
Number of motors	2	1	1	1	2	2	1
Tractive effort in kg at wheel periphery	*C-2,400 **H-4,000	1,800 2,500	2,800 4,900	3,000 5,000	5,250 9,000	5,100 8,500	1,950 3,250
Normal speed in km per hour	70	110	40	90	70	50	100
Maximum speed in km per hour	75	135	60	110	83	60	100
No. of transformers	1	1	1	1	1	2	1
Continuous rating kva	450	600	525	800	915	2 x 450 ÷ 500	600

*C=Continuous rating.
**H=Hour rating.

HEARING ON TRANSFERS IN NEW YORK

The hearing on the rates of fare upon connecting or intersecting street railways in the borough of Manhattan was continued before the Public Service Commission of the First District of New York on Oct. 19, 1911. Charles K. Jewett, of the Metropolitan Street Railway, was recalled and testified in regard to cost of construction of the Metropolitan Street Railway. O. C. Semple, counsel for the commission, offered in evidence certain pages from Exhibit 12 in the reorganization case of the Metropolitan Street Railway in connection with Mr. Jewett's testimony. Commissioner Eustis explained that Mr. Cotton of counsel for the company had offered the whole record of the reorganization case, but that he had reserved the question until he could consult with Commissioner Maltbie before whom the Metropolitan Street Railway reorganization case was heard. Commissioner Maltbie thought it better that the record of the Metropolitan Street Railway case be considered so that the case could be referred to during the present hearing.

Edward A. Maher, president of the Union Railway and the New York City Interborough Railway, recited the points at which it was originally agreed to issue transfers between these companies. He said that the original contract was substantially in force now. The policy of the companies was to issue transfers between the Union Railway and the New York City Interborough Railway at all intersecting points to carry passengers in one general direction. The system of transfers now in use had been put into effect since the interests which control the Third Avenue Railroad had become connected with the New York City Interborough Railway.

Asked by Chairman Willcox of the commission what would be the effect on the Third Avenue Railroad if the transfers between the Third Avenue Railroad and the Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad were discontinued, Mr. Maher said that he thought it would decrease the earnings of both companies. He could not express an opinion in regard to the probable effect of the discontinuance of transfers between the Third Avenue Railroad and the Dry Dock, East Broadway & Battery Railroad, as he had not considered that question. Having in mind that the three lines mentioned were competitors of the Metropolitan Street Railway and the elevated and subway, Mr. Maher felt that it would be advisable to continue the transfers, even if the Third Avenue Railroad, the Dry Dock, East Broadway & Battery Railway and the Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad were under separate managements.

Arrangements had been made with the receiver of the Twenty-eighth & Twenty-ninth Street Crosstown Railroad to exchange transfers between the line of that company

and the Third Avenue Railroad because those interested in the Third Avenue Railroad hoped to take over the crosstown line and make it part of the Third Avenue system to be used as a competitor to crosstown lines near by owned by other interests. Mr. Maher thought that a passenger could be carried cheaper for 3 miles on the Third Avenue Railroad in one general direction than he could be carried 1½ miles on the Third Avenue Railroad in one direction and 1½ miles on the Forty-second Street, Manhattanville & St. Nicholas Avenue Railroad in another direction. He considered the main abuse of the transfer to be the traffic in transfers carried on by persons who secured transfers with the idea of disposing of them for profit. He thought that the pay-as-you-enter cars had to a large extent done away with the non-collection of fares and that the cross-seats in the cars attracted passengers.

The hearing was to have been continued on Oct. 24, 1911, but with the consent of counsel the case was adjourned until Oct. 26, 1911.

THE KANSAS WORKMEN'S COMPENSATION ACT

In explaining the provisions of the new Kansas workmen's compensation act before the Kansas Electrical Association at Independence on Sept. 21, 1911, Charles Kerr, one of the authors of the bill, presented figures to show that of $255,000 expended on workmen's damage suits during a recent year in the Kansas courts only 16 per cent reached the injured men, the rest going for insurance, legal expenses, court fees, etc. The new law is designed to relieve both employer and employee of the heavy tolls thus charged.

Where the workman dies as a result of his injuries, leaving others who are wholly dependent on his earnings, the latter are entitled to an amount three times his annual rate of average wages, but not less than $1,200 or more than $3,600. If these dependents reside abroad the award is limited to $750. In case the dependents did not rely wholly for support upon the man killed they are entitled to receive an amount proportional to their sustained loss.

Where the injury results in total incapacity for work the injured man is entitled to payment—during the time of his incapacity after the second week, but for a period not exceeding ten years in all—of an amount equal to 50 per cent of his daily earnings, but not more than $2.50 or less than $1 per day. In case of partial disability the allowance ranges from 50 per cent down to 25 per cent of the former wages. In the case of persons under 21 years of age receiving less than $10 weekly the limiting compensation prescribed is 75 per cent of the former wages.

The above rates of workmen's compensation are rendered void, of course, if it is proved that the employee deliberately intended the injury, wilfully failed to use guards or precautions provided by the employer, or was intoxicated at the time of the accident.

INDIVIDUAL INDUCTION MOTORS FOR SALT LAKE CITY

The Utah Light & Railway Company is installing a complete equipment of thirty-five induction motors for individual machine tool driving at its new shops in Salt Lake City, this being one of the largest direct-connected street railway repair shop applications thus far made with separate motors. The motors vary in size from a 100-hp unit operating an air compressor to a 1-hp outfit driving a small drill in the toolroom. All the motors are wound for 200-volt service, the smaller outfits being connected directly to the line in starting. Iron conduit and metallic hose are employed in the wiring service and current is supplied to the motors by a special feeder circuit connecting with the Jordan substation of the company in the western part of the city. Alternating-current motors were employed on account of their simplicity and independence of operation with reference to the car distribution circuits. A list of the tools and the sizes of motors required for their service is given herewith:

LIST OF MACHINES IN NEW SHOPS OF UTAH LIGHT & RAILWAY COMPANY

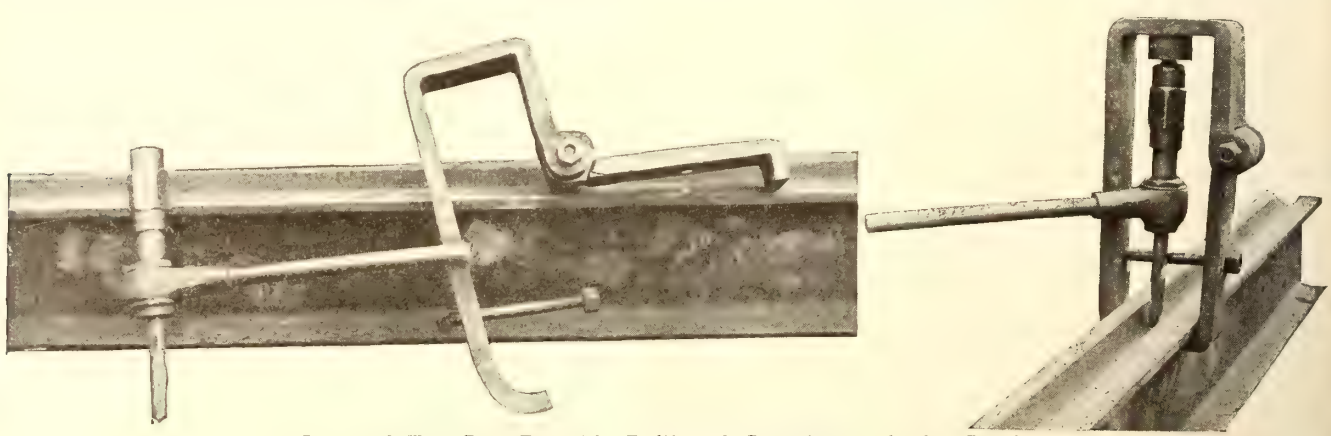
Blacksmith Shop:
- Blower, 15-hp.
- Compressor (old), 53-hp.
- Compressor (new), 100-hp.
- Dust house, 3-hp.
- Punch and shear, 7½-hp.
- Blower, 5-hp.

Machine Shop:
- Boring mill, 7½-hp.
- Wheel press, 5-hp.
- Wheel grinder, 15-hp.
- McCabe lathe, 7½-hp.
- Bradford lathe, 5-hp.
- Niles lathe, 5-hp.
- Doan lathe, 2-hp.
- Radial drill, 5-hp.
- Drill, No. 12, 3-hp.
- Drill (in sand house), 3½-hp.
- Milling machine (new), 7½-hp.
- Landis bolt cutter, 5-hp.
- Milling machine (old), 3-hp.
- Wet tool grinder, 2-hp.
- Small drill, No. 11, 1-hp.
- Walker tool grinder, 2-hp.
- Car hoists, 2 20-hp (40-hp.)
- Overhead crane, 2, 5-hp (10-hp.)
- Turret lathe, 5-hp.
- Bolt cutter, 5-hp (line shaft).
- Grindstone, 5-hp (line shaft).
- Shaper, 5-hp (line shaft).
- Field winder, 5-hp (line shaft).
- Banding machine, 5-hp (line shaft
- Grinder (emery), 5-hp (line shaft)

Carpenter Shop:
- Lathe, 10-hp (line shaft).
- Grindstone, 10-hp (line shaft).
- Planer and joiner, 10-hp (line shaft).
- Rip saw, 10-hp (line shaft).
- Tenoning machine, 5-hp.
- Single surfacer, 10-hp.
- Swing saw, 3-hp.
- Transfer table motor, 25-hp.
- Transfer table hauling motor, 3-hp.
- Heating plant motor, 7½-hp.

PORTABLE DRILL CLAMP

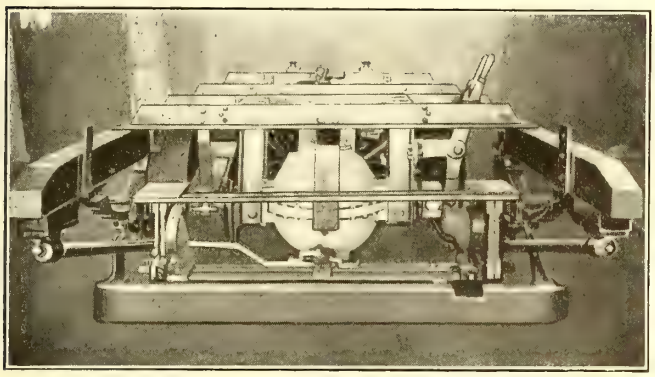
The two accompanying illustrations show a handy drill clamp which is so constructed that the drill pressure is equally divided between two legs. It is superior in this respect to the one-leg type because it is unnecessary to straighten the clamp from time to time. As shown, a hinge on one of the legs permits quick application to the metal to be drilled. When the bolts have been tightened, the clamp is so rigid that it cannot become bent no matter how great the drill pressure may be. The clamp may be attached to the top, sides and bottom of the rail and it can also be employed for drilling shafts or axles by forming a suitable curve at the end of the legs. This clamp was made by the master mechanic of an Eastern electric railway primarily to facilitate the drilling of a large number of drainage holes and rail grooves. It was found to be far superior to devices previously used for such work.

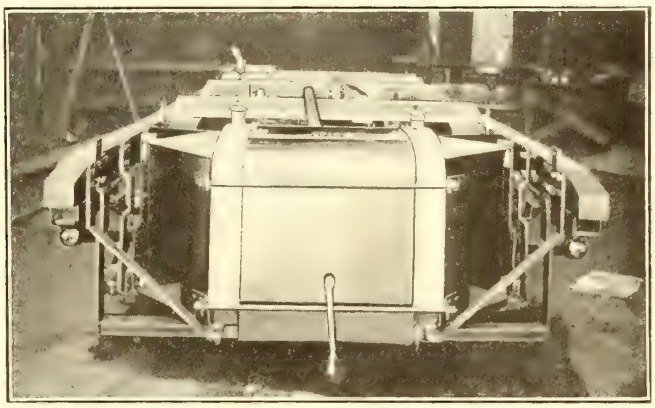


Parts of Two-Leg Portable Drill and Complete Drill in Service

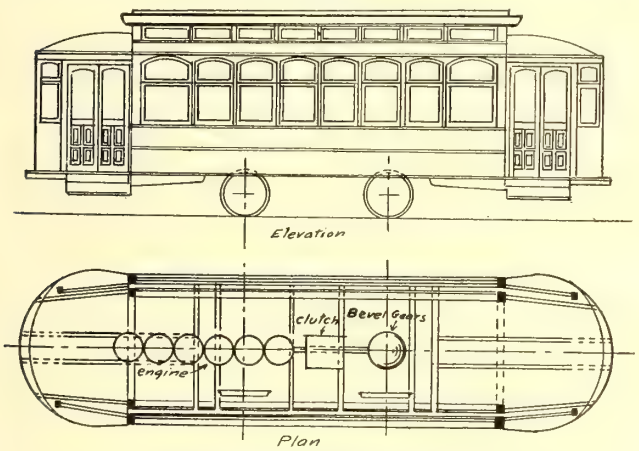
GASOLINE CAR NO. 2 AT POINT SHIRLEY

In the issue of this paper for Oct. 22, 1910, a description was published of gasoline-electric car No. 1 of the Point Shirley Street Railway, near Winthrop Beach, Mass. Since that time, owing to the large increase in traffic, a second car has been put into operation. This car differs essentially from the first car in that instead of an electric clutch it has a mechanical clutch.



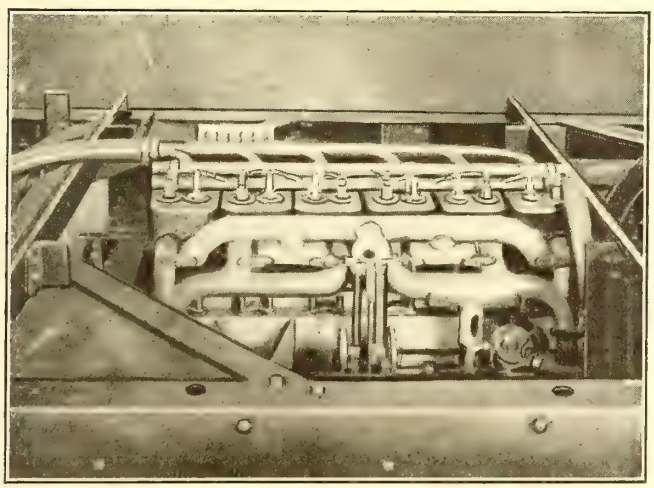


End Views of Truck of Point Shirley Gasoline Car



Plan and Side Elevation of Car

On the truck of this car is installed a six-cylinder gasoline engine, rated at 70 hp at 1500 r.p.m. Energy is transmitted to one axle through a multiple-disk clutch, sliding gear transmission and a bevel gear. This bevel gear is shown in the first engraving. The lever shown in the front right-hand corner is used to reverse the car by engaging one of the two bevel gears contained in the spherical gear box. This illustration also shows the method of supporting the engine and the transmission by the use of angle irons dropped from the top of the truck.



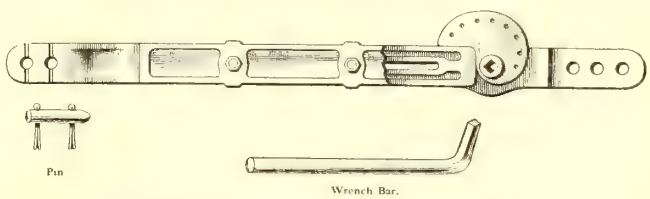
Side View of Motor

The cooling system shown in the second view consists of two radiators, each having a surface of 100 sq. ft. Fans operated by a shaft and bevel gears direct from the crankshaft of the engine maintain the air circulation through the radiators.

The car equipped weighs 8 tons and is capable of a speed of 30 m.p.h. on level track. The car was designed by Herbert N. Ridgeway and was constructed at the Atlantic Works, Boston, Mass. The total cost of the car equipped was $5,500, and the total cost of operation, including fixed and operating costs, is 16.5 cents per car mile when running 95 miles per day.

BRAKE-SHOE ADJUSTER

L. Zink, shop foreman with the Detroit United Railway, is making a cam-type brake-shoe adjuster of the design shown in the accompanying cut. This adjuster can be applied to any truck with inside brakes pulling from the radius bar or live lever. The adjuster is of malleable iron with ribbed edges. The sides and jaw where the pinholes



Cam-Type Brake-Shoe Adjuster

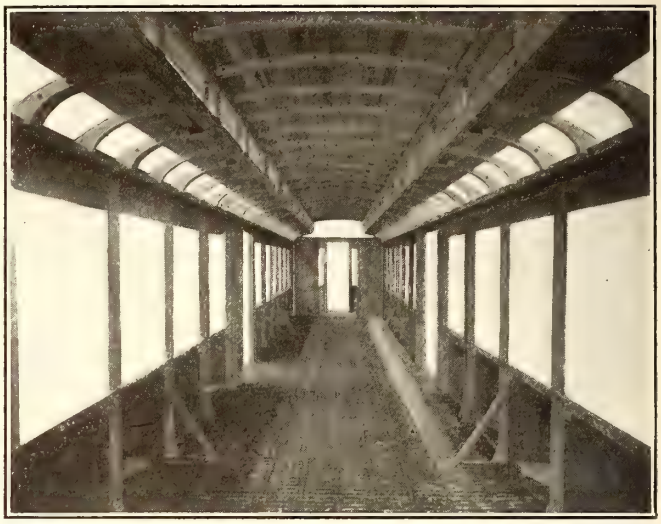
are located are ¾ in. thick, thereby giving ample strength. The round steel pins which fit the holes in the live and dead levers are locked with cotter keys on each side of the jaw to prevent the holes from wearing. The adjustment feature is obtained by the application of a wrench bar to the cam as follows: The cam has a ¾-in. square hole through the bearing hub to receive a 15-in. wrench bar which has a 3-in. turn bent almost at right angles, as illustrated. One turn of this bar extends by 2¾ in. the pin which is connected to the levers. The cam can be locked by placing ¼-in. cotter keys on both sides and screwing two lock-washered machine bolts into place as shown. The adjuster is made in two lengths with 2-in. adjustments—one for extended wheel base trucks ranging from 33 in. to 41 in. and the other from 29 in. to 35 in. If the shoes are not entirely worn out after a complete turn of the cam they may be held to the wheel by placing a wooden block between the brake beams. Further adjustment can then be made by removing the pin, extending the pinhole 2 in. and throwing the cam back to the starting point.

NEW STEEL CARS FOR PHILADELPHIA ELEVATED SERVICE.

The accompanying illustrations show in various stages of construction one of the thirty steel cars which The J. G. Brill Company, Philadelphia, Pa., is building for elevated-subway service in that city. The first car was ready on Oct. 7, within ninety days from receipt of order, and all the cars will be delivered by Nov. 15 of this year. The general dimensions and constructional features of these cars are similar to those which are now in service on the same line. The principal dimensions are as follows:



Interior View of Philadelphia Elevated Car, Showing Completed Ceiling, Part of Seat Framing, Etc.



Interior View of Side and Roof Framing of Philadelphia Elevated Car



Bottom Framing of Philadelphia Elevated Car

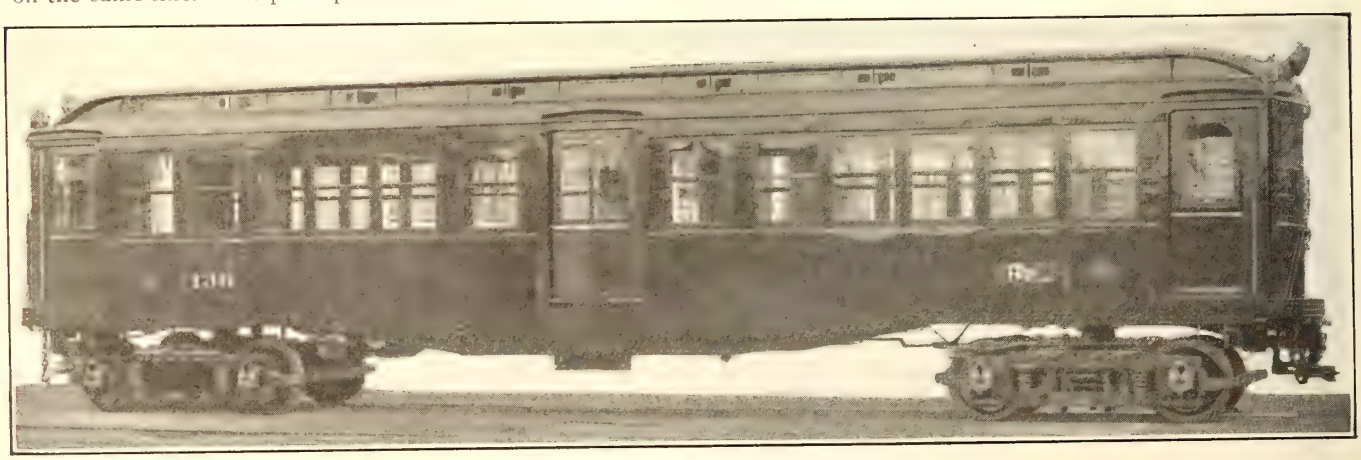
Length of body over the corner posts, 40 ft. 2¼ in.; length over the platforms, 49 ft. 7 in.; width over the sills, including the sheathing, 8 ft. 7 in.; width over the posts at the belt, 8 ft. 6¾ in.; extreme width, 8 ft. 8⅝ in.; height from the track to the underside of the floor, 4 ft. 1 in.; height from the track to the top of the roof, 12 ft. 11 in.; distance between the centers of the side posts, 2 ft. 8½ in.

The general details of the steel framing are shown in the accompanying views. The roof is of ½-in. poplar board covered with canvas. The flooring is of monolithic construction, the monolith being held in place by corrugated sheets. The corrugated flooring is attached to the side panels in such a manner that all leakage and draft under the seats are prevented.

The bodies are mounted on two Brill-27-M.C.B.-3 trucks of 6-ft. 8-in. wheel base, with 34-in. diameter wheels and 5-in. journals. There are two GE-66, 125-hp motors per car. The principal weights are as follows: Car body less electrical equipment, 32,000 lb.; electrical equipment complete, 2500 lb.; air-brake equipment, 1500 lb.; single trail truck, 11,500 lb.; single motor truck, 12,900 lb.; motors, 4375 lb. each; total weight, 69,150 lb.

AIR BRAKES IN NEW YORK

It is estimated that 4000 cars are involved in an order recently issued by the Public Service Commission, First District, New York, requiring all surface electric railway companies in that district to install air brakes on cars over a certain weight. The order requires all companies to equip with air brakes before June 1, 1912, all their double-truck cars weighing more than 27,000 lb., and before June 1, 1913, all double-truck cars weighing more than 25,100 lb. Single-truck cars are not included in the order.



Philadelphia Steel Elevated Car Complete

News of Electric Railways

Chicago Subway Plans

Announcement has been made that on Oct. 31, 1911, the local transportation committee of the Chicago City Council will receive plans for a passenger subway system in the business section of Chicago, which have been prepared by Mayor Harrison's subway commission. It is understood that two plans for a subway system will be submitted to the committee. The first plan contemplates a subway for use only by the trains of the elevated roads; the second plan provides for subways which also would accommodate surface cars. Connection between the two systems is proposed when both have been constructed. The first plan for a subway would cost approximately $12,000,000. The north and south routes would be on State and Dearborn Streets and the east and west routes on Lake and Harrison Streets.

Under the first proposed plan of the city's engineers trains would be run as follows:

From the south side, enter the subway at Thirteenth and State Streets, run north in State Street to Lake Street, west underground to Desplaines Street, then up to the elevated structure to Oak Park.

From the north side, enter the subway at North Water and Dearborn Streets, run south in Dearborn Street to Harrison Street, and then west to Desplaines Street, thence on the elevated structure and to all branches of the Metropolitan system.

It is stated that the subway commission, which consists of John Ericson, E. C. Shankland and J. J. Reynolds, has decided to advocate the construction of a subway occupying the space between curb lines rather than between building lines, as earlier proposed. The systems planned would be double-tracked on a single level. Connection between the State and Dearborn Street bores would be made by arcades on Madison Street and Adams Street. Probably only four other stations will be recommended—two on Lake Street and two on Harrison Street.

Mayor Harrison is quoted as having made the following statement:

"Speaking in a general way, I should say that the plan would be to utilize the elevated lines for through routing, eventually through the subway, while the surface lines would be used for short hauls and as feeders for the elevated lines. But it is too early to express any decided views until we learn just what measures the companies have to propose. Beyond that, naturally, the one fare and the universal transfer must be the first consideration. Without that the one-company plan would mean nothing."

Objection to Ordinance Requiring Extensions in Milwaukee

The City Council of Milwaukee, Wis., has passed the ordinance directing the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., to extend its lines on First Avenue and Eighth Avenue. The company is said to object to the provision which requires the company to extend its tracks on First Avenue from Arthur Avenue to Cleveland Avenue, and on Eighth Avenue from Harrison Avenue to Cleveland Avenue. J. D. Mortimer, president of the company, is quoted as follows in regard to the ordinance:

"I have always been willing to discuss ordinances of this kind with the committees of the Council and to try to meet the administration half way in the effort to reach an amicable and satisfactory arrangement for both sides. The committee did not see fit to give us an opportunity to be heard on these ordinances. I am satisfied that if the committee had discussed the proposition with us the adoption of the ordinance would not have been recommended.

"The extension on First Avenue is not a needed one at the present time and is not a reasonable extension within the meaning of the 1900 ordinance. The block between Arthur Avenue and Cleveland Avenue has only a few houses on one side of the street and there are none at all to the south of Cleveland Avenue. In other words, there are no people on that block who will be better served by the extension than they are under present conditions.

"The extension on Eighth Avenue would be a good thing and the company has been willing to make the extension even further to Oklahoma Avenue if it could be done without crossing the tracks of the Chicago & Northwestern Railway at grade. But the danger of crossing the tracks would more than counterbalance the convenience to the public served by the extension. Then there is a bridge crossing the Kinnickinnic River just south of our present terminus on Eighth Avenue which is not strong enough to bear street car traffic. The extension certainly cannot be made until that bridge is strengthened, or a new one built."

Report of Cleveland Railway for September

The report of the Cleveland (Ohio) Railway for September shows a deficit of $48,735.79 on regular ordinance allowances and an actual deficit of $39,234.58. The company has been operating on a straight 3-cent fare for four months, and in that time the interest fund has been reduced from $700,000 to about $500,000. About four months more would be required to reduce the fund to $300,000, the limit at which the fare would automatically advance. The statement for September follows:

Gross passenger receipts	$534,724.71
*Expenses	439,345.40
Net earnings	95,379.31
Other income	4,935.95
Gross income	100,315.26
Taxes and interest	149,050.00
Deficit	$48,735.00

Actual Disbursements.

Gross passenger receipts	$534,724.71
Expenses	429,844.19
Net earnings	104,880.52
Other income	4,935.95
Gross income	109,816.47
Taxes and interest	149,050.00
Deficit	$39,234.00

*The $439,345 allowed for expenses included $142,490 for maintenance and $296,855 for operation. The actual disbursement for maintenance was $147,167, or $4,676 in excess of the allowance. The actual disbursements for operation were $282,677, or $14,178 less than the allowance. The difference shows a net surplus on the two accounts of $9,501.

Street railway officials state that they will not operate the interurban cars at 3-cent fare or stop at street crossings until they have formal instructions. Judge Vickery a few days ago decided that they would be compelled to do this as the law now stands, although he felt that the law should be so amended that through interurban cars would not come under the same regulation as street cars.

Inquiry Into Cost of Improvements in Kansas City

Judge Hook, of the United States Circuit Court at Kansas City, Mo., has issued an order which directs Hermann Brumback, special master, to report the cost of the work which the Metropolitan Street Railway has been requested to carry out by the city. Judge Hook has ordered Mr. Brumback first to inquire into the cost of bringing the system up to its franchise requirements, including roadbed, tracks and the paving between the tracks, extensions of lines and connections as specified under the city ordinances. The inquiry also is to take cognizance of additional cars necessary for the operation of the present mileage and the number necessary if any extensions are built. The special master is also directed to ascertain the cost of extending the system so as to make it fully commensurate with the present size and importance of the two cities. This is to include additions to tracks, paving and extensions, power houses, carhouses, accommodations

for employees and other features. Consideration also is to be given to the question of intercommunication between Kansas City, Mo., and Kansas City, Kan. The company's probable contribution to the Twelfth Street trafficway also is to be included. Mr. Brumback is also ordered to consider and report in regard to the capital requirements necessary to keep the system abreast of the demands and growth of the two cities.

Strike in Schenectady

A short strike occurred among the employees of the Schenectady Railway during the latter part of the week ended Oct. 22, 1911, but was soon declared off after E. F. Peck, general manager of the company, had made clear the position of the company in regard to union labor at a meeting of representatives of the employees. Mr. Peck announced that while the company did not think it wise or necessary for the employees to join a union, the company would not oppose membership in the union; that the company would reinstate all employees who left its service in connection with the strike, and that the company would meet any committee of its employees and discuss any matters pertaining to their working conditions. The men agreed to return to work under these conditions and the strike was declared at an end.

Mr. Peck also issued a statement to the public outlining his position and the position of the company in regard to union labor, in which he said, in part:

"It was not and is not necessary for the employees of the Schenectady Railway to organize; they have not suffered from harsh treatment; their wages have always been as high as those paid on other street railways, and have been advanced voluntarily from time to time in keeping with the increased cost of living. Again, the amount of money which they will spend needlessly in creating and continuing this organization, if applied to legitimate insurance, would mean very much more to the employee and to his family, and it would create a better citizen for Schenectady and a more desirable employee because of his greater financial responsibility."

Brooklyn Boycott Declared Off.—The boycott which has been maintained against the Coney Island & Brooklyn Railroad, Brooklyn, N. Y., since Aug. 5, 1911, by the former employees of the company has been formally declared off. As previously stated in the Electric Railway Journal, the strike was completely broken by the company soon after its inception.

Chicago A. I. E. E. Section.—At a meeting held on Oct. 18, 1911, J. G. Wray and Ralph H. Rice were elected members of the executive committee of the Chicago Section of the American Institute of Electrical Engineers. The other members of the committee are W. L. Abbott, W. B. Jackson, Prof. John D. Nies and Fay Woodmansee.

New Railroad Map of Pennsylvania.—The new railroad map of Pennsylvania which has been under preparation by the State Railroad Commission for some months will be issued before very long and will give complete outline information about every railroad and electric railway in Pennsylvania. The railroad maps issued heretofore have shown only the railroads and streams.

New Interests Purchase "The American City."—Harold S. Buttenheim and Edgar J. Buttenheim, recently second vice-president and circulation manager, respectively, of the David Williams Company, New York, N. Y., have purchased the magazine *The American City*, which was established in New York about two years ago. The first issue of the publication under the new management has made its appearance and gives promise of a successful career for this periodical in its field of civic work and city government. Mr. Buttenheim's successor as manager of *Iron Age-Hardware* is Roy F. Soule, who has been a frequent contributor to its columns for more than a year past.

Former Cleveland Employees Sentenced for Ticket Frauds.—William E. Farris, John E. Farris and Ira F. Williamson, former conductors of the Cleveland (Ohio) Railway, have pleaded guilty before Federal Judge William L. Day to counterfeiting street car tickets and using the mails to defraud, and each has been sentenced to serve one year in the workhouse at Canton, Ohio, and three years in the federal prison at Ft. Leavenworth, Kan. The federal prison sentence was suspended pending good behavior in the workhouse. The arrest of William E. Farris and John E. Farris, brothers, followed a raid on a house near Akron, which resulted in finding a printing plant, with plates for printing the counterfeit tickets and other material that was used. William E. Farris was arrested in Chicago in June, 1911, and his brother was apprehended a little later.

Voluntary Contribution to Bridge Fund by Tampa Electric Company.—Through J. C. Woodsome, manager, the Tampa (Fla.) Electric Company has written a letter to the Mayor of Tampa confirming the tentative promise of the company to pay to the city's bridge fund the sum of $50,000 to defray part of the expense of building the new bridge across the Hillsborough River at Lafayette Street, over which the company will build a double track for its cars. The gift to the city does not entail any further grants to the Tampa Electric Company than those already enjoyed under its franchise. The estimated cost of the bridge is $205,000. In the letter to the city Mr. Woodsome said: "The Tampa Electric Company makes this offer of donation purely from the standpoint of rendering assistance to the upbuilding of the city and not because of any obligation to contribute anything toward the cost."

Ouster Proceedings in Steinway Tunnel Case.—The Public Service Commission of the First District of New York voted recently to begin ouster proceedings against the Interborough Rapid Transit Company in connection with its ownership of the Steinway tunnel. Chairman Willcox of the commission reported that he had been unable to arrive at any understanding with Theodore P. Shonts, president of the Interborough Rapid Transit Company, in regard to the Steinway property. He had made Mr. Shonts a tentative offer of $3,500,000 for the tunnel, on behalf of the city, and had also pointed out the willingness of the city to contract with the Interborough Rapid Transit Company to operate the tunnel. The concluding paragraph of the commission's letter to the Attorney General of New York State follows: "Since the streets and lands occupied by the so-called Steinway tunnel are needed to secure proper rapid transit railroad extension, and since the efforts of the commission in this regard are frustrated by the possession of such streets and lands by others whose claims the commission believes have lapsed and are now without force and effect, the commission respectfully requests you to begin appropriate action in the name of the people of the State of New York to oust such trustees or any other persons claiming to exercise franchises or rights in the so-called Steinway tunnel or in the streets and lands in which it is located."

PROGRAM OF ASSOCIATION MEETINGS

Meeting of Central Electric Railway Association

The next meeting of the Central Electric Railway Association will be held at Louisville, Ky., on Nov. 23, 1911.

Convention of Railway Electrical Engineers

The annual convention of the Association of Railway Electrical Engineers will be held at the La Salle Hotel, Chicago, from Nov. 7 to 10, 1911. There will be morning and afternoon sessions on each of the four days indicated. Among the papers to be presented are the following: "Insulation," by K. R. Stranberg; "The Light for Safety," by F. R. Fortune, and "Industrial Trucks for Railway Service," by T. V. Buckwalter. There will be reports of committees on "Data and Information," "Car Ventilation," "Standards," "Improvements," "Shop Practice," "Specifications" and "Accounts and Reports." The entertainment features include a dance, a theater party and an automobile tour. Space has been provided for twenty-nine exhibits by manufacturers. The officers of the Association of Railway Electrical Engineers are: President, J. R. Sloan; vice-president, F. R. Frost; secretary-treasurer, J. Andreucetti. The exhibits and entertainment are in charge of the Railway Electrical Supply Manufacturers' Association, of which H. A. Moore is president and J. Scribner secretary.

Financial and Corporate

New York Stock and Money Markets

Oct. 25, 1911.

Financial interests have been concerned this week with the outcome of the hearing on the plan for reorganization of the American Tobacco Company in compliance with the order for its dissolution. Trading on the Exchange has been very quiet and price changes have been unimportant. The government's report on the condition of cotton ginned to Oct. 18 showed that rapid progress has been made in preparing the crop for the market. American bankers continue to lend large sums to foreign interests at advanced rates. Quotations in the local money market today were: Call, 2¼@2½ per cent; ninety days, 3½@3¾ per cent.

Other Markets

Chicago tractions were very active yesterday as a result of further moves toward consolidation of the various street railways in the city. Chicago Railways, Series 1 and 2, were heavily traded in and advanced over a point.

Advances were made early in the week in Philadelphia Traction and Lehigh Valley Transit issues. To-day's market was weak and there were few transactions of importance.

Massachusetts Electric common and preferred were fairly active in the Boston market yesterday. To-day's market was concerned chiefly with the copper shares.

Demand for bonds in Baltimore shows sign of early improvement.

Quotations of traction and manufacturing securities as compared with last week follow:

	Oct. 18.	Oct. 25.
American Light & Traction Company (common)	a295	a295
American Light & Traction Company (preferred)	a106	a106
American Railways Company	a43½	a43½
Aurora, Elgin & Chicago Railroad (common)	a42½	41¼
Aurora, Elgin & Chicago Railroad (preferred)	a87	a85
Boston Elevated Railway	126	a127
Boston Suburban Electric Companies (common)	15	a15
Boston Suburban Electric Companies (preferred)	72	a75
Boston & Worcester Electric Companies (common)	12	a12
Boston & Worcester Electric Companies (preferred)	*51	a50½
Brooklyn Rapid Transit Company	74⅝	75
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	84⅛	84¼
Capital Traction Company, Washington	a130	a130
Chicago City Railway	a180	a180
Chicago & Oak Park Elevated Railroad (common)	3	*3
Chicago & Oak Park Elevated Railroad (preferred)	6	*6
Chicago Railways, ptcptg., ctf. 1	91	a96
Chicago Railways, ptcptg., ctf. 2	a31	a33
Chicago Railways, ptcptg., ctf. 3	a11	a12
Chicago Railways, ptcptg., ctf. 4	a7	a7
Cincinnati Street Railway	a131	a132½
Cleveland Railway	a99½	a99¾
Columbus Railway (common)	83	83
Consolidated Traction of New Jersey	a75	a76
Consolidated Traction of N. J., 5 per cent bonds	a104	a104
Dayton Street Railway (common)	a25	a25
Dayton Street Railway (preferred)	a101	a101
Detroit United Railway	68	a95
General Electric Company	151	150⅜
Georgia Railway & Electric Company (common)	a160	a161½
Georgia Railway & Electric Company (preferred)	93	a93
Interborough Metropolitan Company (common)	14⅜	a14⅞
Interborough Metropolitan Company (preferred)	44	44½
Interborough Metropolitan Company (4½s)	79½	79¼
Kansas City Railway & Light Company (common)	a19	16
Kansas City Railway & Light Company (preferred)	a44	*44
Manhattan Railway	136	a138
Massachusetts Electric Companies (common)	*19⅞	a22
Massachusetts Electric Companies (preferred)	*93	a95½
Metropolitan West Side, Chicago (common)	27	*27
Metropolitan West Side, Chicago (preferred)	75	*75
Metropolitan Street Railway, New York	8	*8
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	a68	a70
Northern Ohio Light & Traction Company	a57	a57½
Northwestern Elevated Railroad (common)	*30	*30
Northwestern Elevated Railroad (preferred)	*70	*70
Philadelphia Company, Pittsburgh (common)	49¾	51¼
Philadelphia Company, Pittsburgh (preferred)	42	42½
Philadelphia Rapid Transit Company	23½	23
Philadelphia Traction Company	83½	83⅞
Public Service Corporation, 5% col. notes (1913)	*94	*94
Public Service Corporation, ctfs.	103½	a104½
Seattle Electric Company (common)	*110	a108
Seattle Electric Company (preferred)	101	a101
South Side Elevated Railroad (Chicago)	a95⅛	*95⅛
Third Avenue Railroad, New York	9	9⅜
Toledo Railway & Light Company	*6½	a10
Twin City Rapid Transit, Minneapolis (common)	*106½	a106⅞
Union Traction Company, Philadelphia	51	51⅛
United Ry. & Electric Company (Baltimore)	*18	*18
United Rys. Inv. Co. (common)	33	a31½
United Rys. Inv. Co. (preferred)	56	a58½
Washington Ry. & Electric Company (common)	a41	a40½
Washington Ry. & Electric Company (preferred)	a90	a90
West End Street Railway, Boston (common)	86	a88
West End Street Railway, Boston (preferred)	100½	101
Westinghouse Elec. & Mfg. Co.	64¼	a64
Westinghouse Elec. & Mfg. Co. (1st pref.)	a120	a120

a Asked. *Last sale.

Possible Consolidation of Surface and Elevated Railways in Chicago

Henry A. Blair, representing the Chicago Railways Company; Ira M. Cobe, representing the Chicago City Railway, Southern Street Railway and Calumet & South Chicago Railway, and Samuel Insull, representing the Chicago Elevated Railways, as the financial heads of the surface and elevated railways of Chicago, have indicated in a letter to Mayor Harrison that a consolidation of all the local transportation lines in Chicago will be brought about if mutually agreeable relations can be established between the city and the properties. The letter to Mayor Harrison, dated Oct. 21, 1911, follows:

"To the end that a comprehensive plan be formulated, having for its purpose the permanent establishment and maintenance of the best possible transportation facilities for Chicago, the undersigned will be glad to co-operate with your honorable body in an earnest endeavor to work out a satisfactory solution of every phase of the transportation problem."

Henry A. Blair and Samuel Insull, two of the signers of the letter, recently re-established the operation of the elevated lines in Chicago under a unified organization and have begun to improve the service.

Mayor Harrison referred the communication to the local transportation committee of the Council for investigation and report. The Mayor expressed his appreciation of the importance of the step, but declined to predict the attitude of the administration toward any terms on which the surface and elevated lines might be consolidated. The Chicago newspapers predict that the traction ordinances of 1907, which established the board of supervising engineers, Chicago Traction, and provided for a division with the city of the profits from the operation of the surface railways, will place the city in a position to dictate terms for unification of the surface lines with the elevated roads. The consolidation and unification of the large surface railways and the elevated system before the subways are constructed in the Chicago business district would aid greatly in planning the proposed subway.

If the elevated railways and the Chicago Railways, Chicago City Railway, Southern Street Railway and Calumet & South Chicago Street Railway are consolidated, the consolidated property will control all the traction facilities in the city. At present the surface lines compete with the most important trunk lines of the elevated company.

The total capital obligations of the companies affected are more than $300,000,000 and the gross earnings last year were more than $33,000,000. The following table indicates the miles, cars and daily average passengers carried by the three railway systems, the figures for the surface lines not including passes or transfer passengers:

	Mileage.	Cars.	Passengers, Daily Average.
Elevated railways	126.92	1,399	454,196
Chicago Railways	491.48	3,068	751,554
Chicago City and consolidated railways	407.01	1,468	534,919
Totals	1,075.41	5,935	1,736,662

Capital obligations of the companies, totaling $305,313,115, follow:

	Preferred.	Common.	Bonds, Notes.
Chicago Railways		$365,100	$74,879,015
Chicago City Railway		18,000,000	23,000,000
Chicago City and consolidated rys	$25,000,000	15,000,000	22,000,000
Chicago Elevated	16,000,000	25,000,000	86,069,000
Totals	$41,000,000	$58,365,100	$205,948,015

Peter Reinberg, chairman of the committee on local transportation of the Chicago City Council, is thus quoted:

"Personally, I am of the opinion that the city should insist upon through routes and universal transfers and that the ordinances should be similar to the franchises of the street car companies. In fact, as I see the proposition now, it should be an absorption of the elevated railways by the surface companies. The elevated roads must come in on the terms granted to the street car companies."

Other members of the Council have stated that if the city approves a merger of the elevated and surface railways an interchange of transfers should be provided, through routing should be put into effect and the matter of revenue to the city should include the present 55 per cent of the profits of the surface lines, as established by the 1907 rehabilitation ordinances.

It has been hinted that the intimate connection of the Commonwealth Edison Company with traction matters might result in that company being included in the consolidation.

Terms of the Montreal Merger

Samuel T. Mains, secretary of the Montreal (Que.) Tramways, has sent the stockholders of the Montreal Street Railway the following offer for exchange of shares of the Montreal Street Railway for cash, debenture stock and ordinary shares of the Montreal Tramways, which recently entered into an agreement with the Montreal Street Railway for the acquisition of its property:

"We have entered into an agreement with the Montreal Street Railway for the acquisition of its undertaking and properties, and among the considerations on our part we have agreed to pay and deliver to shareholders of the Montreal Street Railway on the completion of the transfer to us $438.75 in cash, $800 in 5 per cent debenture stocks of this company and $100 in ordinary shares of this company, for each five shares of the street railway stock held by any street railway shareholder, the number of shares held to be evidenced by the register of the Montreal Street Railway and by delivery to us of the certificates for such shares indorsed in blank. Fractional certificates will be issued to holders who do not own five shares or an exact multiple of five shares.

"At the meeting of the shareholders of the Montreal Street Railway approving the agreement a number of shareholders requested that the Montreal Tramways should undertake to deliver to those shareholders who preferred not to take any cash $1,250 in 5 per cent debenture stock and $100 in ordinary shares against each five shares of stock of the Montreal Street Railway.

"We are ready to accede to this request, but it is necessary for us to know within a reasonable time what shareholders wish to take cash, debentures and shares, and what shareholders wish to take all debentures and shares on the basis above provided.

"Kindly fill in and return within fifteen days of the date of this letter the statement inclosed. Any shareholders who have not returned statement within fifteen days from this date will be taken as electing to receive cash, debentures and shares as provided in the agreement."

The letter referred to is dated Oct. 14, 1911.

Harris, Forbes & Company, New York, N. Y., explain that the $10,000,000 of bonds of the company reported in the Electric Railway Journal of Oct. 21, 1911, to have been purchased by them are first and refunding mortgage 5 per cent gold bonds secured by mortgage on the property, franchises, etc., of the Montreal Tramways Company and not an issue of debenture bonds, as stated last week.

Federal Light & Traction Company

According to a statement made on Oct. 2, 1911, by C. C. Chappelle, vice-president and general manager of the Federal Light & Traction Company, New York, N. Y., the recent acquisitions of the company are as follows:

In May, 1911, the company acquired the Springfield Railway & Light Company, owning all of the capital stocks of the Springfield Gas & Electric Company and the Springfield Traction Company, Springfield, Mo. This city has a population of 40,000. The company is adding to its Springfield plant a 2000-kw generator, which should be in operation by Nov. 15, 1911. Six new cars have been added, the capacity of the carhouse and the shop is to be doubled, the power station is to be changed from non-condensing to condensing, and more than $100,000 is being expended for new track.

On Aug. 2, 1911, the company, through the Trinidad Electric Transmission Railway & Gas Company, all of whose capital it owns, acquired the properties of the Colorado Railway, Light & Power Company, which operates electric light, gas and railway service in Trinidad, Col. The population served is about 25,000. Since taking over these properties the management has secured additional power business in the mining field, which will yield approximately $60,000 additional gross revenue per year.

Mr. Chappelle also reports an increase in the business and extensions of other public utility properties owned by the company. Thus, the generating capacity of the power station of the Gray's Harbor Railway & Light Company, operating in Aberdeen and other cities in Washington, has been increased 70 per cent. At Sheridan, Wyo., a modern condensing steam power station of 3000 kw has been built. A fifty-year lighting franchise has been secured, and the company has made a ten-year contract to supply the local electric traction company with power. At Albuquerque, N. M., the company has installed a 1000-kw steam turbine and has made a ten-year contract to supply power to the local railway companies.

For the year ended July 31, 1911, the total gross earnings of the present subsidiary companies of the Federal Light & Traction Company, exclusive of the Trinidad Electric Transmission, Railway & Gas Company, whose records for the previous year are not available, show an increase of 10.8 per cent, and in net earnings an increase of 11.4 per cent, over the previous corresponding year.

Berkshire Street Railway, Pittsfield, Mass.—The Berkshire Street Railway has applied to the Railroad Commission of Massachusetts for authority to issue additional stock to the amount of $4,900,000. The company's attorney, Henry W. Ely, at a recent public hearing, stated that the company has already expended $2,872,000 in making extensions that were provided for in the New York, New Haven & Hartford Railroad merger act, and plans to expend $1,450,000 more for work not stipulated in the act. There was no opposition to the petition. The commission took the matter under advisement.

Boston (Mass.) Elevated Railway.—R. L. Day & Company, Estabrook & Company and N. W. Harris & Company, Boston, Mass., offered for subscription, on Oct. 19, 1911, at par and interest and have entirely sold the new issue of $5,000,000 of 4½ per cent gold bonds, dated Nov. 1, 1911, and due Nov. 1, 1941. The proceeds of this issue are to be applied as follows: "1. The proceeds of bonds amounting at par value to $500,000 shall be applied exclusively toward the payment of the necessary cost incurred and to be incurred in the construction and equipment of the elevated structure, foundations, tracks and electric system. 2. The proceeds of bonds amounting at par value to $2,400,000 shall be applied exclusively toward the payment of the necessary cost incurred and to be incurred in the construction and equipment of power and transformer stations. 3. The proceeds of bonds amounting at par value to $2,100,000 shall be applied exclusively toward the payment of the necessary cost incurred and to be incurred in the construction, connection and equipment for use and operation of the elevated railways which the company is authorized to construct by Chapter 520 of the Acts of 1906, and their appurtenances and terminals, and the cost of acquisition of any land or lands in connection therewith. Any excess in the proceeds of this issue of bonds which may be realized from premiums shall be held for such application to cost of other permanent additions to and improvements in the property of the company as the board shall hereafter approve."

Columbus, Delaware & Marion Railway, Marion, Ohio.—The Columbus, Delaware & Marion Railway, in a report for the year ended June 30, 1911, shows that the receipts were $385,345, as compared with $352,658 for the preceding year. The net earnings were $4,302.53 as against $801.07 in 1910, and a deficit of $2,517.69 in 1909. The holders of first mortgage 5 per cent bonds of the Columbus, Delaware & Marion Railway have received checks for the coupons on these bonds which were due on May 1, 1911, together with interest on the overdue coupon.

Danville Railway & Electric Company, Danville, Va.—The local capitalists at Danville who were reported in the Electric Railway Journal of June 24, 1911, page 1128, to have secured an option on the property of the Danville Railway & Electric Company are reported to have exercised the option in the name of the Danville Traction & Power Company.

Galveston-Houston Electric Company, Galveston, Tex.—Stone & Webster, Boston, Mass., offer for subscription at 93½ to yield 6.40 per cent $300,000 of 6 per cent cumulative

preferred stock of the Galveston-Houston Electric Company. A statement of earnings of the company for the year ended Aug. 31, 1911, follows: Gross earnings, $1,447,726; operating expenses, $848,135; net earnings, $599,591; interest, charges and taxes, $246,363; balance, $353,227; bond sinking funds, $55,970; balance, $297,257. The dividend on $2,300,000 of preferred stock, which includes that now offered, requires $138,000.

National Light & Power Company, St. Louis, Mo.—The National Light & Power Company has been incorporated in New Jersey with an initial capital stock of $500,000, with Judson M. Boughton as president and W. C. Morehead as secretary and treasurer, as a holding and engineering company for gas, electric, street railway and hydroelectric properties. The National Light & Improvement Company is in process of dissolution. Judson H. Boughton has been identified with the National Light & Improvement Company as secretary and treasurer, president of the Citizens' Railway, Waco, Tex.; vice-president and general manager of gas and electric properties of Waco and Ft. Worth, and also associated with the various other interests of the National Light & Improvement Company.

Winnipeg (Man.) Electric Railway.—Local capitalists, including Messrs. Muir, Reece and Mather of the Manitoba Power Company, are reported to have offered $300 a share for the purchase of a controlling interest in the stock of the Winnipeg Street Railway. This is $50 a share more than what Sir William MacKenzie, president of the company, asked for the property in the recent negotiations for its sale to the city of Winnipeg.

Dividends Declared

Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., quarterly, 1½ per cent, preferred.

Connecticut Railway & Lighting Company, Bridgeport, Conn., quarterly, 1 per cent, preferred; quarterly, 1 per cent, common.

East St. Louis & Suburban Railway, East St. Louis, Ill., quarterly, 1¼ per cent, preferred.

Jacksonville (Fla.) Traction Company, quarterly, 1½ per cent, preferred; quarterly, 1¾ per cent, common.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Maine, quarterly, 1½ per cent. preferred.

Lincoln (Neb.) Traction Company, quarterly, 1½ per cent, preferred.

Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio, quarterly, 1¼ per cent, preferred.

Union Electric Company, Dubuque, Ia., monthly, ½ of 1 per cent, preferred.

Union Street Railway, New Bedford, Mass., quarterly, 2 per cent.

West Penn Railways, Pittsburgh, Pa., quarterly, 1¼ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

AURORA, ELGIN & CHICAGO RAILROAD.

Period.			Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1 m.,	Sept.,	'11....	$167,422	$84,406	$83,016	$36,371	$46,645
1 "	"	'10....	161,599	83,177	78,421	33,054	45,368
3 "	"	'11....	542,975	268,693	274,282	109,290	164,993
3 "	"	'10....	522,715	258,266	264,450	98,662	165,788

BROOKLYN RAPID TRANSIT.

1 m.,	July,	'11...	$2,238,045	*$1,351,926	$886.119	.....	.....

CAPE BRETON ELECTRIC COMPANY, LTD.

1 m.,	Aug.,	'11....	$29,834	$15,027	$14,807	$6,183	$8,625
1 "	"	'10....	30,777	15,703	15,074	6,174	8,900
12 "	"	'11....	331,992	171,060	160,932	73,768	87,165
12 "	"	'10....	314,788	171,075	143,712	74,015	69,697

CENTRAL PARK NORTH & EAST RIVER.

1m.,	July,	'11....	$58,588	*$54,527	†$4,061	.....	.....

CONEY ISLAND & BROOKLYN RAILROAD.

1m.,	July,	'11....	$197,842	*$115,192	$82,650	.....	.....

DALLAS ELECTRIC CORPORATION.

1 m.,	Aug.,	'11....	$129,851	$83,884	$45,967	$25,518	$20,449
1 "	"	'10....	118,257	82,637	35,620	25,659	9,961
12 "	"	'11....	1,571,151	977,109	594,041	558,860	279,873
12 "	"	'10....	1,414,199	934,210	479,989	319,229	160,760

GALVESTON-HOUSTON ELECTRIC COMPANY.

1 m.,	Aug.,	'11....	$142,325	$76,197	$66,129	$25,200	$40,929
1 "	"	'10....	124,764	65,932	58,832	25,965	32,867
12 "	"	'11....	1,447,727	848,135	599,592	332,334	297,258
12 "	"	'10....	1,268,767	769,333	499,434	278,144	221,291

*Includes taxes. †Deficit.

Traffic and Transportation

New Seattle-Tacoma Passenger Tariff

The Puget Sound Electric Railway, Tacoma, Wash., has made public the new rates over its line between Tacoma and Seattle, fixed so as to accord with the recent decision of the Supreme Court of the State upholding the ruling of the Railroad Commission of Washington. In 1909 the company revised its tariff of passenger fares and an appeal from the rates was made to the Railroad Commission, with the result that the through rate between Seattle and Tacoma was upheld, but a reduction was ordered in the zones within twelve miles of Seattle and of Tacoma. The company appealed to the courts for a reversal of the order and, failing in the Superior Court of Thurston County, appealed to the State Supreme Court. Recently R. T. Laffin, vice-president of the Puget Sound Electric Railway, in a public statement, which was reprinted in the ELECTRIC RAILWAY JOURNAL of Oct. 21, 1911, page 929, announced that the company would abide by the decision of the Supreme Court, and that the new rates would become effective when the order was entered. The old rates and the new rates between the cities and suburban points follow:

	New Rate		Old Rate	
From Seattle.	Single Fare.	Round Trip.	Single Fare.	Round Trip.
Englewood	7	14	7	14
Georgetown	8	15	8	16
Colvins	8	15	8	15
McLean	9	15	9	18
Gorgiats	9	15	9	15
Marinos	9	15	9	18
Maples	10	15	10	20
Burts	10	15	10	20
MacKays	10	15	10	20
Van Asselt's	10	15	10	20
Chicago Avenue	11	15	11	22
Davis	12	15	12	24
Meadows	13	15	13	26
South Side	13	15	13	26
Floraville	14	15	14	28
Cardmoores	14	15	14	28
Duwamish	15	15	15	30
Quarry	15	15	16	32
Allentown	15	15	17	34
Riverton	15	15	17	34
Mortimer	15	15	18	36
Foster	15	15	19	38
Tukwila	15	15	20	40
Black River	21	25	21	42
Renton Junction	22	25	22	44
Earlington	24	25	25	50
Renton	27	35	27	54
Nelsons	23	32	23	46
Orilla	25	35	25	50
O'Brien	30	45	30	60
Kent	34	53	34	68

	New Rate		Old Rate	
From Tacoma.	Single Fare.	Round Trip.	Single Fare.	Round Trip.
Brookville	8	15	8	16
Meeker	15	25	22	44
Puyallup	15	25	20	40
Berryton	15	25	18	36
Cedarhurst	15	25	17	34
Firwood	15	25	15	30
Ardena	10	15	13	26
McAleers	10	15	10	20
Willow Junction	9	15	9	18
Cushman	10	15	10	20
Fife	11	15	11	22
Milton	13	15	13	26
Edgewood	18	25	18	36
Jovita	19	35	19	38
Bluffs	22	35	22	44
Pacific City	23	35	23	46
Algona	23	45	25	50
Farrow	26	52	26	52
Auburn	29	55	29	58
Christopher	33	57	33	66
Maridas	34	55	34	68
Thomas	35	69	35	70
Kent	39	75	39	78

Order in Regard to Commutation Rates in New Jersey

The Board of Public Utilities Commissioners of New Jersey has issued an order directing all railroads which operate between Jersey City and Hoboken and other points in New Jersey to sell commutation tickets on demand between these points. The order also requires the railroads to publish their rates for such commutation and file rates with the commission. The order is effective on Dec. 1, 1911. The practice of the railroads heretofore has been to sell this class of tickets from local points to New York, and thus they claimed to be exempt from State regulation as to

rates on the ground that the traffic was interstate. The grounds taken by the commission for issuing the order follow:

"The practice of the carriers to grant in general no commutation or special rates to Jersey City or to Hoboken, but to require the purchase of transportation to New York, at rates which allow stop-offs on the Jersey side of the river, absolutely beclouds the knowledge of what part of the carrier's earnings arises from interstate and what part from intrastate services respectively; and yet such a separation of receipts tends increasingly to become useful and necessary in the solution of various questions affecting carriers' rates and charges, both in intrastate and interstate commerce.

"The commission is empowered, after hearing, upon notice, by order in writing, to require every public utility as defined in Chapter 195, P. L. of 1911, Section 17 (d), 'to keep its books, records and accounts so as to afford an intelligent understanding of the conduct of its business, and to that end to require every such public utility of the same class to adopt a uniform system of accounting.'

"From the foregoing it follows that an order must issue to the carriers concerned requiring them, when request is made upon them for transportation in intrastate journeys between points within the State entitled to commutation and other special rates, to sell such transportation, to quote rates for such transportation between aforesaid interior Jersey points and any river boundary terminal, and to file with this commission schedules of the rates specified, and a future order may require them to keep separate records of receipts from intrastate business."

Free Transportation in Altoona.—After Nov. 1, 1911, free transportation over the Altoona & Logan Valley Electric Railway, Altoona, Pa., will be extended only to employees of the company.

Lower Car Steps in Philadelphia.—The Philadelphia (Pa.) Rapid Transit Company has announced that all future cars will be equipped with a low entrance step, and that some of the cars now in service will be remodeled.

Paterson Car License Declared Illegal.—The Supreme Court of New Jersey has set aside as an invalid exercise of police power an ordinance of the city of Paterson requiring a license fee of $25 for every street car operated in the city limits. The Public Service Railway opposed the ordinance.

Fare Hearing in New Jersey.—The hearing on the application for a reduction in fare over the line of the New Jersey & Hudson River Railway & Ferry Company, Edgewater, N. J., from Edgewater to South Englewood, from 10 cents to 5 cents was held on Oct. 20, 1911, before the Public Utility Commission at Newark. It was agreed that briefs should be filed by Oct. 27, 1911.

Electric Trucks in Freight Service.—The Louisville & Northern Railway & Lighting Company has installed two electric trucks of large capacity to collect and deliver express in Southern Indiana. According to Charles B. Scott, of the company, the expense of maintaining the collection and delivery sections of the express department has been reduced materially by the motor vehicles.

Height of Steps in Hartford.—The Common Council of Hartford, Conn., has adopted a resolution directing the Mayor to petition the Public Utility Commission to require the Connecticut Company so to build the steps of its cars that the distance from the floor of the car to the top step shall be not more than 15 in., and the distance from the ground to the lower step not more than 15 in.

British Columbia Electric Railway Preparing for Train Operation.—As the interurban cars of the British Columbia Electric Railway, Vancouver, B. C., are sent to the shops for repairs Westinghouse multiple-unit control is being installed in anticipation of two-car trains being operated next year between Vancouver and New Westminster when the cutoff just outside the latter city is ready for service.

New Pleasure Resort for Illinois Traction System.—Martin's Grove, 7 miles south of Joliet, Ill., will be transformed into a public park and picnic grounds by the Illinois Traction Company. The park will be furnished with a pavilion, a ball park and other features. It will cost in the neighborhood of $100,000. It is stated that the fare to the grounds from Joliet will be about 20 cents return.

Signs on Fenders in Reading.—The Reading (Pa.) Transit Company has sent a letter to the State Railroad Commission to the effect that it was not committed to the practice of carrying advertisements on fenders and that if the commission deemed it wise to recommend the abolition of the signs the company would not object. The advertisements on the fenders are not a source of revenue to the company.

Limited Service Between Dallas and Sherman.—The Texas Traction Company established limited service over the line between Dallas and Sherman on Oct. 12, 1911. The distance between the cities is 66 miles, and the running time is two hours, with one short stop at McKinney, which is midway of the line. In the limited service there are four cars each way daily, leaving Sherman at 7 a. m. and 11 a. m. and 1 p. m. and 6 p. m., and leaving Dallas at 7:40 a. m. and 9:40 a. m. and 1:40 p. m. and 6:40 p. m.

Pay-as-You-Enter Cars in Louisville.—The delivery of thirty new cars by the Cincinnati Car Company, Cincinnati, Ohio, to the Louisville Railway Company, Louisville, Ky., has been begun. The new cars are equipped with wire gates and a folding step upon the entrance and exit vestibules, and are arranged for pay-as-you-enter operation. The Louisville Railway proposes to equip its East Broadway and West Jefferson, West Walnut and East Walnut and East and West Market lines with cars of the type now being received.

Increase in Wages on Detroit United Suburban Lines.—The Detroit (Mich.) United Railways has increased the wages of its employees on both the Rapid Railway and the city lines in Port Huron. Under the new scale motormen and conductors on the Rapid Railway will receive 23 cents per hour for the first six months, 27½ cents for the following year and 29½ cents thereafter. The former scale was 23, 25 and 28 cents. On the city lines in Port Huron the new scale will be 20, 24 and 27 cents per hour, as against 20, 23 and 26 cents per hour. The company has also increased the pay of the men on the Detroit, Jackson & Chicago line.

Electric Railways Meet Drift from Farms.—To check the drift from the farms in the Empire State, a special study of agricultural traffic development has been begun by members of the Street Railway Association of the State of New York, and traffic experts are receiving reports of past progress in building up agricultural sections tapped by interurban street railways. Lectures by agricultural authorities are being arranged by the electric railways. Experimental farms have already been established by some railways, while others are planning to adopt this means of finding out how the maximum productivity of the soil in their section may be attained. The question of establishing manufacturing plants throughout country regions remote from the railroads but possessed of power facilities is also being considered.

Recommendation Regarding Destination Signs in Albany.—Illuminated designation or route signs to be used at night on the cars of the United Traction Company in Albany, N. Y., are recommended by C. R. Barnes, electric railroad inspector of the Public Service Commission of the Second District of New York. The report states that the classification lamps now in use, which indicate by color the route of the car, are generally understood by residents of the city, but that on account of Albany being the capital of the State, there are a great many transients during all seasons and the necessity for such signs is greater in Albany than in many other cities. It is recommended to the company that it equip all its cars with illuminated route and, where necessary, destination signs within three months.

Booklet on Illinois Traction System.—The department of publicity attached to the office of H. E. Chubbuck, the vice-president executive of the Illinois Traction System, Peoria, Ill., has just prepared a fifty-six-page booklet, 8½ in. x 7 in., in which are described the interurban, city railway, electric, gaslight and other properties which form this system. Sixty half-tone views give a comprehensive idea of the rolling-stock equipment and bridges and buildings of the street railway and interurban railway properties. The text of the booklet is a condensed description of the resources of the territory served and the extent of the properties, which include street car systems in eleven cities, electric light and power plants in twelve cities, gas

plants in five cities and district steam-heating plants in six cities. The historical features surrounding the formation of the system are outlined. This system has grown from a road with only 6 miles of track in 1901 to 629 miles of track in Illinois and several street railways in states farther west.

New Agreement with Employees in Albany.—The United Traction Company, Albany, N. Y., has entered into a new agreement with its employees for three years, ending July 1, 1914, under which the wages of motormen and conductors on all divisions are increased from 26 cents an hour to 27 cents an hour. Under Section 1 of the agreement the company "will recognize and treat with its employees or with any committee of its employees when they desire to be heard in relation to any grievance." The agreement is concluded with the following clause which provides for arbitration of the wage question at the expiration of the agreement: "It is further mutually agreed that if, at or within thirty days prior to the expiration of this agreement, any controversy shall arise between the company and its employees as to the rate of wages to be paid to such employees after the expiration of this agreement the same shall be referred for determination to arbitrators, one to be selected by the company and one by the employees, and if they cannot agree a third man is to be selected by such arbitrators for the determination of the question thus submitted."

Accident Prevention Campaign in New York City Schools.—William H. Maxwell, city superintendent of schools of New York, has sent a circular to all school principals in the city, calling their attention to the number of accidents to school children, and advising them to have the class teachers warn the children. The letter follows: "Many school children have been seriously injured while violating the laws regulating traffic. It may diminish the number of such accidents if, in connection with the lessons in ethics, the teachers call attention to the impropriety of jumping or 'hitching' on cars, which is unlawful as well as dangerous. Pupils should be enlightened as to the safest way of boarding and alighting from a car, and as to care in crossing thoroughfares and refraining from play in the streets where car traffic is heavy. You might call the attention of your pupils to the following statistics for the twenty-one months ended Sept. 30, 1911: There were forty-six children between the ages of one and sixteen years killed by automobiles and 140 injured; there were twenty-nine killed by trolley cars and seventeen injured; there were 104 killed by wagons and twenty-three injured. One child was killed in a collision between two wagons and twelve were injured, making a total killed of 180 and a total injured of 192."

Freight Service Between Indianapolis and Benton Harbor.—The Winona Interurban Railway, Warsaw, Ind., has issued a four-page circular devoted to the all-electric freight route between Indianapolis and Warsaw, Goshen, Elkhart, Mishawaka, South Bend, La Porte, Michigan City, Niles, St. Joseph, Benton Harbor and all intermediate points via the Indiana Union Traction Company's system, the Winona Interurban Railway and the Chicago, South Bend & Northern Indiana Railway. Through cars, without transfers, leave Indianapolis and South Bend at 6 p. m. daily, except Sunday, insuring delivery early next morning to all points. The following eight reasons are given in the circular why freight should be shipped by electric railway: "1. Time schedules are prepared after consulting shipping interests. 2. Trains are run at such times as to insure quick movement and prompt delivery. 3. Local freight is given the same preference as through freight. Not so with steam lines. 4. No transfers—consequently no damaged freight, and, best of all, no claims. 5. A shipment, howsoever small, receives the same prompt delivery as a carload shipment. 6. Our cars containing local shipments are not sidetracked for twenty-four hours at a local station to unload a few hundred pounds of freight, picked up by the next local freight, side-tracked again for twenty-four hours, and handled thus until the car is unloaded, but go through on a continuous trip. 7. On shipments requiring refrigeration you save heavy icing charges from Michigan points to Indianapolis. Think of this. 8. Country merchants can get their orders filled the same day and thus avoid carrying heavy stocks."

Personal Mention

Mr. L. W. Carlisle, chief clerk of the Tampa (Fla.) Electric Company, has been appointed assistant treasurer of the Pensacola (Fla.) Electric Company to succeed Mr. A. G. Jillson.

Mr. J. B. Walker, formerly of the auditing department of the Boston office of Stone & Webster, has been appointed assistant treasurer of the Dallas Electric Corporation to succeed Mr. L. A. Bowers.

Mr. E. D. Trowbridge has resigned as general manager of the Mexican Light & Power Company, Ltd., in order to take up important work in Spain for Dr. F. S. Pearson, president of the company.

Mr. Herbert A. Pasho, superintendent of the elevated division of the Boston (Mass.) Elevated Railway, with headquarters at Charlestown, has had added to his duties that of superintendent of the Cambridge subway.

Mr. Egbert Douglas, commercial engineer of the Milwaukee Electric Railway & Light Company, has been promoted to be sales manager of that company, and as such will have charge of the selling work and commercial organization.

Mr. Harro Harrsen has been appointed general manager of the Mexican Light & Power Company, Ltd., Mexico City, Mex. Mr. Harrsen at the same time will continue as general manager of the Mexico Tramways Company. Mr. Harrsen has also been appointed managing director of the Pachuca Light & Power Company, Ltd., to succeed Mr. E. D. Trowbridge, and managing director of the Mexican Steel & Chemical Company to succeed Mr. Trowbridge.

Mr. Theodore P. Shonts, president of the Interborough Rapid Transit Company and the Interborough-Metropolitan Company, New York, N. Y., has resigned as president of the Iowa Central Railway and the Minneapolis & St. Louis Railroad, but remains a director of both companies. Mr. Shonts is succeeded with the companies as president by Mr. Newman Erb, chairman of the board of directors of the Ann Arbor Railroad and president of the Tennessee, Alabama & Georgia Railroad.

Mr. W. E. Erwin, superintendent of the San Bernardino division of the Pacific Electric Railway, Los Angeles, Cal., in accordance with the scheme of organization of the company, has relinquished his authority over the shops of the company in San Bernardino, Redlands, Riverside and Pomona to Mr. E. J. Martin, who has been given the title of general foreman. In token of their esteem the men employed in the shops presented Mr. Erwin with a pair of cuff buttons inscribed with the emblem of the Order of the Elks.

Mr. Edward Hardin has resigned as superintendent of the Hot Springs (Ark.) Street Railway, to take effect on Nov. 1, 1911. Mr. Hardin plans to enter business for himself in Hot Springs. For thirteen years Mr. Hardin was superintendent of construction for the United States government in Hot Springs, working under the direction of reservation superintendents. He resigned that position to take up construction work for the Little Rock Street Railway, and has for the last seven years been superintendent of the company. The system at Little Rock was rebuilt and extended under his direction.

Mr. Warren C. Billings has been appointed electrical engineer of the Lewiston, Augusta & Waterville Street Railway, Lewiston, Maine, to succeed Mr. Walter G. Parker, who has become connected with the Dover & Foxcroft Light & Heat Company, Dover, Maine, as noted in the Electric Railway Journal of Oct. 21, 1911. Mr. Billings was graduated from Dartmouth College in 1907, having given special attention to electrical studies. Since his graduation Mr. Billings has been in the employ of the Bangor Railway & Electric Company, Bangor, Maine, assisting in the construction and development of the water-power at Ellsworth with the title assistant to the electrical engineer.

Prof. Garret Droppers, of Williams College, has been appointed by Governor Foss to the Massachusetts Board of Railroad Commissioners to succeed Mr. Clinton White. Professor Droppers was born in Milwaukee in 1860 and

was educated at Harvard University, where he took his A. B. degree in 1887. He studied at the University of Berlin in 1888 and 1889. He was professor of political economy and finance at the University of Tokio, Japan, from 1889 to 1898, when he became president of the University of South Dakota, which position he held until 1907. He was lecturer on political economy at the University of Chicago in 1907 and 1908. Professor Droppers was formerly secretary of the Asiatic Society of Japan and is a member of the American Economic Association.

Mr. John L. Sullivan, whose appointment as general freight and passenger agent of the Ft. Dodge, Des Moines & Southern Railroad, Boone, Ia., was noted in the Electric Railway Journal of Oct. 21, 1911, entered the service of the Chicago & Northwestern Railway on June 1, 1886, and remained with that company eight years as agent and operator. He next served as agent and operator with the Chicago Great Western Railway, with which he remained until Aug. 1, 1900. Mr. Sullivan promoted and built the Manchester & Oneida Railway and was general manager of that company for three years. He re-entered the service of the Chicago Great Western Railway as agent at Ft. Dodge and later was traveling freight agent, which position he held for five years. He was appointed assistant general freight agent of the Ft. Dodge, Des Moines & Southern Railway on Feb. 14, 1911.

Mr. D. C. Barnes, whose appointment as manager of the Everett Railway, Light & Water Company and the Seattle-Everett Traction Company, Everett, Wash., was noted in the Electric Railway Journal of Sept. 2, 1911, was tendered an informal luncheon recently at the Butler Hotel, Seattle, Wash., by Mr. R. T. Laffin, district manager for Stone & Webster, Boston, Mass., in the Northwest. Among those who attended besides Mr. and Mr. Barnes were Mr. Jacob Furth, president of the Seattle Electric Company, and the following officers of that company: Mr. H. T. Edgar, manager; Mr. F. Dabney, assistant treasurer; Mr. A. W. Q. Birtwell, auditor; Mr. A. L. Kempster, superintendent of railways; Mr. G. P. James, chief engineer; Mr. George Carson, general claim agent, and Judge J. A. Shackleford, president of the Tacoma Railway & Power Company; Mr. Louis Bran, manager of that company, and Mr. W. E. Wilmot, treasurer of that company.

OBITUARY

H. A. Fairchild, chairman of the Railroad Commission of the State of Washington, is dead.

Monroe H. Kulp, president and general manager of the Shamokin & Edgewood Electric Railway, Shamokin, Pa., is dead.

Robert Mather, chairman of the board of directors of the Westinghouse Electric & Manufacturing Company, died at his home in New York on Oct. 24, 1911. Mr. Mather was born at Salt Lake City, Utah, in 1859, and obtained his first railroad experience with the Chicago, Burlington & Quincy Railroad. In 1882 he was graduated from Knox College, and three years later he obtained his master's degree. From 1882 to 1885 Mr. Mather worked in the office of the treasurer of the Chicago, Burlington & Quincy Railroad, and in 1886 he was admitted to the Illinois bar. In 1889 he was elected vice-president of the Chicago, Rock Island & Pacific Railroad, and in 1902 he was made general counsel for the road. Subsequently he was elected chairman of the executive committee and in 1904 was made president of the Chicago, Rock Island & Pacific Railroad. In 1903 he was elected third vice-president of the St. Louis & San Francisco Railroad, and in 1904 became first vice-president of that road. He was also first vice-president of the Chicago & Eastern Illinois Railroad and the Evansville & Terre Haute Railroad and chairman of the board of directors of the St. Louis, Kansas City & Colorado Railroad. In January, 1909, at the time of the reorganization of the Westinghouse Electric & Manufacturing Company, Mr. Mather was elected chairman of the board of directors, and thereupon severed his railroad connections. At the time of his death Mr. Mather was a director of the Havana Electric Railway, the Westinghouse Lamp Company, the Canadian Westinghouse Company, the R. D. Nuttall Company, the Niagara, Lockport & Ontario Power Company and a number of other companies.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Modesto & Empire Traction Company, Modesto, Cal.**—Application for a charter has been made in California by this company to operate a 5-mile electric railway between Empire and Modesto. Headquarters, Modesto. Capital stock, $20,000. Directors: T. K. Beard, W. H. Brazine, Walter Beard, J. M. Waithall and L. L. Dennett.

Palm Beach, Okeechobee & Western Railway, Palm Beach, Fla.—Application for a charter has been made in Florida by this company to build a 140-mile electric railway from Palm Beach west to the southern shore of Lake Okeechobee, thence westward following the course of the Caloosahatchee River to Fort Myers. One power station will be built at Palm Beach and the other at the south of Lake Okeechobee. Capital stock, $500,000. Incorporators: R. J. Martin, J. H. Cordero, W. W. Marquis and John Mathews.

***Terre Haute & Ohio River Railway, Chicago, Ill.**—Incorporated in Illinois to build an electric railway from a point in the eastern boundary line of the State of Illinois near its intersection with the Wabash River on the eastern line of Clark County to Harrisburg in Saline County and thence to a point on the Ohio River in Hardin County. The principal office is in Chicago. Incorporators and first board of directors are: Philip L. Casford, 438 Belden Avenue, Chicago; George von Reinolts, 4853 North Winchester Avenue, Chicago; Edward W. Powell, Herbert S. Miller, William Barrett Fitzgerald, Chicago.

***Central Illinois Interurban Railroad, Springfield, Ill.**—Incorporated in Illinois to build an electric railway from a point in or near Kewanee through the counties of Henry Stark, Bureau and Marshall to a point in or near Henry, in Marshall County. The principal office is at Bradford. Capital stock, $100,000. The incorporators and first board of directors are C. N. Gerard, Bradford; E. A. Beadle, Kewanee; H. R. Hess, Whitefield; Howard G. Stener, Henry; and Harry H. Haines, Peoria.

***Egyptian Southern Railway, Springfield, Ill.**—Incorporated in Illinois to build an electric railway from McLeansboro to Herrin. Capital stock, $10,000. The principal office is Benton and the incorporators and first board of directors are Walter W. Williams, W. H. Hart, Geo. A. Powers, L. W. Brand and E. B. Nolen, all of Benton, Ill.

***Toledo, Ann Arbor & Jackson Railroad, Monroe, Mich.**—Application for a charter will be made by this company in Michigan to take over the Toledo, Ann Arbor & Jackson Electric Railway, which was organized in 1905 and built about 20 miles of electric railway out of Toledo the following year and then ceased operations. Of the capital stock $300,000 will be used in purchasing the assets and property of the old line and the remaining amount will be used in further construction of the railway. Capital stock, $500,000.

FRANCHISES

Montgomery, Ala.—The Alabama Traction Company has asked the Board of City Commissioners for franchises on additional streets in Montgomery.

Montgomery, Ala.—The Montgomery Traction Company has received a franchise from the City Commissioners to extend its tracks on South Union Street.

Bakersfield, Cal.—The San Joaquin Light & Power Company, Stockton, has asked the Board of Supervisors for a fifty-year franchise in Bakersfield.

Oakland, Cal.—The Oakland Traction Company has asked the Board of Supervisors for a fifty-year franchise to extend its Euclid Avenue line.

Redlands, Cal.—The Redlands University Railway has asked the City Council for a franchise in Redlands. This is part of a plan to build a 2-mile electric railway from Redlands to Redlands University. G. S. Turrill, Redlands, president. [E. R. J., Oct. 21, '11.]

Sacramento, Cal.—The Vallejo & Northern Railway has asked the City Board of Trustees for a franchise on Second Street from M Street to X Street, in Sacramento.

Twin Falls, Idaho.—The Iowa, Nebraska & Dakota Railway, Pierre, S. D., has received a franchise from the City Council in Twin Falls, Idaho. This line will connect Valentine, Neb., and Sioux City, Ia. C. H. Cornell, Valentine, is interested. [E. R. J., Oct. 14, '11.]

***Covington, La.**—W. J. Tracy, Cleveland, Ohio, has asked for a franchise to build an electric railway between Slidell, Mandeville and Houltonville, a distance of 50 miles.

Baltimore, Md.—The United Railways & Electric Company has received a franchise from the City Council to extend its tracks to connect northwest Baltimore and the suburbs with southwest Baltimore.

Medford, Mass.—The West End Street Railway, Boston, has asked for a franchise to extend its tracks in Medford on Medford Boulevard through Myrtle Street to the Malden line.

Saugus, Mass.—The Boston & Eastern Electric Railroad, Boston, has received a franchise from the Board of Selectmen to build its tracks across the salt marshes in Saugus on condition that the company build a station at Ballast Street in East Saugus.

***Traverse City, Mich.**—C. E. Hazlett, E. C. Billings and associates have asked for an electric railway franchise in Traverse City.

***Fergus Falls, Minn.**—S. O. Bridston, Ulrich Huss and Nels Haagenson have asked the Council for a franchise to build an electric railway in Fergus Falls.

Corning, N. Y.—The Corning & Painted Post Street Railway has asked the Common Council for a fifteen-year extension of its franchise in Corning. In return the company offers to build a 1-mile extension to North Corning.

Schenectady, N. Y.—The Schenectady Railway has received permission from the Public Service Commission of the Second District to exercise franchises and begin the construction of additional tracks in Schenectady.

Tonawanda, N. Y.—The Frontier Electric Railway, Niagara Falls, has received a franchise from the Board of Aldermen in Tonawanda. This railway will connect Niagara Falls, Buffalo, Tonawanda and North Tonawanda. James S. Simmons, Niagara Falls, general manager. [E. R. J., Sept. 23, '11.]

Allentown, Pa.—The Lehigh Valley Transit Company has asked the City Council for a franchise to double track its lines in Allentown on Eighth Street from Hamilton south to and across Union Street over a bridge to be constructed by the Allentown Bridge Company and southwardly on Ninth Street to the city limits.

Altoona, Pa.—The Altoona & Logan Valley Electric Railway, Altoona, has asked the City Council for a franchise for the construction of a new Seventh Avenue Bridge in Altoona. The company agrees to pay $25,000 of the cost of the bridge in return for the privilege of laying tracks thereon. The bridge will cost $75,000.

Northumberland, Pa.—The Sunbury & Northumberland Electric Railway, Sunbury, has received a franchise from the Borough Council to extend its lines from the present terminus on Queen Street at Sixth Street to Eighth Street in Northumberland.

Pittsburgh, Pa.—Councilman W. C. Wilkins, chairman of the committee on public service and surveys of the Council of Pittsburgh, is authority for the statement that the Pittsburgh Railways will seek the franchise from the city to build the contemplated Pittsburgh subway system. Two other interests are expected to bid for the privilege of building the subway when the special committee of the Council meets.

Victoria, Tex.—The St. Louis, Brownsville & Mexico Railway has received a fifty-year franchise from the City Council to operate a gasoline motor line in Victoria.

Vancouver, Wash.—Lawrence Harmon, Philadelphia, and associates have received a fifty-year franchise from the City Council to double track present lines and to use some of the existing tracks in Vancouver. This is part of a plan to build a 100-mile electric railway from Vancouver north to the South Fork of the Lewis River, thence northeast to Klickitat Pass. [E. R. J., Oct. 14, '11.]

TRACK AND ROADWAY

Mobile (Ala.) West Shore Traction Company.—This company has awarded a contract to George H. Clarke, Birmingham, for the location of a permanent line from a point a few miles south of the city limits of Mobile to Pascagoula, via Grand Bay and Bayou la Batre. H. Austell, Mobile, president. [E. R. J., Oct. 21, '11.]

Arkansas Valley Interurban Railway, Little Rock, Ark.—This company has placed in operation its line between Wichita and Newton.

British Columbia Electric Railway, Vancouver, B. C.—This company has awarded two contracts in connection with the double tracking of its extension from Vancouver to Eburne. This line forms a part of the Lulu Island Railway and is operated by this company under a lease from the Canadian Pacific Railway. George H. Webster, Vancouver, has the contract for grading 4 miles of track between Twenty-fourth Avenue, Point Grey and Eburne. Armstrong, Morrison & Company, Vancouver, have a contract for reconstruction of the bridge over False Creek. The bridge is 1500 ft. in length and of trestle construction. The company will complete double tracking its line from the south end of False Creek bridge to Kitsilano.

San Diego (Cal.) Electric Railway.—Plans are being made by this company for the immediate construction of an extension and double tracking of certain lines in San Diego.

Central California Traction Company, San Francisco, Cal.—The survey of this company's extension from the main line at Compton to Lockeford has been completed and construction will soon be begun.

Quebec Railway, Light & Power Company, Quebec, Can.—This company has placed in operation its 3½-mile line from Beauport Junction to Kent House.

West Chester & Wilmington Electric Railway, Wilmington, Del.—It is reported that this company will begin at once the construction of a portion of its proposed line from Wilmington along the Concord Pike to Lombardy Cemetery, a distance of about 3 miles. This line will eventually connect West Chester and Wilmington. Lewis Dalmas, Morris Building, Philadelphia, president. [E. R. J., Nov. 17, '10.]

Elberton & Eastern Railway, Augusta, Ga.—The stock has been subscribed, authority has been obtained from the Railroad Commission to issue bonds to the amount of $300,000, and contracts will be awarded within the next thirty days for the construction of this railway between Elberton, Tignall and Washington. W. O. Jones is interested. [E. R. J., July 1, '11.]

St. Simons Railway, St. Simons, Ga.—This company has asked the Georgia Railroad Commission for authority to issue $50,000 of bonds. The application states that $13,000 of the amount is to be used to cover the present cost of the railway, $12,000 to provide for an extensive and additional equipment, and $20,000 to be held in reserve for future development. The company proposes to extend its present line from the New Hotel St. Simon a distance of a mile along the beach front to Postell's Creek. [E. R. J., July 1, '11.]

Northern Illinois Electric Railway, Chicago, Ill.—This company has awarded a contract to Burns & Company, Chicago, Ill., for the construction of an extension between Amboy and Rochelle.

Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind.—Work has been begun by this company relaying 2 miles of track on its Lewis Street line in Ft. Wayne.

Crestom, Winterset & Des Moines Railroad, Creston, Ia.—This company advises that it will begin construction in the spring on its 60-mile interurban railway between Spaulding and Macksburg. It will build first from Creston to Macksburg, and then from Winterset to Des Moines. The company will operate gasoline-electric cars for passengers and express and steam for freight. Capital stock authorized, $500,000. The repair shops will be located at Creston. Officers: R. Brown, Creston, president; M. E. Harris, Winterset, vice-president; A. S. Lynn, Orient, secretary; W. W. Walker, Macksburg, treasurer, and C. B. Judd, 818 East Street, Ottumwa, chief engineer. [E. R. J., Oct. 21, '11.]

Perry, Ia.—B. C. Dilenbeck, Perry, who received a franchise in July to build an electric railway in Perry, is now in the market for construction material and supplies. [E. R. J., July 29, '11.]

***Kentucky-Tennessee Traction Company, Guthrie, Ky.**—Preliminary arrangements are being made by this company to build a 25-mile electric railway between Hopkinsville and Guthrie, Ky., and Clarksville, Tenn. Headquarters will be at Guthrie and at Hopkinsville. The first bond issue has just been placed. Among those interested are Charles Russell, W. O. Myers and Edward E. Walker, all residents of Chicago, Ill.

Kentucky Southwestern Railway, Light & Power Company, Hickman, Ky.—The proposed interurban railway of this company has been divided into seven divisions. The divisions are: Marion division, from Uniontown to Marion; Paducah division, from Marion through Salem and Smithland to Paducah; Wickliffe division, from Paducah through Ragland, Rossington, Grahamville, Barlow, LaCenter and Bandana to Wickliffe; Clinton division, from Wickliffe through Blandville, Bardwell, Milburn, Arlington, Columbus to Clinton; Hickman division, from Clinton through Moscow and Cayce to Hickman; Mayfield division, from Paducah through Krebs to Mayfield; Murray division, from Mayfield to Murray. [E. R. J., Oct. 14, '11.]

Louisville (Ky.) Railway.—The engineers of the Louisville Railway are surveying a route for a crosstown line which will extend from Parkland, the extreme southwestern residence section of the city, through the central suburban section to the Highlands, the southeastern suburb. The Council has assured the company that a franchise for the crosstown service will be offered for sale. Mayor Head and five directors of the company inspected the proposed route recently.

Louisville & Interurban Railway, Louisville, Ky.—It is proposed to extend this line from Fern Creek to Mount Washington, Ky., a distance of 8 miles. The system commences in Louisville and extends through the eastern section of Jefferson County to Fern Creek. B. C. Milner has surveyed the proposed route for the Fern Creek-Mount Washington line and recently reported to the company and the Beuchel Commercial Club, of Beuchel, Ky., that the cost of construction would approximate $36,000 per mile, or a total of $288,000 for the complete work.

Northampton (Mass.) Street Railway.—This company will reconstruct about 7 miles of overhead work at once. About 200 poles will be reset and 7 miles of wire strung. The work of double tracking Elm Street in Northampton will not be taken up until the spring.

Berkshire Street Railway, Pittsfield, Mass.—The Railroad Commission has approved the construction of a 3½-mile extension of this company's line from the Massachusetts State line to the depot in North Canaan.

***Imlay City, Mich.**—L. A. Clark and B. C. Loughlin, Detroit, and associates have completed preliminary arrangements for the construction of an interurban railway between Romeo, Almont and Imlay City. Gasoline motor cars will be used.

Saginaw & Flint Railway, Saginaw, Mich.—Martin Brothers, Saginaw, have begun work on this company's extension between Bay City and Saginaw.

Omaha, Sioux City & Northern Railway, Omaha, Neb.—This company has been voted $10,000 by Tekamah to aid in the construction of the electric railway to connect Omaha, Blair, Tekamah, Decatur and Sioux City. B. M. McCue, Garden City, is interested. [E. R. J., Aug. 12, '11.]

Public Service Railway, Newark, N. J.—The changes proposed by the Public Service Railway to accommodate travel at the new Sip Avenue station of the Hudson & Manhattan Railroad in Jersey City have been approved by the Board of Public Utility Commissioners. Among the changes are the rearrangement of tracks and the construction of curves connecting the property of the company opposite Enos Place with the lines on Sip Avenue. Other changes include the reconstruction and rearrangement of tracks on Montgomery Street and the Old Bergen Road. Authority for carrying out all of this work has been given by the Board of Street & Water Commissioners of Jersey City.

Jamestown (N. Y.) Street Railway.—Work has been begun by this company on a line from Cherry Street to Main Street, and it will double track its Main Street line from Brooklyn Square to Third Street, in Jamestown.

Long Island Railroad, Long Island City, N. Y.—This company has awarded a contract to P. H. Clements & Company for the electrification of its entire line to Port Washington. With the exception of two or three short spaces the entire line has already been double tracked. The company will also build a new bridge over Flushing Creek and one over Mill Creek at Little Neck. The tracks will be elevated over the Corona meadows.

Union Railway, New York, N. Y.—This company placed in operation on Oct. 21 its line on 149th Street, Bronx. Eventually the line will be extended to cross the Bronx River over a drawbridge and northward to Clason's Point.

Salisbury-Spencer Electric Company, Salisbury, N. C.—Work will be begun by this company within the next few weeks on an extension from Locke Mill to the Gibson Mill and on to Kannapolis. Other extensions are also being considered.

Cleveland (Ohio) Underground Rapid Transit Company.—W. R. Hopkins has returned from Europe and is preparing to take charge of the development of subway plans by the Cleveland Underground Rapid Transit Company, of which he is president. Under the franchise granted this company at least one high-level double-track line must be completed between the Public Square and the city limits within four years from the date of the referendum vote and the work must be commenced June 17, 1912. The low-level ordinance also provides that one double-track line must be completed between the Public Square and the Cuyahoga valley within the same time.

Oregon Electric Railway, Portland, Ore.—Work has been begun by this company on its extension south of Albany and it is expected to have 20 miles of grading done between Albany and Eugene before the first of the year. The Guthrie & McDougal Company, which is building the Salem-Albany line, has been awarded the contract for the first 20 miles south of Albany and has begun the grading.

Irwin-Herminie Traction Company, Herminie, Pa.—Several extensions will be built by this company in the near future. One new line will connect Madison, Arona, Adamsburg, Manor, Shafton and Sheridan Terrace. Another branch will reach Yukon.

Ephrata & Lebanon Street Railway, Lebanon, Pa.—This company is erecting a bridge across the Middle Creek between Clay and Durlach and another iron bridge which spans the Cocalico Creek at Ephrata is about completed. There is about 1 mile of grading and 4 miles of track laying to be done between Ephrata and Hopeland. It is expected to have this line between Ephrata and Lincoln in operation by Nov. 1.

***Petersburg, Pa.**—Negotiations are now pending for the construction of a 15-mile electric railway from Petersburg to McAlevy's Fort via Shavers Creek Valley. Two plans have been outlined. One is to have McAlevy's Fort as the terminus, while another plan proposes to extend down Stone Valley to Huntingdon. Samuel Longnecker, Petersburg, is the promoter.

Charleston Consolidated Railway, Gas & Electric Company, Charleston, S. C.—This company has placed in operation its extension from Magnolia Cemetery to the Country Club, near Charleston.

Eastern Texas Traction Company, Greenville, Tex.—The Mansfield Engineering Company, Indianapolis, Ind., has been engaged to report on the interurban railway from Clarksville and Paris, through Greenville to Dallas, and from Sherman via Wolfe City to Greenville, being promoted by Joseph F. Nichols, Greenville, and others under the name of the Eastern Texas Traction Company. [E. R. J., April 23, '10.]

Houston (Tex.) Electric Company.—An extension will be built by this company through the Montrose addition within the next four months.

Southwestern Traction Company, Temple, Tex.—Plans are being considered by this company to construct an extension from Temple to Marlin.

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—Within a short time this company will construct a new three-story building on Ocean Avenue and Fremont Avenue to be used as a temporary central station in Santa Monica.

Vallejo & Northern Railway, Vallejo, Cal.—It is reported that plans are being made by this company to construct new terminal buildings in Vallejo.

Cairo Railway & Light System, Cairo, Ill.—This company has installed a machine shop at its power plant in Cairo. The equipment includes among other tools a 26-in. x 12-in. lathe and an 18-in. shaper.

Boston & Eastern Electric Railway, Boston, Mass.—Plans have been made by this company to build two stations in Danvers. One will be located near the square in Danvers and the other at Davenport.

Northampton (Mass.) Street Railway.—An addition will be built by this company to its carhouse in Northampton. The structure will be 20 ft. x 80 ft. The company will also build a storage house 20 ft. x 100 ft.

Berkshire Street Railway, Pittsfield, Mass.—This company has awarded a contract for the construction of its new freight house on Pearl Street in North Adams to the H. C. Wood & Company. Work will soon be begun.

Billings (Mont.) Traction Company.—Carhouses will be built by this company on Lewis Avenue near Billings Avenue in Billings. The buildings will be of brick and concrete construction and will be so constructed that they may be enlarged as the growth of the company demands.

Jersey Central Traction Company, Keyport, N. J.—C. D. Thorne & Company, of Atlantic Highlands, have the contract to build a two-story building at Lenison for this company. The building will be used as a waiting room and train dispatcher's headquarters.

Pittsburgh, McKeesport & Greensburg Railway, Pittsburgh, Pa.—Plans are being made and bids will soon be asked by this company for the construction of a new carhouse in Irwin. The structure will be located just west of the Irwin bridge on the Trafford City line and will be 125 ft. x 25 ft.

Puget Sound Electric Railway, Tacoma, Wash.—This company has completed its new depot at Church Street and Rainier Street in Puyallup. It contains a waiting room 15 ft. x 32 ft.

POWER HOUSES AND SUBSTATIONS

Northampton (Mass.) Street Railway.—An additional engine is being installed by this company at its power house in Northampton and the cement bunkers for coal have been constructed.

Marquette County Gas & Electric Company, Ishpeming, Mich.—This company has ordered one 200-kw rotary converter from the General Electric Company.

Winona Railway & Light Company, Winona, Minn.—Among the improvements to be made by this company at its power plant will be the installation of a concrete intake water system on the levee front in Winona.

Philadelphia (Pa.) Rapid Transit Company.—This company will build a new substation at 1823 to 1829 East Letterley Street in Philadelphia. The structure will be 65 ft. x 93 ft., one story high, with a lumber storage shed in the rear 65 ft. x 56 ft.

Virginia Railway & Power Company, Richmond, Va.—This company's new power house to be erected in Richmond will be 120 ft. x 150 ft.

Roanoke Railway & Electric Company, Roanoke, Va.—This company has ordered one ATB-8-2500-kw condensing turbine from the General Electric Company for its steam power plant on Walnut Avenue in Roanoke. The new turbine will double the plant's capacity. The company also contemplates the construction of a new substation at Mason's Creek.

Bellingham-Skagit Railway, Bellingham, Wash.—It is reported that this company has completed arrangements with the Western Canadian Power Company to supply the motive power for its line now under construction between Bellingham and Mount Vernon.

Manufactures & Supplies

ROLLING STOCK

Lima-Honeoye Light & Railroad Company, Lima, N. Y., is in the market for a snow plow.

Trinidad Electric Transmission, Railway & Gas Company, Trinidad, Col., expects to purchase three cars.

Norfolk & Portsmouth Traction Company, Norfolk, Va., is said to be considering the purchase of several new cars.

Saginaw-Bay City Railway, Saginaw, Mich., has ordered one double GE-219 motor equipment with type K-36 control from the General Electric Company.

Long Island Railroad, New York, N. Y., has ordered twenty motor passenger coaches for its electric division from the American Car & Foundry Company.

Hillsboro (Ill.) Street Railway has ordered one 32-ft. closed city car with Columbian solid steel truck from the McGuire-Cummings Manufacturing Company, Chicago.

County Traction Company, Chicago, Ill., has ordered three steel underframe, single-truck, long-broom snow sweepers from the McGuire-Cummings Manufacturing Company.

Fries Manufacturing & Power Company, Winston-Salem, N. C., has ordered two 20-ft. 8-in. semi-convertible prepayment motor-car bodies mounted on Brill 21-E trucks from The J. G. Brill Company.

Twin City Railway, South Bend, Wash., has ordered three double-motor equipments of GE 219-B motors and type K-10 control from the General Electric Company, through Sanderson & Porter, New York.

Portsmouth Street Railroad & Light Company, Portsmouth, Ohio, has ordered three 28-ft. pay-as-you-enter motor-car bodies mounted on Brill 27-GE-1 trucks from the G. C. Kuhlman Car Company.

TRADE NOTES

Dearborn Drug & Chemical Works, Chicago, Ill., have removed their Boston office from 8 Oliver Street to 49 Federal Street.

Lewis Roth, Philadelphia, Pa., has removed his office from the Real Estate Trust Building to 312 Denkla Building, Philadelphia.

Brown Hoisting Machinery Company, Cleveland, Ohio, has opened a branch office in the Monadnock Building, San Francisco, Cal., with J. P. Case as manager.

Perry Ventilator Corporation, New Bedford, Mass., has received an order for ventilators for the twenty-five surface cars being built by the St. Louis Car Company for the Boston Elevated Railway.

Albert H. Wiggin, president of the Chase National Bank, New York, N. Y., has been elected a director of the American Locomotive Company, New York, N. Y., to succeed the late Julius E. French.

Safety Steel Ties Corporation, Augusta, Maine, has been incorporated in Maine to manufacture railroad ties and supplies. The authorized capital stock is $5,000,000 common and $1,000,000 preferred. E. M. Leavitt is president and treasurer.

Q M S Company, Plainfield, N. J., calls attention to the fact that it was the manufacturer of the wheel grinder in the shops of the Utah Railway & Light Company in Salt Lake City described in the Electric Railway Journal for Oct. 14, 1911, page 873.

Johnson Fare Box Company, New York, N. Y., has received an order from the United Railways of St. Louis for 240 Johnson registering fare boxes to equip three more lines of that company, making a total of 426 Johnson registering fare boxes ordered by it.

Duff Manufacturing Company, Pittsburgh, Pa., has appointed E. A. Johnson general sales manager with headquarters at its general office at Pittsburgh. Mr. Johnson was formerly Eastern sales manager for the company at New York. C. A. Methfessel has been appointed Eastern sales manager to succeed Mr. Johnson, with headquarters at 50 Church Street, New York, N. Y.

International Automatic Signal Company, Kansas City, Mo., has been incorporated with a capital of $1,000,000 to manufacture a complete line of signal apparatus for steam and electric railways. The company's product will be an electric cab signal with an automatic stop, which can be used in connection with the present interlocking and block signals. A branch office will be opened in Chicago early next month. The incorporators are Louis B. Leach and York Burgess.

C. D. Chasteney has resigned as sales manager of the De Laval Steam Turbine Company, Trenton, N. J., having acquired an interest in the Turbine Equipment Company, 30 Church Street, New York, which company represents the De Laval Steam Turbine Company in New York State, parts of New Jersey and Connecticut. Mr. Chasteney graduated from Stevens Institute of Technology in 1901 and has been with the De Laval Steam Turbine Company since the organization of that company.

F. X. Cleary has resigned as advertising manager of the Western Electric Company, New York, N. Y., to engage in special advertising and sales promotion service. Mr. Cleary's long service as salesman, sales manager and advertising manager has given him a wide experience and acquaintanceship in the electrical field, which will continue to be his line of future effort. P. L. Thomson, formerly manager of the Western Electric Company's Pittsburgh office, has been appointed advertising manager to succeed Mr. Cleary.

United States Electric Company, New York, N. Y., announces that the New York Central & Hudson River Railroad has recently received 249 of its selector-box outfits for use in the extension of its telephone dispatching system over twelve circuits. These selectors, like the others in use on that road, are the Gill bridging telephone selector and are arranged for ringing the signal bell with the main line battery. The Baltimore & Ohio Railroad, also an extensive user of Gill selective telephone dispatching apparatus, has placed orders for ninety-six box outfits, equally divided between train wire and message circuit equipment.

Allis-Chalmers Company, Milwaukee, Wis., through Vice-president Nichols has issued the following statement: "For some time past the volume of new business—the same as with other concerns—has been unsatisfactory. Our product consists of heavy machinery, power plants, etc., for which, as new plants are now being held in abeyance, markets must be found among going concerns which themselves are operating far below capacity. There seems to be no immediate prospect of revival. Our company has current assets greatly in excess of its current liabilities. Our semi-annual audit is now in progress. It has been decided to change the ending of our fiscal year from June 30 to Dec. 31."

Ackley Brake & Supply Company, New York, N. Y., has been incorporated under the laws of the State of New York. Griffin S. Ackley is president and manager, and John C. Raymond is secretary and treasurer of the new company, with offices at 50 Church Street, New York City. This company has taken over from the Ackley Brake Company all the rights of the Ackley adjustable and the Ackley no-staff brakes for Japan, China, Philippine Islands, Australia, New Zealand, all the countries of South America and of Central America south of Mexico, Cuba, Porto Rico and the other islands of the West Indies. The company will also handle the Peacock brake in the territory named. In addition the new company will engage in a general railway and tramway supply business in the United States, Canada and Mexico, and import and export tramway and railway specialties and supplies to all countries of the world. In the latter capacity it will act as the American correspondent of the British Ackley Brake Company, of London; Cie. Française des Freins Ackley of Paris and the Deutsche Ackley Bremsen Company of Berlin. Mr. Ackley, president and manager of the new company, is a pioneer in the geared hand-brake business. He organized the National Brake Company of Buffalo, N. Y., about eight years ago. In January, 1910, he sold out his interest and organized the Ackley Brake Company, with headquarters in New York City, to engage in the export business. Besides being the inventor and patentee of the adjustable geared hand brake that bears his name, he has also invented and patented the Ackley "No-Staff" brake described in the Electric Railway Journal of July 1, 1911. Mr. Raymond, secretary and treasurer of the new company, occupied a similar position with the Ackley Brake Company since its organization, previous to which he was connected with the National Brake Company of Buffalo, as a salesman. All European countries will continue to be supplied with brakes by the three European Ackley companies.

ADVERTISING LITERATURE

National Tube Company, Pittsburgh, Pa., has issued Bulletin No. 6, which describes its pipe-threading dies.

Nelson Valve Company, Philadelphia, Pa., has issued a bulletin which describes and illustrates the various sizes of Nelson blow-off valves manufactured by the company.

Cutter Company, Philadelphia, Pa., has issued a 12-page calendar covering the months October, 1911, to September, 1912, inclusive. On each page is a cut with a description of one of the company's types of circuit breakers.

Gould Storage Battery Company, New York, N. Y., has issued Bulletin No. 13, entitled "Storage-Battery Cars." The bulletin explains the economies of the storage-battery car, describes and illustrates the standard type made by the company and cites the conditions under which storage battery cars can be operated most profitably.

Archbold-Brady Company, Syracuse, N. Y., has issued a booklet in which are presented illustrations with brief descriptions of typical installations of steel transmission line supports and anchor structures, special river and railroad crossing structures, catenary bridges and cross catenary supporting poles which the company designs and fabricates.

Joseph Dixon Crucible Company, Jersey City, N. J., is mailing a 16-page booklet which contains a description of Dixon's graphite wood grease and other graphite productions of special value to electric railways. The company has also issued two folders on Dixon's silica-graphite paint. One folder contains paint specifications for steel and iron construction and maintenance work and the other points out the general advantages of this paint.

Ingersoll-Rand Company, New York, N. Y., has issued Form 3210, which is a bulletin describing Class NE-1 power-driven, single-stage, straight-line air compressors. These compressors consist of an air cylinder supported by a main frame with piston operated by means of a center crank with a belt wheel on one side and a flywheel on the other. The bulletin shows several views of the machines in section and gives tables of sizes and capacities.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has issued Leaflet 2378, covering rotary converters for railway service, which contains several illustrations and brief descriptions of the various parts of rotary converters. The company has also issued Folder No. 4186, which describes auxiliary line switches for use on electric cars euipped with drum-type controllers. These switches are electro-pneumatically operated and are mounted underneath the car.

Titanium Alloy Manufacturing Company, Pittsburgh, Pa., has reprinted on a card the following statistics of the tonnage of steel treated with various alloys as published by the American Iron & Steel Association under date of July 25, 1911: Titanium steel, 326,316 gross tons; nickel steel, 106,707 gross tons; nickel-chrome steel, 52,021 gross tons; chrome steel, 23,550 gross tons; manganese steel, 19,360 gross tons; vanadium steel, 9049 gross tons; other alloys, 30,816 gross tons; total, 567,819 gross tons. The company then points out that the output of titanium steel for 1910 was 300 per cent greater than the next largest, nickel, and greater by 84,813 gross tons than the output of all the other alloy steels combined. The card is headed, "What is the greatest of all cleansers or deoxidizers for steel?"

NEW PUBLICATIONS

Practical Instructor and Reference Book for Locomotive Firemen and Engineers. Compiled by Charles F. Lockhart, New York, 1911. The Norman W. Henley Publishing Company. Cloth, 368 pages. Price, $1.50.

This book contains up-to-date information on the construction and operation of steam locomotives, air brakes, valve gears, rules and signals. The book also contains 850 question and their answers compiled from the examination papers of the different railroads.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVIII NEW YORK, SATURDAY, NOVEMBER 4, 1911 No. 19

PUBLISHED WEEKLY BY

McGraw Publishing Company

JAMES H. MCGRAW, President; C. E. WHITTLESEY, Sec'y and Treas.

239 WEST THIRTY-NINTH STREET, NEW YORK

TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1021 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Thursday, 9 a. m., of the week of issue.

Copyright, 1911, by MCGRAW PUBLISHING COMPANY.

Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, NOVEMBER 4, 1911.

CONTENTS.

Nebraska Depreciation Rules..... 973
Stimulating Urban Tourist Traffic..... 973
Corporations and Supervision..... 974
Engineering Statistics on Small Systems..... 974
The First Trunk Line Electrification in Germany..... 974
Double Car Units in City Service..... 975
Lightening the Equipment..... 975
Values Claimed in the Buffalo Plan..... 976
Power and Transmission Methods of the Prussian-Hessian State Railways..... 978
Detroit United Railway Assists Milk and Cream Contest..... 984
New Power Station of the Utah Light & Railway Company..... 985
Rule for Treatment of Depreciation in Nebraska..... 990
Strike in Copenhagen..... 990
Hearing in Buffalo on International Traction Reorganization..... 991
Tentative Subway Plans for Chicago..... 996
Meeting of the German Street & Interurban Railway Association... 997
Vote on Engineering Standards..... 997
Reduced Insurance Rates in Richmond..... 998
Accident Prevention Cards in Chicago..... 998
Hearing on Transfers in New York..... 999
Hearing on Eight-Car Elevated Trains in New York..... 999
Recent Prepayment Licenses.....1000
Inspection Tour Over Illinois Traction System.....1000
Recent Improvements in Signals.....1001
Exhibits at Convention of American Railway Engineering Association.....1001
Combination Passenger Car for Walla Walla, Wash.....1001
Gasoline-Electric Cars in Europe.....1002
Souvenir Album of the Berlin Street Railway System.....1002
Automatic Car and Air Couplers for Interborough Subway Cars....1003
Ramp for Car Platforms.....1004
Substantial Portable Crossover.....1004
London Letter.....1005
News of Electric Railways.....1006
Financial and Corporate.....1008
Traffic and Transportation.....1010
Personal Mention.....1012
Construction News.....1012
Manufactures and Supplies.....1015

Nebraska Depreciation Rules

The purpose of the rules adopted by the Nebraska State Railway Commission, in reference to accounting practices of electric railways, is to effect a better classification of charges for maintenance, additions and betterments. Among the rules published elsewhere in this issue one provision is that which directs a monthly accounting in reconstruction work as between operating and capital charges. That such a separation should be made without loss of time and before the records become so old that proper segregation is difficult is a point of view which the companies as well as the commission should approve. Other parts of the rules are fundamental requirements of a system of proper accounting and represent an evident effort to promote better practices. It is the decision of the commission, in brief, that replacements shall be replacements in kind and, if increases in value have taken place, the extra cost is part of the expenditure which appropriately goes with the balance into the operating expense accounts. This policy will tend to the integrity of the capital accounts.

Stimulating Urban Tourist Traffic

Observation of transit conditions in several widely separated cities during a recent tour leads again to the text that it is a wise manager who cares for the stranger within the gates. In so-called "tourist cities," dependent to a large degree upon the attractions of climate, historic background or architectural charm, the need of more highly organized means of traffic stimulation is often a pressing one. At stop-over points where long journeys are broken it is common to hear the question, "How can I see the most of the town in an hour or two?" and yet many companies are doing nothing whatever to encourage this class of travel on the regular cars. There is a field here which the special sightseeing car does not cover. Let the company issue a neat folder showing at least a skeleton map of its principal and street relations with the prices and time required for trips of say one-half hour to two hours each, and let these folders be placed in the hands of tourists at waiting rooms and on trains where it is possible. Combine this form of publicity with an electric sign or two near the station exit—a neat billboard sign equipped with five 16-cp reflector lamps and mounted on a feeder pole is better than nothing—and results will come. The type of car passing the station and the character of its signing are also factors in the stimulation of this limited time traffic—for most of it is of the short-haul type and hence often more profitable than double the volume of business handled over greater distances.

Corporations and Supervision

The initiation by the government of a suit for violation of the Sherman law against the United States Steel Corporation and the decision of the Supreme Court that interstate railroads are amenable to the federal statutes so far as concerns the employment of safety devices on their intrastate cars may not have any direct bearing upon electric railways as a whole, because most electric railway companies engage entirely in an intrastate business. Nevertheless, these events are evidences of the growing closer supervision of the affairs of corporations which now seems to be a feature of American government, both state and national. For many years affairs of corporations, even those of a public utility character, were conducted with almost the same freedom as regards rates and service as if they were purely private affairs. The rates were made very commonly those which the managers thought the traffic would bear, and securities were issued with as much freedom from governmental control as in the case of notes issued by an individual. We do not believe that it would be wise to return to a system of free license in corporate affairs, or that the corporations would wish any such change, even if it were possible. They have come to realize that their best interests lie in their reasonable and businesslike treatment of the public. On the other hand, the sentiment is undoubtedly growing that the corporations in their turn require reasonable and businesslike treatment if they are to prosper in their activities and, as the corporations are the principal employers of labor, that the prosperity of the public depends largely upon that of the corporations.

Engineering Statistics on Small Systems

Although the small electric railway cannot afford to keep such detailed operating statistics as large undertakings do, and does not need them as much as the large company does, occasions will arise when it is very desirable to have exact data on costs and conditions. For example, many of these companies have non-condensing engine equipments but know so little of the real cost of power production that they cannot tell the exact saving, if any, to be secured by the installation of a low-pressure turbine. In a case of this kind, it is clear that before deciding to spend thousands of dollars it would pay a company to appropriate a few hundred dollars for an expert investigation of the power generating and distributing conditions. Such an investigation might well include the kindred question of energy consumption on the car as affected by traction, heating and lighting requirements. In fact, the great progress which has lately been achieved in car meters, controller and heater regulating devices and metal filament lamps shows that the power situation is open to betterment from many sides. In this respect the small company has more to gain proportionately than the large one because its generating costs are higher. On the other hand, the small railway's financial inability to employ specialists in the shop makes it cautious about complicating the standard car equipments by adding new contrivances, no matter how promising. However, the decision on such questions should not be made offhand, but only after a statistical study which will show whether the greatest return for the investment is to be expected from changes in power house, distributing system or cars.

THE FIRST TRUNK LINE ELECTRIFICATION IN GERMANY

The electrification of the Dessau-Bitterfeld section of the Prussian-Hessian State Railways, described elsewhere in this issue, is a logical sequel to the formal adoption of 15-16⅔-cycle, single-phase alternating current as the standard for trunk-line service in Germany. This decision was reached only after a long series of experiments which date from the classic high-speed tests conducted with three-phase current during the years 1901 to 1903 under the auspices of the government on a line between Marienfelde and Zossen. Even the present installation is more or less experimental, but the employment of the single-phase system on such a scale for main-line traffic clearly indicates that the builders expect to make few if any radical changes in the standards adopted. The reasons for trunk line electrification are more urgent in Germany than in the United States, because the average density of traffic is greater and good locomotive fuel is more expensive. Thus on the Dessau-Bitterfeld line at least thirty-five trains a day are operated through a district bearing coal which is suitable only for stationary power plants. In other parts of Germany water power is available for electric railway operation. Despite these encouraging conditions trunk line electrification has been delayed partly through lack of public funds and partly because of the feeling of the military authorities that the traffic on an electric road could more easily be interrupted by a hostile force than if steam was used as the motive power.

Both the power transmission and overhead construction systems of the new line possess several unusual features. The behavior of a 60,000-volt underground conduit will certainly be watched with interest by American engineers, in view of the fact that few cable installations in the United States exceed 13,200 volts. Indeed, the maximum, so far as we know, is 25,000 volts, as in St. Paul and Montreal. The catenary line construction, however, will doubtless prove of even wider interest, because it is such a radical departure from the truss type of catenary bridge which has been used here almost exclusively in the case of heavy electric traction lines. As a rule the German bridges consist merely of plain channels, which are supported on two or more towers, according to the number of tracks. The spans are about 250 ft. long. This construction is light and inexpensive. At the same time it permits to the locomotive engineers an unobstructed view of all signal indications. These catenary bridges may seem flimsy when contrasted with the original New Haven designs, but it is noteworthy that the latest New Haven bridges are also much lighter than those first erected. This change, based, as it is, upon experience, should be encouraging to steam railroad men who have feared that overhead construction with catenary bridges would be very costly.

Various ingenious methods have been devised to energize the trolley wire over spur loading and shop tracks after due visual and audible warnings have been given to those who are working on the tracks. It is rather difficult to understand, however, why a 10,000-volt trolley should be permitted in any building, as was done in this case. It would seem as if it would have been an easy matter by the

use of transformers to operate the shops and yards with a low-tension trolley voltage at equal efficiency and greater safety.

DOUBLE-CAR UNITS IN CITY SERVICE

We discussed recently in these columns the importance of providing greater capacity in the motors of cars which are designed to haul trailers than in those which operate singly. It may be that cars which are not over-powered in this way would be able to haul trailers without excessive damage for those short periods each day which are understood to comprise rush-hour service. But when once the practice of hauling trailers is begun the exigencies of different traffic situations will force upon nearly every management the use of trailers at other times of the day, and the motor equipment will suffer accordingly.

But trailers constitute by no means the only method of increasing the carrying capacity of a system without increasing the number of transportation units. A review of the large amount of literature which has appeared on this subject recently indicates a general agreement that the operation of double-car units under certain circumstances may be highly advantageous in city service. The use of more than two cars coupled together for such service is by common consent considered undesirable. As yet, little has been done in such train operation on a large scale, although several cities in the East did use a few such trains experimentally for a short time three or four years ago and then abandoned them.

Since that time, however, there have been developments which suggest that an experiment now conducted along similar lines would prove more successful. One of these developments is the general movement toward lighter cars. The two-car train, if now built, would probably consist of cars somewhat smaller and very much lighter than those used with former experimental trains and with two motors on each car. A complete multiple unit system would not be necessary, and both cars combined should not weigh more than 55,000 lb. or 60,000 lb., which just about equals the weight of one heavy four-motor car with sufficient tractive power to draw a trailer of reasonable size and weight. A double unit of this character, if of the center-door type, might easily provide a seating capacity of eighty-five to ninety people and a carrying capacity of perhaps double those amounts. The all-day operation would be with single cars and during the slack hours the seating capacity would be ample for the traffic.

Such an equipment would possess an important advantage over trailers, in that it would be double-ended, and switching would be more easy because each car could move itself. The question of length of stops and the number of stops made by such a train as compared with single units would depend on the character of traffic in which the train or car was used. Under most circumstances, we do not see why the length of stops should be greater than for a single car, or in most large cities why the number of stops should be greater, because there the street congestion demands stops or slow-downs at a great many more points than those at which passengers board or disembark from a single car.

LIGHTENING THE EQUIPMENT

Science to the contrary notwithstanding, fashion rules in engineering circles almost as much as among milliners. This truism is brought particularly to our minds by the changes which have from time to time appeared in the rolling stock of electric lines. Old timers who remember antediluvian things, like the Richmond road, the little flat Sprague motor with two commutators and the ancient saw of "drop a nickel in the slot and see the trolley come off," appreciate the shift in point of view to the full.

The general phases of the changes mentioned are familiar to all electric railway men. In the beginning every electric car was a made-over horse car and the whole equipment was light in proportion. Then came the era of specialized cars for motor service, of heavy track, relatively high speeds and always a demand for more power and quicker acceleration. Now these various items fatten upon each other. Heavier cars mean heavier motors and track, while high speed and rapid acceleration go hand in hand and demand again heavier track, bigger motors and stronger cars. And so the game went merrily on until a point was reached where every little electric road felt it necessary to use 45-ft. cars with the heaviest motor equipment on the market, on the apparent theory that the scene of their operations was about to become a great terminal metropolis for high-speed electric service to the ends of the earth, and the net result has been mostly repair bills, especially for the tracks. It is most encouraging to note at the present time a realization that unnecessary dead weight, whether in the car itself or in its equipment, costs money both in the beginning and for every mile it is hauled. Years have taught car builders a good deal about light construction, and years of meager dividends have taught railway managers to cut their coats according to the cloth and not according to iridescent dreams of the promoters.

Concerning the construction of the cars themselves, we propose here to say nothing more than to direct attention to the well-known fact that builders know how to make cars of good capacity and good wearing qualities at a weight per passenger certainly 20 per cent less than was thought necessary in the days of extremely heavy construction. What is more, everyone now fully realizes that cars of moderate size and weight answer the requirements of city service in most cases better than the extremely heavy ones. With this knowledge has come an effort to effect a corresponding or greater reduction in the weight of the electrical equipment per passenger carried. The report of the committee on equipment at Atlantic City admirably sets forth this tendency. It is particularly interesting to those familiar with the early history of the art that among the methods now being tried for reduction of equipment weight is the use of motors with field commutation for the high speeds. In fact, our old friend "the loop" has arisen, like the phœnix, for a new flight. The interpole construction has made field commutation again practicable, at least for certain not uncommon cases, and is as well responsible for the possibilities of a general reduction of motor weights with respect to the output. The other methods enumerated in the report are raising the working temperature by using refractory insulation, forced ventilation, use of higher speed

motors and re-design for specially light weight. Now, to get the car equipment down to modest weight any or all of these methods give promise of good results; in fact, they co-operate to secure the extreme of light weights, yet each method has in a sense its own field of applicability. General re-design for light weight would, of course, be a good thing, but does not offer the possibilities of weight reduction to be found in the other devices. The use of higher speed motors has its limitations, yet is practicable where high car speeds are to be the rule. Forced ventilation likewise, so successful in locomotive practice, lends itself more readily to heavy service than to that smaller work in which the weight of equipment is now the most serious burden. The use of refractory insulation is, in and of itself, always a good thing and to be encouraged, yet it may be a question whether it should not be taken advantage of rather to increase the factor of safety and so reduce repairs than to force the output.

In connection with the field control motor there is an interesting possibility of recurrence to the more general use of single-motor equipments, particularly in light service. The weight of such equipments per horse-power can be made materially less than that of a double-motor outfit and its first cost and repair cost is notably decreased. Of course, with double motors there is always the possibility of hobbling home after a breakdown, but with simple car equipment and modern insulation it is at least an open question whether the gain in the use of single motors would not be in very many instances greater than the loss in energy in giving up series-parallel control. At the price at which many railway companies reckon their current the possibilities of the single motor with field control ought to be very thoroughly investigated where the service is not so heavy as to demand the extra adhesion of the double drive.

Another line of improvement which impresses itself very forcibly upon us is the reduction of weight in the car wiring system. With the very heavy cars came elaborate wiring installation in heavy iron conduit, put in almost as it would be in a concrete office building. Iron conduit is permanent, true enough, but it is outrageously heavy, and it is a grave question in the minds of many operators whether in the long run it makes for safety. It seems to us that if care is used to select a good quality of cable and to install it carefully this extreme external protection is unnecessary. A suitable fireproof trough or flexible sleeve guards the cables for all practical purposes just as effectively, lessens the risk of abrasion of the insulation and also tends to avert the troubles from lightning which have of late been not infrequently reported. There will always be a field, perhaps an increasing field, for heavy cars adapted for powerful motor equipment and high speeds, but at least three-quarters of the electric railway service in the United States would be positively improved from an operative standpoint by the deliberate adoption of somewhat lighter equipment. One does not need a pavement maul to kill mosquitoes, and it certainly does not seem necessary to go the limit in heavy cars, intricate and costly motor equipment for the everyday work of electric lines worked with moderate traffic and at moderate speed over tracks without excessive grades. The present reversionary tendency is a wholesome one, and while it will never lead us back to the rickety equipment of ancient days it will certainly result in lower operating costs and smaller repairs.

VALUES CLAIMED IN THE BUFFALO PLAN

The history of the International Traction System of Buffalo, with its early losses and record of superseded property, is not unlike that of other similar companies in various parts of the country. It has been laid before the New York Public Service Commission, Second District, in connection with a plan of reorganization which, in brief, justifies the present capitalization, which, eliminating certain intercorporate holdings, amounts to about $47,000,000. While the plan thus proposes that the securities outstanding continue without readjustment in the reorganized property, the company outlines its intention of using future surplus earnings, above a fair rate of return, to overcome any excess in capitalization.

In the estimate of the value of the property made by Bion J. Arnold certain elements enter, the most conspicuous of which is the theory that a company is entitled to a fair rate of return upon actual investment from the beginning of operation, provided the records show that it has been managed conservatively. This theory, as stated in the issue of the Electric Railway Journal for Oct. 21, is one that has been upheld by the conservative Railroad Commission of Wisconsin. It has never, we believe, been developed so fully as in the present case. This may be due in part to the fact that none of the Wisconsin companies to whose problems the theory has been applied conducts operations on as large a scale as the International company or has been in business for so many years as the constituent railways of that corporation. The theory, then, is advanced as the foundation of a case where its acceptance involves, probably for the first time, a very large amount of money or, what is the same thing, the acceptance of an equivalent amount of securities.

Added to the sums by which the company has failed to earn a return of 7 per cent on its investment—that is to say, the difference between actual net earnings and 7 per cent—is interest on those sums. This interest is computed, in this case, at the rate of 7 per cent per annum. The net effect of the application of the theory in the Buffalo case is a "cumulative excess," as it is termed, of $11,185,908. As is shown in the full figures published in the Electric Railway Journal for Oct. 21, this item becomes an important part of the total capital value claimed by the company. It is, in fact, 23.7 per cent of the full amount. Starting with the year 1866, the investment in the property is stated at $233,690; in the following year this amount had increased to $342,335, and at the end of that year there had accumulated an amount of $11,799 by which the property had failed to earn the fair rate of return used in the calculation.

Until the year 1876, when the investment in the property was $862,437, the amount of the "cumulative excess" increased each year. In that year the actual net income from operation exceeded for the first time the assumed rate of 7 per cent and, as a result, there was an actual decrease in the cumulative excess. From that time until 1884

there were only slight changes in the amount. In each year intervening the actual net income from operation was in excess of the calculated income at the fair rate of return assumed, but in some cases the excess was so small that the interest upon the cumulative excess caused a net increase in the amount to be made up in the future. By the end of 1892 this amount had risen to $546,370. Not until 1896, however, did it exceed $1,000,000. At the end of 1900 the amount was $3,316,173, and from that figure there was a steady increase to $6,708,045 in 1905, $9,168,710 in 1908 and the final figure stated for 1910.

In 1910 the investment in the property was calculated at $35,889,102. The income at 7 per cent, if realized, would have been $2,458,817, whereas the actual net amount derived from operation was $2,239,276, a difference of $219,541. The interest, however, on the cumulative excess which was developed through the previous years of operation made an actual addition for the year 1910 to the amount of profit unrealized and interest thereon of $936,995. The interest is thus increasing rapidly. All the figures which have been developed on this point are based, of course, on totals showing the investment in the property. According to the report these values were determined by calculation of the cost new of existing and superseded property. The information regarding superseded property was secured from records of the company, statements of individuals familiar with the history of the properties and published reports of various subsidiaries; and the values as of the dates of purchase thus determined were used.

Inasmuch as the failure of the property to realize the fair rate of return assumed accounts for 23.7 per cent of the full capital value claimed in this case, it will be of interest to show what proportion of the total is represented by other elements in the appraisal. In the valuation of physical property now held and operated, the cost new was computed at $25,957,015. This is 55.2 per cent of the total capital value. To this amount there was added a charge of $5,677,952 for expenditures charged against capital account for property that has been superseded. This amount comprises 12.1 per cent of the total, making an aggregate of 67.3 per cent to represent the total capital value charged on account of physical property, either existing and operated now or owned in the past and discarded because of supersession. To the figures stated there has been added $4,574,135 on account of bond discount, or 9.7 per cent of the total. As the figures given aggregate 100.7 per cent, it may be stated that the excess amount, $320,000, is subtracted for capitalization of a lease.

The amount of bond discount, as set forth in the report, is developed by a statement of the discount at which bonds of the present company and constituent properties were sold. Some of the discounts were large. From 1867 to 1885 the bonds of the Buffalo Street Railroad were sold at 85 and 90. On most of the bond issues of constituent companies, according to the statement, 85 per cent of par was realized. Even the bonds of the International Traction Company, the present holding company which controls the properties, were sold, according to the statement, at a discount of 24 per cent between 1899 and 1910. Previous issues of the bonds of the holding company were sold at a discount of 12½ per cent in 1899. On the total amount of bonds involved during the history of the property from 1867 to 1910, $32,790,500, the average rate of discount was 13.9 per cent. The bond discount is included in the capitalization on the theory, which is consistent with the basis of the plan, that it is part of the cost of raising capital. If the discount at which the bonds were sold had been set up as an amount to be amortized by charges against earnings, it would have increased the amount by which the properties failed in the past to earn the fair rate of return assumed in this case.

As the total cost new of present physical property is distributed in detail in the report, the proportion which each bears to the total may be shown. Outside of an item of $17,238 for extraordinary carrying charges on track that could not be used promptly because of the failure of the city to open the streets, and an item of $64,752 investments, the summary of physical property shows a total value of $25,875,025. This, however, includes $2,352,275, or 10 per cent, for legal expenses, carrying charges and contingencies. The summary, exclusive of these items, therefore is $23,522,750. This amount consists of the following items in the proportions named: Track, 33.5 per cent; paving, 12.5 per cent; electrical distribution system, 8.8 per cent; rolling stock, 20.2 per cent; power plant and substation equipment, 7.9 per cent; fixed tools and shop equipment, 0.5 per cent; stores, supplies, floating tools and miscellaneous, 1.5 per cent; furniture and fixtures, 0.2 per cent; buildings, 7.7 per cent; real estate, 7.2 per cent.

The corresponding percentages of different classes of superseded and abandoned property are somewhat different proportions of the total value of that class than the percentages of property in actual use at the present time. These are given below: Track, 51.3 per cent; paving, 19.5 per cent; electrical distribution system, 5.4 per cent; rolling stock, 12.7 per cent; power plant and substation equipment, 8.9 per cent; furniture and fixtures, nominal; buildings, 2.2 per cent. The total of these, without allowance for the 10 per cent added for legal expenses and contingencies, and without deduction for the scrap value realized, is $5,837,067.

No depreciation is computed in the report for the reason that if a deduction should be made on account of this loss in value it would simply increase the amount to which the company would be entitled, in accordance with this theory, because of the failure to earn a fair return. At the request of the commission, Mr. Arnold is now preparing a report which will show the depreciated or present value of the physical property. The plan well supports the proposition, in which we concur, that, in all cases possible, outstanding reasonable capitalization, issued legally, should be recognized. The Buffalo plan, however, goes a step further in that it provides for the gradual elimination of that part of the present claimed capital value which is not represented by actual physical property in use. This theory of reimbursement for the investment not now represented by property in existence is upheld by Mr. Arnold in this case because of his counterbalancing proposal that this investment shall be retired in the future.

The hearings upon this general plan of capitalization have not yet been finished, so that further testimony upon it may be expected in the early future.

Power and Transmission Methods of the Prussian-Hessian State Railways

This Article Describes the Power Station, Transmission System and One of the Types of Overhead Construction Adopted for the First Trunk Line Electrification of the Prussian-Hessian State Railways Between Bitterfeld and Dessau

On July 29, 1909, the State Railways of Prussia and Hesse were granted a sum for the experimental electrification with the single-phase system of the Dessau-Bitterfeld section of the trunk line which joins the cities of Magdeburg, Dessau, Bitterfeld, Leipsic and Halle, as shown in the accompanying map. The work was begun on Jan. 18, 1910, and the first electric locomotive was placed in operation exactly one year later. The section now in operation is 16.12 miles long. However, the plans contemplate the electrification of the entire line, totaling 95.48 miles. The Dessau-Bitterfeld line is well suited for high-speed experiments, as it is situated in a very flat country and is built with few curves. One of the controlling reasons for electrifying this particular section was the fact that it is in the heart of a great lignite region. This cheap fuel was available for power station use, but could not be employed by steam locomotives.

The present purpose is not to operate with higher speeds than were customary with steam, but merely to maintain the old schedule of twenty passenger trains and fifteen freight trains a day. The freight service, however, is much heavier during the harvesting of the sugar-beet crop. The average weight of express passenger trains is 170 metric tons and of freight trains from 600 to 1500 tons.

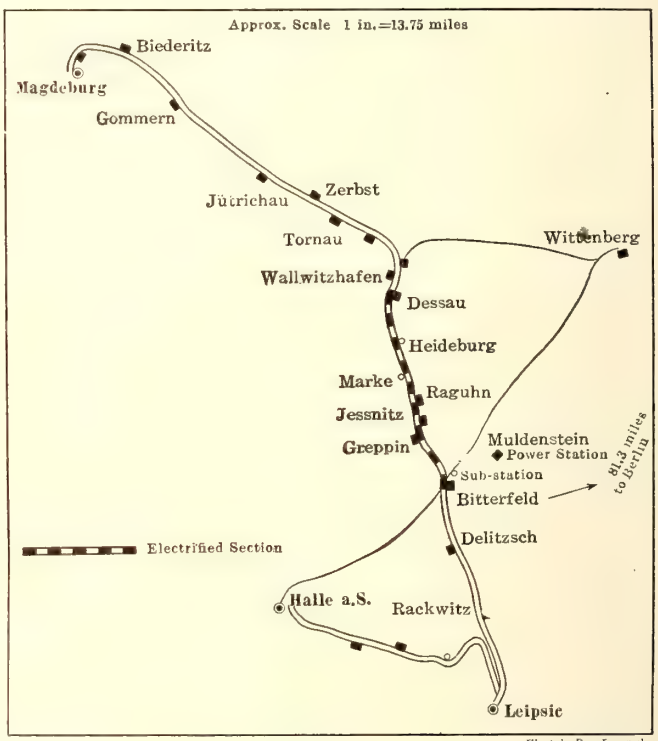
POWER STATION

The energy for the operation of the line is generated in a power station at Muldenstein, 3.16 miles from Bitterfeld. The station is not on the right-of-way, but is very favorably located with regard to cooling water supply and coal delivery. The slope of the land also made it possible to build the structure with very little excavation and to install automatic dumping machinery for the coal storage. The station generators supply current at 15 cycles and 3000 volts, which is transformed to 60,000 volts for transmission and then stepped down again to 10,000 volts for the trolley. Of course, a 60-000-volt line was not required for the short distance from the power station to points on the section thus far electrified, but this high potential was installed at once with a thought of the more extended electrification to come and also because of the desire to gain as much experience as possible with high-tension lines of the selected designs before the equipment of more mileage. At present there is only one substation, and this is located near Bitterfeld.

The Muldenstein power station is a radical departure from other generating plants, inasmuch as the boilers, generating machines, switch equipments, auxiliaries, oil storage, etc., are in separate buildings to insure maximum ventilation and light. The order of the buildings is as follows: Fuel storage along the railroad track, then the boiler, machinery and switch gear buildings parallel to the storage building in the order named. Only a portion of each section has been built at present. The boiler house is of "knock-down" construction, but the portions of the generating section so far built are of massive brick to avoid any future shifting of the crane and generating sets. The switch gear is now housed in a part of this building.

The complete boiler house will have eight batteries of boilers, each connected to a stack 328 ft. high and 13 ft. inside diameter at the top. The present equipment consists of four Stirling water-tube boilers and one stack. Each pair of boilers is supplied with a common feed-water heater. The grate area per boiler is 3229 sq. ft., the steam pressure 120 lb. to 125 lb. above the atmosphere, and the superheat as high as 375 deg. C. The boilers are arranged to use both run-of-mine coal and briquettes.

The machinery room now contains a 5000-hp, 900 r.p.m steam turbine furnished by the Allgemeine Company, direct-connected to a 3000-kw, 3000-volt, 15-cycle single-phase generator made by the Siemens-Schuckert Company. The latter company also furnished a motor-generator set and a storage battery for lighting and auxiliary purposes. The space now required for the switchboard will eventually be used for a machine shop. The basement of the machine room also contains feed-water tanks, turbine-driven feed



Dessau-Bitterfeld Railway—Map of Territory, Showing the Portion Now Electrically Operated

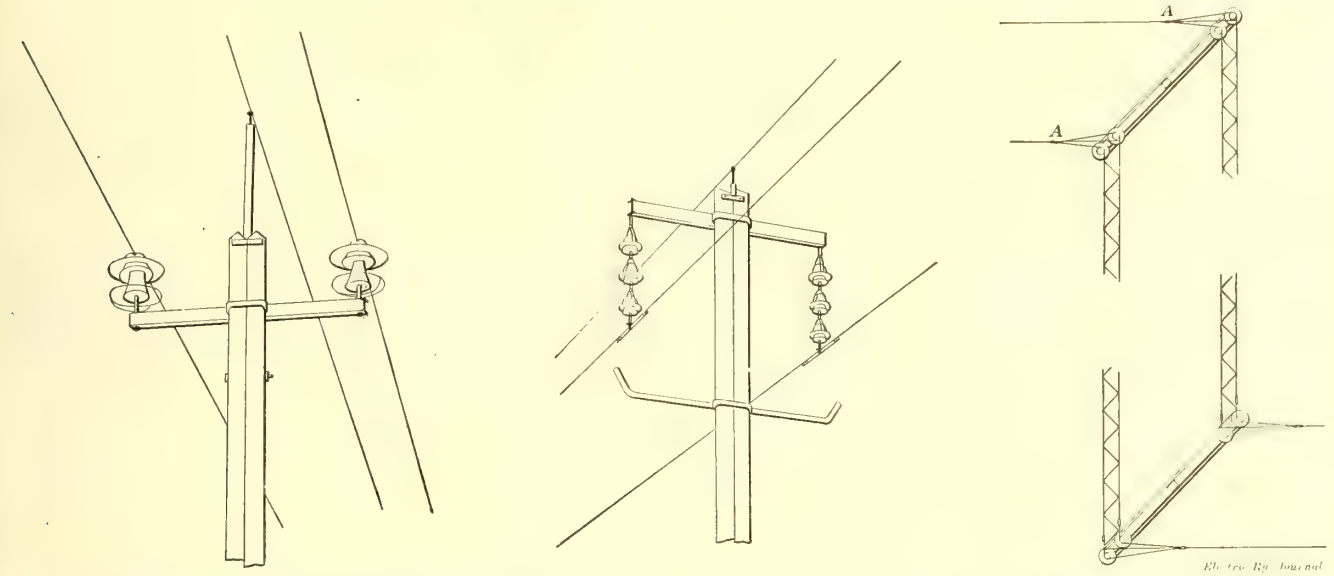
pumps, condensing equipment and other turbine auxiliaries. The turbine is ventilated by filtered air. It may be operated either condensing or non-condensing, valve arrangements being provided for an output equivalent to five-sixths of the rated output under the latter condition. The generator is rated at 3750 kva, equivalent to 3000 kw at 80 per cent power factor, 3900 kw for half an hour and 4200 kw for two minutes.

Two 1850-kva, core-type, oil-cooled transformers made by Brown, Boveri et Cie. transform the generator current to 60,000 volts for transmission. The actual step-up ratio is 2925 volts to 60,000 volts. The transformers can be connected for a possible transmission potential of 30,000 volts should the 60,000-volt underground cable transmission prove unsatisfactory. Each transformer has an oil-circulating pump. These transformers can carry a 20 per cent overload for two hours and a 50 per cent overload for half an hour. The switching equipment was furnished by the

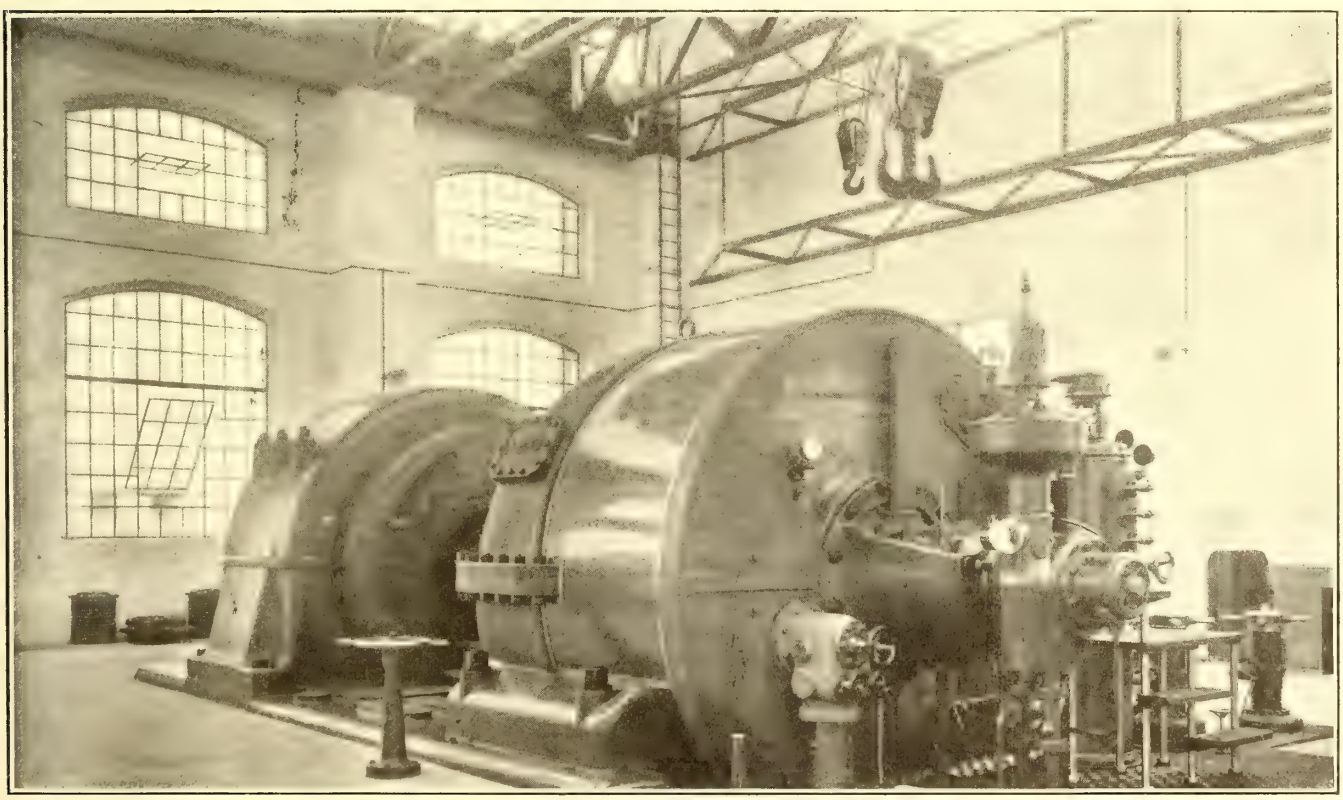
Siemens-Schuckert Company. The 22-kw motor-generator set previously mentioned generates 220-volt direct current for lighting, for operating the remote-control switches, etc.

HIGH-TENSION OVERHEAD TRANSMISSION

The high-tension transmission between the Muldenstein power station and the Bitterfeld substation consists of one overhead and two underground 60,000-volt lines. The overhead line was built to forestall delays through the possible failure of the underground cable lines and also to determine its influence on nearby parallel low-voltage circuits. Owing to the limited appropriation, the overhead line which was built by the Siemens-Schuckert Company is of the simplest character consistent with safety. The poles at the stations and over special crossings are of metal lattice design, but elsewhere the wires are carried on pairs of wooden poles which are screwed together as shown. The average distance between the twin wooden poles is 230 ft., but between the metal poles as much as 311 ft. The transmission lines are of stranded copper of No. 3 wire carried 19 ft. to 24 ft. above the ground according to conditions. The porcelain insulators have iron pins and comprise the ordinary cross-arm and suspension types illustrated. The cross-arm insulators have guard rings for protection against atmospheric discharges and disruptive arcs. All insulators were tested for punctures up to 100,000 volts and for over-arcing up to 80,000 volts. The latter test was made in an artificial shower. Auxiliary wires are used at all crossings to prevent a broken wire from falling to the ground. The grounding wire installed above the two transmission wires is connected to all cross-arms and to eight submerged iron grounding plates.



Dessau-Bitterfeld Railway—Examples of High-Tension Line Construction, Including a Crossing Over Steam Railroad Tracks



Dessau-Bitterfeld Railway—3000-Kw, 3000-Volt, Single-Phase Turbo-Generator Set in the Muldenstein Station

A somewhat special construction was used in crossing

the Berlin-Halle Railway. As shown on page 979, each of the high-tension wires is connected to two steel wires just before reaching the insulators. Each wire is then zig-zagged across the right-of-way over the corresponding pair of steel wires. These steel wires are connected to the copper strands with special clamps placed at the points marked A. The insulators were installed in pairs on account of the extra strain at the corners of the transmission lines.



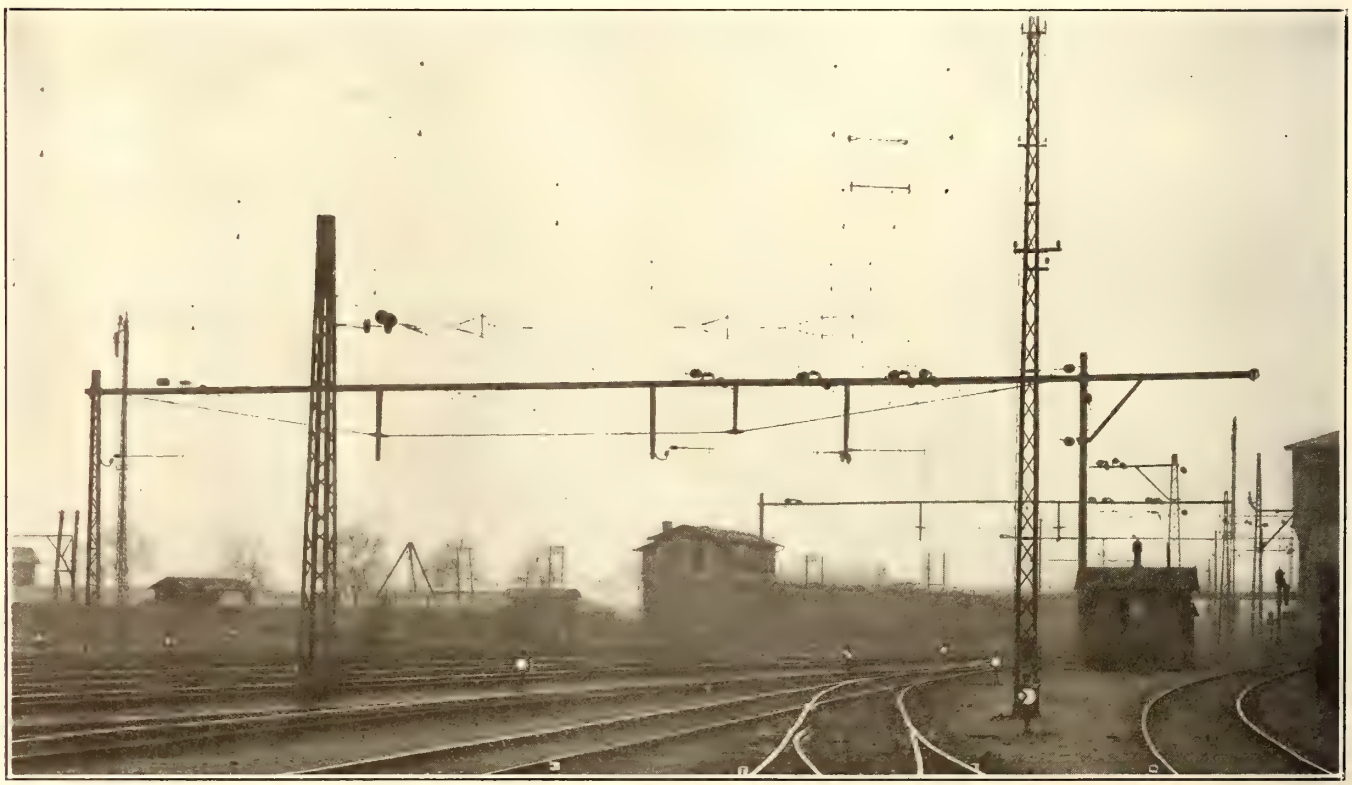
Dessau-Bitterfeld Railway—Long Span Construction in the Yard at Bitterfeld

HIGH-TENSION UNDERGROUND TRANSMISSION

Underground cable lines were installed for two reasons. One was to have a high-tension transmission line which could not be so readily located and destroyed by rioters or invading armies as an exposed overhead line; another was the immunity from atmospheric disturbances which such lines would enjoy. It was found on taking up the question with the cable manufacturers that cables could be built to withstand test potentials as high as 200,000 volts. Finally one set of cables was ordered from the Siemens-Schuckert Company and another from the Felten & Guilleaume-Carlswerk Company.

The Siemens-Schuckert transmission consists of two single-conductor aluminum cables of 100,000 circ. mils cross section covered with prepared paper insulation, a double layer of lead and an external protection of asphalted jute. The cables were laid at a depth of about 2.6 ft. in a sand-filled conduit. After installation the cables were subjected for ten minutes to a test of 50,000 volts against the earth. These cables showed the following characteristics: Insulation resistance per mile, 3128 megohms; capacity per mile, 0.2712 micro-farads, and ohmic resistances per mile, 0.4288 ohms.

The Felten-Guilleaume underground lines are also single-conductor cables with lead covering and prepared-paper insulation. The conductors are of copper of 80,000 circ. mils cross-section. These cables were tested to 120,000 volts, 40 cycles, first for an hour and then for ten minutes. They showed the following characteristics: Insulation resistance per mile, 5420 megohms; capacity per mile, 0.2928 micro-farads; ohmic resistance per mile, 0.4928 ohms.



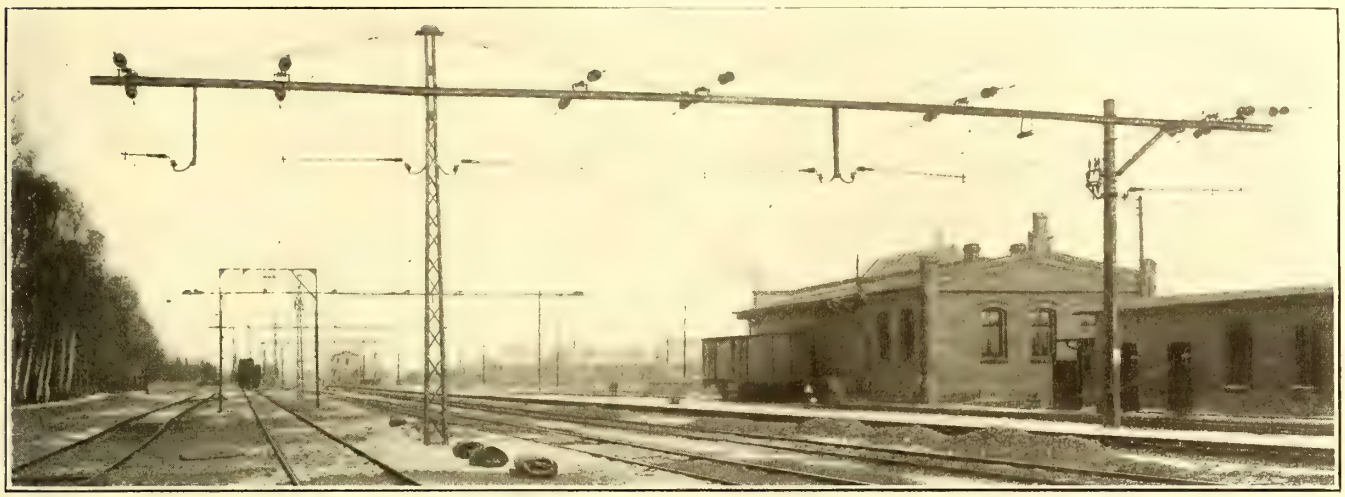
Dessau-Bitterfeld Railway—Construction at a Curve in the Bitterfeld Yard. The Lattice Pole at the Right Is a Lighting Pole

BITTERFELD SUBSTATION

The Bitterfeld substation was built to convert the 60,000-

volt transmission current to 10,000 volts for the contact line. Two transformers with the necessary switching apparatus are installed for this purpose. The substation building, with the exception of the transformer section, is two stories high. The lower floor contains a switch room, a 32-cell storage battery for operating the switches and lighting, and a high-tension room which contains the 10,000-volt and 60,000-volt switches, and the oil and water resistances for the lighting and high-tension discharge protective apparatus. The horns for the latter and the 60,000-volt busbars are placed on the upper floor. In addition to this equipment, the switch room contains a small motor-generator set and telephone.

The two main transformers are placed in individual cells which were carefully designed to insure clean air for cooling the transformer oil. The cool air comes from below through metal gratings and the hot air escapes through ventilators at the top. The transformers can be moved out of the cells over tracks within reach of a crane for ready dismantling. They are built for 15-cycle, single-phase service and are rated at 1800 kva. Contact thermometers are installed in the transformers to show the temperature of the oil and to close a circuit in the switchroom as soon as the critical temperature is reached. The transformers were furnished by the Allgemeine Company and the switching equipment and protective devices by the Siemens-Schuckert Company.

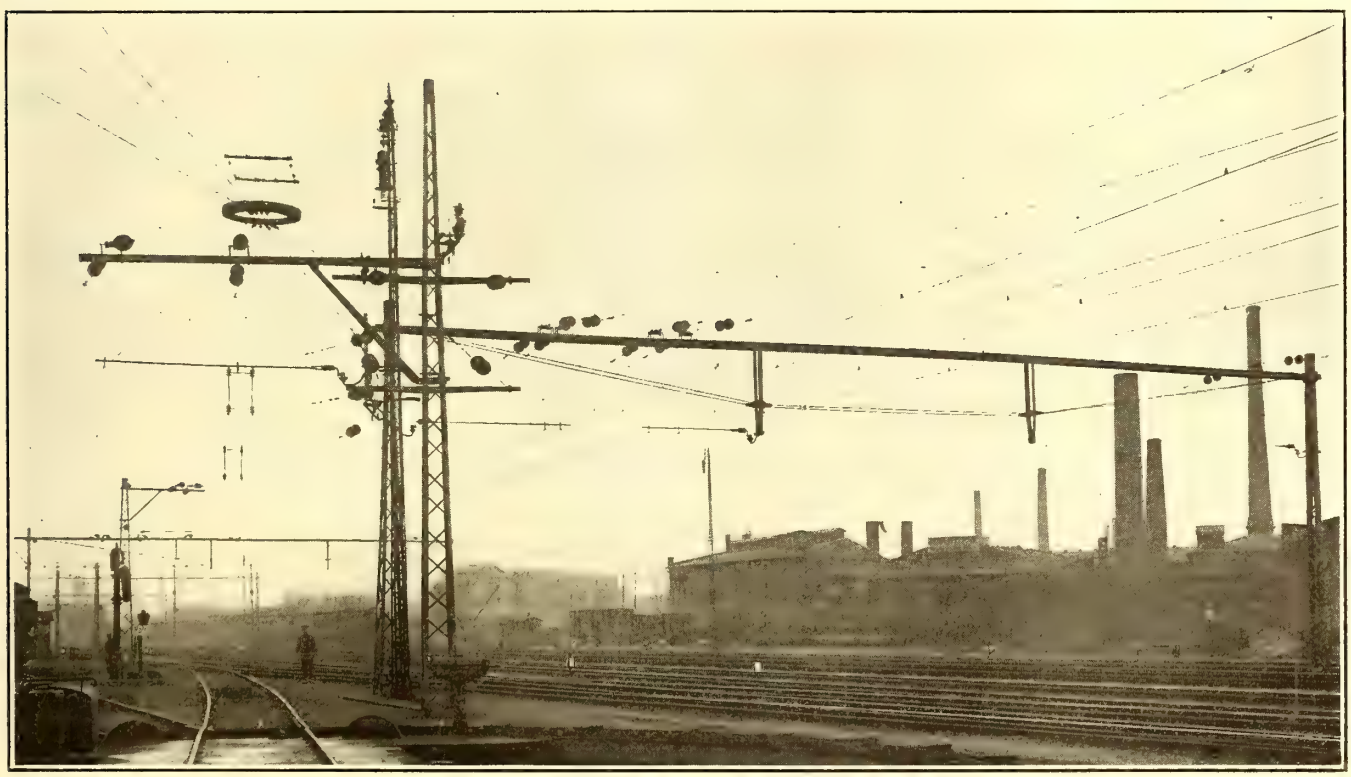


Dessau-Bitterfeld Railway—Overhead Construction for Six Tracks at Jessnitz

OVERHEAD LINE CONSTRUCTION

The overhead lines between Bitterfeld and Raguhn were furnished by the Allgemeine Company, while the section from Raguhn to Dessau was installed by the Siemens-Schuckert Company. Throughout the entire system great care was exercised in designing the supporting structures to give the locomotive engineers a clear view of signal indications. For this reason, trusses were avoided in the catenary bridges wherever possible. The particulars in the remaining paragraphs of this article relate to the overhead work of the Allgemeine Company.

This company's contact line is of simple catenary design, the trolley wire being suspended at distances of 19.7 ft. by



Dessau-Bitterfeld Railway—Overhead Construction Over Yard Tracks and Turntable

hangers from a wire rope catenary. The catenary bridges are about 246 ft. apart. In most cases ordinary channel iron cross-girders are attached by means of hook bolts to the poles or towers erected on both sides of the track. The cross-girders on greater spans are held by tie-rods or are



Dessau-Bitterfeld Railway—Construction at the End of a Tension-Regulating Section

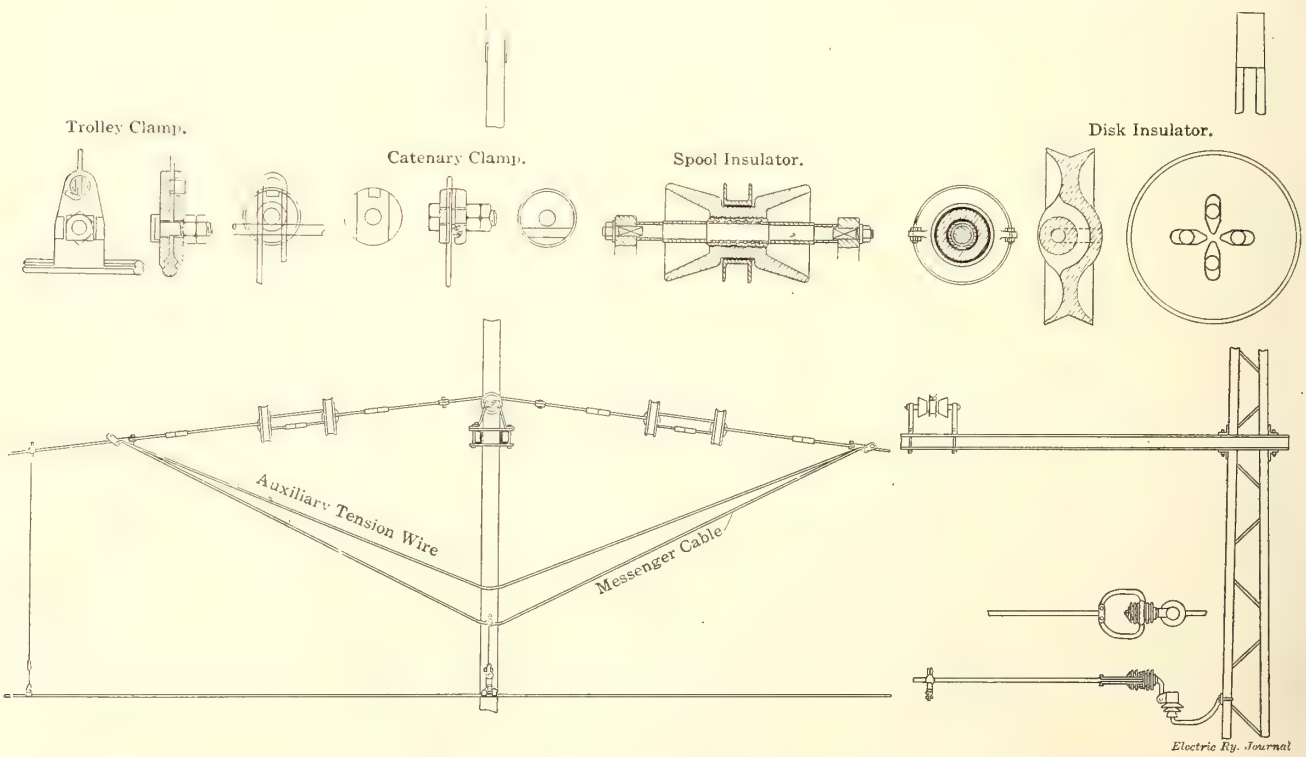
fitted with struts. The bridge shown on page 980 is approximately 230 ft. long and spans thirteen tracks.

The overhead line is sectionalized about every 3280 ft. The center of each section is rigidly anchored, while the two ends are kept taut by automatic tension devices, so that the supporting wires are under approximately the same tension at all temperatures. Both the trolley wire and the messenger cable are kept under tension. A third wire is provided to insure the uniform tension of the messenger cable in all sections. This wire, which is also kept taut, has a sliding connection to the messenger cable at all of the latter's suspension points. Its action is as follows: The messenger cable expands when the temperature rises, and consequently its sag increases. The auxiliary tension wire, however, which is of the same material, expands in the same proportion, and, therefore, it takes up the slack with the aid of the tension-regulating weights which are installed at the ends of the section. When the temperature



Dessau-Bitterfeld Railway—Horn Switch Section Circuit Breakers

falls the two suspension points of the messenger cable approach one another, because of the contraction of the tension wire, thus equalizing the reduction of the sag. Hence, as the sag of the messenger cable is kept practically constant at all temperatures, the contact wire remains permanently in a practically horizontal position.

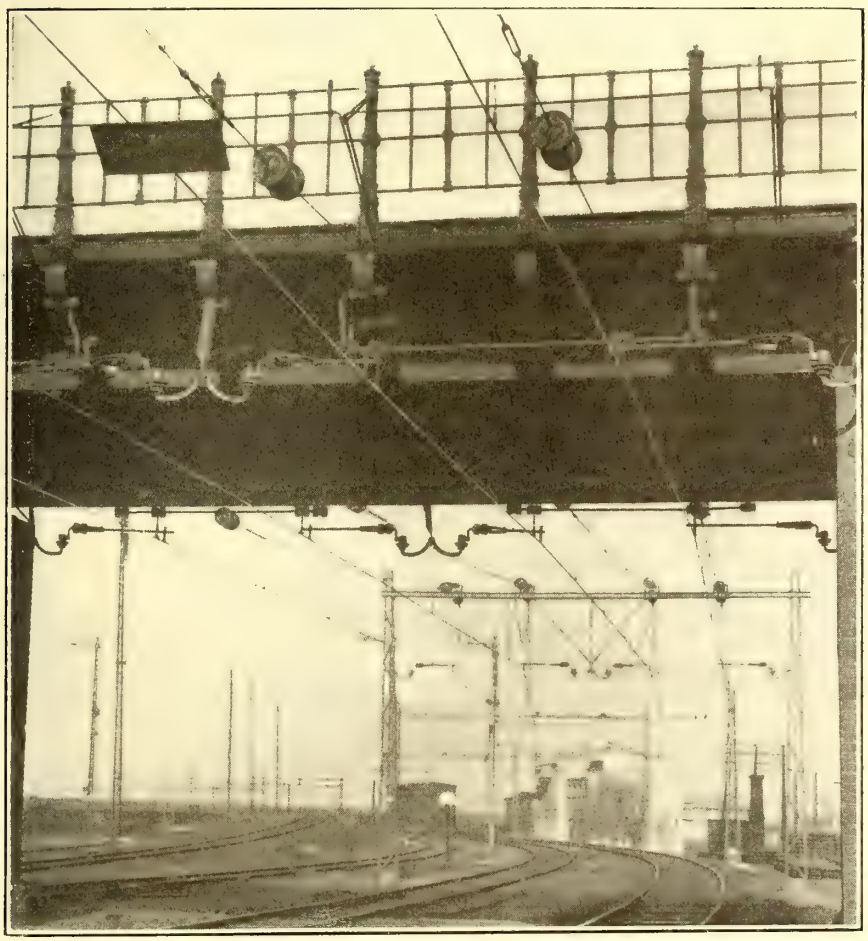


Dessau-Bitterfeld Railway—Details of the Catenary Line Construction and Insulators

A drawing on this page shows the suspension of the overhead line at a pole or bridge. It will be observed that the messenger cable itself does not rest directly on the spool

or "Diabolo" insulator, but is led under the supporting structure in the form of an unbroken loop which is suspended from the insulator by stranded wire at about 8.2 ft. from each side of the support. The auxiliary tension wire is looped under in the same manner and clamped to the messenger cable as shown. These two wires are insulated from the ground by a pair of disk insulators placed in series in each side of the loop which supports them. The tubular brackets which carry the trolley wire are vertically adjustable and are supplied with one bell and one grooved insulator to secure double insulation from ground. The clamp for the trolley wire can slide along the bracket in accordance with conditions. The contact line is staggered as much as 19½ in. from the center line of the track to insure the uniform wear of the current collectors.

The contact wire is of hard-drawn copper. It has two side grooves for the hanger wire clamps. Galvanized steel is used for all other wires. The hanger wires are prevented from being bent on account of the passage of the collector by providing them with a lower loop which permits the trolley wire to move upward about 2 in.



Dessau-Bitterfeld Railway — Double-Trolley Construction on a Curve Under a Bridge with Low Clearance

AUTOMATIC TENSION DEVICES

The automatic tension devices previously mentioned are constructed as follows: The two ends of adjoining tension take-up sections are led past one another for a distance of one span and are connected to the tension-adjusting weights as shown on page 982. To divide this tension in the desired proportion between the trolley wire, the messenger cable and the span wire, the ends of these wires are connected to a lever whose arms are so proportioned that the tension remains constant under all conditions. The cable from the tension weights is led over a pulley on this lever. A second loose pulley is provided to secure a quadruple ratio, thereby making it possible to obtain heavy tension (about 2460 lb.) with a comparatively small weight. The cast-iron tension weights run in guides which are mounted on the poles or towers. The two ends of overlapping sections are movably connected to each other so that satisfactory current collection can be obtained when the bow slides from one section to the next. This connection is not hindered by temperature variations.

SECTIONALIZATION

The track is divided into several sections, which can be cut out as required. The arrangement of the trolley line at a section break is the same in principle as that for a tension take-up section. In this case, however, the two ends of the adjacent sections are not connected in the middle of the span, but are carried separately over a section insulating bridge. The two overlapping contact wires are connected to horn switches which are mounted on the towers of this bridge as shown on page 928. Usually these horn switches are closed, but when they are opened, as in emergencies, the sections behind them are cut out of circuit. The horn switches are operated by means of a winch placed at the foot of the tower. The two main lines are completely separated from one another electrically. However, in case of a breakdown a connecting switch in each section is available to feed the following sections from the other main line. This switch is open under normal working conditions. It can be closed by employees after they have telephoned to the substation.

The contact lines over the station sidings are permanently in circuit with the main lines at the smaller stations, except that the contact lines over the loading tracks can be switched in only after the persons working on the track have been requested by warning signals to leave the car. The switch for the signals is actuated by a crank mechanism, inside of which are two contact devices, one connected to a bell and the other to a lamp circuit. The section switch does not close until about 30 seconds have elapsed from the time the crank was operated. During these 30 seconds the bell rings and the lamps burn. The lamps continue to burn as long as the contact wire of the loading track is alive. The current to operate these warning signals is supplied by a pole transformer which is always in circuit with the main line.

SPECIAL OVERHEAD FEATURES

As all curves on open tracks are of a large radius, no special arrangements were necessary to prevent the current collector from sliding off the contact line. On the other hand, pull-offs were required at the stations. At these points the contact line is anchored by means of an extra tower erected on the outer side of the curve as shown in one of the views on page 980.

Among other special constructions is a highway undercrossing at the north end of the Bitterfeld station, where the clearance between the bridge and the rails is limited to 15.8 ft. Here the contact line could not be suspended over the center of the track because of curve elevation. The difficulty was overcome by using two off-side trolley wires for each track and a current collector 7.9 ft. wide. The inner pair of wires is carried from a yoke suspended from the middle of the bridge and the outer pair of wires is carried from brackets anchored in the abutments of the bridge. At

this location also the Bitterfeld yard is cut off from the open track by section insulators, the several circuits being anchored as shown on page 983. All highway crossings of this kind are protected by screens placed above them at an angle of 45 deg.

The equipment of the locomotive shed at Bitterfeld is worthy of note because the full line pressure of 10,000 volts is used therein on the four maintenance tracks. The corresponding contact lines are interrupted at the entrance, but each track is energized by means of an individual roof switch which grounds the line when in its normal position. Switching-in can only be effected, however, after warning signals are given. These warning signals are similar in principle to those used on the loading track sidings. A signal bell rings and a transparent warning sign which is suspended over each track is illuminated upon operating the switch gear of the affected track. When the operating device is released the switches return automatically to the off position and thus ground the corresponding overhead lines in the shed.

The contact line which is installed over the turntable leading to the shed can also be isolated and grounded. It



Dessau-Bitterfeld Railway—Part of Center-Supported, Double-Channel Catenary Bridge as Installed for Eight Tracks in the Bitterfeld Yard

is fed from the main line, but the separate shed tracks which lead to it are energized from the turntable. The overhead installation at the turntable is shown in the half-tone illustration on page 981. It includes an iron ring which is suspended over the center of the turntable with a separate slot to receive an anchoring clamp from the trolley wire of each track.

Lightning arresters are provided for protection against excess pressures, one being mounted in each of the main lines. They are adjusted to operate at a pressure of approximately 15,000 volts.

NEXT ARTICLE

The second article on this installation will describe the mechanical and electrical features of the several types of the passenger and freight locomotives which have been built by the Allgemeine Company. The speeds of these locomotives vary from 44 m.p.h. to 68 m.p.h., and their axle arrangements and other details vary accordingly.

The United States Bureau of Mines, Washington, has issued a circular (Miners' Circular No. 5) entitled "Electrical Accidents in Mines: Their Causes and Prevention." One section contains rules, with illustrations, for resuscitation from electric shock, the Sylvester method of artificial respiration being specified. According to this older method the patient is placed face upward. In many recent rules the newer Schaefer, or prone, method is employed, in which the patient is placed face downward.

DETROIT UNITED RAILWAY ASSISTS MILK AND CREAM CONTEST—OTHER RECENT FREIGHT WORK

For the convenience of farmers located on the lines of the Detroit United Railway the company did what it could to assist in making a success of an annual dairy meeting and milk and cream contest held in Detroit on Sept. 25 to 26. The contest was held by the Detroit Board of Commerce in the Young Men's Christian Association Building, Detroit, under the direction of the dairy division, bureau of animal industry, United States Department of Agriculture, and the Detroit Board of Health.

Copies of the letter issued by the Board of Commerce explaining the object and conditions of the contest, together with a supply of entry blanks for both milk and cream, were given to conductors of cars carrying milk or cream and distributed. A circular issued to producers and shippers by George W. Parker, general express and freight agent of the company, announced that the letter and blanks would be furnished by conductors on request. Empty packages for samples sent to producers, and also the packages containing the samples of milk and cream to be entered in the contest, were carried free on the regular milk cars of the Detroit United Railway. Circular letters were issued by the company addressed to conductors in charge of milk cars calling special attention to the contest and directing the careful distribution of the general circular letters so that one would reach each shipper or producer of milk or cream. A regular local tariff was filed with the Michigan Railroad Commission covering the free transportation of the packages of bottles.

In the contest all but one of the winners of prizes for high grades of milk and cream were shippers on the Detroit United lines. Altogether there were 108 exhibitors of milk and cream, of whom ninety were shippers on the lines of the Detroit United Railway. In both the milk and cream contests $25 was awarded for the first prize, $15 for the second prize and $10 for the third prize. Other producers who showed a purity of milk or cream above 90 per cent were awarded diplomas.

During the last season the Detroit United Railway has hauled material for the Board of Road Commissioners of Wayne County, Michigan, for the completion of a road on Grand River Avenue. The material was taken by the Detroit United Railway in steam railroad cars from a connection with the Père Marquette Railroad at Greenfield, Mich., just outside of Detroit, and distributed along the Grand River road for a distance of 5 miles. This road parallels a line of the Detroit United Railway.

The material comprised a total of 248 steam railroad cars, of which sixty-five cars were loaded with cement and the remainder with sand and gravel. The total weight of material handled was approximately 9000 tons. On account of lack of water for use in making concrete arrangements were made whereby the Detroit United Railway sent out twelve carloads of water in its regular sprinkling cars. Every courtesy was extended by the company to assist in the completion of the road.

The Detroit United Railway has also hauled material for the construction of a new pumping station for the city of Detroit. Heretofore material has been hauled to the waterworks by wagons as there is no direct railroad connection to the district. A year ago the Detroit United Railway built a track to connect with the Detroit Terminal Railroad. It has also built a line connecting the Jefferson Avenue line to the property occupied by the waterworks of the city and since that time has hauled all the material for the erection of the new pumping station. The company will also haul all machinery necessary to equip the plant. In addition to this work the company has hauled all material for further enlargement of the old pumping station. All the work has been done between the hours of midnight and 4 o'clock in the morning.

New Power Station of the Utah Light & Railway Company

This New Station on the Jordan River Is an Auxiliary to the 60-Cycle Long-Distance Transmission Plant of the Company —A Special Feature Is a 2000-kw Water Rheostat

An important addition to the generating plants of the Utah Light & Railway Company has recently been placed in operation on the east bank of the Jordan River, about 2 miles from the business center of Salt Lake City. The company conducts a general lighting and power business, besides operating the street railway services of the cities of Salt Lake and Ogden, and the greater portion of its electrical supply is drawn from hydroelectric stations located in the Wasatch Mountains. For several years the company has had at the Jordan River site a steam auxiliary equipment of about 1,800 kw, consisting of a 750-kw, 4400-volt belt-driven, revolving armature alternator, and an exhaust steam turbine with a direct-connected three-phase alternator, capable of being operated in conjunction with the foregoing equipment.

The limited capacity of the old station and the desirability of controlling the entire output of the hydroelectric and steam equipment at a central point led the management of the company to investigate the problem of establishing a new turbo-generating auxiliary plant of high capacity, which would also serve as the load-dispatching center of the system. The engineering firm of Westinghouse, Church, Kerr & Company, New York, was retained in a consulting capacity, and it was decided to build a new plant on property owned by the company at the site of the existing auxiliary plant in Salt Lake City. The installation of the initial apparatus has lately been completed, and the company now has available an emergency supply of about 8000 kw, which is entirely independent of the capacity available in the hydroelectric stations. The new station is built on the unit plan, with ample room for expansion, and contains an elaborate installation of switching apparatus for the control and measurement of the incoming transmission and outgoing distribution feeders.

PRESENT SYSTEM OF ELECTRICAL SUPPLY

The present system of electrical supply for the company's service is shown in the following table:

Pioneer Station, Ogden Canon,	4 units, total	3,000 kw
Bear River Station,	4 " "	4,000 "
Devil's Gate Station,	1 unit, "	3,000 "
Granite Station,	4 units, total	1,500 "
Stairs Station,	2 " "	1,600 "
Telluride Power Company service, normally		2,500 "
Total hydroelectric service		15,600 kw
Auxiliary plant, old and new Jordan		8,600 "
Total available generating capacity		24,200 kw

With moderate overload upon the above system the company can produce about 30,000 kw at its generating points. The accompanying diagram shows the principal lines of transmission utilized on the system. The Bear River station is owned by the Utah-Idaho Sugar Company, and is located in Bear River Cañon, 85 miles north of Salt Lake City. The Telluride Power Company operates generating plants at Grace, Idaho, and at Logan, Jordan Narrows, Battle Creek and Olmsted, Utah, only a small part of its output being required for the Utah Light & Railway service. The Pioneer station is situated in the outskirts of the city of Ogden, and the Devil's Gate station is a newly built plant owned by the company, located on the Weber River, and about 40 miles north of Salt Lake City. The Granite and Stairs stations are older plants owned by the company and are located in the Big Cottonwood Cañon, about 15 miles southeast of Salt Lake City. At the present writing the company operates a system of transmission lines carrying current at 28,000 volts and 44,000 volts, but the entire transmission will shortly be conducted at the latter voltage.

In general, the transmission system consists of two three-phase, 60-cycle trunk lines connecting the Pioneer and Devil's Gate stations on the north with the Jordan station in Salt Lake City, through a substation located just outside the site of the auxiliary steam plant; a tie line connecting the Bear River station with the Pioneer plant; a double line connecting the Jordan station with the plants in the Big Cottonwood Cañon, and two lines feeding the system from the high-tension services of the Telluride Power Company. The two northern trunk lines, known as Ogden "A" and Ogden "B," are each 38 miles in length and are being located permanently upon steel towers, the wires be-

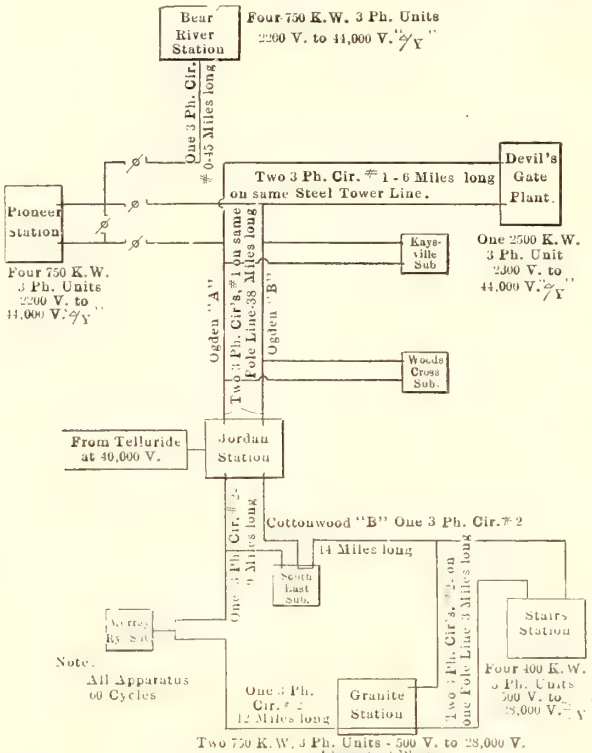


Jordan Power Station—Exterior

ing of No. 0 B. & S. bare copper. The Devil's Gate tie lines are also of No. 1 copper, each being 6 miles in length. The Bear River tie line is 45 miles long and of No. 0 copper. No. 2 copper is used on the Big Cottonwood lines, these being 24 and 14 miles long respectively, the variation being due to the inclusion of various substations between the stations and Salt Lake City.

Substations are located at the Pioneer station in Ogden, at Kaysville, at Woods Cross; and in Salt Lake City, at the Jordan River, West Temple Street, Murray, and at the so-called Southeast distributing point in the city, at Eleventh East Street, between Twelfth and Thirteenth Streets. Both railway and lighting service, as well as the supply of a.c. power, are handled through these substations. The general distribution of current at Salt Lake City is at 4400 volts and three-phase, the street railway supply being obtained at 550 volts through rotary converters and motor-

generator sets delivering direct current in the usual manner. All important switching of high-tension lines and synchronizing of the various sources of supply are handled at the Jordan station, the substation at this site having been provided with apparatus for this purpose before the transfer of facilities was effected between the former and the new turbine station switch house. The potential is



Jordan Power Station—Diagrammatic Layout of High-Tension System

transformers of the following capacities:
stepped down from 44,000 to 4400 volts in water-cooled

Ogden "A" Circuit, 3 transformers, total rating	3,000 kw
Ogden "B" Circuit, 3 transformers, total rating	3,000 "
Cottonwood "A" Circuit, 3 transformers, total rating	999 "
Cottonwood "B" Service, 3 transformers, total rating	1,500 "
Telluride Power Company, 9 transformers, total rating	3,498 "
Total step-down capacity	11,997 kw

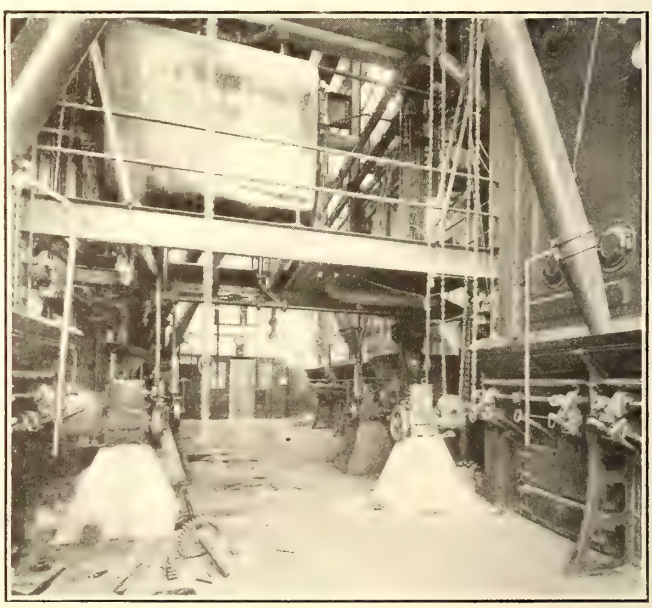
These transformers are all located in a switch house transformer compartment installation situated about 100 ft. south of the new Jordan station, the latter being equipped with a complete remote-control benchboard and concrete busbar and oil-switch house for the expeditious handling of the incoming and outgoing lines and feeders. Disconnecting switches of the air-brake type are provided in all incoming lines, as well as 44,000-volt oil switches for emergency operation. The high-tension line switches are located in the original substation building and will not be re-located inside the new auxiliary steam plant switch house. The latter handles 4400-volt current exclusively.

STRUCTURAL FEATURES OF NEW STATION

The new station is a handsome red pressed-brick structure with a steel frame and pile and concrete foundations. On account of the unstable character of the soil 1500 piles, averaging 36 ft. in length, were driven on the station site; the piles were then capped with a 4-ft. concrete slab which served as a machinery foundation. Concrete caps and sills are used at the window openings and at doorways. As the station is built mainly to serve as a steam relay, special pains were taken in its design to secure a compact layout of apparatus. The volume of the plant, including the switchboard room, is 56 cu. ft. per kilowatt of continuous output. The floors, roof and coal bunkers are of concrete slab construction. The piles used in the foundation are of Oregon fir, spaced in general 3 ft. apart between centers. Draft for the boilers is provided by a Kellogg radial brick stack 226 ft. high and 11½ ft. in inside diameter at the top. The company has utilized the stack on the side toward the city for the display of its corporate name in letters of inlaid black brick, 4 ft. in height, the words being legible at a distance of about 3 miles. The bottom of the sign is 80 ft. from the ground, and the letters also serve to give the company publicity on a popular route to the Great Salt Lake. The station building is rectangular in shape, with a wing at the south end to accommodate the switchboard room and the east end of the bus and oil-switch installation. The over-all ground dimensions of the building are 153 ft. x 71 ft.

FUEL SUPPLY

Coal is brought to the station from mines in Wyoming over a railroad route, terminating in a side track on the north side of the building. The fuel used is of the bituminous type, having a heating value of about 11,700 b.t.u. per lb. Outside the station building a hopper in the track receives the coal by gravity from the cars, the hopper being of 4 tons' capacity and provided with 3 in. x ½-in. screen bars set 3 in. apart on centers. The track is carried over the hopper by a 12-in. I-beam under each rail. No crushing equipment is provided, the cars dumping directly into the hopper, at the bottom of which conveyor buckets receive the coal and elevate it by means of an inclined runway to a point about 60 ft. above the ground, whence it is discharged upon a traveling horizontal rubber belt-conveyor, which distributes the fuel to the bunkers above the boilers. The coal-handling apparatus is of the Stephens-Adamson type, has a capacity of 60 tons per hour and consists of the receiving hopper, bucket elevator and distributing equipment. The bucket elevator is gear-driven by a 15-hp, 220-volt, three-phase induction motor provided with a rawhide pinion and operating at 850 r.p.m. The motor is located at the top of the housing carrying the elevator buckets, the latter running on structural steel supports and protected by corrugated sheet-iron housing walls. The buckets are 18 in. wide and 18 in. deep, and travel at a speed of 100 ft. per minute. A stairway is provided on



Jordan Power Station—Boiler Room

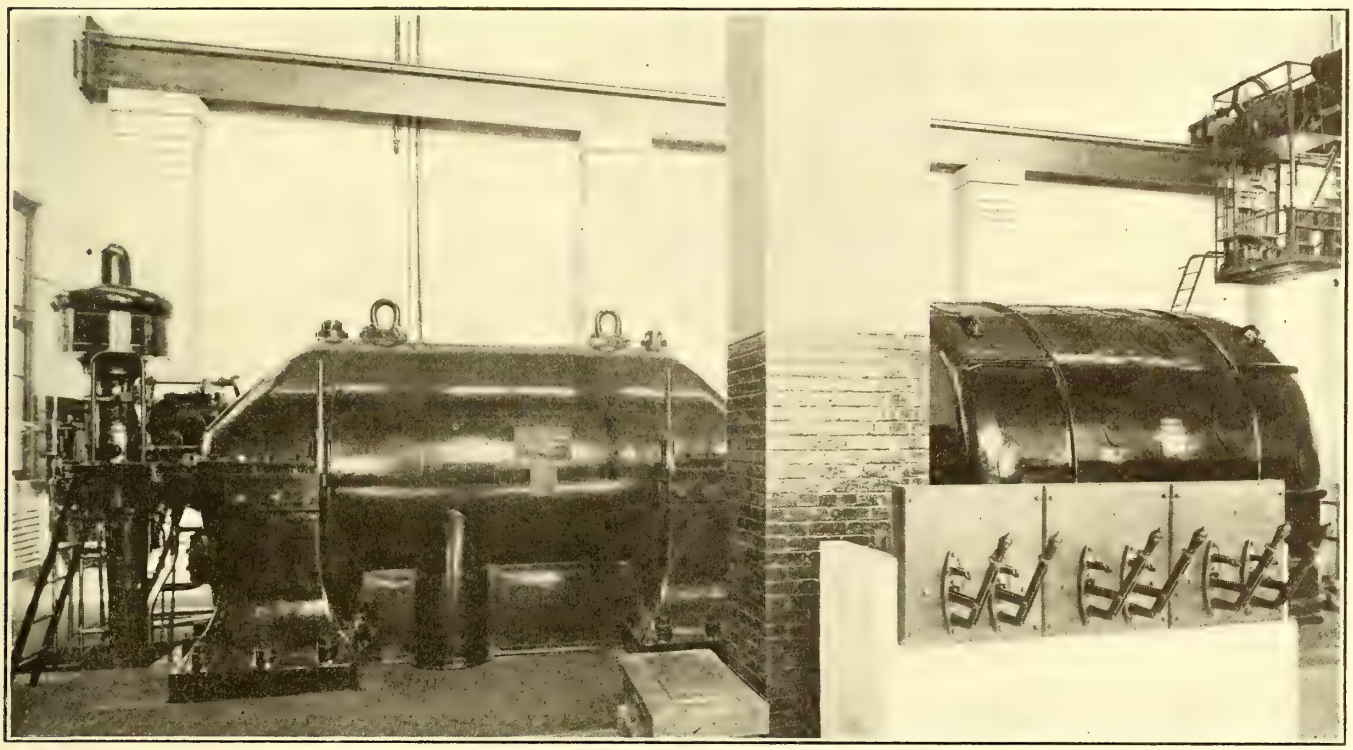
the inside of the elevator housing to facilitate access to the machinery, and the distributing apparatus is designed to permit delivery of the fuel into the bunkers at any point. The coal bunker is designed for a capacity of 2750 tons, and is of concrete carried on steel I-beams. The belt conveyor is 20 in. wide and 72 ft. long, and it is provided with an adjustable hopper equipped with two spouts, which may be discharged into the bunkers either individually or

together, according to the valve setting. The upper portion of the conveyor house is ventilated by four 18-in. roof outlets, and the entire runway is lighted by incandescent lamps of 16-cp rating, supplied with current through circuits run in iron conduits. The rubber belt is driven by a 5-hp, 220-volt induction motor through horizontal gearing, the motor being located near the top of the conveyor house at the east end.

BOILERS

The boiler room occupies the entire northern portion of the plant, being 77 ft. long x 67 ft. wide, with a basement 14 ft. in height throughout its entire area. The boilers are installed in four batteries, aggregating six 600-hp Stirling water tube units, two batteries being located on each side of a central firing aisle about 18 ft. wide. The coal bunker is located immediately above the boiler room, with its axis parallel to the firing aisle, and from it each boiler is served with fuel through a 630-lb. volumetric measuring hopper and adjustable distributing spout. The boilers are equipped with Roney stokers driven by Westinghouse vertical engines, one per battery being provided. The delivery spouts are 12 in. in diameter at their upper ends and 6 in. at the feed ends, fuel dampers being provided in each with chain control from the boiler room floor. The stoker engines are mounted on concrete piers, and in common with all steam-driven auxiliaries in the plant, exhaust into the feed-water heater, which is of the Stilwell open type, located on a platform carried by steel I-beams 11 ft. above the floor. Each boiler is equipped with a superheater and delivers steam at a pressure of 200 lb., the superheat being 125 deg. Fahr. Each superheater and boiler are equipped with safety valve connections, the valves being set for 210 lb. Draft gages are installed on all boilers, and the stack connection is provided with an independent draft gage. The products of combustion from each boiler are collected in sheet-iron breechings connecting with a 7 ft x 15-ft. main smoke flue, which discharges into the stack at a height of 33 ft. above the ground. The draft ordinarily varies from 0.1 to 0.25 in. A wattmeter of the indicating type is installed in the boiler room over the center of the firing aisle, as a guide to the operation of the boiler room.

Ashes are dumped from the ash pit of each boiler through a hopper into hand cars running on a track of 22-in. gage, and provision is made for the operation of such cars on each side of the basement below the ash hoppers. From the basement the ash cars are raised to the surface of the ground by two hydraulic Otis plunger-type elevators of 2500-lb. capacity each, having a lift of 5½ ft., and operated by water under a pressure of 200 lb. per sq. in., the ashes being used around the premises for filling. City water is used for boiler feeding on account of the unsuitability of the river water. The boiler room is provided with a monitor with wired glass windows, and special lavatory provision is made for the comfort of firemen, there being a separate lavatory for the engine room attendants. The present stack is designed to handle the existing boiler installation, but in event of the expansion of the station, an additional stack will be required. Ample room exists on the property for the symmetrical enlargement of the station along the present lines of development. A 100-gal. boiler-compound tank is installed on the north side of the boiler room and above the boilers. It is piped with city water, and is arranged for the rapid mixture of the compound when necessary.



Jordan Power Station—Side View of Turbo-Alternator

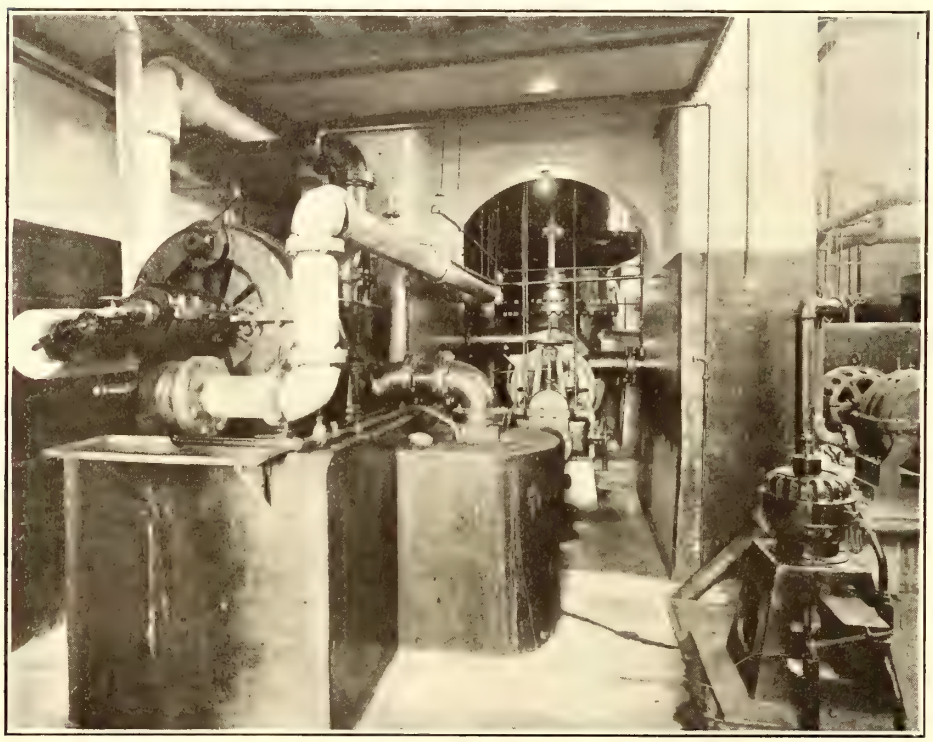
STEAM PIPING

The steam piping is of extra heavy quality, all flanges for high-pressure lines being welded and the fittings and valve bodies being of cast steel. Valve seats, disks and spindles are of "monel" metal. All high-pressure drips are returned to the boilers by the Holly system. From each boiler a steam delivery pipe 8 in. in diameter discharges into a 10-in. header carried in a loop around the ends of the boiler room next the turbine room, stop valves being provided in each outlet between the boiler and the header. The header forms a complete rectangle in a vertical plane so that any valve or section of piping may be cut off for repairs without interfering with the continuity of service. Similarly, a 4-in. feed-water loop extends in a horizontal rectangle around the boiler room, permitting the independent feeding of any boiler battery without regard to the section of main feed piping which may be in service at the time. The boiler feed pumps, located in the basement under the firing aisle, are of the Worthington duplex steam-driven type, with compound cylinders, 12 x 17 x 10

x 15 in. The boilers are ordinarily operated banked, the steam pressure in four being kept at 150 lb., one being run at from 100 to 125 lb., and the sixth without fires. The draft gages are of the Ellison differential type. The feed water is admitted to the boilers at a temperature of from 200 to 210 deg. Fah.

ENGINE ROOM

The operating room of the station is about 24 ft. wide x 67 ft. long, and is divided into a raised section containing an 8000-kva Westinghouse-Parsons 4400-volt, three-phase, revolving field turbo-alternator, operating at 1800 r.p.m., and a lower bay or auxiliary section containing the various exciting and condensing equipment required. Two 100-kw turbine-driven 125-volt Westinghouse compound-wound interpole exciters are installed on concrete foundations at the basement floor level. The turbine room is covered from end to end by the travel of a 25-ton, motor-driven Whiting crane, having a span of 23¾ ft., the crane rails being supported on I-beams carried on brick pilasters at the side of the turbine room and provided with an operator's cab. The turbine has a capacity of 25 per cent overload for 24 hours and 50 per cent. for one hour. It is wired with star connections with the neutral, grounded through a cast grid resistance aggregrating 1.5 ohms located in the basement of the turbine room and screened to protect the operating force from chance contacts. The resistance limits the flow of current in case of a ground on one phase of the 4400-volt system and is a substantial protection to the turbine. The turbine operates at about 6500 kw with greatest economy, on account of the relatively high steam consumption of the auxiliaries at light loads. It is supplied with superheated steam through a 12-in. pipe connecting with the boiler room main. The turbine exhausts into a Westinghouse LeBlanc condenser of the mixing type, with inclosed circulating pump and exterior air pump mounted on a horizontal shaft and driven by a steam turbine at a speed of 700 r.p.m., the condenser being located immediately under the turbo-alternator.



Jordan Power Station—Auxiliaries in Basement of Turbine Room, Priming Pump at Left, Sump Pump with Vertical Shaft at Right, Boiler Washing Pump with Horizontal Shaft at Right, Condensers in Rear

CONDENSERS AND AUXILIARIES

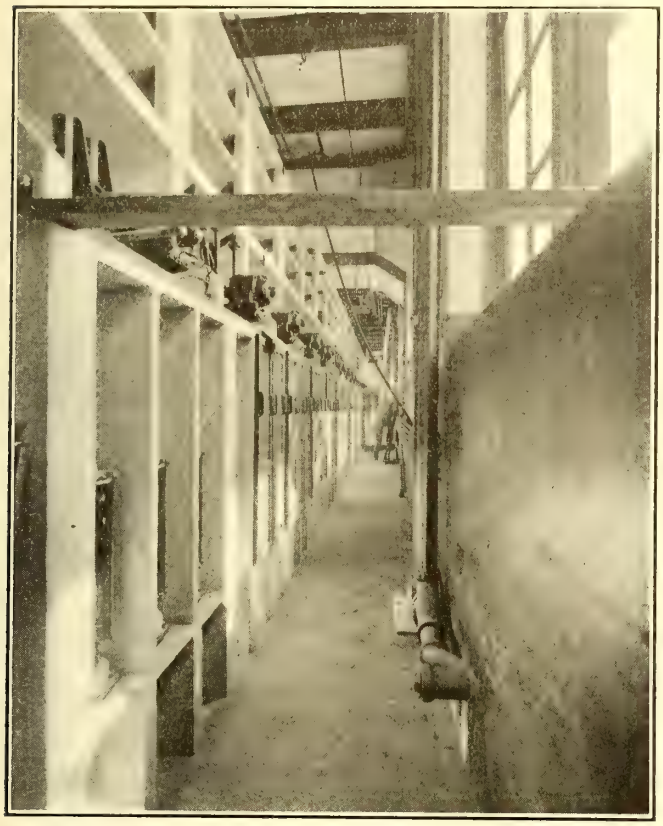
The water supply for condensing service is obtained from the Jordan River through a wooden flume starting at a screened intake about 150 ft. west of the plant and running toward the station parallel to the turbine room wall, with provision for the branching off of lateral flumes to future condensing equipment required as the station expands. The flume has a cross-section of about 5½ x 11 ft., and is provided with a hand-operated winch for the screens at the intake end. The condenser discharge passes through an 18-in. pipe into a concrete receiving tank in the auxiliary section of the turbine room basement, and from thence the flowage is turned into the river below the intake through a pipe connecting with a 5½ x 7-ft. discharge flume, also of wood, and laid parallel to the intake flume. Both flumes are laid below the surface of the ground. A mixing type of condenser was selected for this installation on account of the increased efficiency of operation secured from a higher vacuum than would be feasible with a surface condenser, combined with reduced cost of maintenance. A vacuum of 25½ in. is usually obtained with the turbine in operation, and the altitude of the plant is about 4230 ft. The circulating pump is designed so that when running at 700 r.p.m. it will discharge 4,000,000 lb. of condensing water per hour in addition to the steam condensed from the turbine under full load conditions. A 24-in. outboard exhaust is provided with an automatic relief valve for operation in case the turbine loses its vacuum, the exhaust line rising through the boiler room in the form of a spiral riveted galvanized-iron pipe and terminating in a head about 6 ft. above the level of the roof.

Other auxiliary equipment includes a 3-in. vertical centrifugal sump pump, located in the basement of the turbine room and direct-driven by a 2-hp, 220-volt induction motor at 1120 r.p.m.; a Jeansville three-stage boiler washing pump of the centrifugal type, direct-driven by a 30-hp motor and having a capacity of 200 gal. per minute against a head of 250 ft., and a priming pump of centrifugal type, turbine-driven, for use in the condenser circulating pump service. The sump pump is operated by an automatic float switch and handles all the general station drainage, discharging it into the river below the plant. The boiler washing pump is piped so that river as well as city water may be used for boiler cleaning purposes, and it has resulted in considerable economy, the cost of city water being 6 cents per 1000 gal. A 15-hp Bury air compressor driven by an induction motor is also installed in the turbine room basement and piped to all important parts of the plant for cleaning service. The auxiliaries are unusually accessible in the plant and are all installed in a well-lighted compartment with ample room for replacing with spare parts, inspection and adjustment. In the boiler room basement a small machine shop is in service, the principal equipment being a group consisting of a lathe, pipe cutter, hack saw, drill press, emery wheel and grinder, all driven by a 10-hp induction motor. The boiler room basement is also provided with flue outlets leading to the combustion chambers of the boilers, to facilitate cleaning the latter. The generator is supplied with air through a galvanized iron and concrete duct brought into the turbine room under the floor and across the ceiling of the bus structure room.

SWITCHBOARD

The switchboard room of the station is designed to

handle not only the turbo-alternator but all the principal outgoing feeder circuits from the 4400-volt busbars and the incoming transmission line connections on both the primary and secondary sides. The installation consists of a bus and oil switch compartment running the entire length of the station below the turbine room, and above the center of this an operating switchboard room containing an instrument board, control benchboard, exciter and auxiliary board, with various lighting apparatus for central station service at the east end. The bus and oil-switch structure is one of the most complete in the West, and is installed in a head room of 16½ ft. and a width of 14½ ft. All the oil switches in the station are of the motor-operated type, furnished by the General Electric Company, each being installed in a concrete cell provided with arc-proof wooden doors. Above the oil switches are installed the various busbars and connections, also in concrete apartments, and on a mezzanine gallery of concrete 10½ ft. from the floor ample space is provided for attendance. Current and instrument transformers are located on the under side of the mezzanine gallery; and beyond these, at a height of about 8 ft. from the floor, disconnecting knife switches are provided between the busbar connections and the outgoing feeders. The latter are carried partly overhead and partly underground, those of the railway service being at 4400 volts, three-phase, and all electric railway circuits in the city are supplied from the substation rotaries or motor-generators, no railway direct-current service being in operation at the Jordan station.



Jordan Power Station—Bus and Oil Switch Structure

The switchboard room contains a benchboard of seven panels, with remote control switch handles, pilot lights, busbar models and instrument and synchronizing plugs. The instrument board behind contains the usual indicating wattmeters, ammeters and voltmeters for high-tension feeder service, with recording wattmeters in each incoming line and curve-drawing wattmeters in the more important circuits. The turbo-generator is protected by reverse current relays, and the company is considering the installation of automatic reverse current relays on its incoming lines, with the object of securing automatic disconnection in case of trouble. The remote control motors are operated by a storage battery of 55 cells and 120-amp-hours capacity, which is located in a cabinet in the turbine room and is wired for charging either by exciter current or from the alternating busbars through a mercury arc rectifier. The general arrangement of the 4400-volt busbars is in the form of a ring and bus junction or sectionalizing switches of the motor-operated oil-break type are installed at four points, so that trouble can readily be isolated. In addition a master switch is provided on the front of the benchboard, so that in case of emergency every bus junction switch can be opened simultaneously.

The station busbars in general receive the incoming 4400-volt current from the transmission lines on the step-down sides of the transformers in the Jordan substation, with provision for the parallel operation of the Jordan turbine set, and distribute it throughout the Salt Lake district through numerous outgoing feeders handling all branches of railway, lighting and power service. Three 50-kw, 4400 to 220 and 110-volt transformers supply current from the busbars for general lighting and power service within the Jordan station.

2000-KW WATER RHEOSTAT

A special feature of the plant operation is the use of a water rheostat when artificial loads are required. In common with several other plants in the West which operate hydroelectric stations in parallel over long transmission lines, the company finds it desirable at times when the load is lost wholly or in part to throw a water rheostat having a large percentage of the capacity of the generating station directly upon the busbars, such a course being a decided aid in maintaining speed and renewing synchronous relations with other plants. At the Jordan plant the rheostat has a range of from 0 to 2000 kw, and it consists of



Jordan Power Station—Benchboard, Instrument Board and Distributing Board

three 2-in. iron pipes surrounded in sewer tile 30 in. apart on centers, the pipes being 4 ft. long and set into a concrete well 7 ft. square and 5 ft. deep. Each pipe is connected through an oil switch with a corresponding bus-bar of the three-phase system of the plant, and the raising and lowering of the pipes into the water is effected by a Dickerson oil governor mechanism, driven by a 2-hp induction motor. Fresh water is used in the rheostat, as the river water is unsuitable on account of the tendency which its low resistivity creates to produce excessive loads. The plant contains a double exciter bus set, and the system voltage regulation is handled by a Tirrill regulator mounted on the distributing board in the switchboard room. The latter board contains two exciter panels, a regulator panel, battery and rectifier panel, station service panel, and six feeder control panels, with the usual instruments. The generator field rheostat is motor-operated from the bench-board.

NEW SUBSTATION

A new substation is now under construction for railway service at Eleventh East Street, between Twelfth and Thirteenth Streets South. It will contain four 875-kva transformers, a 1000-kva motor-generator set delivering direct current to the trolley lines in the vicinity at 550 volts, and two 100-light, 4-amp rectifier sets for use in magnetite street arc lighting. Two induction motor-driven lighting feeder regulators for residential and commercial service will also be in operation, and the substation will be provided with oil switches and wiring capable of handling an incoming current of 44,000 volts, from Cottonwood stations, or from the Jordan substation, with provision for by-passing the substation when necessary.

ENGINEERS

The Jordan station was designed and erected by Westinghouse, Church, Kerr & Company in conjunction with the Utah Light & Railway Company's engineering department at Salt Lake City. R. W. Stovel was engineer in charge, and H. A. Brinkerhoff resident engineer for the former organization, the railway company being represented by O. A. Honnold, electrical engineer, and C. A. Cohn, superintendent of power stations.

RULE FOR TREATMENT OF DEPRECIATION IN NEBRASKA

The Nebraska State Railway Commission has adopted a code of rules to govern charges by electric railways for maintenance, additions and betterments.

The rules, which are prescribed by the commission for the government of accounting officers of all the electric railway companies operating in the State, became effective on July 1, 1911. The order does not state the rate at which depreciation is to be accounted for or how the amount set aside shall be determined. The essential part of the order of the commission is as follows:

"All expenditures for maintenance shall, as they are made or incurred, be charged to their appropriate subsidiary maintenance accounts, and all these various maintenance accounts shall then be closed and cleared into the maintenance and depreciation accounts monthly.

"No charge shall be made against maintenance, additions or betterments for the service of regularly salaried officials and employees, except only where such officials or employees are specifically assigned to the work and their time exclusively devoted to it.

"As distinguishing between additions and betterments and maintenance, it is to be understood that additions and betterments shall include additional structures, property, facilities or equipment not taking the place of anything previously existing, or the enlargement or improvement of existing properties, facilities or equipment, and, when for enlargement or improvement, only the proper proportion of the cost of the new structure, facility or equipment of the improved or higher class proposed to take the place of that previously existing. When expenditures are made for replacement, enlargement or improvement of existing facilities or equipment, then the amount which may be charged to additions and betterments shall not exceed the difference between the actual cost of the new work, facility or equipment and the value of the old, replaced in kind, at the time when the new work is being done, together with the cost of taking up the old and making preparation for the placing of the new work, facility or equipment. The value of the old, plus cost of removal, and preparation for new, less value of salvage, to be charged to the maintenance and depreciation account, and salvage from old to be charged to material account.

"When construction work is being done, the division as between that part of the cost which is chargeable to maintenance and that which is chargeable to betterments and additions shall be definitely and distinctly made from month to month, and accounts, so far as maintenance is affected, shall be closed into the maintenance and depreciation account monthly.

"In case, however, the amount to be charged to maintenance and depreciation account is large or extraordinary, and its inclusion in the operating expenses for a single year will unduly burden the operating expense accounts for that year, upon application to the commission, such charge may be carried in an appropriate 'property abandoned' or 'suspense' account, and charged off to maintenance and depreciation account in such instalments and spread over such length of time as may be determined by the commission.

"When property is abandoned and not replaced, the original cost, carefully estimated, if not known, should be credited to the additions and betterments account, and the amount so credited, less salvage, shall be charged directly to profit and loss account and shall not pass through the maintenance and depreciation account.

"When facilities are reconstructed or replaced in kind, all expenditures and costs incident thereto shall be directly chargeable to maintenance account, it being intended herein especially that reconstruction accounts shall not be carried from month to month over a long period and then apportioned as between betterments and maintenance, but that the appropriate charge to maintenance accounts for such construction or reconstruction shall be made monthly.

"Paving, when none has theretofore existed, shall be a charge to betterments, but the work preparatory, if any is necessary in the form of realignment, lowering or raising the track, shall be considered a maintenance charge. In repaving, replaced in kind, the entire cost shall become a charge to the maintenance account."

STRIKE IN COPENHAGEN

On Aug. 1 the Copenhagen (Denmark) Tramways were taken over by the municipality and the wages of the employees increased. The employees of the two other companies operating in and near the city thereupon demanded an increase. This being refused, they went on strike. A boycott of the lines was declared by the strikers and their sympathizers. The radical newspapers even published the names and addresses of the strike-breakers and their relatives, of merchants who sold goods to the strike-breakers, etc. This action has led to a number of lawsuits by the aggrieved persons against the newspapers which published these notices. The strike was practically over at the end of three weeks, but only a small portion of the strikers were re-employed. A peculiar feature of the strike was that many of the municipal employees contributed funds to support the strikers. The wages of the trainmen in Copenhagen who struck were $8.25 a week. The men also received free uniforms, one day off each week and an eight-day holiday once a year.

Hearing in Buffalo on International Traction Reorganization

An Account Is Given of the Methods Used by B. J. Arnold in Determining the Cost to Produce New as of April 1, 1911, the Physical Property of the International Traction Company of Buffalo

As a supplement to the article in the Oct. 21 issue of the ELECTRIC RAILWAY JOURNAL describing the basis of valuation of the property of the International Traction Company of Buffalo, there is published herewith additional information taken from the report of Bion J. Arnold on the plan of reorganization. This deals with the methods used in the determination of the cost of reproduction new of the physical property of the company as of April 1, 1911. The preliminary explanatory chapter says in part:

GENERAL METHOD EMPLOYED

"Throughout the appraisal the 'cost new' in the detailed exhibits and in the subsummaries includes all expense for materials, tools and labor required to furnish each item in place, including the subcontractor's contingencies and profits as of April 1, 1911. To this cost a percentage varying with the different classes of work has been added for the expense of organization, engineering and incidentals.

"The item of organization includes such cost as general office expense, securing bids, awarding contracts, bills of material, purchase of materials, salaries of officials chargeable to construction and legal expenses chargeable to construction.

"The item of engineering includes cost of preparation of plans, drawings and specifications, together with the expense of general supervision and inspection required in carrying out the plans and specifications.

"Incidentals cover all general expenses that lie outside of the contracted cost, such as might be included as extras on the contract price. They may be due to small changes in design; to interference with construction from various causes, such as operation, floods, quicksand, uncertain foundations, insurance against fires and accidents. The aggregate of these percentages varies from a minimum of 5 per cent to a maximum of 15 per cent.

"In case of real estate 5 per cent has been added, which is intended to cover organization as defined above, and what might be the equivalent of engineering, namely, selection of site, search of title and purchase fees.

"These percentages have been added to the subsummaries, and the total represents the cost to the company of the property detailed, but does not include the cost of obtaining the money necessary to finance the property, namely, brokerage, carrying charges during construction, including taxes and interest, and legal expenses not properly chargeable to construction, such as those incurred in organizing the company, obtaining franchises, preparing trust deed, and in securing money. Neither do they include any preliminary engineering, legal or other expense incurred in promotion.

"An additional 10 per cent has been added to the general summary to cover the above charges with the exception of cost of promotion and bond discount. The amount added later for discount is that determined from the records of the company and includes simply the discounts on bonds, no account whatever being taken of the value of stock in this appraisal. The amount of money resulting, with the percentage above noted and the bond discount added, represents the total money that would have to be provided to reproduce the property, thus including in the total cost not only the material and labor costs with their suitable percentages for contractor's profits, organization, engineering and incidentals, but also the expense that would be incurred in financing the property. The value thus obtained includes nothing for developing expense or for promoter's profit.

"For the purpose of making an inventory the property was divided into track, paving, electrical distribution system, rolling stock, power plant and substation equipment; fixed tool and shop equipment; stores, supplies, floating tools and miscellaneous; furniture and fixtures; buildings, real estate and leases. These divisions were again subdivided into various parts, that is, track was divided into tangent track; track special work; tangent track in carhouses and yards; track special work in carhouses and yards; bridges, culverts and trestles; cuts and fills; fences; miscellaneous. In a similar way subdivisions were made for the other general divisions. These divisions are intended to include all of the physical property belonging to the International Traction Company. In addition to this physical property values are returned for certain long term leases held by the company in accordance with its trust deed, as well as for securities of other companies held by the International Traction Company or its subsidiaries.

"The property is owned by various companies, including the International Traction Company and the subsidiary companies which are controlled by the International Traction Company through stock ownership. No attempt is made in the general inventory to distinguish between the parts of the property used by or belonging to the various companies, but the whole property has been collected and grouped.

"On the subsummaries and detail sheets of the various exhibits there is set up the cost new, together with the date of installation or purchase. Recapitulation sheets are included on which the amount of money represented by the exhibit is shown segregated into the years in which the expenditure for this property was made. The values shown on these recapitulation sheets taken in connection with similar recapitulation sheets for the superseded property are used in the totals of a statement of 'investment in property by years.'

TRACK AND ROADWAY

"The various types of rails and joints, together with their location, the size and spacing of the ties, the depth and kind of ballast and other features of track construction, were determined by field inspection, together with the limits of each type. Unit price estimates of the cost per mile of single track were prepared for each class.

"The amount of tangent track shown as existing on any certain street is the net amount, the number of feet of track included in special work being excluded from tangent track and included in track special work.

"The location and type of all track special work was determined by inspection, and each piece was listed alphabetically by location. Those layouts similar in type were then grouped and given a key number, and unit price estimates were made for the different types. The price shown in the estimates covers not only the cost of the layout together with joint plates and bolts, but also a charge for unloading and hauling the steel to the point of installation. Unless otherwise shown, all special work is of the hard center guaranteed type, 9-in. girder rail, Lorain section 119-341 or equal. Only those curves on which guard rail was installed were classed as special work.

"The length of the tangent track and special work in car houses and yards was checked in the same manner as the tangent track. The item of excavation does not appear in

this section since it has been considered a part of the building cost and is listed under that exhibit.

"Each item inventoried under bridges, culverts and trestles was inspected and the plans of the larger bridges, whenever obtainable, were checked against the existing structure. Detail bills of materials were prepared for which estimates were made covering the cost of material and labor required to reproduce the structure as of to-day. Whenever the original plans could not be found sufficient sketches were made up in the field to serve the purpose of making an estimate. The matter of joint ownership was investigated and the value returned on all structures in this exhibit which are operated over, or owned, jointly was satisfactorily established before the cost was included.

"A considerable mileage of track is in country districts. The normal quantity of excavation required for any given class of track is included in the unit cost in 'tangent track.' In the sub-exhibit of cuts and fills there is included all that amount of grading that is required over and above the minimum requirement included in the tangent track section. The amount has been determined both from a study of the original profiles and by inspection of the present lines.

"The amount of right-of-way fence was determined by inspection. The inventory of snow fence includes both the number of panels in the field and those stored in and about the various yards.

"Cattle guards, track drains in Buffalo city, derails at steam railroad crossings, and both highway and farm crossings along the various interurban lines are included in 'miscellaneous.' Their number, type and location were checked up by examination in the field.

"On all of the items of track 15 per cent was added to cover organization, engineering and incidentals.

PAVING

"Field inspection was made to determine location, type and width of paved right-of-way. The lengths of right-of-way paved were taken from the maps used in determining the tangent track work. Unit price estimates were made for the various types of pavement which, in connection with the quantities above referred to, served to determine the total cost new. The dates of installation of pavement were assumed to be the same as those of the tangent track in connection with which it was found. To the values thus found 15 per cent was added to cover organization, engineering and incidentals.

ELECTRICAL DISTRIBUTION SYSTEMS

"Field notes were taken including the number, type and location of poles, spans and special work layouts, and estimates of the cost new were made for each type. Special layouts, and those for each carhouse or caryard, were treated individually. Lengths of trolley, feeder or transmission wire were taken from the maps of the International Traction Company and checked and an allowance was made for sag and waste.

"The underground conduit system is shown under three heads—manholes, ducts and cables. The number, location and size of manholes was determined by field inspection and their cost estimated in detail. The number, kind and location of duct lines and underground cables was determined by field inspection, and their lengths, as determined from the records of the company, were checked by field inspection.

"The telephone and signal systems are shown in detail and their cost estimated, using lengths of wire as determined from the company's maps. The ownership of all telephone instruments and signal apparatus was investigated and only those instruments owned by the company are shown.

"Miscellaneous equipment, such as guard wires, trolley guard, trough under bridges, lightning arresters, etc., are inventoried in detail. To the values thus found 15 per cent was added for organization, engineering and incidentals.

ROLLING STOCK

"This has been divided into three divisions, namely, passenger equipment, utility equipment and miscellaneous. Passenger equipment includes all passenger cars, while utility equipment includes all the remainder of the cars and miscellaneous includes all extra equipment and duplicate parts used on cars.

"The cars were divided into groups, according to type, style and make, and in detailing the cost new of component parts of a complete car the following items were used: car bodies, motor equipment, trucks and brake equipment. Car bodies includes all that part of the car ordinarily purchased from the car builder, but does not include such fixtures as brake equipment, fare registers, portable headlights and, in same cases, fenders. Motor equipment includes that portion of the car ordinarily purchased from the motor builders, namely, motors, controlling apparatus, control wiring and light wiring. Trucks include the truck complete, with the exception of the motor equipment and track scrapers. Brake equipment includes both air and electric brakes.

"The cost new of car bodies was determined by preparing a complete specification for a car body typical for the group, from which the cost of car body, f.o.b. builder's factory, could be determined. To this cost the freight charges and cost of assembling the car at destination were added to give the total cost new. Similar procedure was adopted for determining the cost new of motor equipment, trucks, brake equipment and miscellaneous.

"To the total cost new 5 per cent was added for organization, engineering and incidentals.

POWER PLANT AND SUBSTATION EQUIPMENT

"For the purpose of determining the cost of the power plant a detailed inventory was made of all machinery and equipment in the plant. Individual prices were applied to the various items which, together with the cost of labor and installation, were used in arriving at the cost new. All larger items of the equipment were estimated in detail. The cost new of minor items, such as small wiring and miscellaneous equipment about the plants, was determined by applying unit cost estimates to the quantities of this material found in the plant.

"A detailed inventory was made of the tools and fittings required in the various plants, to which prices were applied. To the values thus obtained 10 per cent was added to cover organization, engineering and incidentals.

FIXED TOOLS AND SHOP EQUIPMENT

"All fixed tools and general shop equipment are included in this exhibit. A list of this equipment was submitted by the company and was checked up by field inspection. Such additions have been made to the list submitted as were necessary to complete the list to the date of appraisal, April 1, 1911. To the total cost new 10 per cent was added for organization, engineering and incidentals.

STORES, SUPPLIES, FLOATING TOOLS AND MISCELLANEOUS

"All stores, supplies, floating tools and miscellaneous items are included in this exhibit. By stores are meant those supplies in the possession of the storekeepers and located at the principal store and at the supply stores maintained at the various points. The value of the stores, as determined by the company's inventory of Jan. 1, 1911, and revised as of April 1, 1911, was used in this report.

"Supplies include material of the same class as that included in stores, but which have been issued by the storekeeper to the various departments.

"Floating tools include all the various tools found in each department and listed in detail.

"Miscellaneous includes a number of items as horses, wagons, harness and all barn equipment.

"Patterns included in this exhibit are those that have been made for the purpose of casting duplicate parts of various kinds of machinery and equipment used in operation of the system.

"Drawings included in this exhibit are those that have been prepared for the purpose of making various changes and improvements on cars and general machine shop equipment. The drawings made for the purpose of changes and additions to buildings are not included in this exhibit as the value of these drawings is covered by the engineering percentage.

"To the total cost new of all the material included in this exhibit 10 per cent has been added for organization, engineering and incidentals.

FURNITURE AND FIXTURES

"Furniture and fixtures have been listed in detail by location and a value as of April 1, 1911, has been applied. To the value thus obtained 10 per cent is added to cover organization, engineering and incidentals.

BUILDINGS

"In determining the cost new of buildings as of April 1, 1911, one or more of each of the various types was selected and measurements were made and a detailed inventory taken of the kinds and amounts of material required to reproduce these buildings. To these quantities the current prices, as of the above date, were applied, thus determining the cost new. Measurements of these buildings were also taken, from which their cubical content was obtained, which served to determine the unit price of each of the various types. This method was applied to the larger structures and to typical buildings. The cost of other building structures of the same type was determined by applying the unit price thus obtained, such variation in unit price being made as would properly represent any modification in type or other conditions that might affect the cost.

"The smaller building structures were examined and measured and the cost new determined by applying a unit price to the measurements thus obtained.

"To the values thus obtained 10 per cent is added to cover organization, engineering and incidentals.

REAL ESTATE

"The real estate has been appraised by Gurney & Overturf, real estate experts of Buffalo, and this exhibit contains the property values as determined by this firm.

LEASES

"In 1899 the company leased for 999 years from the Erie Railroad a certain right-of-way, tracks and buildings, at an annual rental of $16,000 per year. While the railroad company does not actually own the title to this right-of-way and these buildings, it does practically own them, on account of the length of the lease, consequently the valuation was made up as follows:

"The real value of this right-of-way and of these buildings, on the same basis as of other values, was determined as of April 1, 1910, the right-of-way as then determined amounting to $186,000, and the buildings to $40,000, or a total of $226,000. This amount was added to the value of other property of the International Railway Company in 1899, and then from the total thus obtained was deducted $320,000, the assumed value of the right-of-way and buildings, determined by capitalizing the above mentioned rental of $16,000 per year at 5 per cent.

Table I.—Summary of Track Values.

	Cost New
Tangent track	$5,013,444.03
Track special work	1,228,285.77
Tangent track in carhouses and yards	110,601.00
Special work in carhouses and yards	226,613.00
Bridges, culverts and trestles	923,755.00
Cuts and fills	324,228.95
Fence	33,258.05
Miscellaneous	15,023.35
Total cost new	$7,875,209.15

NOT INCLUDED IN PHYSICAL APPRAISAL

"The above appraisal does not include any allowances for the following: (a) development expenses, legal, technical or financial, (b) going value, (c) franchise value, (d) water rights."

COSTS THUS DETERMINED

The distribution of the total summary of physical property was shown in the issue of Oct. 21, 1911. The values of the different classes of track are shown in Table I.

These values are also distributed by years in the appraisal. In the appraisal of the various classes of tangent track unit cost estimates were made. One of these estimates is published in Table II.

Table II.—Unit Cost Estimate to Produce One Mile of Single Track.

Class A.—Girder Rail, 140-lb. 9-in. Lorain Sec. 140-142. 50-ft. Lengths, Steel Ties on 5-ft. Centers, Tie Rods Every 5 ft., Concrete Substructure, 12-Bolt 36-in. Joint Plates.

Item	Unit	Quantity	Unit Cost	Unit Cost
Rail, 140-lb., girder	Ton	220	$38.00	$8,360.00
Hauling to street	Ton	220	1.00	220.00
Excavation	Cu. yd.	2,112	.75	1,584.00
Ballast—concrete	Cu. yd.	1,017	5.50	5,593.50
Ties—steel I-beam	Each	1,056	1.55	1,636.80
Tie rods	Each	1,060	.30	318.00
Joints, 12-hole, Thermit shoe	Each	211	6.50	1,371.50
Bonding joints	Each	211	1.50	316.50
Labor, track	Ft.	5,280	.30	1,584.00
				$20,984.30
Organization, engineering and incidentals, 15 per cent				3,147.65
Total cost new				$24,131.95
Total cost new used				$24,132.00

The cost new of the paving was distributed as follows: Tangent track, $2,650,648.44; special work, $224,013; widening streets and paving from curb to curb, $66,053; total cost, $2,940,714.54.

Table III shows the summary of cost of the electrical distribution system. The report also gives a recapitulation of the cost new by years.

Table III.—Summary of Electrical Distribution System.

	Cost New
Trolley	$841,129
Overhead feeders	622,123
Transmission lines	53,059
Underground conduits	485,528
Telephone lines and signals	23,422
Miscellaneous equipment	56,526
	$2,081,787

The cost new of the rolling stock is divided as follows: Passenger equipment, $4,385,530.80; utility equipment, $242,796.75; miscellaneous, $81,694.02; total cost new, $4,710,021.57.

Table IV shows the value of the equipment by years.

Table IV.—Present Equipment—Recapitulation by Years.

Year	Cost New	Year	Cost New
1885	$8,644.51	1903	$365,340.23
1890	5,722.50	1904	300,797.00
1892	30,133.98	1905	3,101.70
1893	381,478.06	1906	1,067,509.50
1895	1,157,820.08	1907	382,458.03
1898	11,530.76	1909	2,066.40
1899	71,522.85	1910	3,328.50
1900	856,013.63		
1901	44,073.75	Total cost new	$4,710,021.57
1902	27,480.09		

The passenger equipment consists of 917 cars, divided into forty-five groups of an aggregate value of $4,176,696 plus 5 per cent, or $208,834.80, for organiation, engineering and incidentals. Table V shows the computation for the cost of one group.

Table V.—Group No. 1.—150 Cars—Type "5000" Pay-As-You-Enter—Year Purchased, 1906

	Number	Unit Cost	Total Cost
Bodies	150	$3,743	$561,450
Four motors, GE-80 equipment	150	2,025	303,750
Double trucks, Brill No. 27-F. E.-2	150	575	86,250
Air brakes, Christensen A. A.-4	150	350	52,500
Total cost new		$6,693	$1,003,950

POWER PLANT AND SUBSTATION EQUIPMENT

Regarding power plant and substation equipment the report says in part:

"The equipment listed under each power plant and substation is compiled from field inventories made in April, 1911.

"The dates of installation of the various items of equipment have been taken from the following records, viz.: office copies of purchase orders and contracts, log books in possession of plant employees, office records furnished by the company. Where the dates are omitted, as in the case of switchboards and wiring, it has been assumed that portions of such equipment were installed at the same time as the machines for which switchboards and wiring are required. In the case of plant tools and furniture, the dates of installation are omitted, since the purchase of these items extends over a long period of years.

"The cost new value represents the cost as of April, 1911, to reproduce and install equipment of like kind in first-class condition, fair allowances having been made for labor and contingencies incidental to the complete installations. Where second-hand equipment is known to have been purchased or installed, the purchase price or an estimated second-hand value for such equipment has been used. Equipment which is now obsolete owing to changes in the art and the discontinuing of the manufacture of the same, making the replacement of the particular apparatus difficult, has been given a fair estimated value.

"In recapitulating the value of power plant equipment by years, all items in general have been credited directly to the year in which each piece of equipment was said to have been installed. Where items have not been so credited, as in the case of certain switchboards, wiring and plant tools and furniture, the amounts have been prorated to the years in which the contiguous equipment was installed in proportion to the kilowatt capacity of generating units installed in each plant in said years.

"The plant, tools and furniture of the Niagara Street power plant have been prorated equally into the ten years during which changes and additions have been made to the plant."

The value of the power plant and substation equipment is distributed as follows: power plant equipment, $767,555.31; substation equipment, $993,864.61; dams, canals and pipe lines, $103,590.85; total cost new, $1,865,010.77.

To the value of fixed tools and shop equipment as inventoried, $128,430.87, there was added 10 per cent for organization, engineering and incidentals, making the total cost new of $141,273.95.

Stores, supplies, floating tools and miscellaneous were divided as follows: stores, $265,505.29; supplies, $26,583.38; floating tools and miscellaneous, $58,278.64; total cost new, $350,367.31. Each of these items includes 10 per cent for organization, engineering and incidentals.

The total cost new of furniture and fixtures includes 10 per cent for organization, engineering and incidentals.

The method of appraisal of the buildings is indicated in Table VI.

Table VI.—Power House, Niagara and School Streets, Built 1900.

Type of Construction.

Ground area—13,195 sq. ft.
Contents—580,580 cu. ft.

Detail of Construction.

Preparation of site—General clearing of grounds and removal of old structures.
Excavation—Excavations for basement and foundations through solid rock.
Foundations and concrete floors—Rubble masonry foundations. Plain concrete ground floor and reinforced concrete first floor.
Superstructure masonry—Brick with stone trimmings.
Structural steel and iron—Columns, trusses, purlins, floor framing, stairs and railing.
Carpenter work—Roof sheathing and rafters.
Millwork (including painting and glazing)—Windows, box frame and sash, panel and matched doors.
Roofing—Vermont slate on main roof, tar and gravel on monitor.
Sheet metal and skylights—Galvanized iron gutters and conductors and metal clad fire doors.
Painting (other than millwork)—R. O. W. and cold water paints for main building, oil paints for office.
Drainage system—Vitrified tile sewer pipes
General water service—1-in. pipe from city main.
Lighting system—32-cp. and Thomson arc lamps.
Telephone and signal system—Booth with wall phone and call gong.

Value of Building

Contents—580,580 cu. ft. at 15 cents	$87,087.00
Organization, engineering and incidentals, 10 per cent	8,708.70
Total cost new	$95,795.70
Total cost new used	$95,795.00

The real estate is divided as follows: operating property, $1,582,318; non-operating property, $122,906; total, $1,705,224. A letter from Gurney & Overturf, who appraised the real estate, addressed to Mr. Arnold, says in part:

"This appraisement was made on information and description of properties submitted by the company, and represents a close estimate of the current market value, the total appraisement for the sixty plats being $1,705,224.

"A contiguity factor of three was used on the right-of-way property for the following divisions: Buffalo and Lockport; Lockport and Olcott; Gulf line; Bellevue and Lancaster."

Investment in Property by Years

An important feature of the report deals with the methods by which the totals of the investment in the property were determined. An introductory chapter says in part:

"These addenda include the data necessary to determine the amount of the investment in physical property by years from the time of the inception of each of the subsidiary companies now included in the company. For this purpose it is necessary to include in the cost new, not only the property now existing, which has been included in the appraisal, but also those items that were purchased and utilized during the first years of the life of the property and since have been superseded. With regard to these items it is necessary to know the date at which they were purchased, together with the cost new. After these values have been determined for all of the superseded property they can then be collected on a recapitulation sheet, showing expenditures by years. This will represent the total capital expenditure on account of the property throughout the entire life of the company.

"In case the superseded property has been disposed of for cash, such as by the sale of any real estate or the disposal of scrap in worn-out equipment or apparatus, the amount received was deducted from the expenditures for capital account in the year during which such property was disposed of. Similarly if any items of property were rebuilt or reconstructed, as occurs in the case of cars in which, while the trucks and part of the equipment were scrapped, the car body was reconstructed and forms part of a car now in operation on the system, the estimated second-hand and scrap value of such superseded property is deducted from the capital expenditures for the year in which the reconstruction took place.

"The net capital expenditures for a series of years may then be accumulated annually, and the cumulative statement resulting will represent the net capital invested in the property throughout its life.

"The information with regard to the superseded property was secured from the records of the company and from statements of individuals familiar with the company's early history and from the published reports of the various subsidiary companies now forming the system. The statements showing capital expenditures date back to 1862, when the first horse car lines were organized for operation in Buffalo. The system was gradually extended until, in 1890, there were about 63 miles of line.

"At this time the electrification of the system was decided upon, and during 1890-93, inclusive, the horse car lines were completely replaced. Within the next few years various extensions were built, until in 1895 about 67 miles of electric lines were in operation in Buffalo.

"During this electrical reconstruction period power plants, electrical distributing systems, electrical equipment in cars and reconstruction of track were provided for. This resulted in the displacement of a part of the property that had been used in the operation of the horse car system. Similarly, during the years succeeding the electrification and up to the present time, portions of the electrical system have been replaced. The larger increases in the capital account, however, have been due to the extension

of the lines during these years, and the acquiring of other properties, which have been consolidated into the International Traction Company.

"The reports of these various properties, together with the records of the company, serve to furnish reasonably complete information with regard to the location and type of construction work that has been built and superseded during the period of electrification. A more detailed statement of the methods used follows:

"Track and roadway.—From records of the International Company, supplemented by information from various other sources, the dates of construction of the different horse car lines were determined. The first lines, built in 1862, consisted of a total of about 13½ miles single track. The reports of the company to the Board of Railway Commissioners for 1890, the year in which the electrification of the original lines was commenced, show that 63.75 miles of track existed at that time, and their records were utilized for the purpose of spreading over the years between 1862 and 1890 the 50.25 miles of track which must have been built during that period. Satisfactory specifications describing the early track construction were available, and from these unit cost estimates were made, from which the cost new of the early lines was calculated. During the three-year period of 1890-92 the old lines were completely rebuilt and electrical operation supplanted the horse cars. Since no dates were available from which the exact portion of the 63.75 miles rebuilt during each of these years could be determined, it has been assumed that one-third of this mileage was rebuilt during each of these years. Accordingly one-third of the total scrap value of the horse car lines has been charged against the sum expended during each of these three years. From the dates of construction covering the present lines as shown in the main appraisal, the time at which the various sections rebuilt during 1891-2-3 were in turn replaced was readily determined, and the scrap value of these lines was handled as was that of the horse car lines. As a further check on this method, the report of the company to the Board of Railroad Commissioners, made in 1895, shows that 67 miles of track existed at that time, and the miles of track built previously, which have been shown as superseded, together with the miles of track in the main appraisal built before 1895, will be found to total 67 miles. The proportion of the cost of special work to that of tangent track in the main appraisal was found to be 29.5 per cent in Buffalo, and for that reason it was assumed that the cost of the superseded special work could be fairly taken at this percentage.

"In estimating the scrap value of superseded track, the rails of the first period were given a scrap value, whereas those laid about 1890-91 and superseded within a few years were appraised at a relaying value and the additional value of the varying percentage of the number of ties, depending on their life at the time of their removal, together with the scrap value of the spikes, joints and tie rods, was added to the rail value to give the gross scrap value. The cost of tearing up the track was deducted from this gross cost in order to obtain the net scrap value. A further deduction was made, in the case of abandoned track, of the cost of refilling the right-of-way formerly occupied to establish street grade.

"Paving.—No scrap value was returned on paving, since the cost of hauling the stone to a storage yard would offset the small scrap value which existed in the cobblestone pavement installed along the superseded track.

"Electrical distribution system.—The cost new and scrap value of equipment which has been superseded and abandoned have been determined by using unit prices which are the average of prices obtaining in the period during which such property was installed. The location and quantities of such superseded equipment and the years in which it was originally installed were taken from the records of the International Railway Company.

"Renewals and extensions of trolley lines have been checked by comparing the storehouse records of trolley wire bought with the increase or decrease of total mileage of track.

"In the case of underground cable or equipment, only that equipment which has been renewed on account of the rearrangement of the underground system entailed by the building of new substations has been shown as superseded, as all other underground cables are shown in the main appraisal.

"Rolling stock.—The subdivision of the investment in superseded cars and car equipment into the various years is based upon a report submitted by the company, in which is given the history of the rolling stock from 1860 to 1909.

"The only information offered for the horse car period, namely, 1860 to 1890, was that the company owned five cars in 1860 and 1861, thirty in 1870 and 250 in 1888. From this information, together with the data available as to dates of track extensions, an approximate distribution was made of the number of cars purchased during that period. Some of the superseded horse cars were rebuilt for electric service, and the salvage received from those not rebuilt was approximately $25,000, which appears under scrap value in the year 1888.

"The information furnished by the company for the period subsequent to electrification was found to be more detailed than that of the horse car period, and appears to be substantially correct.

"Fixed tools and shop equipment.—The information pertaining to the time and quantities in which the fixed tools and general shop equipment were purchased was obtained verbally from parties long in the service of the company. This information, together with the knowledge of the car equipment that had to be taken care of year by year and the present day inventory, made it possible to approximately distribute the money expended for machine tools and shop equipment at intervals of two or three years.

"As the normal life of equipment included in this exhibit has not terminated, it has been assumed that there was no superseded material, and therefore no scrap value or salvage is listed.

"Stores, supplies, floating tools and miscellaneous.—An annual record of inventory of stores dating back to 1900 was submitted by the company. From this information, together with the record of the rolling stock operated from year to year, as well as the present day inventory of all materials covered by this exhibit, it was possible to determine the approximate annual expenditure for this material. Because of the character of material comprised in this exhibit, no scrap value has been returned.

"Buildings.—The records of the company were used to determine the cost new and scrap value of the superseded and altered buildings. These records were verified as far as possible by making inquiries of all persons from whom such knowledge could be obtained, and from notes or other information which they might possess. The percentage for scrap value of superseded buildings varies from 5 to 15 per cent, depending upon the construction of the building and date at which it was superseded.

"Furniture and fixtures.—In determining the value of superseded furniture and fixtures the only information secured was that given by some of the present employees of the company, who claimed to have knowledge of such materials being abandoned. This comparatively small value was listed by years and amounts.

"Since the values for real estate returned by Gurney & Overturf, real estate experts, are the current market value, these values if entered as invested in the years in which the respective parcels of land were bought would be higher than the actual amount paid in these years. A re-distribution of real estate values by years has therefore been made.

"The value of all real estate in Buffalo, exclusive of improvements, was taken from the records of the city

assessor's office, for each year since 1875, and the values of real estate returned by Gurney & Overturf have been distributed over the years after the dates of purchase in the same proportion as the general increase in values throughout the city. The sum of the amounts charged in any year therefore represents approximately the money spent for real estate, plus the increase in value of real estate already owned by the company."

Table VII shows the value of the superseded and abandoned property.

Table VII.—Summary of Superseded and Abandoned Property.

	Cost New	Scrap Value
Track	$2,994,819	$274,402
Paving	1,134,048	.....
Electrical distribution system	316,811	82.601
Rolling stock	742,035	291,874
Power plant and substation equipment	518,188	82,395
Furniture and fixtures	815	.....
Buildings	130,350	11,549
	$5,837,067	$742,822
Legal expense, carrying charges and contingencies, 10 per cent	583,707	
Total cost new	$6,420,774	
	742,822	
Net value of superseded property	$5,677,952	

Superseded and abandoned equipment in the electrical distribution system was divided between $119,343 for trolley and $197,468 for underground conduits. These amounts include 15 per cent for organization, engineering and incidentals.

The item of $130,350 for buildings in Table VII includes $91,850 representing the cost new and $38,500 representing the alterations. Each of the latter amounts includes 10 per cent for organization, engineering and incidentals.

The item of $17,328 for extraordinary carrying charges, shown in Table II on page 914 of the Electric Railway Journal of Oct. 21, 1911, is explained as interest at 6 per cent on property that was not in use because "the city of Buffalo has been delayed in opening Morgan Street from Chippewa Street to Virginia Street, thus rendering inoperative the track on Franklin Street from Chippewa Street to Terrace, and on Terrace from Franklin to Pearl Street. This track is to be used as a continuation of the line on Elmwood Avenue. The carrying charges on this property are covered in the main appraisal for a period of six months after construction, and for the remainder of the time to April 1, 1911, are covered by this additional item." Construction of this track was completed in December, 1907.

TENTATIVE SUBWAY PLANS FOR CHICAGO

Before the local transportation committee of the City Council of Chicago and an assemblage including the Mayor and a number of Aldermen and citizens, the subway commission of that city on Oct. 31 presented briefly, in outline, tentative plans which it recommends. These plans are simply general suggestions for the committee to discuss, as working plans cannot be made until the routes are decided upon. John Ericson, city engineer, acted as spokesman for the commission.

The commission was appointed to examine the many plans which have been proposed for passenger subways in Chicago and to make a recommendation. The commission is limited financially to the money on hand, together with that which will be received within two years from the revenues under the traction ordinances of 1907. The subways proposed by the commission are to be used in connection with the existing transportation facilities, except that the abolition of the downtown Union Loop is recommended. The commission has visited New York, Boston and Philadelphia, and Mr. Ericson told of the experiences of those cities with subways.

Two initial subways are recommended to be connected with the four elevated railways of the city and to furnish through routes for rapid transit through the heart of the city. The first of these would connect the North Side elevated system of the Northwestern Elevated Railroad Company with the West Side system of the Metropolitan company. It would start at the Wells and Kinzie Street station of the former company and run east on North Water Street to State Street, south to Harrison Street and west to Halsted and Pearce Streets, with an approach at Halsted Street between Harrison and Pearce Streets.

The second elevated-railway subway would connect the South Side system with the West Side system of the Chicago & Oak Park company. It would start at Fourteenth Street, connecting with the South Side Elevated between Wabash Avenue and State Street, turning at once into State Street and running north to Randolph Street, thence west to a point near Green Street, with an approach bringing it to the corner of Lake and Green Streets, where connection would be made with the Oak Park road.

High-level subways within 3 ft. of the street surface are proposed. Two-track construction would be used, except on a portion of State Street, where there would be a four-track subway. There would be no grade crossings, as one subway would dip beneath the other at crossing points. It was stated that the present capacity of the Union Loop, including extra stub terminals, was 915 cars an hour. The subways proposed for the elevated railways could handle 1893 cars an hour. By constructing small loops at the downtown termini of each elevated road for local trains as contrasted with through trains, the capacity of the elevated railways, with the subways, could be increased to 3200 cars an hour. The cost of these two elevated-railway subways, including three river tunnels, relocation of sewers and utilities, paving, damages to buildings, etc., is estimated at $9,812,000, and they could be built in three years.

There may be also two initial surface-railway subways connecting the three sides of the city. One is planned for LaSalle Street, Adams Street, Dearborn Street and Jackson Street and the other for Dearborn Street and Washington Street, transfers to be arranged between these two subways and also between the surface street railway subways and the high-speed subways. The present capacity of the surface lines in the downtown district is 1037 cars an hour, and this can be increased to 1300 cars an hour by through-routing arrangements on surface tracks. The two surface-railway subways would increase this by 720 cars an hour. The cost of the two proposed surface railway subways, including three tunnels, would be $9,328,000. Thus, the two systems proposed would be about the same in cost, but the one for the elevated railways would increase transportation facilities much more than the surface-railway subways. The present tendency is not to bring surface cars downtown; the function of surface cars is to feed rapid transit lines and for short-haul traffic.

The commission recommends as the initial step the building of the first system mentioned, or the one to connect the elevated railways. This plan contemplates high-level subways, through routing, no grade crossings, easy grades, few curves and low cost and provides for unlimited expansion. The length of the elevated-railway subways would be 3.85 miles. Mr. Ericson added that he understood that an engineer representing one of the transportation companies, and perhaps all of them, would present soon an alternative plan on behalf of the companies to the local transportation committee.

The September report of the British Chamber of Commerce for Spain states that the Soc. Anon. Tramways Electriques de Castile has been formed in Brussels to purchase and operate tramways and railways in Spain. It has already purchased from the Sociedad Nueva Montaña, of Santander, the electric tramways in that city and from Santander to the Sardinero.

MEETING OF THE GERMAN STREET & INTERURBAN RAILWAY ASSOCIATION

The thirteenth convention of the German Street & Interurban Railway Association was held in Berlin from Sept. 19 to Sept. 22, inclusive. The meetings of this association are held every other year, as they alternate with those of the International Street & Interurban Railway Association. All of the sessions were held in the Reichsrat or German Parliament building in Berlin. The following paragraphs summarize the principal facts in the various reports.

TRACK CONSTRUCTION

Committee "B" presented a report on standard track appliances which recommended types of angle-plates, spacings of bolt holes and sizes of bolts for the four rail sections which were adopted as standard at the previous meeting of the association. These recommendations applied, of course, only to mechanical joints. A second report by the same committee related to the use of stone paving between and alongside rails laid in asphalted streets. It stated that the campaign of educating municipalities to favor block paving between and alongside the rails was showing good progress. The report contained cross-sections and half tones of various types of combined block and asphalt construction as installed in Berlin, Bremen, Cologne and Düsseldorf.

The third report of committee "B" was on corrugation. It stated that about $5750 had been jointly contributed by several street railway companies, the principal German rail makers and the International and German electric railway associations to defray the expenses of a study of this subject. Following out the original program, about 16,400 ft. of rails were rolled by the different mills, the rails being tested from the pig iron to the finished product. Chemical and physical tests were made at every stage, temperatures were noted and the duration of each process was recorded. The ingots were cut at the top, middle and base. Upon completion the rails were laid on eight different sections on the system of the Grosse Berliner Strassenbahn, the greatest care being exercised in the methods of installation, fastening and paving. In this connection a tabulation has been prepared on the traffic conditions, wheel weights, car speeds and other conditions which might have a bearing on the wear of the rails. The results will be checked against the behavior of the old rails installed for the same traffic conditions. To assist in this work, the Grosse Berliner Strassenbahn has furnished a metallographic laboratory and appointed three men to make and record the various tests outlined. No exact data will be published until the trials are completed so that erroneous conclusions may not be drawn from fragmentary reports.

CAR HEATING

The report on car heating was presented by committee "E." This report was based upon replies received to thirty-two questions from eighty-three railways. It appears that about two-thirds of all the cars in Germany are heated in winter, although some of the municipalities do not require it. Thirty-eight companies employ electric heaters which are supplied directly from the trolley circuit, but others also use the heat otherwise wasted in the resistances, particularly on cars which have electric brakes. Most companies heat their cars when the temperature drops to the freezing point. The general practice is to maintain a temperature 6 deg. to 12 deg. C. (from 11 deg. to 22 deg. Fahr.) above the outside air. The higher limit applies more particularly to suburban and interurban lines. Some companies which use stoves endeavor to control the heat by limiting the amount of the daily fuel supply per car. One company which uses electric heaters has installed a meter in the heater circuit.

INTERPOLE MOTORS

Mr. Lehrmann, operating engineer, Elberfeld, read a paper on interpole motors with special reference to their use in connection with electric braking. His data sheet had been answered by fifty-six companies which operated 1241 cars with interpole motors in 1911 as compared with 453 cars so operated by twenty-eight companies in 1909. Most of the interpole motors installed were of larger capacity than those which they replaced. The value of the commutating pole design had already shown itself in lower maintenance cost, due largely to cleaner commutators and longer brush life. Another advantage was that the companies could now operate on higher potentials. One system in fact had changed from 550 volts to 750 volts. The writer said that the magnetic field of an interpole motor can be weakened much more without bad effects than in the case of the ordinary series motors, thus affording the possibility of better speed regulation. There was, however, no special advantage in weakening the field so far as electric braking was concerned. The disadvantages of interpole motors were said to be greater weight, less clearances, greater liability that the bottom field coils would become damaged by water, and higher first cost. The first three disadvantages had not proved important, but further experience was necessary to determine whether the fourth disadvantage would not be eliminated by lower maintenance cost.

MISCELLANEOUS

Papers were also presented on the development of the Pomeranian railways, on self-contained cars for light railways, on car-lighting systems and on the proposed law concerning the erection of power transmission and distribution lines. In conclusion a paper on the development of single-phase railways was read by Eugene Eichel, editor of *Elektrische Kraftbetriebe und Bahnen.*

As usual, elaborate entertainments were provided for the delegates and their wives. Excursions were made to the famous Sans Souci palace of Frederick the Great at Potsdam, to the Berlin Zoological Gardens and over the Spree River. The municipality of Berlin gave a reception at the City Hall and a banquet was tendered by the Grosse Berliner Strassenbahn. The delegates also visited the works of the principal manufacturers of electric railway materials in and about Berlin.

VOTE ON ENGINEERING STANDARDS

Norman Litchfield, secretary American Electric Railway Engineering Association, has issued a notice under date of Oct. 30, addressed to member companies and associate members and reading as follows:

"A meeting of the committee on standards will be held at the offices of the association, 29 West Thirty-ninth Street, New York, Nov. 6 and 7, commencing at 10:30 a. m., at which will be considered those matters referred to the committee by the association at its convention held in Atlantic City, N. J., Oct. 9 to 13, 1911. If acted on favorably by the committee at this meeting these matters will then be submitted to letter ballot of the member companies for vote as to their adoption as standards and recommended practices.

"It is the desire of the association that all proposed standards should receive the fullest investigation before their submission to letter ballot, and to that intent suggestions and criticisms in regard to the subjects to be considered at this meeting, as listed below, are invited, and should be sent at once to the chairman of the committee, Paul Winsor, in care of the association, 29 West Thirty-ninth Street, New York.

"PROPOSED STANDARDS

"1. Specification for high-tension, three-conductor, paper-insulated lead-covered cables. See report of committee on

power distribution, Section No. 1, Sub-division a, pages 4 and 60.

"2. Specifications for single-conductor, paper-insulated, lead-covered cable for 1200 volts. See report of committee on power distribution, Section No. 1, Sub-division b, pages 10 and 60.

"3. Section for grooved trolley wire, Nos. 00 and 000. See report of committee on power distribution, Section No. 2, Sub-division a, pages 17 and 60.

"4. Specifications for No. 00 round hard-drawn copper trolley wire. See report of committee on power distribution, Section No. 2, Sub-division d, pages 29 and 60.

"5. Specifications for overhead crossings of electric light and power transmission lines. See report of committee on power distribution, Section No. 3, pages 30 and 60.

"6. Third-rail clearances. See report of committee on heavy electric traction, page 4.

"7. Definitions of third-rail gage and bond. See report of committee on heavy electric traction, pages 4 and 5.

"8. Specifications for heat-treated carbon steel axles, shafts and similar parts. See report of committee on heavy electric traction, page 7.

"PROPOSED RECOMMENDED PRACTICES

"1. Location of automatic train stops. See report of committee on heavy electric traction, page 5.

"2. Instructions to employees for fire protection. See report of committee on buildings and structures, page 9.

"3. Book of rules and regulations for the government of employees of the way department. See report of the committee on way matters, pages 12 and 13."

REDUCED INSURANCE RATES IN RICHMOND

An interesting illustration of the application of the new rating schedule for traction properties recently adopted by the Central Traction and Lighting Bureau and now being applied by the various rating organizations throughout the country has just been furnished in the case of the Richmond and Petersburg properties of the Virginia Railway & Power Company, with its main office at Richmond, Va.



Remodeled Carhouse—Richmond

Some two years ago this property was taken out of the hands of the receivers and placed again under the control of its own officers, and shortly thereafter its board of directors, following recommendations and representations that the saving in premiums alone would amply repay them for this outlay, determined to discontinue some of the old carhouses and obtain the necessary housing capacity due both to this discontinuance and to the purchase of additional cars to meet the increased traffic conditions by building several new depots and overhauling the old ones destined to remain in service.

The plans after being drawn were submitted to the engineering department of the Southeastern Underwriters' Association, the bureau having jurisdiction, and were revised to conform to suggestions from that source. This bureau then kept in constant touch with the work during the entire time that the buildings were under construction.

When the work was completed demand was made on the Southeastern Underwriters' Association for the promised reduction in rates. The results were a reduction in total amount of premium from $20,374.68 to $10,840.09, in spite of an increase in value of property insured of $83,000.

Under the new schedules the basis rate has been reduced to 20 cents, and a large number of deficiency charges were added to the list. The rolling stock rate was brought from $1.35 down to 32 cents.

ACCIDENT PREVENTION CARDS IN CHICAGO

The Chicago City Railway has just had printed 6500 display cards of the form illustrated herewith. These cards are 18 in. square, printed on both sides in two colors — red for the crosses and brown for the half-tone view and the type lines. The display of these cards is a part of a campaign for the prevention of accidents, and in this work the railway company is receiving the assistance of the superintendent of schools. The display cards are being distributed one to every schoolroom, and it is planned to have the instructors call particular attention to the need for children taking care of themselves when on the city streets. A letter of transmittal accompanying the signs reads as follows:



Poster Sent to Public School by Chicago City Railway

"To Principals and Teachers:

"Through the courtesy of Mr. T. E. Mitten, president of the Chicago City Railway Company, the accompanying placards referring to the prevention of street car accidents are being distributed to all the Chicago schools, with the suggestion that they be circulated in the various classrooms and finally posted in conspicuous places about the school buildings.

"It is further suggested that the teachers take this opportunity of talking to their classes concerning the prevention of accidents to children, with particular emphasis on the following points:

"1. To 'Stop and Look' before crossing streets used by cars and other vehicles.

"2. When passing behind a standing car or vehicle to be certain there is not one approaching from the opposite direction.

"3. The danger of playing on or near car tracks.

"The foregoing suggestions permit of amplification as the individual judgment of teachers may dictate. The public safety crusade has the sanction of the school authorities and you are earnestly invited to assist in preserving the lives and safety of school children by bringing these matters forcibly to the attention of your classes.

(Signed) "Ella Flagg Young, Superintendent of Schools."

HEARING ON TRANSFERS IN NEW YORK

The hearing on the question of rates of fare on the connecting or intersecting surface railways in the borough of Manhattan was continued before the Public Service Commission of the First District of New York on Oct. 26, 1911.

Edward G. Connette, transportation engineer of the commission, was recalled and examined by O. C. Semple, counsel for the commission, in respect to appraisals of the properties of some of the companies under the jurisdiction of the commission made by him in other cases. Mr. Semple had read into the record of the present case the experience and employments which Mr Connette had prior to his connection with the commission.

Mr. Connette explained that he had caused to be prepared under his direction appraisals of the Central Park, North & East River Railroad and the Second Avenue Railroad, and that he had testified in the Third Avenue Railroad and Metropolitan Street Railway reorganization cases regarding the appraisals made by his department. He had gone over most of the property belonging to these companies, but he had not undertaken to make a complete observation of all of the properties included in the inventory.

Mr. Connette expressed the opinion that in addition to the amount ascertained as the net cost or actual cost of the labor and materials, a contractor's profit of 10 per cent should be allowed on such items as buildings, track, paving, distribution system, power equipment and rolling stock, and that 15 per cent of the net cost plus the contractor's profit should be allowed for incidentals, organization and engineering. He explained in detail why he had allowed only 10 per cent for engineering, contingencies, etc., in the case of the Third Avenue Railroad.

In estimating the life of the various elements of property Mr. Connette assumed the life of buildings and structures at fifty years, the substructure of conduit track at 100 years, the distribution system, including cables, at twenty years, and ducts and manholes at 100 years. In regard to track and other items Mr. Connette explained that he assumed that the property was maintained on a fifty-year basis. A certain number of renewals took place annually, and in the course of a certain number of years the renewals were completed, forming a circle. On that basis there would be 50 per cent accrued depreciation, minus the scrap, at all times. It would be extremely difficult to obtain the actual amount of depreciation of the rails.

This examination was preparatory to the introduction into the testimony of appraisals of the tangible property of the street railways operating in Manhattan which had been made by Mr. Connette. The companies included were the Metropolitan Street Railway, the Central Park, North & East River Railroad, the Second Avenue Railroad and the Third Avenue Railroad. For each of these companies except the Third Avenue Railroad two statements were filed, one showing the property as a whole and the other showing separately the property in use for railroad purposes and the property not in use for railroad purposes. The net cost, the percentage for additions, the cost to reproduce, the accrued depreciation and the present value were all included in the statements. The totals of the net cost, the cost to reproduce and the present value of the properties each, as of July 31, 1911, as shown in Mr. Connette's valuations, appear in the accompanying table.

	Net cost.	Cost to reproduce.	Present value.
METROPOLITAN STREET RAILWAY.			
Total	$48,368,222	$57,812,861	$42,075,826
Real estate	13,808,987	13,808,987	13,808,987
Grand total	$62,177,209	$71,621,848	$55,884,813
CENTRAL PARK, NORTH & EAST RIVER RAILROAD.			
Grand total	$2,492,426	$2,948,220	$2,251,993
SECOND AVENUE RAILROAD.			
Grand total	$6,131,676	$7,262,210	$5,710,525
THIRD AVENUE RAILROAD.			
Grand total	$28,441,133	$32,166,526	$24,544,350

In the case of the Metropolitan Street Railway the following values are placed on the property not in use for railroad purposes: Net cost, $5,338,737; cost to reproduce, $6,102,267; present value, $5,072,677.

In the case of the Central Park, North & East River Railroad the following values are placed on the property not in use for railroad urposes: Net cost, $174,444; cost to reproduce, $212,880; present value, $156,884.

In the case of the Second Avenue Railroad the following values are placed on the property not in use for railroad purposes: Net cost, $354,513; cost to reproduce, $404,510; present value, $320,556.

John Flint was recalled at the hearing on Oct. 30, 1911, and was cross-examined in regard to the details of the accounts of the Third Avenue Railroad.

The hearing was adjourned until Nov. 2, 1911.

HEARING ON EIGHT-CAR ELEVATED TRAINS IN NEW YORK

At the continued hearing before the Public Service Commission of the First District of New York on Oct. 27, 1911, on the question of the operation of eight-car trains during the rush hours on the elevated lines of the Interborough Rapid Transit Company both Frank Hedley, vice-president and general manager of the Interborough Rapid Transit Company, and E. G. Connette, transportation engineer of the commission, were recalled.

In answer to a question by James L. Quackenbush, counsel of the Interborough Rapid Transit Company, as to why eight-car trains in the subway could be increased to ten-car trains whereas seven-car elevated trains could not readily be increased to eight-car trains, Mr. Hedley added the following to the statements made by him at previous hearings:

"When we were operating eight-car trains in the subway the track conditions, the station conditions, the approaches to the stations and the station platforms were very different from those on the elevated, so that the elevated and subway cannot be compared. In the subway we had considerable space that was not occupied by trains, because it was considered necessary to hold the trains back from the station a safe braking distance to avoid rear-end collisons. We have covered a very large amount of the space that was not formerly occupied by trains with the lengthened ten-car train.

"On the elevated lines the trains follow each other now so closely that it is impossible to get any more cars past; in short, the seven-car unit is the one that fits the elevated railroad service best, and enables us to operate the largest number of cars over the track within a given time. The interval between trains in the subway is one minute forty-eight seconds. That equals thirty-three and one-half trains an hour, or 335 cars passing a given point during the busiest hour of the twenty-four. On the elevated railroad, the Third Avenue line, for instance, we are operating seven-car trains. The interval between trains is sixty-two seconds, which gives fifty-eight trains of seven cars, or 406 cars per hour in the busiest hours, which is a great many more cars per hour on the elevated railroad with seven-car trains than we can possibly operate in the subway with ten-car trains."

Mr. Connette said that the cost of equipping the cars on the elevated lines with new drawbars and draft rigging, and strengthening the cars for the introduction of the new draft rigging and drawbars, and for taking care of the train stresses that might be introduced by reason of adding an extra car, would cost approximately $700 per car. As he understood that the company had approximately 1800 elevated cars, the total cost would be $1,260,000, plus $250,000

for replacing and relocating signals. Mr. Connette had not had time personally to reach his final conclusions as to what the total cost would be, but, taking into consideration the elements which he had just mentioned, he did not believe that the total cost would exceed $2,000,000. He had made no allowance, however, for changes in terminals.

The hearing was adjourned until Nov. 10, 1911.

INSPECTION TOUR OVER THE ILLINOIS TRACTION SYSTEM

A party of electric railway men from Indiana and Ohio were entertained on Nov. 2 and 3 by H. E. Chubbuck, vice-president executive of the Illinois Traction System, by a trip made over a considerable portion of this company's interurban lines in Central Illinois. The Indiana party included the following:

E. F. Schneider, general manager Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.

F. W. Coen, vice-president and general manager Lake Shore Electric Railway, Sandusky, Ohio.

R. A. Crume, general manager Dayton & Troy Electric Railway, Tippecanoe City, Ohio.

Charles L. Henry, president and general manager Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.

Arthur W. Brady, president; H. A. Nicholl, general manager Indiana Union Traction Company, Anderson, Ind.

R. I. Todd, vice-president and general manager; E. B. Peck, vice-president, Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.

C. E. Morgan, general manager Indianapolis, Crawfordsville & Western Traction Company, Crawfordsville, Ind.

L. E. Fisher, St. Louis, Mo.

Hugh M. Wilson, vice-president, New York, L. E. Gould, Western editor, Electric Railway Journal, Chicago.

The representatives of the Illinois Traction System on the trip, besides Mr. Chubbuck, were Messrs. Handshy, Martin, Quackenbush, Leisenring, Buffe, Bell, Bascom and Creeviston.

The party gathered at Peoria Thursday morning and were escorted to the office car, No. 233, of the Illinois Traction System, on which breakfast was served en route to East Peoria. At East Peoria car 233 was side-tracked until the passage of the 8:10 southbound limited, which carried signals for car 233, from East Peoria to Mackinaw Junction. This arrangement of first and second sections was made so that the railway men from Indiana might view the operation of the automatic block signals and note the facility with which trains of several sections are handled on protected track.

At Mackinaw Junction a stop was made to inspect the new coal pits which have just been built by the company for under-water storage of Illinois coal. A description of a similar pit built near the Riverton power plant of this system appeared in the Electric Railway Journal April 1, 1911, page 591. The Mackinaw Junction pits have a capacity of 15,000 tons, are lined with concrete and are surmounted by trestles on which a locomotive crane carrying a grab bucket operates for reclaiming submerged coal. After leaving Mackinaw Junction the office car containing the Indiana party was routed around the city of Springfield, Ill., on the new high-speed belt line which recently was opened to service. This belt line is single-tracked and is approximately 5 miles long. It passes through an industrial district of Springfield and encircles the southeast section of the city. Thus it affords opportunity for many loading tracks and connections with several steam railroad trunk lines. All grade crossings are protected with interlockers and the grades are separated at the most important steam road crossings.

The party was then taken southward over the Springfield-St. Louis division, which is 100 miles long, passing around, also, Edwardsville by the Edwardsville belt line, which is about 3½ miles long. At Granite City the party was again routed around the new Granite City belt line to the Illinois approach to the McKinley Bridge, at which location is the new power station which furnishes energy for the operation of the city cars in St. Louis and the interurban cars on the Springfield-St. Louis division.

After viewing this power station, the party was taken over the McKinley Bridge and shown the two new passenger stations and the new express and freight station at St. Louis. Mr. Chubbuck then entertained the party at a dinner at the Jefferson Hotel. Each guest before leaving was presented with a leather-bound copy of a recent pamphlet issued by the Illinois Traction System. The name of each guest was embossed upon the cover of the pamphlet.

RECENT PREPAYMENT LICENSES

The Prepayment Car Sales Company, New York, reports a large number of recent contracts for licenses and door devices. Some of the more important which have been closed since July 1 are:

Chicago Railways Company; license for 292 pay-as-you-enter cars of the Railways Company standard platform design.

Detroit United Railway Company; license for fifty pay-within type of cars.

Boston Elevated Railway Company; license and door and step mechanism for fifty pay-within cars of Boston special type.

New York State Railways Company, Rochester; license for fifteen new and twelve remodeled pay-as-you-enter cars.

International Railway Company, Buffalo; license for ten cars remodeled to pay-as-you-enter type.

Georgia Railway & Electric Company, Atlanta, Ga.; license for seventeen cars remodeled to pay-as-you-enter type.

Lehigh Valley Transit Company, Allentown, Pa.; license and door and step mechanism for ten new pay-within cars and pay-within door and step mechanism to be applied to ten pay-as-you-enter cars now in operation.

Central Pennsylvania Traction Company, Harrisburg, Pa.; license and door and step mechanism for six new pay-within cars.

Charleston Consolidated Railway & Lighting Company; license and door and step mechanism for six new pay-within cars.

Virginia Railway & Power Company; license for eight cars remodeled to pay-as-you-enter type and door mechanism for two other cars.

Wilkes-Barre Railway Company; license for fourteen new pay-as-you-enter cars.

Lynchburg Traction & Light Company; license for fourteen new pay-as-you-enter cars.

Topeka Railway Company; license for four new pay-as-you-enter cars.

New York & North Shore Traction Company; license for four new pay-as-you-enter cars.

Milwaukee Electric Railway & Light Company; license and door mechanism for twelve cars remodeled to pay-within type.

San Antonio Traction Company; license and door and step devices for ten new combination pay-as-you-enter and pay-within cars, and for nine cars converted to pay-within type.

Richmond & Henrico Railway Company, Va.; license and door and step devices for four new pay-within cars.

Frankford, Tacony & Holmesburg Street Railway Company; license for two pay-as-you-enter cars.

Union Electric Company, Dubuque, Ia.; license for six pay-as-you-enter cars.

RECENT IMPROVEMENTS IN SIGNALS

The Nachod Signal Company, Philadelphia, Pa., has made various improvements in its automatic signals. The new oil-immersed resistance unit is wound on a brass tube which is insulated with impregnated asbestos. It has a mechanically protective covering of Bakelite, applied to the outside, there being a narrow strip running the length of the winding uncovered. The contact bands may thus be placed at any point on the resistance tube and the desired resistance obtained. Consequently, although three different resistances are required, they can be obtained with three different settings of the same unit instead of by the use of separate units, as hitherto. The unit has a resistance of 1100 ohms, but is quite sturdy. Great overload capacity is obtained through the immersion of this resistance in oil.

The main magnet coils are wound with one size finer wire, thereby decreasing the amount of heat liberated to the oil. The coils are form-wound, with paper between the layers, of enamel insulation copper wire, the bobbin heads being pressed on. The terminals are directly on the heads, thus avoiding loose leads. These coils are interchangeable in any location, as only one type is used. The wood parts are impregnated under vacuum, whereby the moisture is removed and replaced with an insulating medium.

Improvements have been made in the jigs and fixtures in order that the parts may be accurately interchangeable. A change has been made in the directional relay which selects the setting or clearing magnet according to the direction of the car under the contactor. This is now series-wound instead of shunt-connected, so that the wire of the winding is enlarged thirteen sizes. By the combination of residual magnetism and a prolonged front contact the armature is released slowly, and the trolley wheel may bounce under the contactor without causing any wrong signal indications. The trolley contactor, which was especially designed to meet high-speed requirements and is without moving parts, is manufactured with contact strips which remain in proper alignment despite their great flexibility.

A new suspension bracket has been designed so that the signal box may be conveniently and uniformly suspended from the pole on either the right or left-hand side. It is a ribbed iron casting, secured to the pole in gains by two through bolts, the signal box itself hanging to the bracket by means of lugs. An adjusting screw on the bracket permits the signal box to be hung vertically if the pole is raked. The entire signal box can be removed from the bracket in the simplest manner by block and tackle through an eye bolt. Thus work may be done on the signal box either in place or when it is lowered to the ground.

EXHIBITS AT CONVENTION OF AMERICAN RAILWAY ENGINEERING ASSOCIATION

The thirteenth annual convention of the American Railway Engineering Association and the spring meeting of the Railway Signal Association will be held in Chicago, Ill., March 18 to 23, 1912. Preparations are now being made for the annual exhibition of appliances used in the construction and maintenance of steam and electric railways, which will be given at the same time by the National Railway Appliances Association at the Coliseum and First Regiment Armory in Chicago. The arrangement of the main floor space in the Coliseum will be practically the same as last year, but the balconies will not be used. In order to provide for the increased demand for space, the First Regiment Armory, adjoining the Coliseum, has been leased, and will give an additional 16,000 sq. ft. of floor space. The price of the floor space will be 45 cents per square foot. The additional charge of 5 cents per square foot over last year has been made because of the necessity of buying fixtures this year, instead of renting them as heretofore. The first allotment of space will be made on or about Nov. 1, 1911, by the executive committee of the association. All applications for space should be made to the secretary, Bruce V. Crandall, 1400 Ellsworth Building, 537 South Dearborn Street, Chicago, Ill., before that date.

COMBINATION PASSENGER CAR FOR WALLA WALLA, WASH.

The Walla Walla (Wash.) Railway has lately received from the Danville Car Company the combination passenger and smoking car of the straight-side design shown in the accompanying illustration. This car is 46 ft. long over the outside vestibule sheathing, 36 ft. long over the end panels at the sill and 8 ft. 9¼ in. wide over the post above the belt rail. The platforms are 5 ft. long with an opening and step on both sides. The step openings are inclosed with Brill automatic doors with inside lock, while the car body proper has mutually operating double sliding doors at each end and single sliding doors between the compartments. The smokers' compartment occupies the space of five windows at one end and the passenger compartment the rest of the car, the first seating twenty persons, the latter thirty.

The bottom framing consists of 5 in. x 8 in. side sills cov-



Combination Passenger and Smoking Car for the Walla Walla Valley Railway

ered with ¾-in. x 8-in. plate; 5-in. x 7-in. white oak end sills and 4½-in. x 6¾-in. center cross joists of white oak. The car ends are protected by Brill angle iron bumpers. The body framing includes 3¾-in. corners posts and 3-in. side posts. The roof is strengthened with concealed steel rafters ⅝ in. thick. To deaden sound the floors are double, with intermediate building felt. The inside finish of the car is of quartered oak and the ceiling of three-ply birch veneer painted light green and decorated. Bronze metal trimmings are used throughout. All seats are upholstered in rattan and furnished with corner grab handles. The windows are furnished with green pantasote curtains and Forsythe No. 86 fixtures.

The car body is mounted on two Brill 27-E-1 trucks with 6-ft. 4-in. wheel base and equipped with 34-in. diameter Midvale rolled-steel wheels and 5-in. axles. Other equipment furnished includes Westinghouse straight-air brakes with graduated release and piped for air signals; G.E. luminous arc headlight; Peter Smith B-2 hot-water heater; Tomlinson M. C. B. radial couplers and "Dumpit" sand-boxes. Eventually the car will carry electrical equipment consisting of four G.E.-57 motors with K-14 control, but at present it will be used as a trailer.

GASOLINE-ELECTRIC CARS IN EUROPE

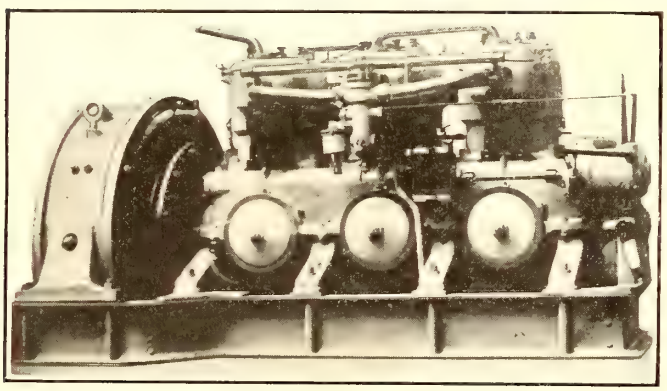
During the last five years the British Westinghouse Electric & Manufacturing Company has developed an interesting type of gasoline-electric motor car. Thirty-eight of these cars are now in service on railways and tramways in Great Britain and Europe. The cars are made in several sizes and have a cab about 7 ft. long at one end in which the engine and generator set is mounted. They are mounted on a four-wheel truck under the engine end and a single axle at the rear end. One motor is mounted on the four-wheel truck and another on the single axle.

The engine is of the four-cycle type and will operate on



Arad-Csanad Gaso-Electric Motor Car

gasoline or a mixture of gasoline and alcohol. It is made in two sizes, 60 hp with four cylinders and 90 hp with six cylinders. The cylinders of both sizes of engines are 5½-in. bore by 6¼-in. stroke and the speed is 950 r.p.m. The torque and speed characteristics are specially designed to meet the conditions of railway service. The carburetor is of the spray type and gives automatic regulation of the jet according to variations of the load. It permits the engine to be throttled down to a speed of 200 r.p.m. at no load. The governor controls the quality of the mixture by regulating the admission of air to the carburetor in such a way as to maintain the same relative proportion of air and gas admitted to the engine cylinders irrespective of the engine



Engine and Generator for Gasoline Motor Car

speed. Magneto high-tension ignition is employed. The engine is started by hand by means of a geared crank, and when starting a special cam acting on the exhaust valves reduces the compression in the cylinders. Pressure lubrication is employed for all of the principal bearings.

The generator is a shunt-wound machine with interpoles and is direct-connected to the engine by a Zodel-type flexible coupling. Special care has been given to the insulation and the windings are of liberal size to insure low temperatures. The complete generating set is mounted on a bed formed by a channel bent to shape.

The motors on the axles are of the standard Westinghouse traction type. They drive the axles through single-reduction gears. The controller does not change the motor connections nor vary the external resistance of the motor circuit, but instead varies the excitation, and hence the voltage of the generator, and also controls the speed of the engine. For double-end operation a controller may be mounted in a cab at the end of the car opposite to the engine compartment.

The Arad-Csanad Railway in Hungary, which operates 290 miles of line serving a thinly populated territory, began operating motor cars in 1903. [illegible]w has among other motor cars fourteen 40-hp cars, [illegible] car and one 60-hp car, all of Westinghouse ma[illegible]ure. These cars run singly and also haul light trail cars in trains. They make about 25,000 miles each annually and the cost per train mile is 16.5 cents, divided as follows: Wages 3.3 cents, fuel 3.3 cents, lubrication 0.5 cents, repairs 5.7 cents, other charges, including taxes, 3.7 cents. The steam trains, which these motor cars have supplanted for the most part, cost 32 cents per mile to operate.

SOUVENIR ALBUM OF THE BERLIN STREET RAILWAY SYSTEM

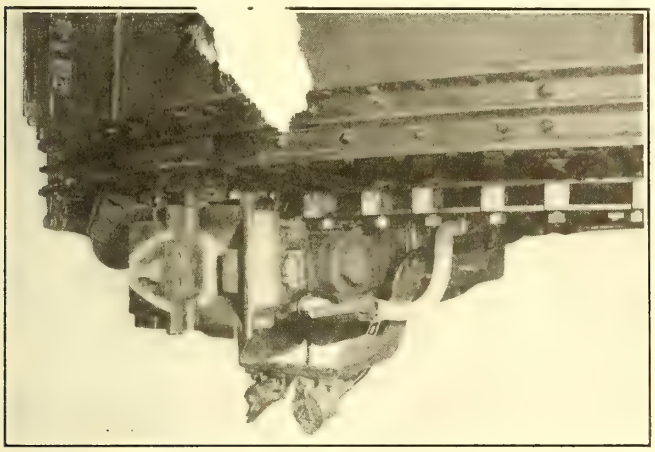
The Grosse Berliner Strassenbahn has published in honor of the September meeting of the German Street & Interurban Railway Association a souvenir album which describes the Berlin street railway system somewhat along the lines followed in the Electric Railway Journal's convention issue in its description of the Public Service Railway system.

The book, which is bound in cloth, consists of 246 pages printed on heavy coated paper and contains several hundred illustrations in the text besides thirteen half-tone inserts and five traffic maps. The opening chapters describe the development of the company and its subsidiary lines from the original horse car company of 1871. This is followed by a review of the franchise situation, a financial statement and a description of the organization. In all the company employs 10,677 persons, for whom a fortnightly paper is published to give changes in personnel and operating rules, employees' organization notices, etc. The chapter on welfare work contains curves which show that the company has always given its men twice, and even three times, as much as was required by the laws covering sick and death benefit pensions and kindred matters. The chapters immediately following describe the methods of training transportation men, the arrangement of runs, conductors' trip reports and the handling of fare tickets and transfers. The chapter on accidents contains charts which show by months the proportion of accidents due to collisions with different classes of vehicles and also a chart which shows the proportion of accidents according to the time of day. An extended account is presented of the traffic conditions in the city, including many forms, traffic curves and a complete tabulation of every route in the city.

The methods of traffic analysis used by this company were described in the Electric Railway Journal of Feb. 5, 1910. The acompanying chart shows the growth of the system from 1891 to 1910 inclusive, giving the number of passengers per car-km, income per passenger, number of car-km, earnings per car-km, gross earnings, operating expenses, also the comparative increase of population and traffic. The chapter on rolling stock reviews the history of the various types of cars, giving their principal construction features. The rest of the book contains in order chapters on shop facilities; energy consumption and reduction of same through the use of time meters on cars; line construction, including the use of auxiliary wires at ears to prevent broken wires from falling to the street; track construction, including the use of reinforced concrete plates instead of ties.

AUTOMATIC CAR AND AIR COUPLERS FOR INTER-BOROUGH SUBWAY CARS

The lengthening of the express trains operated in the New York subway from eight cars to ten cars introduced many new problems in such details as signal arrangements, operation of car doors, train signals, braking apparatus and train connections. With longer trains it was necessary to provide improved brake apparatus of the electro-pneumatic



Coupler Applied to Subway Car

type which would insure instantaneous application of the brakes on all cars in a train in order to prevent destructive surging due to slow application on the rear cars. Closely related to the problem of effective braking was the design of suitable couplings between the cars. In such long trains, composed of alternate motor and trailer cars, even slight inequalities in the rates of acceleration and retardation tend to produce violent and uncomfortable jerks unless the couplers and draft attachments are designed to eliminate all slack. At the same time they must allow for both vertical and horizontal deflection from the center line when the cars pass over breaks in grade or around short-radius curves.

When the change was made to ten-car trains, the Westinghouse Traction Brake Company was prepared to furnish not only the improved electro-pneumatic brake apparatus but suitable couplers of the tight-lock type as well. The necessity for a coupler of this type had been foreseen in advance of the actual need for it, and several years ago George Westinghouse had designed such a coupler which embodied also means for connecting the airbrake train pipes. The practicability of the device had been demonstrated by a number of these couplers of smaller size operating in regular service on suburban cars, and it was only necessary to change the details of the design so as to make the new couplers heavy enough to withstand the stresses to which they would be subjected in subway service. The protection afforded by this coupler to yardmen when making up trains is at once apparent. The time required in making up trains is also much reduced, and there is a large saving due to the practical elimination of wear and tear on hose and gaskets, which materially reduces the loss of air by leakage.

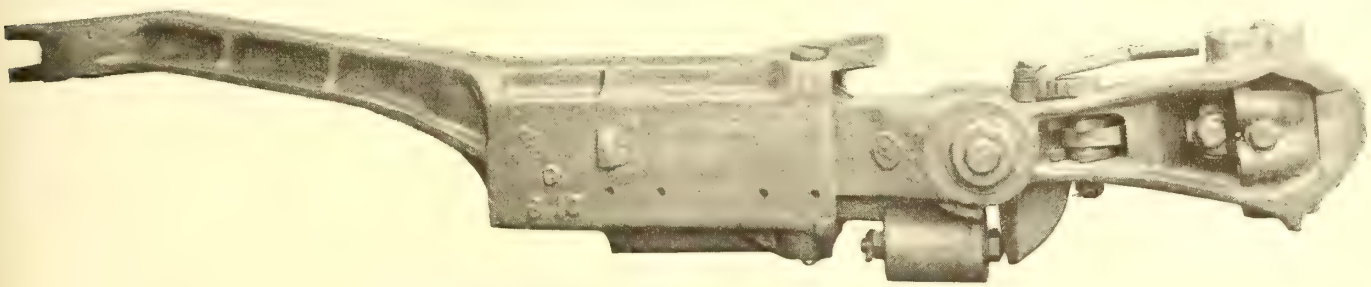
The accompanying engravings illustrate the subway coupler and draft attachment. The coupler consists of a cast-steel head with a centering projection having a hook formation above and below the projection and a recessed face to engage with the corresponding head of another coupler. The head is pivoted for vertical movement by a pin of large diameter on the end of a heavy cast-steel drawbar, and on the under side there is a lug which engages with a spring plunger incased in a housing cast on the bottom of the drawbar. This spring holds the coupler head up in a horizontal position, but permits some deflection in a vertical plane.

The hook faces of the coupler head are at an angle of about 30 deg. with the butting faces, and the width is such that two couplers will engage and move into position for coupling when their center lines are as much as 7 in. apart. The couplers will likewise gather when the difference in height does not exceed 3 in. In the recessed face opposite the hooks is a pivoted latch, which is forced outward or toward the face by a spring under control of the uncoupling handle. This latch engages with the outside face of the centering projection or guard arm of the connecting coupler. When the latch on both couplers in engagement is forced out, the two couplers cannot be parted, as the guard arms must slide out to one side in order to disengage.

The locking latch is operated by a handle and sector gear engaging with a gear on top of a vertical cam shaft which passes through the shank of the coupler head just in front of the pivot pin. This cam shaft is connected by a rod and crank arm to the locking latch in the coupler head. When two couplers of this type engage and the locking latches are thrown in, the faces of the couplers are tight against each other and there is no possibility of their chafing against each other with the ultimate result of producing wear and lost motion.

The train line air connections are made by two ports in the face of each coupler which are fitted with rubber gaskets. As the faces in which the ports are located do not slide over each other in coupling or uncoupling, the gaskets are not subjected to wear and no difficulty is experienced in keeping the connections air-tight. The air hose is attached by nipples and cut-out cocks to outlets on the side of the coupler head, and only short lengths of hose are required to permit free movement of the drawbar and coupler head without danger of kinking the hose.

The draft attachments for these couplers were furnished by Forsyth Brothers Company. They consist of a one-piece cast steel radial draft beam and spring housing and a series of leaf springs with follower plates at each end which are inclosed within a yoke formed on the end of the drawbar. These springs supply the friction principle so desirable in a high capacity gear. The draft beam is pivoted under the car center sills near the bolster and is supported at the outer end by a lip cast on the draft spring housing which slides on a radial carry iron. The draft spring consists of thirty-six flat leaves divided into two groups of ten leaves and two groups of eight leaves. Each group of leaves is separated by concave or convex follower



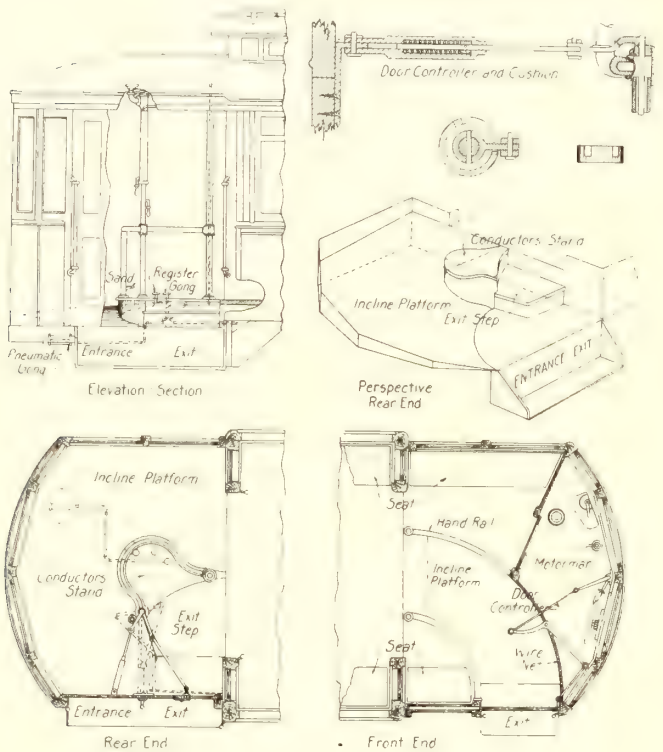
Side View of Subway Coupler and Draft Attachments

plates. When either of the end follower plates is moved by the drawbar, the flat springs are bent to conform to the curve of the end and intermediate follower plates. The movement of the leaves over each other is accompanied by high frictional resistance in addition to the force required to deflect the leaves, thus giving high buffing capacity with low recoil.

RAMP FOR CAR PLATFORMS

The accompanying engraving shows a ramp for the rear platform of cars which has recently been designed by Charles C. Crewson, shop foreman, Metropolitan Street Railway, Kansas City, Mo. A plan and side view of one of twenty-five cars built with a similar ramp for the Metropolitan Street Railway, Kansas City, was illustrated on page 665 of the issue of this paper for Oct. 7.

The arrangement shown is for single-end cars. As will be noted the rear platform instead of being flat is inclined, so that there is a rise, in the case of the Kansas City cars, of 12 in. between the top of the entrance step and the car door. The floor of the car has another rise of 1½ in. between the car door and the rear body bolster. Some of the claims put forward by Mr. Crewson for this design of car are as follows:



Details of Platform and Ramp

It makes possible a reduction in the height of the steps from the street without reducing the height of the floor of the car or the size of the car wheel.

It increases the speed at which passengers enter the car and reduces the number of platform accidents.

Conductors are better able to perform their duties when standing at the same elevation as the floor of the car, as they can more easily see passengers entering, leaving or approaching, and can be heard by passengers in the car.

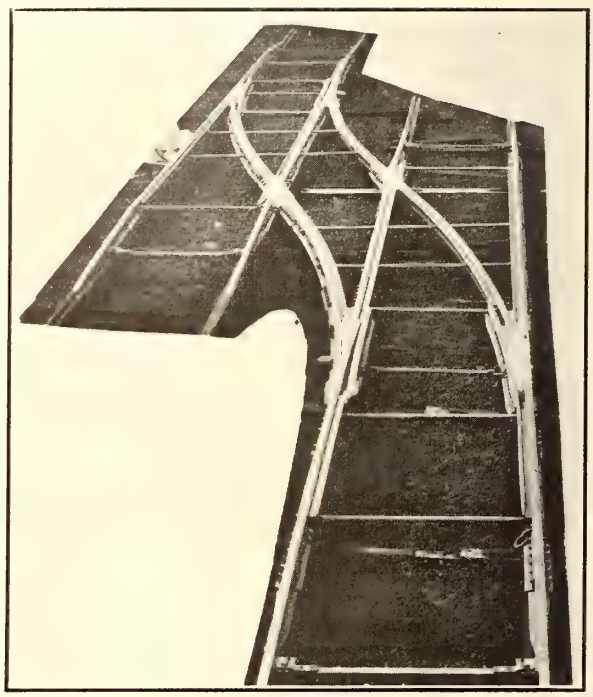
As the front vestibule has an inclined exit-way, and as the front vestibule floor is on the same level as the car floor, there is greater seating capacity, and the motorman has a better view of passengers leaving the car.

In the Kansas City cars the motorman is inclosed by a wire netting so that there is a free circulation of air, and it is expected that there will be a more even temperature in winter. Patents have been allowed the inventor for this arrangement.

SUBSTANTIAL PORTABLE CROSSOVER

The Cleveland Frog & Crossing Company, Cleveland, Ohio, is now making a portable crossover invented by John Kerwin, superintendent of tracks Detroit United Railways. This crossover, of which a specimen was exhibited at the recent convention at Atlantic City, is remarkable not only for its permanent construction, but also for several other features not found in the ordinary style of crossover. It is built of 80-lb. A. S. C. E. rail with the regulation angle bar joints. The frogs are of the maker's "Hard Service" manganese type as used on many steam and electric railroads and the tongues and mates are of the regulation "hard center" manganese construction. The crossover exhibited was 100 ft. long from tip to tip and weighed about 20,000 lb. The base of the crossover was 2-in. above the track or lower rails, which gave a total rise of 7 in.

One of the interesting features is the application of "dutchmen," namely, rail inserts of various lengths to accommodate variations in widths of the devil strip. Another feature is that the crossover rails are provided with shoes which have a lip on one side to engage the flanged side of the track rails. These shoes serve two purposes: They prevent the crossover from getting off the track,



Portable Crossover

and they also permit it to slide along the rails through the medium of end rings and chains which can be attached to any motor car. The rails of the crossover are kept to gage by transverse struts, each consisting of a pipe which serves as a spreader and an inner rod which is used as a binder. One threaded rod is also provided at each end of the crossover to make adjustment for minor variations in gage so that the shoes will fit the track rails perfectly. The accompanying view was taken before the original form of end adjusting rods was replaced by the threaded design. A plan view and detailed drawings of the first Kerwin crossover were published on page 585 of the Electric Railway Journal for April 1, 1911. At that time also figures were given to show the saving in expense effected in Detroit by its use. It has also been found more convenient than the type formerly used.

The substantial construction of this crossover makes it unnecessary to have watchmen or to spike it to the pavement. Furthermore, its permanent character enables it to be used as regular track whenever desired merely by removing the points.

LONDON LETTER

(From Our Regular Correspondent.)

The directors of the North-Eastern Railway are considering the use of electricity to operate freight trains on Tyneside. Although the company has been operating its passenger traffic over the Tyneside suburban area by electricity since 1904, the goods and mineral traffic has been handled by steam. The present proposal is to use electricity for freight traffic and to shunt goods and minerals in the marshaling yards at Heaton Junction and other traffic centers in the electrified area. Vincent L. Raven, the company's chief mechanical engineer, and Charles H. Merz, the company's consulting electrical engineer, are in America inspecting the electrical locomotives in use there for hauling and shunting purposes.

Lord Ormidale gave judgment recently in the Court of Session at Edinburgh in the action brought by the Municipal Council of Johannesburg against D. Stewart & Company, Ltd., Glasgow, and William Beardmore, for breach of contract in the installation of the machinery in the power station at Johannesburg, intended to operate on the electric tramways of the city. It was decided that gas engines supplied with producer gas should be installed in the station. Such engines had not been made in Great Britain up to that time, but Stewart & Company, Ltd., undertook to build them on the Oechelhauser system. It was found after the engines were installed that they got clogged up and would not work on account of the inability to purify the gas. Attempts were made to correct the defects in the plant, but eventually Stewart & Company, Ltd., abandoned the contract. The decision of the court awards the Johannesburg Corporation the sum of about £350,000.

The British Electrical & Allied Manufacturers' Association took advantage of the recent electrical exhibition to hold its inaugural dinner at the Hotel Cecil, London. At this dinner, Mr. Ferranti, president of the Institution of Electrical Engineers, occupied the chair. In proposing the toast "The Association," he pointed out that it was just as vital to the buyer that the manufacturer should be prosperous as it was to the manufacturer himself. There was too much competition in England. While competition was excellent what was really wanted was competition in excellence. Mr. Nalder, chairman of the council, in responding, said that the aim of the association was to temper competition by conference. If all the manufacturers would work together the association might accomplish a great deal. Bruce Anderson, member of council, proposed the toast "The Industry." He devoted most of his speech to a protest against giving electrical work to the foreigner.

At the conclusion of the meeting of the Municipal Tramways Association in Glasgow, referred to in last month's letter, H. E. Blain, general manager of the West Ham Corporation Tramways, was elected president of the association for the ensuing year. In returning thanks, Mr. Blain invited the members to hold the next conference at West Ham. A. R. Fearnley resigned as secretary of the association and was appointed one of the vice-presidents. C. J. Spencer, general manager of the Bradford Tramways, was appointed secretary and treasurer to succeed Mr. Fearnley.

The Lord Mayor of London recently laid the foundation stone of the new electric power station of the Egham & Staines Electricity Supply Company. This station is the first for public service in England to be designed for the exclusive use of Diesel engines.

The London General Omnibus Company has announced that at the end of November the last of its horse omnibuses will be withdrawn from the London streets and that thereafter the entire service will be motor driven. This marks another epoch in the history of transportation in London. After Dec. 1, 1911, only a few horse omnibuses will be left to carry on a hopeless competition against the motor 'bus. The London General Omnibus Company has established a factory in which it is building new motor 'buses at the rate of fifteen to twenty a week and at a cost of about £350, or one-half what the company paid when it purchased vehicles in the open market.

At a recent meeting of the Town Council of Norwich it was stated by the Lord Mayor that the Council had decided not to purchase the property of the Norwich Electric Tramways.

Negotiations have been completed between the City Corporation and the London County Council in regard to the construction of the tramways across the new St. Paul's Bridge. The bridge has been authorized by Parliament, but the County Council's tramway scheme will have to be formulated into a bill and be approved by Parliament. The suggested tramway will extend from Southwark Street across the new bridge and dip under St. Paul's Churchyard, where there will be an underground station in the vicinity of the old general post office. The new line will not connect with the Southern and Northern systems, as it will go no further north than Cheapside. The whole scheme, however, is a matter of the future, as the renovating of the old Southwark Bridge will have to be completed before the construction of the new St. Paul's Bridge is commenced. This work of renovation will be commenced in the spring, and will probably take two or three years to complete. It will therefore probably be ten years before St. Paul's Bridge is opened, but it is necessary to decide in regard to the tramways as they will have an important bearing upon the design of the bridge.

Up to the present no London County Council tramway has been allowed to cross the boundary of the city proper, but an interesting decision has been rendered by which the tramway at Norton Folgate is to be extended from its present terminus about a quarter of a mile, which will bring it well within the city boundary into Bishopsgate Street, close to the important terminus of the Great Eastern Railway at Liverpool Street. This concession will be of convenience to thousands of passengers. It will bring the trams into the heart of the city and link them with this important railway and with the new terminus of the Central London tube and the Metropolitan system at Bishopsgate. Bishopsgate Street is being widened, and in a few years tram lines will be continued to Cornhill.

A special meeting of the stockholders of the British Electric Traction Company, Ltd., was held in London on Oct. 17, 1911, to consider a resolution in regard to a scheme for the reorganization of the capital of the company. Emile Garcke, chairman, said that the directors felt that something ought to be done to adjust the altered relations between the two classes of shareholders which had been produced by the profits not being sufficient to pay the full preferred dividend. In a memorandum which he had issued he had explained the condition in regard to the profits and had given the reason why they were small in comparison with the paid-up capital. He emphasized the point that in this respect the stockholders of the British Electric Traction Company were perhaps better off than stockholders in other electrical undertakings of the same class. The British Electric Traction Company consisted of fifty-seven companies, with an aggregate capital of more than £12,000,000. Last year the associated companies collectively showed an increase in net profits of more than £100,000, and he hoped they would do still better this year. The question of what proportion of the annual profits should be set aside for reserves could be better discussed after the plan under consideration had been adopted. The board had been advised by counsel that a loss on capital account was not necessarily a loss which had to be made good out of revenue. There was no loss on the revenue account of the company and there was no reason why all division of profits should be stopped because the assets had depreciated in value. With regard to the amendment proposing the appointment of a committee of inquiry he said that the directors would welcome such a committee. The first consideration of the committee, however, must be the interests of the shareholders. The proxies which had been lodged indicated that the directors enjoyed the full confidence of the shareholders, and he understood that in view of the support which the directors had received the amendment for the appointment of a committee would not be moved. He then presented a resolution approving the scheme for the subdivision and rearrangement of the capital subject to such modification as might be made and approved at the requisite extraordinary meetings of shareholders. The resolution to adjourn the meeting to Nov. 3, 1911, was carried.

A. C. S.

News of Electric Railways

Paul Shoup on the Arnold (Los Angeles) Report

Paul Shoup, vice-president of the Pacific Electric Railway, Los Angeles, Cal., was quoted in the Los Angeles *Examiner* of Oct. 27, 1911, as declining to make any formal statement in regard to the partial report by Bion J. Arnold on transit conditions in Los Angeles which was abstracted in the Electric Railway Journal of Oct. 21, 1911, page 907. Mr. Shoup did, however, discuss transit conditions in general in Los Angeles, referring incidentally to the Arnold report, and is quoted in part as follows:

"As soon as the people will permit the company to do so under an equitable arrangement, the Pacific Electric Railway will give Los Angeles the best interurban traffic and terminal system, but the company cannot invest the millions of dollars which will be required until the people have granted us rights under liberal enough terms to warrant the investment.

"The Arnold report shows a clear conception of the situation. It has evidently been prepared with much study and reflects credit upon Mr. Arnold and his associates. I understand this to be only a preliminary study, a foundation on which to build, and that the details are to be worked out as each problem comes up for practical solution. While we may not agree with all the conclusions reached in the report, any objections we have had best await the practical working out of each problem. Certainly the report has such evidence of fair intention as to make it possible for us to approach its discussion with friendly feeling.

"As for the transfer system recommended by Mr. Arnold, I need more light. Under what restriction? Under what limitations as to 5-cent fare radius? This question anyway has to be answered, when answered at all, by the Los Angeles Railway Corporation and the Pacific Electric Railway jointly. The Pacific Electric Railway is essentially an interurban system giving service similar to the steam railroads, and it may be reasonably expected that its present 1,000 miles of track will be very largely increased; and its terminals and tenure of its terminals must correspond to this outside construction. As concerns the construction of other terminals in the city sometime in the future, to be occupied by the Pacific Electric Railway as a tenant, as suggested by Mr. Arnold, it would not be possible to discuss that subject now and reach any conclusion—it is a question to which the answer lies in the future."

Plans for the Cleveland & Youngstown Railroad

The Cleveland & Youngstown Railroad filed an application with the City Council of Cleveland, Ohio, on Oct. 23, 1911, for a franchise to build a four-track railway along Kingsbury run. Because the company's charter will allow it to operate a steam railroad, the local newspapers assumed that the plan for a large terminal at Ontario and Prospect Streets proposed a union station which would be used by all the steam and electric railways entering Cleveland. This is merely a possibility, according to a statement made by Warren Bicknell, who is in charge of the plans. The terminal will be for the use of interurban roads primarily. The Cleveland & Youngstown Railroad will be used to afford an entrance into the city to the proposed terminal.

The Cleveland & Youngstown Railroad was incorporated about a year ago. The following officers, all members of a firm of attorneys at Youngstown, constitute the temporary organization: President, James H. Wilson; vice-president, John T. Harrington; treasurer, Judge U. C. DeFord. The firm of Arrel, Wilson, Harrington & DeFord is perfecting the organization of the company with the intention of completing a railroad between Cleveland and Youngstown. It has been intimated that steam will be used as motive power outside of Cleveland.

In order to secure the right to cross certain streets, which in reality are not streets except as they appear upon the maps, the company has agreed to deed to the city about forty acres of land suitable for park purposes. An appropriation had already been made by the City Council to purchase some of this land, but the money may also be used for improvement purposes. If the city accepts the offer of the company the streets will be vacated and the company will thus be enabled to operate rapid-transit cars without hindrance.

An interesting feature of the plan is a tunnel for a four-track system, from East Twenty-fifth Street, near the Nickel Plate depot, to Canal road on the boundary of the terminal property, a distance of 5500 ft.

It is said that more than $1,000,000 has been invested recently in land for the proposed terminal station. The total investment for construction is estimated at about $25,000,000. As stated previously in the Electric Railway Journal, the new line will give an entrance to the city to the interurban railways from the east and south and will reduce their running time within the city limits from thirty-six minutes to eighteen minutes.

After leaving the Cleveland city limits the proposed line will pass through Shaker Heights district to Chagrin Falls Garrettsville, Leavittsburg, Warren, Niles and Girard.

The Question of Six Tickets for a Quarter in Wilmington

The Wilmington & Philadelphia Traction Company recently filed a bill in equity with the United States Circuit Court in Wilmington, Del., to restrain the Public Utility Commission of Delaware from enforcing an order directing the company to restore the sale of tickets at the rate of six for 25 cents. The company has now filed with the court in support of its bill affidavits made by John A. Rigg, president of the Interstate Railways; Oscar T. Crosby, president of the Wilmington & Philadelphia Traction Company, and Henry P. Scott, a director of the company. Mr. Crosby declares that the company was deprived of proving its charter rights and contends that the order of the Public Utility Commission in directing that the sale of strip tickets should be restored was illegal. He gives the financial condition resulting from the operation of the leased railways in Wilmington and vicinity for the year ended July 1, 1911, as follows: Gross receipts, $553,644.67; amounts expended, $487,197.71; remaining for depreciation and interest charges and surplus and special charge, $66,445.96; pro rata of discount on reissue of $600,000 of Wilmington City Railway bonds upon new mortgage, $10,286; balance, $56,159.96; interest on outstanding mortgages, $24,000; interest on $400,000 outstanding mortgage bonds of the Wilmington & Edge Moor Railway, $20,000; balance, $12,159; rentals, $113,088.49; deficiency supplied by new capital, $100,928.53. Mr. Crosby says that the withdrawal of the sale of six tickets for a quarter will result in an increase in the gross revenue of the company in Wilmington from $25,000 to $50,000 per annum.

Mr. Scott avers that since its organization the company has expended out of its capital about $200,000 in improvements to the local property and that of the Southern Pennsylvania Company; that the Wilmington & Philadelphia Traction Company has borrowed $100,000 to purchase new rolling stock, and that it must expend further sums to make the property efficient. He speaks of the paving which the company has done and that which it is to do, and says that during the year ended July 1, 1911, such paving and repaving amounted to upward of $24,000; that for grading and paving next year the amount will likely be $100,000. Mr. Scott states that there should be taken into account the annual depreciation of trackage, overhead work, rolling stock, etc., and continues:

"The power to borrow money has a limit which is eventually reached and is being nearly approached at present by the railway companies complainant in the bill of complaint. The experiment conducted for ten years of selling six tickets for a quarter in connection with straight fares has been ineffective adequately to increase patronage by the public of Wilmington."

Mr. Scott states that the plan to abolish strip tickets was contemplated by the old company, but at the request of persons organizing the Wilmington & Philadelphia Trac-

tion Company, the order was withheld so as to give a further trial of the sale of strip tickets under conditions of improved service. At the end of one year it was found that a larger income was necessary and the tickets were abolished.

The affidavit of Mr. Rigg takes up the cases of the old companies with respect to interest charges, etc., under the terms of the lease.

Air Brake Order in New York

The order of the Public Service Commission of the First District of New York in regard to the use of power brakes on the surface cars of the street railways under its jurisdiction, to which reference was made in the ELECTRIC RAILWAY JOURNAL of Oct. 28, 1911, page 960, follows:

"ORDERED (1) That after June 1, 1912, all passenger double truck surface cars in service weighing over 27,000 lb. shall be equipped with power brakes and geared hand brakes;

(2) That after June 1, 1913, all passenger double truck surface cars in service weighing over 25,100 lb. shall be equipped with power brakes and geared hand brakes;

(3) That after June 1, 1912, all other passenger double truck surface cars in service weighing 25,100 lb. or less, shall be equipped with geared hand brakes; and

"(4) That after June 1, 1912, all surface cars in service, other than passenger cars, shall be equipped with power brakes and geared hand brakes; and it is further

"ORDERED, that this order shall take effect forthwith and shall remain in force until revoked or modified; and it is further

"ORDERED, that within five days after the service of a copy of this order upon them, said corporations and said receivers notify the commission whether this order is accepted and will be obeyed."

Reasons Why Portland Railway, Light & Power Desires Additional Franchises

B. S. Josselyn, president of the Portland Railway, Light & Power Company, Portland, Ore., has issued the following statement in regard to the company's application for additional trackage, the ordinance to authorize which the city attorney is seeking to load with many onerous conditions, among them the right to fix fares and a common user clause:

"Our application to the City Council for additional trackage is solely to improve the street car service. Rose City Park people desire to get into the downtown district and out of it on shorter schedules. It takes forty minutes to make the trip now. By forming a loop at Stark Street and double-tracking we can cut this time down. In each case the extensions mean additional value to property. In no case will it add to the revenue of the company, except as the city and country grow. In the meantime these extensions will be a burden to maintain. For these accommodations to the people the city attorney suggests that we give valuable consideration, such as paying for paving upon streets not occupied. This question is in the Circuit Court and when it is decided will determine the whole matter as to our rights. The attempt to force us into paying for something which we do not use, before the final adjudication of the matter, is hardly fair and would indicate a fear as to the outcome of the case in the courts on the part of the city attorney. He further provides that we shall donate to the city any realty property that we may own for street purposes. In other words, any private owner receives from the city the value of his property taken for street purposes, while we are requested to donate it. That would appear to be confiscating property.

"We are anxious to give the people of Portland the very best of service. Outlying districts can only maintain their values in realty and in their homes by having good service. If it is the City Council's desire that we give the people the present service, which is inadequate in point of schedules in many cases, we shall be content, for we can continue in our present way. The franchise under which we are operating continues for twenty-one years. The vital thing which a growing city like Portland needs is service—quick service and good service. The application for an additional franchise was made at the urgent request of the citizens in the various districts involved. We desire to accommodate them."

San Francisco's Municipal Railroad

Commissioner of Public Works Laumeister, of San Francisco, not being satisfied with the progress being made in equipping the Geary Street, Park & Ocean Railroad with electricity for operation by the city, has taken over the task of supervising the work on the line and has announced that hereafter he will be responsible for the work. In an interview in the San Francisco *Chronicle* Mr. Laumeister is quoted as follows:

"I have taken all the drawings and incomplete specification work away from the city engineer, and from now on if there is any delay in the construction of the road I will be responsible.

"I have encountered nothing but delay since I took this office. In the first place, I found that no one would bid on the specifications for redwood ties. I went to the dealers and discovered that the specifications had been drawn in such a manner that no business man would bid on them. When the specifications were rewritten so that they could be understood there was no difficulty in getting satisfactory bids. The same thing happened when we tried to get bids for poles.

"Patrick Broderick, superintendent of construction of the Geary Street, Park & Ocean Railroad, knows how long it will take to tear up the old tracks, and when we have accepted a bid on the cars we may be able to tell when they will be delivered. The present cable cars will be allowed to run up to a day which will allow sufficient time to complete the new track by the time the cars are delivered. The specifications for the power house have not been completed, but we will be able to buy power until we can manufacture it."

It was at first proposed to equip the line with all-steel cars, but home interests protested against this on the ground that a type of car should be adopted which could be constructed in San Francisco. Up to Oct. 21, 1911, the question of the type of car was still in abeyance, but it is hoped to open bids for the cars on Nov. 15, 1911.

Detroit Settlement Plan Presented to Council

The plan of settlement with the Detroit (Mich.) United Railway advocated by Mayor Thompson was formally presented to the Detroit City Council on the evening of Oct. 24, 1911. It was partially read and then referred to the committee on franchises. The same evening this committee reported in favor of directing Corporation Counsel Hally to draft an ordinance embracing the features of the agreement arrived at betwen Mayor Thompson and the company. Mr. Hally has been at work on this ordinance for several days and the action was taken to ratify informal proceedings which had been taken at a previous session. John McVickar has been employed by the city to inspect the paving between the tracks and the foundations under them on the five lines in which the city is interested and to estimate the expense of putting them in the best condition and maintaining them in that condition.

Onerous Franchise Conditions in Middletown, Ohio.—W. Kesley Schoepf, president of the Ohio Electric Railway, has written the City Council of Middletown, Ohio, that the franchises submitted to him by that body for a local street railway system are so different from those suggested by the company that it is useless to go into the matter further, adding that any attempt to establish lines in Middletown on the basis suggested in the franchise would be disastrous to the town and to those who undertook to carry out the enterprise.

Pittsburgh Subway Ordinance.—The subway ordinance was before the public service and surveys committee of the Council of Pittsburgh, Pa., for consideration on Oct. 26, 1911. A. O. Fording appeared on behalf of the Pittsburgh Subway Company and presented a bond for $100,000 binding that company to meet the terms of the general subway

ordinance as now drawn. J. D. Callery, president of the Pittsburgh Railways, was out of town and representatives of that company and the Rapid Transit Subway Company asked a continuance for two weeks. A motion to this effect was carried, but it requires the companies in the meantime to submit their proposal to the City Council in writing.

Decision in Des Moines Arbitration Case.—A decision was reached Oct. 28, 1911, in the arbitration case between the Des Moines (Ia.) City Railway and its employees. A history of the case briefly is as follows: Conductor Hiatt was discharged July 23, 1911, for failure to ring up fares. This led to a strike on Aug. 4 which was stopped by an injunction issued on Aug. 5 and Hiatt was temporarily reinstated. On Sept. 1 and 3 Motorman Roberts was discharged for smoking while on duty, Hiatt was again discharged for alleged shortage and a second conductor, Bruce, was also discharged for the same offense. The company agreed to arbitrate these cases, but a strike was ordered and was later declared off. The decision of the three arbitrators justifies the company in its discharge of Roberts and Hiatt, but states that the evidence in the case of Bruce did not sufficiently support the charge against him. The decision has been accepted by both sides and the company has agreed to reinstate Bruce.

Philadelphia & Suburban Railroad's Plans Outlined.—S. S. Neff, president of the Philadelphia & Suburban Railroad, has appealed to the comprehensive plans committee of Philadelphia for aid in securing a franchise for the construction of a subway in North Broad Street to Lehigh Avenue, Philadelphia, with elevated connections in the latter thoroughfare to Thirty-fourth Street and Strawberry Mansion and to Front Street and by way of Kensington Avenue to Frankford. A third elevated structure, also connecting with the proposed subway, is planned to Wayne Junction. Mr. Neff added two new features to the project as introduced in Councils some time ago. These include a proposed extension of the elevated railroad from Strawberry Mansion to the Convention Hall at the Cliffs, and the leasing by the Philadelphia & Suburban Railroad of the branches of the Pennsylvania Railroad from Wayne Junction to Chestnut Hill and of the Reading Railroad's Frankford branch. Mr. Neff said that the entire system, including a terminal under the north plaza of City Hall, with necessary loops, stations and power plants, could be built for $20,000,000. The plans of the Philadelphia & Suburban Railroad as outlined by Mr. Neff have been referred by the comprehensive plans committee to a sub-committee for report.

Sub-Committees Appointed by National Civic Federation to Consider Utility Regulation.—The executive committee of the department on regulation of interstate and municipal utilities of the National Civic Federation met in New York recently and arranged for an exhaustive investigation of the problems of which this branch of the federation has cognizance. Emerson McMillin, of the American Light & Traction Company, acted as chairman of the meeting, which divided the work to be done among a number of sub-committees, which will have cognizance, respectively, of rates, control of service, control of capitalization, franchises, accounts and reports. A sub-committee was also appointed to draft a model bill. The general question to be studied is: "What is adequate regulation of municipal utilities, railroads, telegraph and telephone companies, both interstate and intrastate?" The organization of this department of the federation follows the investigation into the relative merits of public and private operation of public utilities both in the United States and in Europe made some time ago by a commission of the federation. That commission unanimously declared for adequate regulation by a competent authority, with power to require for all public utilities a uniform system of records and accounts, giving all financial data and all information concerning the quality of service and the cost thereof, and recommended that no stock or bonds for public utilities be issued without the approval of some competent public authority. The first meeting of the committee of the federation on the regulation of railroads and public utilities was held in New York on June 23, 1911, as noted in the Electric Railway Journal of July 1, 1911, page 60.

Financial and Corporate

New York Stock and Money Markets

November 1, 1911.

After slowly regaining some of the ground lost after notice of suit against the Steel Corporation the steel shares to-day led a general advance in prices, in which the common reached a price above that at which it sold shortly before the suit was filed. Quietness continues in the money market. Quotations to-day were: Call, 2⅜@3 per cent; ninety days, 3½@4 per cent.

Other Markets

Prices were higher in Chicago to-day, reflecting the tone of the New York market. Traction issues have been active during the week, but offered no special feature of interest to-day.

Higher prices also prevailed on the Philadelphia exchange in the trading to-day. Transactions in Steel were in large volume, at advanced prices.

Outside buying was in greater evidence in Boston to-day than has been the case for some time. Improvement was made throughout the list, the most noteworthy gains being made in the coppers and the Steel shares.

The Baltimore market also participated in the widespread advance, and prices were much firmer and higher than recently.

Quotations of traction and manufacturing securities as compared with last week follow:

	Oct. 25.	Nov. 2.
American Light & Traction Company (common)	a295	a291
American Light & Traction Company (preferred)	a106	a107
American Railways Company	a43½	a44½
Aurora, Elgin & Chicago Railroad (common)	41¼	a43
Aurora, Elgin & Chicago Railroad (preferred)	a85	a85
Boston Elevated Railway	a127	a126
Boston Suburban Electric Companies (common)	a15	a15
Boston Suburban Electric Companies (preferred)	a75	a75
Boston & Worcester Electric Companies (common)	a12	a12
Boston & Worcester Electric Companies (preferred)	a50½	50
Brooklyn Rapid Transit Company	75	75½
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	84¼	*84¼
Capital Traction Company, Washington	a130	127½
Chicago City Railway	a180	a180
Chicago & Oak Park Elevated Railroad (common)	*3	3
Chicago & Oak Park Elevated Railroad (preferred)	*6	5
Chicago Railways, ptcptg., ctf. 1	a96	a96
Chicago Railways, ptcptg., ctf. 2	a33	a32¼
Chicago Railways, ptcptg., ctf. 3	a12	a11
Chicago Railways, ptcptg., ctf. 4	a7	a7
Cincinnati Street Railway	a132½	132½
Cleveland Railway	a99¾	a100¼
Columbus Railway (common)	83	83
Consolidated Traction of New Jersey	a76	a75½
Consolidated Traction of N. J., 5 per cent bonds	a104	a104½
Dayton Street Railway (common)	a25	a25
Dayton Street Railway (preferred)	a101	a101
Detroit United Railway	a95	a79
General Electric Company	150⅜	150½
Georgia Railway & Electric Company (common)	a161½	a160
Georgia Railway & Electric Company (preferred)	a93	a93
Interborough Metropolitan Company (common)	a14⅞	15
Interborough Metropolitan Company (preferred)	44½	45⅛
Interborough Metropolitan Company (4½s)	79¼	79½
Kansas City Railway & Light Company (common)	16	a16¼
Kansas City Railway & Light Company (preferred)	*44	a44½
Manhattan Railway	a138	a136
Massachusetts Electric Companies (common)	a22	a22¼
Massachusetts Electric Companies (preferred)	a95½	a94
Metropolitan West Side, Chicago (common)	*27	*27
Metropolitan West Side, Chicago (preferred)	*75	*75
Metropolitan Street Railway, New York	*8	8
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	a70	a74
Northern Ohio Light & Traction Company	a57½	*57½
Northwestern Elevated Railroad (common)	*30	*30
Northwestern Elevated Railroad (preferred)	*70	*70
Philadelphia Company, Pittsburgh (common)	51¼	a52¾
Philadelphia Company, Pittsburgh (preferred)	42½	a42¾
Philadelphia Rapid Transit Company	23	a23⅝
Philadelphia Traction Company	83⅞	84½
Public Service Corporation, 5% col. notes (1913)	*94	*94
Public Service Corporation, ctfs.	a104½	a110
Seattle Electric Company (common)	a108	a108
Seattle Electric Company (preferred)	a101	a101
South Side Elevated Railroad (Chicago)	*95⅛	*95⅛
Third Avenue Railroad, New York	9⅜	9½
Toledo Railway & Light Company	a10	10
Twin City Rapid Transit, Minneapolis (common)	a106⅞	a107
Union Traction Company, Philadelphia	51⅞	a51¼
United Ry. & Electric Company (Baltimore)	*18	18
United Rys. Inv. Co. (common)	a31½	34¼
United Rys. Inv. Co. (preferred)	a58½	58
Washington Ry. & Electric Company (common)	a40½	a41⅛
Washington Ry. & Electric Company (preferred)	a90	a91
West End Street Railway, Boston (common)	a88	a87½
West End Street Railway, Boston (preferred)	101	a102
Westinghouse Elec. & Mfg. Co.	a64	64⅞
Westinghouse Elec. & Mfg. Co. (1st pref.)	a120	a120

a Asked. * Last sale.

Georgia Railway & Power Company

The Georgia Railway & Power Company, chartered recently, as noted in the ELECTRIC RAILWAY JOURNAL of Oct. 7, 1911, page 677, has organized and has applied to the Georgia Railroad Commission for authority to issue $30,000,000 of bonds in addition to $27,000,000 of stock. Of this stock $15,000,000 will be common stock, $2,000,000 first preferred stock and $10,000,000 second preferred non-cumulative stock. The hearing on the application for permission to issue the bonds will be held on Nov. 7, 1911. The directors of the company are: President, Charles Magee, Toronto, Canada; vice-president, Alexander C. King, Atlanta; secretary-treasurer, Forrest Adair, Atlanta; George G. Moore, Detroit, Mich., and J. J. Spalding, Atlanta. Mr. Magee was not present at the meeting in the offices of King, Spalding & Underwood, Atlanta, Ga., lawyers, when the company organized, but he was represented by Elliott G. Stephenson, Detroit. Others who attended the meeting were C. Elmer Smith, York, Pa., president of the Georgia Power Company; George H. Moore, Detroit; Alexander C. King, J. J. Spalding, Forrest Adair and E. Marvin Underwood, Atlanta.

The proposed bond issue is to consist of $30,000,000 of 5 per cent sixty-five-year bonds, with the Fidelity Trust Company, Philadelphia, as trustee. It is stated that $10,000,000 of the bonds will be used to take up an equal amount of bonds of the Georgia Power Company, $1,500,000 to retire a similar amount of bonds of the Atlanta Water & Electric Company and $550,000 to redeem a like amount of bonds of the Savannah River Power Company. The rest of the proposed issue will be held in the treasury. It is said that the stock to be issued to the amount of $27,000,000 will take the place of $29,500,000 of other stock as follows: $10,000,000 of stock of the Georgia Power Company, $3,000,000 of stock of the Atlanta Hydroelectric Company, $5,000,000 of stock of the Inter-State Power Company, $10,000,000 of stock of the South Carolina Company and $1,500,000 of stock of the Atlanta Water & Electric Power Company. The new company will lease the property of the Georgia Railway & Electric Company, as explained previously in the ELECTRIC RAILWAY JOURNAL.

The company's plants will be located upon three distinct and separate watersheds—the Savannah and Tallulah River section, the Chattahoochee River and the Etowah River. Construction is well advanced at Tallulah Falls and the plant there is expected to be in operation by July, 1912. Work will be started soon on the electric railway from Stone Mountain to Decatur to connect with the lines of the Georgia Railway & Electric Company operating in Atlanta and the suburbs.

Chicago (Ill.) Railways.—The annual meeting of the stockholders of the Chicago Railways was held on Oct. 26, 1911. The vacancy in the board of directors caused by the resignation of R. G. Hutchins was filled by the election of M. B. Orde.

Coney Island & Brooklyn Railroad, Brooklyn, N. Y.—William A. Day and J. A. Thake have been elected directors of the Coney Island & Brooklyn Railroad, to succeed J. H. Hyde and William H. McIntyre, resigned.

El Paso (Tex.) Electric Company.—Perry, Coffin & Burr, Boston, Mass., are offering for subscription at 99 and interest to yield 5.08 per cent, 5 per cent first mortgage collateral trust bonds of the El Paso Electric Company. There are $1,000,000 of these bonds outstanding, followed by $500,000 of 6 per cent debentures, $1,000,000 of 6 per cent preferred stock and $1,000,000 of common stock paying dividends at the rate of 5 per cent. A statement of earnings of the El Paso Electric Company for the year ended Aug. 31, 1911, as made public by Perry, Coffin & Burr, follows: Gross receipts, $671,628; operating expenses and taxes, $405,303; net earnings, $266,324; bond interest, $50,000; balance, $216,324.

International Traction Company, Buffalo, N. Y.—The annual meeting of the stockholders of the International Traction Company was held on Oct. 31, 1911. Charles E. Richards was elected a director to succeed Grant B. Schley. The other directors and the officers were re-elected. It was announced that the annual report of the company would not be made public until the Public Service Commission of the Second District of New York had acted on the plan of reorganization of the company which is now before that body, as reported in detail in the ELECTRIC RAILWAY JOURNAL of Oct. 21, 1911, page 910. Thomas Penner, president of the company, is quoted as follows: "Satisfactory progress is being made toward a plan of reorganization of the International Traction Company, and this plan is now before the Public Service Commission of the Second District of New York for approval. The plan of reorganization provides briefly for a new holding concern, to be known as the International Traction Railways. This company has already received the consent of the city of Buffalo to build a short line there and to issue securities to take over the properties now owned by the International Traction Company and to provide for future capital requirements."

Joliet & Southern Traction Company, Joliet, Ill.—The bondholders' protective committee, representing more than 75 per cent of the bonds of the Joliet & Southern Traction Company, has adopted resolutions instructing the trustee to begin proceedings at once to foreclose the property.

London (Ont.) Street Railway.—The directors of the London Street Railway have voted to issue the remainder of the $750,000 of authorized stock, of which $552,000 is outstanding. It is stated that the proceeds of the new stock will be used to build extensions under a clause in the company's charter.

Metropolitan Street Railway, Kansas City, Mo.—The receivers of the Metropolitan Street Railway have deposited with the Old Colony Trust Company, Boston, Mass., the amount necessary to pay the coupons on the $7,242,000 of consolidated mortgage 5 per cent bonds of the Metropolitan Street Railway and the $2,000,000 of 5 per cent bonds of the Central Electric Railway due on Nov. 1, 1911.

Montgomery Traction Company, Easton, Pa.—The details of the purchase of the property of the Montgomery Traction Company by the Lehigh Valley Transit Company, Allentown, were arranged on Oct. 25, 1911.

Montreal (Que.) Street Railway.—The report of the Montreal Street Railway for the year ended Sept. 30, 1911, was presented at the annual meeting of the company on Oct. 27, 1911, by E. A. Robert, president. The gross earnings were $4,775,300; operating expenses, $2,679,805; net earnings, $2,095,494; interest on Montreal, Park & Island Railway, $114,807; total income, $2,210,302; taxes, rentals, interest and city's percentage on earnings, $583,904; net income, $1,626,398; dividend, 10 per cent, $1,000,000; surplus, $626,398. After deducting from the surplus $275,000 for the contingent account and for the fire insurance fund there was left to be transferred to the general surplus $351,398.

Ocean Shore Railroad, San Francisco, Cal.—The Ocean Shore Railroad has been incorporated in California with $5,000,000 capital, as the successor to the Ocean Shore Railway, the property of which was sold some time ago under foreclosure. The incorporators were P. I. Mullen, S. M. Mannon, Jr., S. W. Reynolds, O. B. Wyman, F. E. Boland, S. I. Langmaid and O. C. Greene.

Oskaloosa Traction & Light Company, Oskaloosa, Ia.—The Des Moines River Power Company is reported to have exercised the option which it secured some time ago on the property of the Oskaloosa Traction & Light Company.

Riverside Traction Company, Camden, N. J.—The Public Service Corporation of New Jersey has leased the property of the Riverside Traction Company through the Public Service Railway. Under the terms of the lease interest is guaranteed on the bonds, 5 per cent dividends on the preferred stock and dividends on the common stock increasing on a sliding scale.

Tampa (Fla.) Electric Company.—The Tampa Electric Company has declared in addition to the usual quarterly dividend of 2 per cent on the $1,700,000 of stock an extra dividend of 1 per cent, both payable on Nov. 15, 1911, to holders of record on Nov. 3, 1911, making a total of 10 per cent in 1911.

Washington, Baltimore & Annapolis Electric Railway, Washington, D. C.—Arthur L. Spamer has been appointed special master and auditor of the Washington, Baltimore & Annapolis Electric Railway. This action was taken fol-

lowing the filing on Oct. 31, 1911, of the final statement of the receivers in the United States Circuit Court. The statement of the receivers, George T. Bishop and George W. Williams, shows total assets of $365,416 and total liabilities of $2,188,271. On March 30, 1911, all the property, franchises, etc., of the Washington, Baltimore & Annapolis Electric Railway were sold at foreclosure, and on March 31, 1911, all the property, rights and franchises thus purchased were conveyed to the Washington, Baltimore & Annapolis Electric Railroad.

Dividends Declared

Cape Breton Electric Company, Ltd., Sydney, N. S., 3 per cent preferred; 2 per cent common.

Ohio Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred.

Texas Traction Company, Dallas, Tex., 1½ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

HOUGHTON COUNTY TRACTION COMPANY.

Period.			Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1 m.,	Aug.	'11....	$28,534	$13,189	$15,345	$7,756	$7,589
1 "	"	'10....	29,709	13,537	16,171	6,637	9,534
12 "	"	'11....	304,956	159,690	145,267	80,985	64,281
12 "	"	'10....	317,014	167,787	149,228	76,978	72,249

HUDSON & MANHATTAN RAILROAD.

1 m.,	July	'11....	$216,375	*$105,676	$110,699	.....	.....

JACKSONVILLE TRACTION COMPANY.

1 m.,	Aug.	'11....	$44,565	$23,861	$20,704	$12,365	$8,339
1 "	"	'10....	47,043	27,100	19,943	9,494	10,449
12 "	"	'11....	576,353	317,323	259,029	126,320	132,709
12 "	"	'10....	551,983	290,728	261,255	112,473	148,783

METROPOLITAN STREET RAILWAY, NEW YORK.

1 m.,	July,	'11...	$1,134,765	*$727,006	$407,758	.....	.....

NEW YORK & QUEENS COUNTY.

1 m.,	July,	'11....	$131,146	*$116,814	$14,332	.....	.....

NORTHERN TEXAS ELECTRIC COMPANY.

1 m.,	Aug.,	'11....	$135,529	$69.585	$65,944	$26,009	$39,935
1 "	"	'10....	119.813	63,952	55,860	20,301	35,560
12 "	"	'11....	1,561,348	809,592	751,756	272,611	469,144
12 "	"	'10....	1,377,638	743,535	634,102	221,411	412,692

PADUCAH TRACTION & LIGHT COMPANY.

1 m.,	Aug.,	'11....	$21,470	$12,097	$9,373	$7,828	$1,545
1 "	"	'10....	20,780	11,807	8,973	7,071	1,902
12 "	"	'11....	258,450	141,744	116,706	92,279	24.427
12 "	"	'10....	241,341	143,931	97,410	82,864	14,546

PENSACOLA ELECTRIC COMPANY.

1 m.,	Aug.	'11....	$23,555	$15,418	$8,137	$5,860	$2,277
1 "	"	'10....	24,178	14,483	9,695	5,243	4,452
12 "	"	'11....	284,626	167,364	117,262	67,824	49,438
12 "	"	'10....	260,462	153,157	107,306	57,949	49,357

PUGET SOUND ELECTRIC RAILWAY.

1 m.,	Aug.	'11....	$155,665	$96,661	$59,004	$51,878	$7,125
1 "	"	'10....	173,989	100,169	73,820	52,145	21,675
12 "	"	'11....	1,809,871	1,226,821	583,050	602,554	†19,504
12 "	"	'10....	1,922,895	1,267,097	655,798	602,657	53,137

SAVANNAH ELECTRIC COMPANY.

1 m.,	Aug.,	'11....	$58,681	$40,331	$18,350	$18,342	$8
1 "	"	'10....	56,871	38,681	18,190	18,181	9
12 "	"	'11....	668,756	448,774	219,981	218,604	1,377
12 "	"	'10....	618,104	403,951	214,153	213,940	214

SEATTLE ELECTRIC COMPANY.

1 m.,	Aug.,	'11....	$448,863	$240,443	$208,420	$116,260	$92,160
1 "	"	'10....	479,573	258,749	220,824	111,081	109,743
12 "	"	'11....	5,529,712	3,071,971	2,457,741	1,345,171	1,112,570
12 "	"	'10....	5,720,820	3,336,691	2,354,129	1,290,010	1,064,118

TAMPA ELECTRIC COMPANY.

1 m.,	Aug.,	'11....	$56,408	$30,151	$26,256	$6,603	$19.654
1 "	"	'10....	50,346	25,070	25,276	5,958	19,318
12 "	"	'11....	627,172	332,669	294,503	77,472	217,032
12 "	"	'10....	621,395	345,983	275,412	48,674	216,738

THIRD AVENUE RAILROAD, NEW YORK.

1 m.,	July,	'11....	$337,434	*$167,389	$170,045	.....	.....

UNION RAILWAY, NEW YORK.

1 m.,	July,	'11....	$252,033	*$169,838	$82,195	.....	.....

†Deficit. *Includes taxes.

At a meeting of the London County Council reports on the tramway accounts for the year 1910-11 were submitted by the highways and finance committees. The accounts showed a gross income of £2,232,817 15s 1d. and the working expenses amounted to £1,337,769 13s 1d, leaving a surplus on working of £895,048 2s 9d. After reductions for debt charges, Parliamentary expenses, etc., the net surplus was £232,726 14s 5d. The finance committee pointed out that the surplus on working was 4.8d a car mile against 5.06d to 5.17d in the four preceding years.

Traffic and Transportation

Passenger Traffic in the New York Subway

The Public Service Commission of the First District of New York has made public a statement of passenger traffic on the subway division of the Interborough Rapid Transit Company as indicated by the number of tickets sold at each station of the subway in the year ended June 30, 1911. The summary shows a considerable change in the starting points of travel and consequently in the distribution of population. Although the subway carried 7,742,681 more persons in the twelve months ended June 30, 1911, than in the preceding year, nearly half the stations reported an actual decline in the sales of tickets. Most of these were in the center of the city, while the increases were at the outlying stations, particularly along the West Farms branch. The following summary has been prepared from the original report to show the returns of the stations on the Lenox branch, the Broadway branch, the main line from Ninety-sixth Street to the Battery and the Brooklyn branch, with figures for the express stations at Ninety-sixth Street, Seventy-second Street, Grand Central, Fourteenth Street and Brooklyn Bridge, also Times Square and all the stations in Brooklyn:

Stations.	Total	Year's Increase	Daily Average a 1911	1910	1909
Lenox Branch (total)	52,120,508	3,321,459	153,296	143,527	126,233
Broadway Branch (total)	34,018,155	1,662,800	100,053	95,163	79,978
96th St. to South Ferry (total)	155,735,045	602,634	458,044	456,272	414,762
96th Street	4,581,128	d602,634	458,044	456,272	414,762
72nd Street	4,102,000	d66,404	12,065	12,260	11,212
Times Square	11,663,025	387,590	34,303	33,163	29,756
Grand Central	13,799,160	d207,237	40,586	41,195	36,725
14th Street	12,516,177	d289,816	56,813	37,665	34,703
Brooklyn Bridge	16,909,540	d50,145	49,734	49,881	48,147
Brooklyn (total)	34,652,559	2,176,472	101,919	95,518	79,657
Borough Hall	7,755,366	d84,509	22,810	23,058	22,630
Hoyt Street	6,044,714	835,193	17,779	15,322	10,522
Nevins Street	4,133,629	3,219	12,157	12,148	11,031
Atlantic Avenue	16,718,850	1,422,569	49,173	44,989	35,474
Grand total	c276,704,796	7,742,681	813,837	791,065	701,265

a Treating Sundays as half days (340 days to the year). c These totals are arithmetical only and do not account for passengers who buy tickets at "island" stations. d Decrease.

Instructions in Regard to Reports of Accidents in Connecticut

Henry F. Billings, secretary of the Public Utilities Commission, of Connecticut, has addressed the following letter to the public service corporations of the State in regard to filing reports of accidents with the commission:

"Section 17 of Chapter 128 of the Public Acts of 1911, being 'An Act Concerning the Regulation and Supervision of Public Service Corporations,' reads as follows:

"'Companies to report accidents. Every public service company shall, in the event of any accident attended with personal injury or involving public safety which was or may have been connected with or due to the operation of its plant or equipment, or caused by contact with its wires, notify the commission thereof, by telephone or otherwise, as soon as may be reasonably possible after the occurrence of such accident. If said notice be given otherwise than in writing it shall be confirmed in writing within five days after the occurrence of such accident. Any company failing to comply with the provisions of this section shall be fined not more than $500 for each offense.'

"While this commission has no power or desire to abrogate or waive any of the requirements of the section quoted above, a compliance with the following instructions will, in the opinion of the commission, meet the intent of the statute:

"1. Accidents attended with slight personal injury must be reported in writing to the commission within five days of the occurrence of such accident.

"2. Accidents resulting in severe personal injury which were or may have been connected with or due to the operation of the plant or equipment of any public service corporation, or caused by contact with its wires, must be reported immediately to the commission, and a notice sent by telegraph to the chief engineer and inspector of the commission, Charles C. Elwell, at New Haven, Conn.; such report must be confirmed in writing within five days after the occurrence of such accident.

"3. All railroad wrecks (either steam or electric) which

occur attended with personal injury or involving public safety must be reported at once by telephone and telegraph to the chief engineer and inspector of the commission, Charles C. Elwell, at New Haven, Conn., and a like report made to the commission; such report and notification must be confirmed in writing to the commission within five days after the occurrence of such wreck.

"4. All notices and reports required to be given to the commission concerning accidents should be sent to the office of the Public Utilities Commission at Hartford, Henry F. Billings secretary.

"This commission respectfully requests that all public service corporations strictly comply with the above instructions."

School Tickets in San Francisco.—The United Railroad, San Francisco, Cal., has offered to replace the former commutation tickets issued to school children with tickets to be sold in pads at the rate of forty for $1.

Near Side Stops in East St. Louis.—The East St. Louis & Suburban Railway, East St. Louis, Ill., has decided to stop its cars on the near side of the street. It was planned to put the new rule into effect on Nov. 1, 1911.

New York Rapid Transit Route Approved.—The Board of Estimate of New York has approved the rapid transit route known as the Fifty-ninth Street-Queensboro Bridge route, which runs from Seventh Avenue, Manhattan, out to Woodside and Corona, in Queens. The board has also approved the contract for the construction of Section 15 of the Lexington Avenue subway, Manhattan.

Tickets Restored in St. Joseph.—The St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., which recently issued an order to conductors to refuse all tickets detached from ticket books so as to put a stop to the practice of newsboys selling tickets with papers, has decided to resume the sale of tickets, orders having been issued by the police department to policemen to arrest all persons who offer a ticket for sale or who refuse to abide by the company's rule holding tickets void if not detached in the presence of conductors.

Extension of Electric Truck Service.—In the ELECTRIC RAILWAY JOURNAL of Oct. 28, 1911, page 966, mention was made of the success which followed the use of electric trucks by the Louisville & Northern Railway & Lighting Company, New Albany, Ind., in connection with its express business, which is handled under the name of the Interurban Express Company. The trucks, which have a capacity of 1½ tons, have been used for New Albany business only. They have proved so economical and advantageous that it has been decided to use another truck of the same type in the down-town district of Louisville.

New York & Long Island Traction Company Reduces Fare.—The New York & Long Island Traction Company, Hempstead, N. Y., has made a reduction of 5 cents in the fare between the end of the Kings County elevated line of the Brooklyn Rapid Transit Company at the city line of Brooklyn and Rosedale, Lynbrook and Rockville Centre, and cars will be run on a fifteen-minute headway in the rush hours, or from 6 a. m. to 8 a. m. and from 5 p. m. to 7 p. m. Hereafter the fare from the end of the elevated railroad to Rosedale will be 5 cents; from the same point to Valley Stream and the heart of Lynbrook, 10 cents, and from the same point to Rockville Centre and Stop 81, at Baldwin, 15 cents. The question of a 5-cent fare over the company's line between Hempstead and Belmont Park, instead of a 10-cent fare, was to be heard at Mineola on Nov. 4, 1911.

Ordinance Vetoed to Require Sale of Tickets on Cars.—Mayor George W. Dilling, of Seattle, Wash., has vetoed the ordinance requiring the Seattle Electric Company to sell street car tickets on all cars. In his communication to the Council vetoing the ordinance the Mayor said he had been guided by the corporation counsel's opinion that the ordinance was illegal. Continuing, the Mayor said: "The city cannot repudiate the contracts which it has with the company and read into them provisions which they do not contain." The franchise of the company provides that the company shall sell twenty-five tickets for $1 at its main office and power stations. Recently the company has voluntarily established about fifteen more stations where tickets are on sale.

Fare to the Suburbs of Birmingham.—The city commissioners of Birmingham, Ala., as a whole have been appointed to take up with the Birmingham Railway, Light & Power Company the 5-cent car fare proposition, and other questions between the city and company, excepting that of freight service on the city streets. On May 6, 1911, the board passed a resolution requesting the company to carry passengers over its lines between Wylam and Nineteenth Street in Birmingham, and between Ensley and Nineteenth Street in Birmingham, and between Pratt City and Nineteenth Street in Birmingham, and between intermediate points between Wylam, Ensley and Pratt City and Nineteenth Street in Birmingham, at the rate of 5 cents for each passenger, this rate to apply in each direction with the usual transfer privileges. This request the company declined.

Argument Heard in Washington Transfer Case.—Justice Wright, of the District Supreme Court, Washington, D. C., devoted the entire session of Equity Court No. 2 on Oct. 18, 1911, to the hearing of arguments on the question of universal transfers in Washington as incorporated in a petition of Arthur L. Shreve, receiver of the Baltimore & Washington Transit Company, to compel the Capital Traction Company to make reciprocal transfer arrangements at Fourteenth Street and Kennedy Street. The hearing was on a motion of the Capital Traction Company to dismiss the petition of the receiver on the ground of lack of jurisdiction in the court. The company also contended that even if the court has jurisdiction it should disregard the petition of the receiver, as the enactments of Congress relied on are unconstitutional and there is no physical connection between the two lines as contemplated in the act which requires transfers to be issued between connecting lines of street railways.

Hearing on Height of Car Steps in Connecticut.—J. K. Punderford, general manager of the Connecticut Company, New Haven, Conn., appeared before the Public Utilities Commission of Connecticut at Hartford on Oct. 24, 1911, as the representative of that company at the hearing on the question of the height of street car steps. Considerable testimony was presented bearing on the injurious effect which high car steps have on the health of women. Mr. Punderford said that the company would endeavor to remedy the trouble. He thought that the fifteen bench open double-truck cars were enjoyed by many of the patrons of the company. He spoke of the two and three step cars on the Unionville line, but feared that there would be more or less trouble because of the additional steps. The company was co-operating with car builders and truck builders and he would like to see the present type of car continued in service if the car can be lowered. As soon as the information had been obtained which he sought he would lay it before the commission. The company has 511 double truck cars, and to put an additional step on each of these cars would involve a large expense.

Two things stood out clearly at the recent meeting of the Municipal Tramway Association in Glasgow, Scotland, as important subjects for further discussion; first, the building of a proper reserve, and, second, the relief of the rates. Mr. Rogers, in his paper on tramways finance, attacked the various municipalities which were not providing for the future in this way. On the whole, it was the opinion of the conference that there should be no more relief for rates from tramway profits until the financial position of every tramway undertaking had been made unassailable. Some of the municipalities were evidently of the opinion that it was sufficient for them to take care of their sinking fund and pay for renewals out of revenue. Councilor Rogers charged that many of the tramway committees allowed their profits to be raided from political fears and that all chairmen of committees should withstand this attack upon profits of the tramways for the reduction of rates. Another subject considered was the question of further concessions in the matter of fares. It seemed to be the general opinion that fares were as low as they could possibly be made except in a few isolated cases. There is also a growing disposition to raise the workman's fare, as the underpaid clerk or professional man is considered to be as much entitled to a reduction in fare as the man who has to go to work before 7 a. m.

Personal Mention

Mr. F. E. Wood has resigned as treasurer of the Gray's Harbor Railway & Light Company, Aberdeen, Wash.

Mr. J. W. Williams has been elected secretary-treasurer of the London (Ont.) Street Railway to succeed the late George H. Bentson.

Mr. August Beidenbender has resigned as general superintendent of the Cincinnati, Milford & Loveland Traction Company, Cincinnati, Ohio.

Mr. John W. Aker has resigned from the Kentucky Traction & Terminal Company, Lexington, Ky., to become chief engineer of the Paris Gas & Electric Company, Paris, Ky.

Mr. J. S. Thornton has resigned as secretary, general manager and purchasing agent of the Gray's Harbor Railway & Light Company, Aberdeen, Wash., and Mr. H. B. Zimmerman has been appointed to these positions to succeed him.

Mr. James K. Gray, assistant superintendent of the Chicago, Lake Shore & South Bend Railway, Michigan City, Ind, has been appointed superintendent of the company to succeed Mr. C. E. Palmer, whose appointment as superintendent of transportation of the Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind., was noted in the Electric Railway Journal of Oct. 14, 1911.

Mr. George W. Dunlap, whose appointment as electrical engineer of the Public Service Commission of the First District of New York in charge of the bureau of transit inspection under Mr. E. G. Connette was noted in the Electric Railway Journal of Oct. 21, 1911, was born in North Berwick, Maine. His first work was with the Portland Locomotive Works, Portland, Maine. From 1884 to 1891 he was a locomotive engineer on the New York & New England Railroad running between Boston and Hartford and Boston and Willimantic. For three years Mr. Dunlap was employed at the Magid-Hope silk mills in Milford, Mass., which he equipped for electric operation. Subsequently he installed a 2600-hp electric plant for the Stevens Manufacturing Company at Fall River, and then became consulting engineer for the Davoll mills at Fall River. Mr. Dunlap was also chief engineer of the Waltham Gas & Electric Company, Waltham, Mass., chief engineer of the Newton (Mass.) Street Railway and chief engineer of the Hyde Park Electric Company, which furnishes power to the Suburban Street Railway, and equipped the power plant of the Biddeford & Saco Street Railway, Biddeford, Maine. During Mr. Dunlap's connection with the Worcester Consolidated Street Railway important improvements have been carried out affecting the power distribution system, the most noteworthy being the construction of the new Millbury station, which was described in the Electric Railway Journal of Aug. 26, 1911, page 342. Mr. Dunlap is a member of the American Society of Mechanical Engineers.

OBITUARY

Sherman Culp, president of the Sandusky, Norwalk & Mansfield Railway, Norwalk, Ohio, and a prominent attorney, died at his home in Norwalk, on Oct. 26, 1911, after a long illness.

George E. Randolph, who was prominently connected with street railway development in Denver, Col., from 1889 to 1897, died in Denver on Oct. 22, 1911. Mr. Randolph was born in Quincy, Ill., on March 29, 1840, and was educated in the public schools of Providence, R. I. As the representative of Eastern capitalists, Mr. Randolph supervised the construction of the West End Street Railway, Denver, and the Denver City Cable Railway, and subsequently was general manager and purchasing agent of the Denver City Cable Railway. Later he and Cornelius E. Sweatland were appointed receivers of these companies. The Denver City Railroad was chartered in 1896 as the successor to the Denver City Cable Railway and the West End Street Railway, and Mr. Randolph served the Denver City Railroad as general manager and purchasing agent. Mr. Randolph was for several years Colorado agent of the Massachusetts State Mutual Life Insurance Company and had lately been chairman of the board of public works of Denver.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

San José & Almaden Railway, San José, Cal.—Application for a charter has been made in California by this company to build an electric railway from San José to Almaden. Capital stock, $120,000. Incorporators: Charles A. Nones, H. F. Tatham, New Almaden, and A. P. Anderson and D. M. Burnett, San José. [E. R. J., Oct. 21, '11.]

Hamilton (Ill.) Railway.—Incorporated in Illinois to build an electric railway from a point on the bridge over the Mississippi River between Hamilton, Ill., and Keokuk, Ia., to Warsaw. Headquarters, Chicago. Capital stock, $1,000,000. Directors: George Higginson, Winnetka, Ill.; Joel D. Harvey, Geneva; Joseph L. Valentine, Chicago; Hayne Wells, Chicago, and A. W. O'Hara. [E. R. J., July 9, '11.]

***Kansas City & Fort Scott Electric Railway, Topeka, Kan.**—Chartered in Kansas to build an electric railway from the terminus of the Metropolitan Street Railway in Rosedale via Stanley, Prescott, Fulton, Louisburg and Pleasanton to Ft. Scott. Surveys are now being made through Johnson and Miami Counties in Kansas. Capital stock (preliminary), $10,000. Incorporators: W. S. Quarles, Stanley; M. M. Sweetman, Kansas City, Mo.; D. E. Ainsworth and T. W. Conboy, Stilwell; W. H. Foster, O. K. Reed, C. Kohlenberg, C. A. Bodenhammer and R. J. Rogers, Louisburg; M. Langan, Paola; A. Graves, Drexel; John Rose, Merriam; J. Frank Smith, Pleasanton.

Laurel Electric Power & Light Company, Laurel, Miss.—Application for a charter has been made in Mississippi by this company to build an electric railway and power plant in Laurel. Capital stock, $75,000. Incorporators: P. H. Saunders, Herbert Lampe and S. M. Jones. [E. R. J., Oct. 14, '11.]

***Flathead Power & Traction Company, Polson, Mont.**—Incorporated in Montana to build an electric railway between Polson and Dixon, a distance of about 30 miles. Incorporators: F. L. Gray, G. R. M. Stritzel, T. R. Arnold, F. E. Faucett, M. A. Myhre and A. W. Pipes, all of Polson.

Chattanooga (Tenn.) Traction Company.—Application for a charter has been made in Tennessee by this company to build an electric railway in Chattanooga under a franchise granted by the City Council several months ago. It will also build interurban lines. One of the first will be to Dayton, Tenn., requiring construction through Hamilton and Rhea Counties. Another line will be built to the Georgia State boundary and the terminus of this line will be Ringgold, Ga. A line up Lookout Mountain is also proposed. The company expects to obtain its power from a hydroelectric company now completing a dam near Chattanooga. Capital stock, $100,000. Incorporators: C. E. James, D. F. Beckhaw, J. L. Davies and Franklyn Harris. [E. R. J., May 13, '11.]

FRANCHISES

Sacramento, Cal.—The Sacramento Electric, Gas & Railway Company has received franchises from the City Trustees to extend its lines through Sacramento in four new sections.

San Diego, Cal.—The San Diego Electric Railway has asked the City Council for a franchise to extend its lines in San Diego.

Savannah, Ga.—The Savannah Electric Company has received a franchise from the City Council to extend its tracks over several streets in Savannah.

Averyville, Ill.—The Peoria & Northern Railway has received a fifty-year franchise from the Board of Trustees in Averyville. [E. R. J., Oct. 14, '11.]

Averyville, Ill.—The Peoria Terminal Company has received a twenty-year franchise from the Board of Trustees in Averyville.

DeKalb, Ill.—The DeKalb-Sycamore & Interurban Traction Company has received a forty-year extension of time on its franchise in DeKalb.

Kankakee, Ill.—The Kankakee Electric Railway has received a franchise from the Board of Supervisors to extend its East Court Street line in Kankakee to the Commercial subdivision, which is outside the city limits.

Logansport, Ind.—The Indiana & Northwestern Traction Company, Monticello, has asked the City Council for a franchise in Logansport. [E. R. J., Oct. 21, '11.]

***Terre Haute, Ind.**—John W. Ratliff, West Terre Haute, has asked the Commissioners of Vigo County for a franchise to construct an electric line from West Terre Haute to Clinton on the west side of the Wabash River.

Tama, Ia.—The Tama & Toledo Electric Railway, Toledo, has received a franchise from the Council in Tama.

Pittsfield, Mass.—The Berkshire Street Railway, Pittsfield, has received permission from the Railroad Commissioners to extend its tracks in Pittsfield.

Hibbing, Minn.—Victor L. Power, representing the Northern Traction Company, has asked the City Council for a franchise in Hibbing.

Springfield, Mo.—The Springfield & Western Railroad has secured a franchise from the City Council to enter the city from the west on Division Street. A party is now in the field making the permanent location of the line from Springfield west toward Joplin. M. M. Hollenback, Springfield, Mo., is chief engineer.

Patchogue, N. Y.—James A Gifford, representing the receivers of the South Shore Traction Company, has obtained from the Board of Estimate an extension of thirty days for completion of a line from the Queensboro Bridge to the Nassau County line through Jamaica, L. I.

Fargo, N. D.—The Fargo & Moorhead Street Railway, Fargo, has received a twenty-five-year extension of its franchise in Fargo.

Cincinnati, Ohio.—The Cincinnati Traction Company, Cincinnati, has received a franchise from the City Council to extend its lines to Bond Hill. It will not become effective for sixty days in order that a referendum petition may be filed if desired.

Portland, Ore.—The Portland Railway, Light & Power Company has asked the Council for a franchise to double track Sandy Boulevard in Portland.

Connellsville, Pa.—The West Penn Railways, Pittsburgh, has received a franchise from the Town Council to extend its lines on Seventh Street and on Leisenring Avenue, in Connellsville.

Coraopolis, Pa.—An application has been made by the Coraopolis & Sewickley Railway to build an electric railway in Moon Township, Coraopolis and Sewickley, crossing the new Sewickley-Coraopolis bridge. S. L. Tone is interested. [E. R. J., Oct. 14, '11.]

Scranton, Pa.—The Scranton & Ariel Railway, Scranton, has asked the Council for a franchise in Scranton. This line will connect Lake Ariel and Scranton, a distance of about 20 miles. J. J. Brown, president. [E. R. J., July 1, '11.]

***West Pittston, Pa.**—The Pittston & Exeter Street Railway has asked the City Council for a franchise in Pittston.

Dallas, Tex.—The Board of Municipal Commissioners has granted the Dallas Southern Traction Company right-of-way for its proposed interurban line over Zang's Boulevard from the southern limits of Dallas to a junction at Jefferson Street with the line of the Northern Texas Traction Company. The company has a contract with the latter company and the Rapid Transit Railway Company for the use of their Jefferson Street and Commerce Street tracks in Dallas. J. F. Strickland, president. [E. R. J., Oct. 14, '11.]

Ridgeley, W. Va.—The Ridgeley & Miller Avenue Railway, Ridgeley, has asked the Court of Mineral County for a franchise through Mineral County. This railway will extend from the Potomac River bridge just opposite Cumberland about 2 miles through Ridgeley. John L. Miller, Ridgeley, is interested. [E. R. J., July 1, '11.]

TRACK AND ROADWAY

Fresno, Hanford & Summit Lake Interurban Railway, Fresno, Cal.—This company has awarded the contract for the concrete and pile bridge work along its line to H. A. Hansen, Fresno.

San Francisco, Oakland & San José Railway, Oakland, Cal.—Plans are under way, it is said, for the extension of this company's lines through Contra Costa County and as far east as Stockton. One extension is planned through the Livermore Valley to Stockton.

Petaluma & Santa Rosa Railway, Petaluma, Cal.—It is reported that this company plans to extend its line north to Healdsburg.

Sacramento Electric, Gas & Railway Company, Sacramento, Cal.—This company has awarded a contract for a new line on Third Street, Sacramento, to the Clark & Henery Construction Company, Sacramento.

Sacramento & Woodland Railway, Sacramento, Cal.—Grading has been begun on this company's line near Woodland which is to connect Sacramento and Woodland. [E. R. J., Oct. 21, '11.]

Stockton (Cal.) Electric Railroad.—Plans are being considered by this company to extend its lines to Fair Oaks.

San Joaquin Valley Electric Railway, Stockton, Cal.—Plans are being considered by this company to construct a line between Fresno and Modesto.

Denver (Col.) City Tramways.—Material is at hand and construction will soon be begun by this company on its extension east of Denver to Park Hill Heights.

Willimantic & Stafford Street Railway, Stafford Springs, Conn.—The organization of this company has been completed and surveys will soon be made for the route of its proposed line between Willimantic, Mansfield Center, South Willington, Spring Hill, Storrs and Stafford Springs. The following officers were elected: William H. Hall, South Willington, president; Charles A. Capan, Willimantic, secretary, and Lewellyn J. Storrs, Spring Hill, treasurer. [E. R. J., April 22, '11.]

Twin Falls (Idaho) Railway.—This company has begun the construction of its 125-mile electric railway between Twin Falls, Kimberly, Fisher, Buhl and Jerome. Capital stock authorized, $500,000. Officers: L. B. Peraine, Twin Falls, president; E. B. Williams, vice-president; Charles M. Smith, secretary; D. B. Moorman, treasurer, and Paul S. A. Bickel, chief engineer. [E. R. J., Oct. 14, '11.]

East St. Louis, Columbia & Waterloo Railway, East St. Louis, Ill.—It is expected that this company's lines will enter East St. Louis by Jan. 1. The line, to be supplied with current by the East St. Louis & Suburban Railway until it builds its own power house, will extend through Dupo, Prairie du Pont, Cahokia, Columbia and Waterloo and enter St. Louis over the Eads Bridge, using the tracks of the East St. Louis & Suburban Railway.

Evansville, Chrisney & Eastern Railway, Evansville, Ind.—This company has decided upon the route of its proposed line from Boonville to Chrisney and to Lynnville. It is expected that the line will ultimately be extended to Louisville, Ky. Subsidy elections are soon to be held in the various counties through which the proposed line is to pass. J. P. Chrisney is interested. [E. R. J., Oct. 17, '11.]

Vincennes & Southeastern Interurban Railway, Vincennes, Ind.—This company has agreed to build its line through Newtonville since the citizens of Newtonville have accepted the company's proposition to donate $2,300 to be paid when the line is completed. G. B. Hazleton, Vincennes, president. [E. R. J., Sept. 9, '11.]

Des Moines (Ia.) City Railway.—This company placed in operation on Oct. 22 its first crosstown line in Des Moines.

Red Oak & Northeastern Railway, Red Oak, Ia.—This company advises that its proposed railway between Red Oak and Des Moines will be operated by steam and not by electricity, as reported in the ELECTRIC RAILWAY JOURNAL for Oct. 21.

Union Traction Company, Coffeyville, Kan.—Construction has been begun by this company on the western extension in Coffeyville.

Frederick (Md.) Railroad.—Surveys have been begun by this company on its 6-mile extension between Jefferson and Brunswick.

Springfield (Mass.) Street Railway.—Plans are being considered by this company to double track its Belmont Avenue line in Springfield.

Monterey Railway, Light & Power Company, Monterey, Mex.—This company is preparing to make important extensions of its railway. One of its lines will be extended to the suburb of Gonzalitos, a distance of 3 miles. The other extensions will be run to new residence sections that are being opened up.

Detroit, Mich.—P. N. Jacobson, Detroit, and associates plan to construct an electric railway from Wyandotte to Ann harbor, via Ypsilanti, a distance of about 40 miles. It is expected to extend this line to Lansing and later to Grand Rapids. [E. R. J., July 2, '10.]

Michigan-Indiana Traction Company, Lansing, Mich.—Right-of-way is being secured by this company in Coldwater and Athens. The line will connect Columbia and Coldwater, via Athens and Union City. Walter Powers, Battle Creek, is interested. [E. R. J., Oct. 21, '11.]

Hattiesburg (Miss.) Traction Company.—Plans have been outlined by this company for improvements and extensions which will mean the expenditure of about $200,000.

Columbia & Northern Electric Railway, Columbia, Mo.—This company advises that it will begin construction within thirty days on its 60 miles of electric railway between Columbia, Jefferson City, Mexico and Moberly. P. M. Johnson & Sons, St. Elmo, Ill., are the contractors. The company will furnish power for lighting purposes. Its power station and repair shops will be located at Columbia. Headquarters, Victoria Building, St. Louis, Mo. Capital stock authorized, $1,500,000. Bonds authorized, $1,500,000. Julius W. Koch, Victoria Building, St. Louis, secretary and treasurer. [E. R. J., Oct. 21, '11.]

***Canton, N. Y.**—J. F. Hammond and others are considering plans to construct an 8-mile electric railway between Canton and Pyrites.

North Carolina Traction Company, Danbury, N. C.—An extension from Rock Hill to the Seaboard Air Line Railway at Catawba Junction, a distance of about 8 miles, is being considered by this company.

Cincinnati, Milford & Loveland Traction Company, Cincinnati, Ohio.—It is reported that the Cincinnati, Milford & Loveland Traction Company is formulating plans for an extension to Washington Court House, which is 76 miles from Cincinnati on an air line to Columbus.

Columbus (Ohio) Railway & Light Company.—This company has placed in operation its extension of the Schiller Street line in Columbus, a distance of 1½ miles.

Dayton, Springfield & Xenia Southern Railway, Dayton, Ohio.—Work has been begun by this company on the construction of a new concrete and steel bridge at Zimmerman.

Steubenville & East Liverpool Railway & Light Company, East Liverpool, Ohio.—Work has been begun by this company double tracking its line through Follansbee.

Southeastern Ohio Railway, Light & Power Company, Zanesville, Ohio.—It is reported that this company will extend its line from Crooksville to New Lexington in the spring.

Berlin & Bridgeport Electric Street Railway, Berlin, Ont.—This company contemplates important improvements of its lines in Berlin. Plans for a belt line to circle the city making connections at King Street with the present main line between Berlin and Waterloo and the present radial are being considered.

London (Ont.) Street Railway.—Plans are being made by this company to extend its lines in London.

***North Toronto, Ont.**—Plans are reported to have been presented for a new electric railway in North Toronto on Melrose Avenue, south on Mt. Pleasant Road to St. Clair Avenue. E. A. James, Eglinton, Ont., engineer, is interested.

***Owen Sound, Ont.**—Elias Lemon plans to construct a 6-mile electric railway in Owen Sound.

Willamette & Molalla Valley Railway, Canby, Ore.—Preliminary surveys have been completed and application for a charter will soon be made by this company to build an electric railway from Molalla Valley to Portland, via Canby, a distance of 30 miles. At Canby the line will cross the Willamette River over a bridge and from the Tualatin Valley into Portland through a tunnel owned individually by the company and a subway to a point on Washington Street. From Tualatin a branch will be built to Oregon City, across the Willamette River, and to Abernathy. W. J. Lee, Canby, general manager. [E. R. J., June 10, '11.]

Johnstown & Altoona Railway, Johnstown, Pa.—This company is considering the purchase of catenary overhead construction material. The roadbed, track and bridge construction is being managed by the Pierce & Barnes Company, engineers, 7 Water Street, Boston, Mass. This 40-mile electric railway will connect Altoona and Johnstown. G. U. G. Holman, 52 William Street, New York, N. Y., agent. [E. R. J., May 21, '10.]

Sunbury, Lewisburg & Milton Railroad, Sunbury, Pa.—This company has completed one mile of its line. The route will cross the river at Winfield, where a new bridge will be built, and will continue to Lewisburg and West Milton. W. H. Lyons, Sunbury, president. [E. R. J., July 22, '11.]

***Three Rivers, Que.**—The citizens of Three Rivers have voted to construct an electric railway in Three Rivers.

Greenville (S. C.) Traction Company.—This company will extend its North Street line 1 mile in Greenville.

Southern Traction Company, Dallas, Tex.—The required amount, $150,000, in stock has been raised by this company in Waco, thus closing the deal for building this railway through Waco. The line will connect Dallas, Hutchins, Wilmer, Ferris, Waxahachie, Milford, Hillsboro and Waco. [E. R. J., Oct. 14, '11.]

***Gainesville, Tex.**—A syndicate represented by E. B. Blanton, Gainesville, has under consideration the construction of an interurban railway from Gainesville to McKinney, a distance of about 45 miles. It is planned to operate the gasoline motor cars.

Gray's Harbor Railway & Light Company, Aberdeen, Wash.—Surveys for two extensions have been made by this company. One mile will be to Willapa Harbor and will be built first. It will necessitate the building of a free bridge across the Chehalis River. The other branch will be built to the Sound from Gray's Harbor. H. B. Zimmerman, general manager.

Bellingham-Skagit Railway, Bellingham, Wash.—The route of the main line of this railway has been definitely decided upon and will connect Bellingham, Happy Valley, Sockeye, Samish, Ladysmith, Allen, Burlington and Mt. Vernon. Work on the grade has progressed as far as Allen and construction of the tunnel at Mount Vernon has been begun.

South Morgantown Traction Company, Morgantown, W. Va.—Plans have been decided upon by this company for the immediate construction of a 2-mile extension in Morgantown.

Morgantown & Southern Railway, Morgantown, W. Va.—Work has been begun by this company on the extension in South Morgantown to its South Park carhouse. Later the company will extend the line over the old survey and down through South Park to Euclid Avenue, connecting with the extension of the South Morgantown Traction Company's tracks as now proposed.

***Rawlins, Wyo.**—The Nebraska Coal Company, Rawlins, has prepared plans, estimates and surveys for a 200-mile railway traversing the lignite fields of central Wyoming. The plans include three large gas producer power plants operating electrical units. About 20 miles of line will be equipped for electrical operation. H. Larsen, Rawlins, is president and general manager, and Hiram A. R. Gray, vice-president and consulting engineer.

SHOPS AND BUILDINGS

San Francisco, Oakland & San José Railway, Oakland, Cal.—Stations of the Mission type are to be built at Piedmont, East Oakland, Fruitvale, San Leandro, Hayward and at intermediate points where population warrants, by this company.

Tampa (Fla.) Electric Company.—This company plans to build an oil house, pumping station, paint shop and a reel house as soon as the main shed is completed.

Illinois Traction System, Peoria, Ill.—A large freight yard will be built at East Peoria on property at the end of the company's bascule bridge over the Illinois River and close to the center of Peoria. The yard as laid out by L. B. Martin, engineer maintenance of way, will include ten storage tracks and modern facilities for transferring freight.

Boston & Eastern Electric Railway, Boston, Mass.—A station will be built by this company on Ballard Street, in Saugus.

Portland Railway, Light & Power Company, Portland, Ore.—This company is constructing two brick buildings on East Seventeenth Street in Portland, the first two units of its carshops. The first building will be 100 ft. x 200 ft. and one story high. Work has been started on the second building on the north side of the first structure and covers a little more space. It is also a one-story brick structure and is nearly a duplicate of the first building. It is announced that the completed plant includes six buildings similar to the first two units, but it is not probable that the company will undertake to put up any more than the first two this year.

Flathead Power & Traction Company, Polson, Mont.—A. L. Jaqueth is securing sites for car shops and other traction facilities for this company.

Rhode Island Company, Providence, R. I.—This company has purchased in the name of the Union Railroad land on Cranston Street between Burnham Avenue and Prince Street in Cranston, on which it will build a new carhouse.

Gray's Harbor Railway & Light Company, Aberdeen, Wash.—The construction of a new central office building in Aberdeen is being contemplated by this company. H. B. Zimmerman, general manager.

POWER HOUSES AND SUBSTATIONS

Aurora, Elgin & Chicago Railroad, Chicago, Ill.—Plans are being made by this company to install a 5000-kw turbo-generator in its central plant at Batavia. The improvement will include the erection of another wing at the north end of the main building of this plant.

Metropolitan West Side Elevated Railway, Chicago, Ill.—This company has awarded a contract to the W. J. Scrown Building Company, Chicago, for the construction of a new substation at 259 South Franklin Street, Chicago. The structure will be one story and basement, 62 ft., x 65 ft., and of brick, steel and concrete construction.

Union Electric Company, Dubuque, Ia.—This company is now more than doubling its power plant capacity by the installation of a 2500-kw six-stage horizontal Curtis turbine.

Bangor Railway & Electric Company, Bangor, Maine.—This company has ordered one motor generating set; one 1000-kw 220-volt generator with direct-connected exciter; three H-25 375-kva transformers; lighting arrester, oil switches and a switchboard from the General Electric Company.

Nebraska Transportation Company, Omaha, Neb.—Plans are being made by this company for the construction of a steam power plant on the Elkhorn River near Elk City, Neb., which will be capable of developing 21,000 hp.

Trenton-Mercer County Traction Company, Trenton, N. J.—This company will install a 1100-hp De Laval steam turbine at its power plant at Trenton.

Johnstown & Altoona Railway, Johnstown, Pa.—This company is considering the purchase of two 750-kw turbo-generators, 1200-hp capacity in water-tube boilers with the necessary condensers, piping and pumps. G. U. G. Holman, 52 Williams Street, New York City, agent.

Waynesburg & Blacksville Street Railway, Waynesburg, Pa.—Plans and specifications are being prepared and bids will soon be asked by this company for the construction of a power plant in Waynesburg.

Southern Traction Company, Dallas, Tex.—Plans are being considered by this company to construct a power plant near Waco.

Wausau (Wis.) Street Railway.—This company, the Marathon Paper Mills Company, and the Wausau Sulphate Company, of Mosinee, will build a joint power plant near Wausau

Manufactures & Supplies

ROLLING STOCK

Memphis (Tenn.) Street Railway has ordered ten 23-ft. 3-in. car bodies from the St. Louis Car Company.

Redlands University Railroad, Redlands, Cal., expects to purchase two cars. Gardner S. Turrill, Redlands, president.

Public Service Railway, Newark, N. J., has ordered thirty-five partial independent air brake equipments from the General Electric Company.

Vicksburg (Miss.) Traction Company has ordered two semi-steel double truck cars equipped with St. Louis No. 99 single motor trucks from the St. Louis Car Company.

Metropolitan Street Railway, New York, N. Y., has requested bids for 640 air-brake equipments with motor compressors, etc., complete. These bids are due next week.

Cleveland (Ohio) Railway has ordered twenty quadruple direct current interpole motors equipped with K-35-G control from the Westinghouse Electric & Manufacturing Company.

Detroit (Mich.) United Railway has ordered from the Westinghouse Electric & Manufacturing Company four quadruple interpole motor equipments arranged for multiple-unit control.

Dry Dock, East Broadway & Battery Railroad, New York, N. Y., has fifteen GE-1022 two-motor storage battery car equipments with type K-45 controllers, from the General Electric Company.

Central Pennsylvania Traction Company, Harrisburg, Pa., has ordered six double equipments of No. 101-C motors and K-36-F control from the Westinghouse Electric and Manufacturing Company.

Morgantown & Dunkard Valley Railroad, Morgantown, W. Va., has placed an order with the Westinghouse Electric & Manufacturing Company for quadruple, direct current, No. 306 interpole railway motors equipped with K-35-G control.

Johnstown & Altoona Railway, New York, N. Y., is considering the purchase of seven interurban combination passenger and smoking cars, one express car, one snow plow and two snow sweepers. G. U. G. Holman, agent, 52 William Street, New York.

TRADE NOTES

Dodge, Day & Zimmerman, Philadelphia, Pa., engineers, announce that the name of the firm has been changed to Day & Zimmerman.

A. Eugene Michael, New York, N. Y., advertising engineer, has moved his main office to the Park Row Building, New York, where larger space has been secured.

Pennsylvania Equipment Company, Philadelphia, Pa., desires to purchase, for immediate delivery, 1400 ft. to 1500 ft. 600,000 cir. mil double braid weatherproof cable, in first class condition.

Robb Engineering Company, Ltd., South Framingham, Mass., has completed the installation of two 78-in. return tubular boilers in the power plant of the Lewiston, Augusta & Waterville Street Railway at Gardiner, Maine.

Walter R. Burrows, New York, N. Y., has resigned as manager of the railroad department of Topping Brothers, New York, and will continue the manufacture and sale of Burrows jacks on his own account, with offices at 150 Chambers Street, New York.

C. G. Young, New York, N. Y., has added to his staff D. Sterrett Pindell, B. A., E. E. Mr. Pindell has had a broad experience in the construction and operation of public service utilities and his activities with Mr. Young will be especially in connection with engineering examinations and reports.

E. P. Roberts, formerly president of the Roberts & Abbott Company, Schofield Building, Cleveland, Ohio, will continue under his name the business of this company, which has recently been dissolved. In addition to acting as consulting engineer in various lines of work, Mr. Roberts will devote special attention to electric railway work, including reports and investigations.

Allis-Chalmers Company, Milwaukee, Wis., has announced the resignation of David Van Alstyne as vice-

president, in charge of the manufacturing department of the company, effective on Nov. 15. Mr. Van Alstyne was formerly vice-president of the American Locomotive Company. He will engage in business in New York. C. E. Search, formerly assistant to Mr. Van Alstyne, has been appointed works manager.

United States Electric Company, New York, N. Y., has furnished telephone train-dispatching equipment, including individual Gill silent calling keys, to the Missouri, Kansas & Texas Railroad for operating the double track main line from McAlester, Okla., 95 miles south to Denison, Tex., and for the Waco division extending from Smithville, Tex., north to Hillsboro, 158 miles, including 47 miles of the San Antonio line. These lines have been in operation since Oct. 1, 1911.

Allgemeine Elektricitäts Gesellschaft, Berlin, Germany, reports net profits derived exclusively from manufacturing of $5,535,500 for the year ended June 30, 1911, as compared with $4,606,500 in the preceding year and $4,096,500 in the year before that. It is proposed to maintain the dividend at 14 per cent on $20,000,000 of old shares, and to pay 7 per cent on the $7,500,000 new shares whose dividend rights commenced Jan. 1, 1911. The report states that the orders booked exceed those of the corresponding period of 1910-11, which aggregated $60,000,000.

Railway Roller Bearing Company, Syracuse, N. Y., reports that thirty-five storage battery cars of the Third Avenue Railroad, New York, equipped with Rollway bearings are now in operation; and that the Third Avenue Railroad has just placed its third order for Rollway equipment, making a total of fifty-five cars to be so equipped. The company has also furnished Rollway bearings for the electric locomotive built by the Baldwin Locomotive Works for the Portland, Grey & Lewiston Railway. These roller bearings are said to be the largest of their kind ever built for railway work.

Thermit, Ltd., London, Eng., calls attention to a typographical error which appeared in the advance report on city track practices in Great Britain, read at the Glasgow convention of the Municipal Tramways Association, Sept. 27-29, and published in abstract on page 738 of the issue of this paper for Oct. 11. The report in question stated that the breakages of these joints in Manchester, where there are some 7000 thermit joints, had amounted to less than 3 per cent during the past five years. The correct figure, as explained by J. M. McElroy, general manager of the Manchester tramways, on the floor of the convention, was less than 0.3 per cent, or only one-tenth of the ratio quoted in the advance report.

Northern Equipment Company, Chicago, Ill., has completed a sales arrangement for its Copes boiler feed regulators and Copes pump governors with the Dravo-Doyle Company, engineer, of Pittsburgh, Pa., which has recently established a steam specialty department, with headquarters in Pittsburgh, covering the Pittsburgh, Cleveland, Philadelphia, Chicago and West Virginia territories. D. D. Pendleton, who has for the past five years represented the Northern Equipment Company in the Pittsburgh district, has completed arrangements with the Dravo-Doyle Company so that it will have all rights in that district, thus giving it complete jurisdiction over the territory previously mentioned.

Dick, Kerr & Company, London, Eng., held their annual meeting of stockholders recently. John Kerr as chairman said that keen competition for orders has continued in all departments. The greatest interest in electrical undertakings had now been awakened in England. A considerable amount of equipment had been ordered, and a number of important installations were under consideration. At the last general meeting it was stated that the company intended to manufacture steam turbines. The efforts of the directors in this connection were meeting with satisfactory results. In view of the demand for metallic filament lamps the directors decided to add a lamp factory. This factory was approaching completion. Prospects for the coming year were encouraging. The balance sheet showed an improvement over the two previous years. The plant and machinery had been amply depreciated. The rearrangement of the staff necessitated by the death of George Flett last year had been carried out.

United Electric Car Company, Ltd., Preston, Eng., held its annual meeting recently. George Richardson, chairman of the company, said that the net profit for the year, after making due allowance for all expenses, was £4420. The directors regretted the smallness of the profit, but considered it satisfactory in face of the stagnation in the car-building trade during the year. The company had had, as usual, a fair share of the business, but the output of the works had been so small that the profit was very small after taking into account the fixed charges. After adding the amount brought forward and deducting the preferred dividend for the half year to Dec. 31, 1910, already paid, there was an available balance of £5481 and the directors felt justified in recommending a dividend at the rate of 6 per cent per annum on the preferred shares for the six months ending June 30, 1911, leaving £2481 to be carried forward to next year. The prospects for the future were better than for some years past. There were now 710 men employed by the firm, as against 327 in 1910. The cars on order numbered almost a hundred more than at the commencement of the current year.

ADVERTISING LITERATURE

Okonite Company, New York, N. Y., has published a booklet entitled "Economy in Joint Making, with Instructions."

The J. G. Brill Company, Philadelphia, Pa., has issued Catalog No. 200, which serves as an order guide for parts of Brill trucks. This catalog supersedes Brill order guide No. 165.

Schutte & Koerting Company, Philadelphia, Pa., has issued Catalog 6, section B, which fully describes the Koerting system of spray cooling. The publication contains several tables showing the results of tests made with Koerting centrifugal spray nozzles; also illustrations of spray-nozzle plants. Catalog 5, section A, describes and illustrates the company's eductor and induction condensers.

Clark Electric & Manufacturing Company, New York, N. Y., has issued several bulletins illustrating specialties of its manufactures, among which are insulated clamps for use with both the pin and suspension type of insulation, guy and strain clamps, clamps for use on street arc lamp circuits or for holding in place angle or vertical conductor twin splice connectors, split tinned copper connectors and overhead clamp sets.

Wheeler Condenser & Engineering Company, Carteret, N. J., has issued Bulletin No. 107, which contains a discussion on high vacuum jet condensers. Several installations of this type of condenser are illustrated, and a number of tables of actual tests showing very high efficiencies are presented. The bulletin also describes and illustrates the Wheeler barometric ejector condenser, Wheeler direct-acting jet condenser and other important products which the company manufactures.

Universal Lubricator Company, Cleveland, Ohio, has issued a four-page circular entitled "Tulc Lubricant." Tulc is known as Tulc No. 2-H, a plain solidified oil, Tulc No. 2 WW, staple wool waste impregnated with Tulc No. 2 H, and Tulc No. 2 yarn, a high-grade staple wool yarn, impregnated with Tulc No. 2 H. Facts about Tulc lubricant are contained in a series of short paragraphs and the statement is made on the concluding page of the circular that sufficient Tulc will be furnished by the manufacturer to prove the assertions made in the circular.

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 4891, composed principally of illustrations of the railway equipment installed in the United States by the company. These illustrations comprise interiors of the power stations, both main and sub-stations, and the rolling stock of various railways. Bulletin No. 4883 is devoted to the general principles of the Curtis steam turbine and generator, with numerous illustrations of turbine and generator parts, and complete representative installations. Bulletin No. 4885 describes a new meter designed for accurately measuring the power used by relatively small consumers. Bulletin No. 4889 describes and illustrates two types of commutator grooving machines. Another bulletin, No. 4894, is devoted to cylinder controllers for railway service. This bulletin supersedes the company's previous bulletin on this subject.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVIII NEW YORK, SATURDAY, NOVEMBER 11, 1911 No. 20

PUBLISHED WEEKLY BY

McGraw Publishing Company

JAMES H. MCGRAW, President; C. E. WHITTLESEY, Sec'y and Treas.

239 WEST THIRTY-NINTH STREET, NEW YORK

TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1021 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Thursday, 9 a. m., of the week of issue.

Copyright, 1911, by MCGRAW PUBLISHING COMPANY.

Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

NEW YORK, SATURDAY, NOVEMBER 11, 1911.

CONTENTS.

Dust Guards..... 1017
Economy and Efficiency..... 1017
Regulation of Capitalization..... 1018
Plans for Increasing the Associate Membership..... 1018
The Southern Pacific Electrification..... 1019
Electric Locomotive of the Prussian-Hessian State Railways..... 1020
Printing Shop of the Milwaukee Electric Railway & Light Company 1023
Reasons for the Choice of 16⅔ Cycles for Prussian State Railways.. 1025
Instructing Trainmen in the Economical Use of Power..... 1025
Reports at the Convention of the National Association of Railway Commissioners..... 1026
Improvements of the International Railway of Buffalo..... 1029
Meeting of Engineering Association Committee on Standards..... 1031
Electric Express Service of Bay State Street Railway..... 1033
Circular on A. E. R. A. Work..... 1033
Fare Hearing Before Connecticut Commission..... 1033
Standard Steel Wire Gage..... 1034
Linemen Signals for Indianapolis & Cincinnati Traction Company.. 1034
New Type of Air Compressor for Cars..... 1034
Starting of 20,000-kw Turbo-Generator in New York Edison Station 1034
Recent Developments in Oil-Switch Design..... 1035
News of Electric Railways..... 1036
Financial and Corporate..... 1039
Traffic and Transportation..... 1043
Personal Mention..... 1044
Construction News..... 1045
Manufactures and Supplies..... 1047

Dust Guards

The Engineering Association standard journal boxes of all sizes are designed with a dust guard slot in the rear wall and the standard axles of the association have a dust guard seat from 2 in. to 2½ in. wide between the journal and the wheel seat. While this would seem to indicate that dust guards were intended to be used in all electric car journal boxes they seldom are used. The purpose of a dust guard is to prevent oil from working back along the axle into the motor axle bearings and out on the wheels and to prevent dust and dirt from getting into the waste and oil in the journal box. Great care is taken to machine the lid and hold it down tight by springs or bolts in order to keep dirt from getting in the front of the box, but the opening in the back of the box is left entirely unprotected when a dust guard is not used. It is true that most dust guards are not so effective as they might be in keeping the oil in and the dust out, but even a poor dust guard is better than none at all. Dust guards are very cheap and it is worth while to maintain them in all journal boxes. One company has a standing rule that a new dust guard shall be applied to every box that is removed from an axle for any reason, regardless of the condition of the old dust guard. This keeps them in fairly good condition all the time. The journal lubrication costs of this company, it might be mentioned, are low, due to the small waste of oil and the better condition of the packing in the boxes.

Economy and Efficiency

In discussing the application of efficiency methods to engineering work many persons confuse efficiency with economy. To the engineer in charge of new construction or routine maintenance a mandate from the executive office to economize conveys only one meaning, to lay off every possible man, stop buying and using material, and, in general, to skimp the job. Much the same idea prevails regarding the institution of efficiency methods. The engineer who attempts to increase the efficiency of his department by reducing the number of men employed, using second-hand material where new material is needed and in other similar ways reducing the expenditures is working in the wrong direction. Efficiency does not necessarily imply doing the same work with fewer men, but, instead, doing more and better work with the same number of men. The bad effects of a policy of retrenchment and economy are sure to follow a temporary saving, whereas the highest degree of efficiency work may cost more at the start but save large amounts in the future. Much routine maintenance work on an electric railway property remains undone because no men can be spared to attend to it or no money is appropriated to buy the necessary material for

proper repairs. The useful life of the apparatus is materially shortened by such neglect and the annual cost is greatly increased. For example, a few loose joints develop in a piece of track laid in a paved street, and no attention is paid to them because the track force is engaged on some large job. The track foundations, the rails and the paving are soon badly damaged, and it is necessary to make expensive repairs which are not warranted by the remaining life of the whole piece of track. The temporary economy secured by not spending a little money on the bad joints is a mere fraction of the value of the shortened life of the track which results from such a policy. The efficiency method would be to tighten the joints and grind them to a smooth surface as soon as possible and before the foundation or the paving was badly damaged, thus prolonging the life of the whole track at small expense.

Regulation of Capitalization

Complete regulation of railway capitalization was not favored by all the representatives of public commissions who attended the last annual meeting of the National Association of Railway Commissioners. The report made on this subject, an abstract of which is published elsewhere in this issue, refers specifically to the law of New York State and the administration of the statute by the commission which has jurisdiction. As the commission of the Second District has authority over practically all of the steam railways operating in the State, it is evidently that body which the members of the committee had in mind in the preparation of the report. The important results mentioned are that full money value, or as nearly as may be estimated, is obtained for bonds and notes, while par is paid for stock. The proceeds are then applied to proper capital purposes, not replacements, with wholesome effect on the fixed capital accounts. During the discussion on the report the opinion was expressed that governmental regulation went far enough if it supervised merely to make sure that the money realized from the sale of securities was applied to expenditures that could properly be capitalized. This would avoid the unfortunate results experienced in at least one prominent instance in Massachusetts, where the sale of additional shares of stock is authorized only at prices close to the market values. In that State the analysis of earnings of a large railroad corporation showed that its full dividends had not been earned and adequate provision for maintenance had not been made. The dividend rate was reduced and the price of the stock declined many points below the figures at which the shares had been sold by order of the regulating commission. While the sale of stock at par, pro rata, to existing shareholders would afford a profit to the purchasers in the case of a prosperous company paying a sufficient rate of dividend to maintain the price of the security well above par, the holders could realize the profit if they chose to sell and would therefore have less, if any, ground for complaint against the State, should the price decline greatly in the distant future In the same degree in which a State supervises railway capitalization it is morally, if not legally, responsible and will be so held by the public. Reasonable regulation, which opens opportunities for fair profit, will accomplish more in the development of public utility properties than a rigid supervision which leaves no hope of gain for enterprise.

PLANS FOR INCREASING THE ASSOCIATE MEMBERSHIP

An important question now before the new executive committee of the American Electric Railway Association is the best method of carrying out the recommendation of President Brady at Atlantic City of an enlarged field of usefulness for the association through a greatly increased associate membership. With the general advisability of such a step all will agree. The association is capable of greater things that it can now do with its support of less than 400 companies and only about 1300 associate members. To live up to its opportunities it should have at least twice that number of active members and ten times that number of associate members. We believe that the time will come soon when the management of every electric railway company will feel that active membership in the association is necessary. But it is our purpose here to discuss only the possible plans for increasing the associate membership, because the opportunities for growth there seem greater at present.

There are two ways in which the associate membership can be increased. One is through the addition in large numbers of railway men who are not now associate members. The other is to place the associate membership on such a basis as to make it appeal to all others who are closely identified with the industry, such as those engaged in the manufacture of electric railway apparatus. These are the problems to be solved by the committee on associate membership, and some light may be thrown on their answer by a study of the organization of similar national bodies.

So far as the first class of members is concerned, the feature of the associate membership of the National Electric Light Association which has been the greatest factor in the growth of that association has been the plan of "company sections." In fact, the tremendous increase in membership of the National Electric Light Association during the past two years under its present plan of organization has undoubtedly suggested the adoption of a somewhat similar plan in the railway association. The membership in each company section in the electric light association is confined to the employees of one member company, except that occasionally several member companies in one city unite in forming a company section. These sections have their own meetings under the auspices of the national body and discuss matters connected with the industry but related principally to the local property. The popularity of these local organizations is shown by the fact that the New York Edison Company's section—for instance—has a membership of over 1000 and the Commonwealth Edison Company's section in Chicago has a membership of over 1300. Some railway men have expressed doubt as to whether there is the same opportunity to organize company sections among the employees of a railway company and say that the employees of an electric lighting company include a proportionately larger number of men with considerable engineering knowledge, like inspectors, line men and station engineers. Others on the contrary believe the opportunity

among the railway companies to be far greater and advocate the inclusion in a railway company section of trainmen, as well as of inspectors and other higher officials. If this was done the opportunities in the railway industry would greatly exceed those in the lighting industry.

These matters would have to be settled by a careful study of the field. Nevertheless, we believe in the general plan of company sections. Its success among the lighting companies is certainly a strong argument in its favor. Moreover, as practically 25 per cent of the railway companies in this country also do a lighting or power business and so are familiar with the company sections plan, it does not possess the element of newness to a large proportion of the companies which are members of the American Electric Railway Association.

The second plan which we have mentioned for increasing the associate membership of the association relates to the manufacturers and their representatives. At present they come in contact with the association and the policies which it represents only once a year, yet their prosperity is closely bound up with that of the railway companies and all should be working for the common good. In this connection it is interesting to recall that at the time of the reorganization of the American Electric Railway Association in 1905 the relation of the manufacturers to the association formed one of the most serious problems considered. One suggestion made by the manufacturers was that their association should be an affiliated association, somewhat on the same basis as the other affiliated associations, and should be part of the main organization; but other counsels prevailed and the Manufacturers' Association was made in the constitution an "allied" association and not an "affiliated" association. The proposition to change this plan of organization comes now not from the manufacturers but from the parent association. The best way in which this may be done cannot be decided offhand, but President Brady's address pointed out the desirability of uniting for the common welfare all of the interests concerned in the industry represented by the association.

The electric railway industry is passing through a critical period in its history and needs the assistance and support of all those who wish to see the industry develop instead of stagnate. It has been estimated that there are more than 250,000 officials and other employees of electric railway companies in the country and that there are in addition more than 100,000 men engaged largely in the manufacture of electric railway apparatus. If even a small portion of this number—say only 5 per cent—should become associate members of the association within the next two or three years it would be of immense advantage. With even 10,000 interested members, a small number compared with the importance of the industry, in touch with the main office of the association and acquainted with its plans and policy, a great deal of good would be accomplished. President McCarter has already announced, in behalf of the new executive committee, the intention of directing the work of the association along even broader lines than have heretofore been attempted and the inauguration of plans which will make membership in the association even more attractive than before. Now is the time to pull together in the furtherance of this policy.

THE SOUTHERN PACIFIC ELECTRIFICATION

Those of our readers who have followed the descriptions published in the Electric Railway Journal of the electrification by the Southern Pacific Company of its Alameda, Oakland and Berkeley suburban lines will realize that a piece of work of considerable magnitude has been carried out in the Far West quietly and without attracting anything like the attention from the electrical engineers of the country that the same work would have attracted if it had been executed, say, within 1000 miles of New York City. These articles appeared in our issue of Feb. 4, 1911, which described the power house and substations; in the issue of June 17, 1911, which described the motive power equipment and repair shop, and in the issues of Oct. 21 and 28, 1911, which contained an account of the overhead line construction and distribution system of the company.

The total cost of the first stage of this work, as just nearing completion, is approximately $10,500,000. Ordinarily a piece of electrification involving such a first cost receives the distinguished consideration of many consulting engineers and manufacturers, all of whom are naturally interested to devote a considerable part of their time and attention to its successful outcome. The past history of large electrification problems bears abundant testimony that often these influences complicate an already complex situation. The Southern Pacific project, however, is unique in that the entire work of design, specification, purchase and construction was carried out wholly within the organization of the railroad company as it stood at the time the work was ordered, with its engineering force augmented by assistant engineers and draftsmen who had received their training in the larger electrification undertakings of the East. It is also unique in that in every case the contract requirements have been exceeded by the performance of the apparatus under acceptance tests. In all the work that passed through the hands of the designing engineers no appropriation has been exceeded, there has been no extra on any contract, nor has there been a single error that cost money to rectify; and the total cost of engineering has been less than 3 per cent.

The construction work was executed by the organized construction forces of the company, its work being inspected and in general directed by the designing engineer's office as regards compliance with the plans and specifications. In no case was it necessary to go outside of the company's organization for any part of the work. Even the dinner given in the Fruitvale power house to the San Francisco Section of the American Institute of Electrical Engineers, described in our issue of June 3, 1911, was carried out to an admittedly successful conclusion by the commissary department of the railroad company, one of its standard dining cars being placed within the power house for this occasion.

The entire work may be taken as an example of the independence of thought and action of the engineers in the Far West, a condition brought about largely, no doubt, by their geographical isolation from the large Eastern centers of engineering activity. It also affords a striking illustration of the resources in men, money and materials of one of the larger railroad organizations.

Electric Locomotives of the Prussian-Hessian State Railways

This Article Describes Three Locomotives with Novel Types of Drive Built or Under Way for the Recently Electrified Dessau-Bitterfeld Line

An article on the Dessau-Bitterfeld electrification of the State railways of Prussia and Hesse published in the Nov. 4 issue described the power generating and distributing system. The present article relates to the three locomotives which have been furnished for this line by the Allgemeine company.

DESIGN OF HIGH-SPEED PASSENGER LOCOMOTIVE

The passenger locomotive shown on page 1021 is built for a speed of 68 m.p.h. Its total length over buffers is 41 ft. and its fixed wheel base is 9 ft. 8 in. A diameter of 63 in. was selected for the driving wheels, which revolve at 400 r.p.m. or more at the maximum speed. This speed, which is high compared with that of steam locomotives, was adopted without hesitation by the engineers in charge of the work because of the absence in the electric locomotive of large reciprocating masses.



Dessau-Bitterfeld Electrification—Express Train in Service

It will be noted that the two leading axles of the passenger locomotive are combined in a pony truck, while a single or "Adam" axle is used at the trailing end. The two driving axles have a parallel crank drive with an intermediate crank shaft which is driven from a motor mounted high in the frame. This arrangement provides such good balance that the locomotive runs smoothly at all speeds. It has even run without difficulty at the highest permissible speed with the trailer axle in front.

The motor is placed vertically over the intermediate crank shaft, an arrangement which is advantageous in motor mounting. The intermediate crank-shaft bearing is constructed in four parts and is adjusted both vertically and horizontally by means of wedges. Further, as this bearing is somewhat inaccessible, a safety device in the form of a fusible metal plug is placed in the bearing and is connected with the main air tank by a pipe. This pipe leads to an alarm whistle in the motorman's cab. If the bearing becomes hot, the plug melts and the compressed air operates the warning whistle. The form of the driving rods corresponds to the usual construction on German steam locomotives.

ELECTRICAL EQUIPMENT OF HIGH-SPEED PASSENGER LOCOMOTIVE

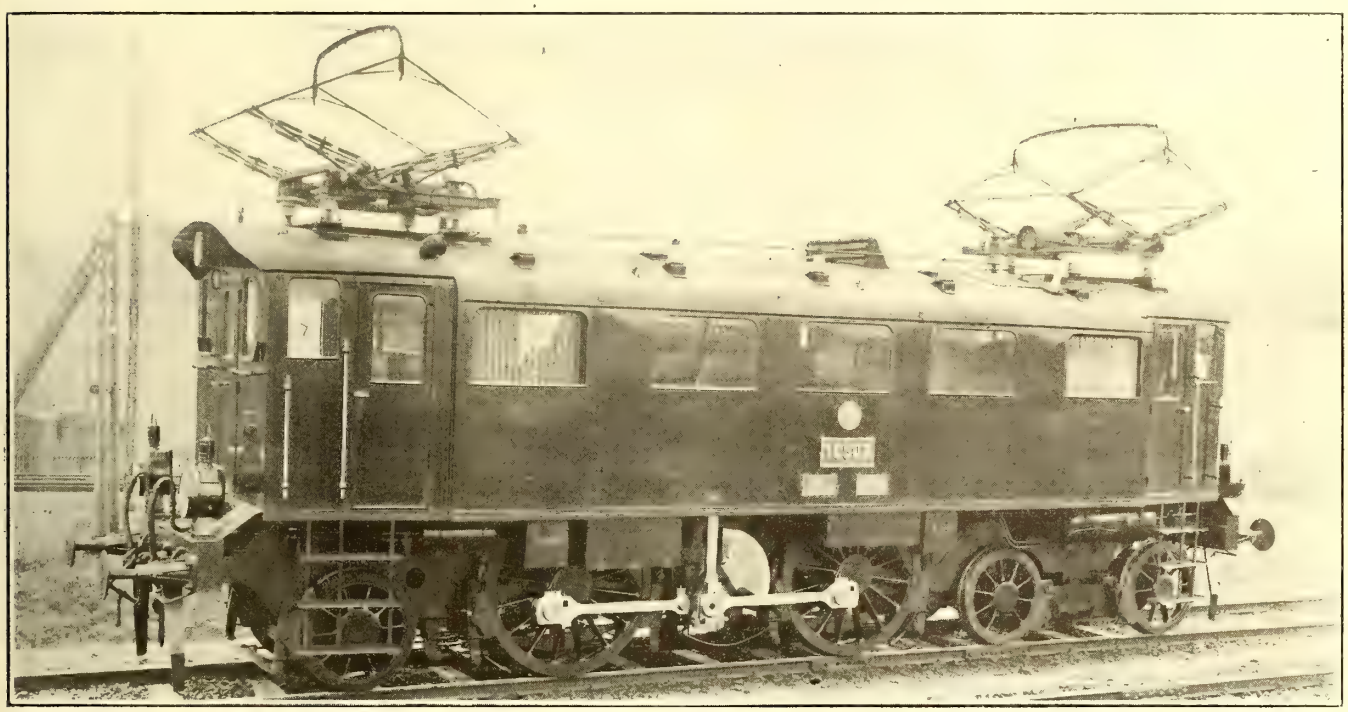
The locomotive is driven by an a.c. commutator motor of about 1000 hp on the hourly rating. The motor frame is attached to the transverse girders of the locomotive and can be adjusted in place by means of wedges and pressure screws. Its open construction permits a convenient inspection of the commutator brushes. Its tractive effort and speed are regulated by the ordinary contactor control. The current is taken at 10,000 volts by means of two pantograph collectors, is led through a choke coil which serves as a protection against excess pressures, and thence is conducted to the main oil switch. The latter has auxiliary and main contacts. An equalizing resistance is placed behind the auxiliary contacts in order to reduce the shock when the motor is switched in to the circuit. The current passes from the oil switch to the high-tension winding of the main transformer and from the latter through a current transformer to ground. The low-tension winding of the main transformer has several taps so that the motor voltage may be varied according to the tractive effort and speed required. These different transformer voltages are switched in by eight contactors, and the circuit is broken by two pairs of contactors, each of which is connected in parallel. Thus there are twelve contactors in all.

A static balancer with special taps is provided to adjust the armature winding to a special voltage, thus enabling the ratio of the voltages between the armature winding and the compensating winding to be regulated in accordance with the speed at which the locomotive is traveling. The regulation of the tractive effort and speed is carried out at the controller, whose upper and lower

cylinders can be revolved independently of one another. The upper cylinder regulates the tractive effort and the lower cylinder adjusts the commutation. Their operation from the motorman's cab is effected by two hand-wheels placed one above the other. The different speeds are marked on the lower hand-wheel so that the motorman can easily adjust the wheel to the correct position in accordance with the position of the speed indicator. The armature of the motor is short-circuited at starting by means of a throw-over switch, which is operated by means of a compressed-air cock on the controller.

Another feature worthy of note is a release device for the oil switch. This device is operated by the brake and prevents the motorman from switching in the oil switch when the brake is on. The oil switch may be released by a push-button in the motorman's cab. The control current for the contactors is supplied by an auxiliary coil of the main transformer. This transformer is erected in a ventilated shaft adjoining one of the cabs. The main oil switch is mounted above it, so that the switching-in and release handles project into the cab. The contactor chamber adjoins the apparatus compartment.

speed of 43.4 m.p.h. All axles are used for driving, so that the entire weight of the locomotive can be utilized for adhesion. The total length of this locomotive is 34 ft. 5 in. over the buffers and its total wheel base is 15 ft. 9 in. One of the end axles has a play of ½ in. on each side to obtain flexibility on curves. With a driving wheel of 41-in. diameter the locomotive can develop a maximum tractive effort of approximately 22,000 lb. measured at the periphery of the driving wheel. A parallel crank driving through an intermediate crank shaft is used as on the passenger locomotive. In this case, however, the motor is not placed vertically over the intermediate crank shaft, but in such a manner that the driving rods form an angle of 45 deg. with the horizontal. This arrangement gives a much more favorable distribution of the strains on the intermediate crank shaft because only a part of the torque has to be transmitted from one side of the intermediate crank shaft to the other. The two cranks are set at an angle of 90 deg. to one another. A rigid connection is obtained between the motor shaft and the intermediate crank shaft in this locomotive by the use of a steel casting which is bolted to the frame. The form of the intermediate crank shafts,



Dessau-Bitterfeld Electrification—High-Speed Passenger Locomotive

Two ball-bearing current collectors are used for current collection. They easily follow any alteration in the height of the trolley wire. The bow type of current collectors originally used proved unsuitable for high speeds as they would not remain in position when under heavy wind pressure.

The working results hitherto obtained with this locomotive have been exceedingly satisfactory. In tests at Bitterfeld the locomotive developed a maximum tractive effort of 20,900 lb. at starting. The average starting acceleration with a train of 280 metric tons was 0.62 ft. per second per second. To determine the efficiency of the locomotive seven trips with short lay-overs were made between Bitterfeld and Dessau and back, with a train weighing 250 tons. On one trip from which the hourly rating was determined the weight of the train was 350 tons. With an external temperature of 20 deg. C. the maximum temperature of the motor was 70 deg. at the end of the seven trips. The locomotive was also successful in drawing a freight train weighing 596 tons.

FREIGHT LOCOMOTIVE

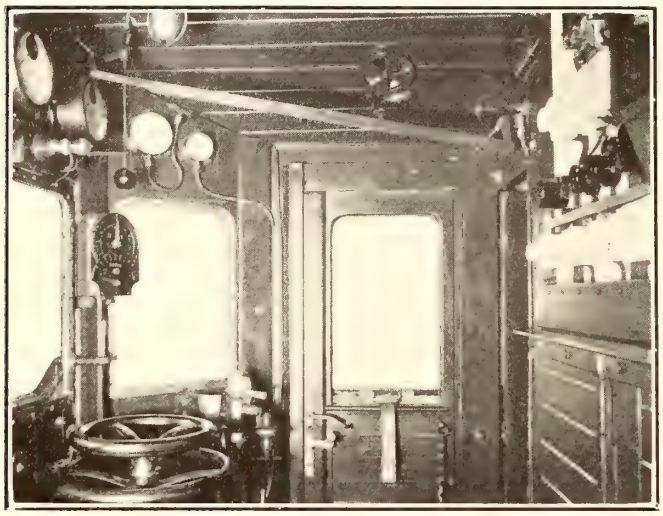
The freight locomotive is constructed for a maximum

the motor bearings and the other parts of the driving mechanism corresponds to that adopted for the passenger locomotive. The driving and coupling rods lie in the same plane, however, and the coupling rods are connected to the driving rods by links.

The electrical equipment of the high-tension circuit and of the low-tension circuit, including the apparatus for such auxiliary purposes as lighting and compressed air, corresponds to that of the high-speed passenger locomotive. The arrangement of the apparatus in the locomotive is also exactly alike. The chief difference is in the smaller size of the motor and the system of brush regulation.

The locomotive has one single-phase motor with an hourly rating of 800 hp. The regulation of the motor at starting differs from the method followed in the passenger locomotive, as an attempt has been made to change the direction of rotation and to effect starting by a shifting of the brushes. The axis of the brushes is moved from the neutral position to one side or the other according to the desired direction of travel until there is obtained a given angle of torsion which corresponds to the end position of the brushes. An indicator in the engineer's cab gives the

brush position or the commutating step. The shifting of the brush rocker is done through a screw drive. The brush rocker is mounted on rollers and is connected with the nut of the driving screw through a driving rod. The driving screw is turned mechanically from the engineer's cab by means of the controller. A view of the motor with the movable rocker is shown on this page. Further regulation is



Dessau-Bitterfeld Electrification—Cab of Freight Locomotive

effected by altering the motor voltage by means of a step transformer, the separate steps of which are switched in by a mechanically operated controller. A static balancer is employed to obtain good commutation at all speeds. This balancer is constructed as a step transformer, and its function is to permit the regulation of the ratio between the voltages in the main winding and the compensating winding. An extra pair of controllers is provided so that the locomotive can also be used for switching.

The locomotive is now employed for drawing passenger and freight trains. It is well suited for passenger service because its high starting torque gives rapid acceleration, so that it can easily keep to the schedule notwithstanding its lower maximum speed.

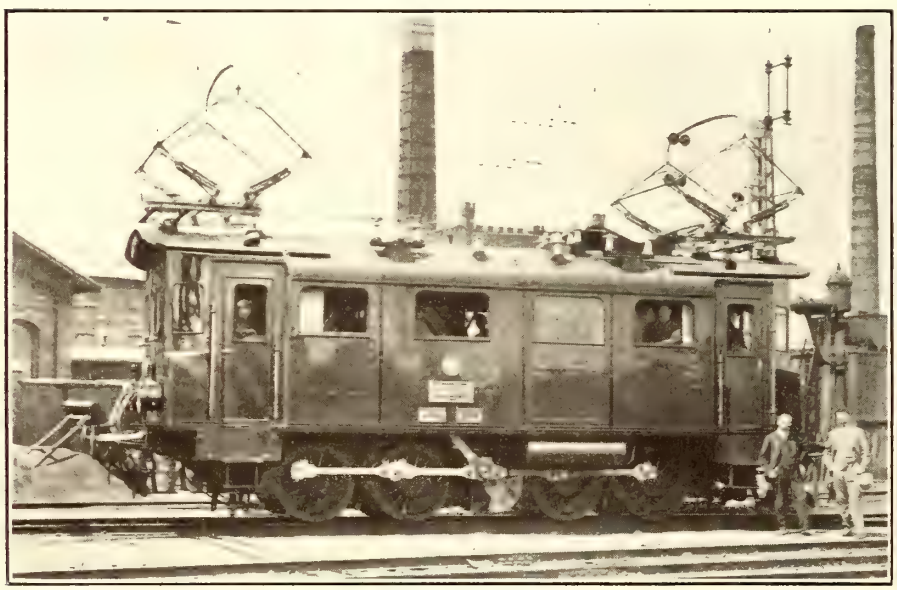
THIRD LOCOMOTIVE

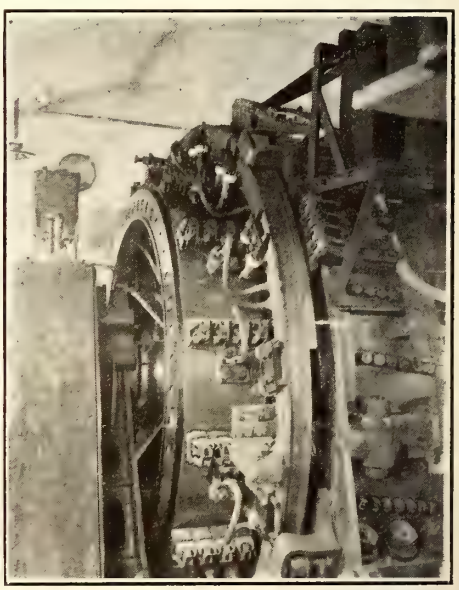
In addition to these two locomotives, the railway authorities have placed an order with the Allgemeine company for another locomotive of special construction, which will also be delivered this year for test on the Dessau-Bitterfeld line. It is intended for heavy train service on tracks with steep grades similar to those, for example, on the Lauban-Königszelt line in Silesia, the electrification of which will be undertaken shortly. This locomotive must be capable of drawing express trains at speeds up to 68.2 m.p.h. and heavy freight trains at lower speeds.

This locomotive will have four coupled axles to permit the development of maximum tractive effort. Accordingly the locomotive is to be equipped with two motors, each having an hourly rating of 900 hp, which will give it a maximum tractive effort of 23,100 lb. The motors will drive the axles by means of a parallel crank drive, both drives being connected to one intermediate crank shaft, which will be supported between the two center driving axles. The driving rods will be placed at an angle of 45 deg. to the horizontal. This arrangement will allow a favorable distribution of the strains on the intermediate crank shaft. Even when two motors are used, only one intermediate crank shaft is required, and, owing to the special nature of the drive, it is believed much more favorable conditions will exist than if two separate crank shafts were used.

This locomotive will differ appreciably from the other two designs, both in its external construction and in its system of control. The regulation of the motor voltage will not be effected in steps by means of a transformer but uninterruptedly through a rotating transformer whose core will be revolved by an auxiliary motor controlled from the motorman's cab. The commutation, however, will also be adjusted with a static balancer, the separate steps of which will be placed in circuit by a special switch, corresponding with the speed.

The two motors will be mounted near the center of the locomotive. The main transformer will be placed between them but will be slightly raised to enable the heat generated to be dissipated easily through the ventilators in the roof. The rotating core transformer will be mounted near one cab, and the mechanically operated switches for cutting out the motors and adjusting the commutation will be placed in a single case mounted above the motors. The motor-compressor and heating boiler will be placed close to the other cab. Arrangements have been made also to heat this boiler with electrical energy by the use of resistances.





Dessau-Bitterfeld Electrification—View of Freight Locomotive and of Its Single-Phase Motor with Brush Rocker

The principal data for this locomotive are as follows: Total length measured over the buffers, 46 ft. 3 in.; total wheel base, 31 ft. 9 in.; diameter of driving wheels, 58.5 in.; diameter of trailer wheels, 39.2 in.; pressure on driving wheels, 16 tons; weight available for adhesion, 64 tons.

Printing Shop of the Milwaukee Electric Railway & Light Company

This Printing Department Has Been Conducted by the Company Since June, 1906—During the Last Year This Department Turned Out $24,000 Worth of Stationery

The printing shop of the Milwaukee Electric Railway & Light Company was established as a department of that company in June, 1906. When this office was started, the only work which it handled was that of the transportation department and comprised the printing of transfers, trip sheets, etc. Gradually the scope of the work was enlarged until now practically all the printing of the company, with the exception of Milwaukee city tickets, is done at the printing shop, which is located in the Public Service Building.

As an indication of the variety of the work handled, it may be stated that nearly 900 forms are printed for the company. The work includes ruling of an intricate nature on some of the larger forms. On some of the larger books used in the accounting department the binding is done outside, but with this exception all the binding is done in the office. The superintendent of printing, H. A. Rogers, is a practical printer with a knowledge of press work. The total force consists of eleven persons, including the superintendent. The shop is an open one and employees work nine hours a day and are paid on a monthly basis.

REQUISITIONS

When a department is in need of a new form a requisition is made and sent to the purchasing department. The heading of this requisition is published herewith. The copy is then sent to the comptroller's office, where it is edited and censored and a form number supplied, after which it is sent to the printing shop. When the stock of a standard form becomes exhausted, the stationery storekeeper requisitions the purchasing department for a supply and this order is sent to the printing shop. The finished

The Milwaukee Electric Railway & Light Co.
PRINTERY TIME SLIP

Name ..... Date 19

Occupation .....

JOB NO.	CHARACTER OF WORK	FROM	TO	TOTAL TIME
			Total Time	

Each Employe is expected to fill out this slip and place it on Superintendent's desk at the close of each day. Time spent on work not directly chargeable to a specific job should be distributed among the various job numbers.

Milwaukee Printing Shop—Time Slip Filled Out by Employee

product is sent to the stationery storeroom, where all departments must procure supplies of this nature on a form, "Requisition and Receipt for Supplies."

JOB TICKET

When the requisition is received in the print shop a job ticket is made out in envelope form for the purpose of a record of all details in connection with the work. This envelope is 6½ in. × 9½ in. It has spaces for a job order number and several divisions in which provision is made for a statement of the name of the person who ordered the work, the authority for the order, the dates on which the order was issued and received, the name of the person to whom the material is to be delivered and the date on which the material is needed. There is also provision for a statement of the quantity and description of stock and of the

ORDER NO. _____ REQUISITION NO. 1050

The Milwaukee Electric Railway & Light Co.
REQUISITION FOR PURCHASE

_____ 191

Material Required for _____

To be delivered at _____

QUANTITY	DESCRIPTION	DO NOT WRITE IN THIS COLUMN

Milwaukee Printing Shop—Requisition for New Stationery

color of ink desired. The details of the binding are also noted on the envelope. The face of the envelope is reproduced on page 1024.

COST TICKET

When the work on the material is begun in the printing shop a cost ticket is made out by the superintendent. The form of this ticket is also shown. It is designed to show all the details of the men employed, time, amount, etc., involved in each job. In order that these details may be kept accurately, employees are required to use time slips which are given to the superintendent at the close of each day. The time that is spent on work and cannot be charged directly to a specific job is distributed among the various job numbers. The form of the time slip used by employees is reproduced.

In accounting for the operations the superintendent of printing makes out a monthly report. The form of this statement is shown and it provides for a statement of the cost of production of the work handled each month. In computing this cost the superintendent of printing uses, as a basis, the figures of the National Cost Congress; that is to say, he computes the cost of doing the work on the basis adopted as standard by that congress and then deducts 10 per cent from the figures. The net cost therefore is assumed to be 90 per cent of the standard cost fixed by the congress. With these figures as a basis the department showed last year a profit of over 13 per cent on the output.

The classification of printing bureau accounts used by this department in its reports is as follows:

851: Salary of superintendent and clerks. Salary of superintendent of printing bureau and salary of clerks keeping cost accounts not directly chargeable to specific job numbers.

852: Operating wages, wages of printers, apprentices and helpers. This account to be distributed on cost sheets from daily time report of the various job numbers.

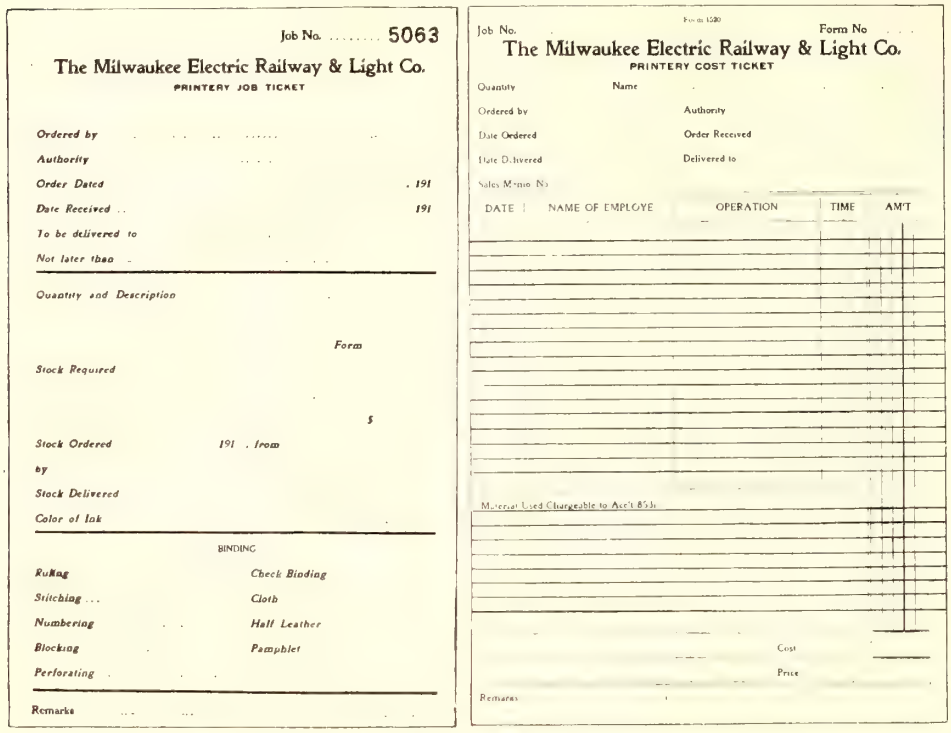
853: Materials. Cost of paper, cloth for banners, plates, directly chargeable to job numbers and all material purchased or drawn out of stock for the various job numbers. This account to be distributed on cost sheets from invoices or from stock manifest. (Make no charge to this account unless accompanied by a job number.)

854: Miscellaneous expense and supplies. Stationery and printing used in the printing bureau, benzine, kerosene,

rags, gage pins, inks, staples, binding cloth, glue, padding, etc. not charged to specific job numbers.

855: Power. Cost of power to operate equipment.

856: Rent. Cost of rent including light and heat, $125.



Job No. 5063

The Milwaukee Electric Railway & Light Co.

PRINTERY JOB TICKET

Ordered by

Authority

Order Dated . 191

Date Received .. 191

To be delivered to

Not later than

Quantity and Description

Form

Stock Required

$

Stock Ordered 191 . from

by

Stock Delivered

Color of Ink

BINDING

Ruling — Check Binding

Stitching ... — Cloth

Numbering — Half Leather

Blocking — Pamphlet

Perforating

Remarks

Job No. Form No

The Milwaukee Electric Railway & Light Co.

PRINTERY COST TICKET

Quantity Name

Ordered by Authority

Date Ordered Order Received

Date Delivered Delivered to

Sales Memo No

DATE | NAME OF EMPLOYE | OPERATION | TIME | AMT

Material Used Chargeable to Acc't 853:

Cost

Price

Remarks

Milwaukee Printing Shop—Job Ticket and Cost Ticket

857: Repairs and renewals. Repairs to printing presses, ruling machines, paper cutters, and all other tools and appliances, including replacement. (Sharpening of knives to be charged to account No. 854.)

858: Renewal of type and plates. Replacing worn-out type, cost of plates not chargeable to account No. 853, etc.

859: Insurance, taxes, interest and depreciation. Monthly charge to cover insurance, taxes, interest on investment and depreciation.

Equipment valuation	$20,000
Insurance	1 per cent
Injuries and damages	1 per cent
Taxes	2 per cent
Interest	5 per cent
Depreciation	10 per cent
Total—$3800	19 per cent

Charge $316.67 per month for fixed charges.

Monthly charge to cover any possible expense in connection with injuries and damages is 1 per cent on the total output.

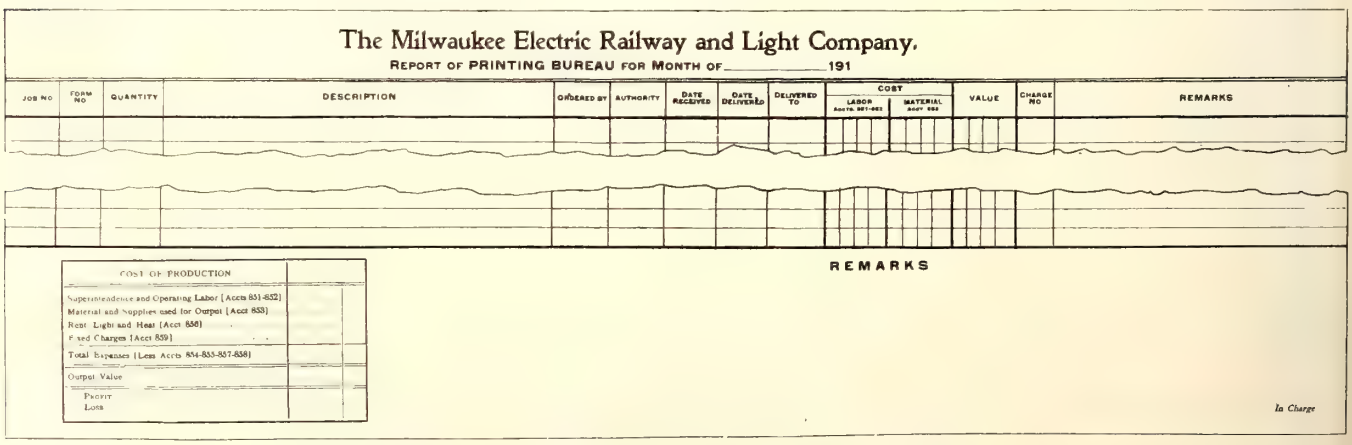
The floor space occupied by the print shop measures 26 x 127 ft. in area. The shop is charged by the company the regular commercial rate for all power used. During the last year the printing department charged $23,000 worth of work to the Milwaukee Electric Railway & Light Company and $1,000 worth of work to companies affiliated with that company. From the sale of scrap paper $250 was realized. Some of the costs of the department are as follows: Salaries, $5,000; materials and supplies used, $9,000; repairs, including some installation work, $225; power, $90; rent, $1,500; renewal of type and plates, $30.

In meeting the charges in the classification the proportionate monthly amount is deducted each month. The cost of the work is kept down by the fact that the company has no overhead charges or expenses for solicitors and no debts to consider. Everyone employed is actively engaged in producing work which is definitely needed for some purpose in the operations of the company.

The plant consists of a Harris automatic press which prints transfers and conductors' receipt books, besides doing other work; a 42-in. Miehle press, a Colt job press and a Chandler & Price-Gordon job press; a Bloomfeld & Rapp special ticket-printing machine, a punch, perforator, paging machine, stitcher, Hickok ruling machine and a baling machine. The latter is used for waste paper.

The net result of operation of the print shop is that the work of printing is done as a rule for about 10 per cent less than the price of outside printers. In the effort to keep the cost of production as low as possible, the stock for transfers is bought in car-load lots. The net cost of transfers to the company is about 8½ cents per thousand and this price does not include any allowance for the printing office for changes in forms, which amounts to something each year. No charge is made for experiments in forms.

As an example of the many classes of forms and books printed by the printing department, the following may be mentioned: Cash-fare receipt for interurban cars; income account, employees' record, condensed income account and balance sheet, line article record, daily record of contracts secured, conductors' record of transfers issued, daily report of conductors' ticket and transfer errors, daily report



The Milwaukee Electric Railway and Light Company.

REPORT OF PRINTING BUREAU FOR MONTH OF_____191

JOB NO	FORM NO	QUANTITY	DESCRIPTION	ORDERED BY	AUTHORITY	DATE RECEIVED	DATE DELIVERED	DELIVERED TO	COST LABOR Acct's. 851-852	COST MATERIAL Acct 853	VALUE	CHARGE NO	REMARKS

COST OF PRODUCTION	
Superintendence and Operating Labor [Accts 851-852]	
Material and Supplies used for Output [Acct 853]	
Rent Light and Heat [Acct 856]	
Fixed Charges [Acct 859]	
Total Expenses [Less Accts 854-855-857-858]	
Output Value	
Profit / Loss	

REMARKS

In Charge

Milwaukee Printing Shop—Form of Monthly Report

of cars operated, record of transfers issued to conductors, register readings and mileage and conductors' returns, blueprint record, meter test record, utility department order, electric salesman's daily report, feeder report, boiler inspection report, record of names of witnesses of accidents, car repair notice, conductors' daily cash remittance slip, complaint card, conductors' trip sheet, substation load record, consumers' electric service record, time slips for rolling stock and other departments, load record of transformer station, report of unusual electrical operation and trouble, installation record, conductors' report of accidents, form for statement of accidents by witnesses, voucher, bill for electric service, consumers' billing record, work order notification, statement of distribution of stores delivered, payroll analysis, traffic statistics, pay roll, balance sheet, statement of tickets issued by conductors, passengers carried and earnings by days and stations.

REASONS FOR THE CHOICE OF 16 2-3 CYCLES FOR PRUSSIAN STATE RAILWAYS

An article by an official of the Prussian State Railways in *Elektrische Kraftbetriebe und Bahnen* for Oct. 4, 1911, explains why the Prussian State Railways have decided to make 16⅔ cycles their standard frequency for trunk-line electrification. In the first place, it was desired that the generating plants should be of such character that they could supply current most economically for both the railway service and lighting and industrial motor circuits thereby securing the best possible load factor. The standard frequency in Germany for lighting and industrial purposes is 50 cycles, which is too high for the most efficient railway operations. To effect a compromise advantage will be taken of the efficiency of synchronous converter sets, which are better and cheaper than asynchronous motors for changing three-phase current to single-phase current. When synchronous motor-generator sets are used there is a definite ratio between the frequency of the three-phase current and that of the converted current. For instance, a 50-cycle synchronous motor-generator set changes the frequency in the ratio of 50:3, giving an output of 16⅔ cycles, which is 1⅔ cycles higher than the frequency hitherto used in Germany for heavy electric traction. The use of 16⅔ cycles gives a greater choice in the selection of converter sets, as either synchronous motors of high efficiency or asynchronous motors may be used, according to conditions. Furthermore, the use of synchronous motors improves the power factor of the distribution system. What has been said about synchronous machines with regard to generating single-phase current from three-phase current is also true of the opposite case.

The use of 16⅔ cycles will also increase slightly the capacity and efficiency of the transformers. The weight of a 16⅔-cycle transformer is 4 per cent to 5 per cent less than that of 15-cycle transformers of the same capacity. The conditions for the turbines and motor-generator sets are also a little more favorable, and there is no great difference in the efficiency of the distribution systems in the two cases.

Of course the reason for choosing a very low frequency for railway electrification was to insure the most favorable conditions for the locomotives and other electrical parts of the railway equipment. It was not absolutely essential to choose 15 cycles, and, as a matter of fact, the present 15-cycle machines will operate on 16⅔ cycles with very little loss in efficiency or increase in commutator sparking and heating. The writer in the German paper mentioned points out that under American conditions, where 60-cycle, three-phase current is so largely used for lighting and industrial motor circuits, synchronous converter sets could be used to change it economically to 15 cycles, of which it is a perfect multiple.

INSTRUCTING TRAINMEN IN THE ECONOMICAL USE OF POWER

Special emphasis has been laid of late upon the efficient application of power at the hands of trainmen and other car service employees, and both in preliminary training and inspection of operating performance much has been accomplished in the direction of educating the men most closely concerned in the handling of equipment in its economical use. To carry this work of conservation a step further the Boston Elevated Railway Company has just had printed a 32-page pamphlet on the "Economical Use of Power," the text being based upon a paper read several months ago before the Boston Elevated Efficiency Club by John W. Corning, electrical engineer of the company. The pamphlet is planned for the special use of motormen and other employees more or less intimately connected with the use of power for car and train propulsion, heating and lighting of rolling stock, buildings and stations. It constitutes a species of elementary practical textbook which is certain to be found of great value in the broadening of the training of transportation employees in the principles and uses of electricity on the system.

The booklet presents the general theory of power generation and supply from a central alternating-current plant through to the rolling stock, the technical points involved being explained in clear and simple language. There are half a dozen excellent diagrams giving analogies between the flow of water and the transfer of electricity along a circuit, and the chain of operations occurring between the unloading of the coal barge at the power station wharf and the return of current to the negative bus from the track. Many points of general interest are also covered, such as the annual expenditure of about $1,000,000 by the company for power, the fact that modern standards of car design and speed require at least 50 per cent more power per passenger than a few years ago, the evils of wasted power, differences between "power" and "energy," underlying principles of generation, transmission, conversion and distribution.

The fundamental electrical units encountered in electric railway work are then explained, together with the elements of lighting, motor service and heating. An interesting point is that the ordinary eight-bench open cars of the company require about 8 kw in power station capacity, compared with 12 kw for a ten-bench car; 24 kw for a 25-ft. closed car; 26 kw for a 26½-ft. closed car; 56 kw for a No. 3 semi-convertible car; 76 kw for an elevated car, and 120 kw for a Cambridge subway type of car. Of the yearly power output of the company, 78 per cent is used in car propulsion, 9 per cent in line losses, and lighting and heating from 5 to 6 per cent each. Air brakes require 2 per cent of the yearly output. The power required for car lighting in Boston varies from 640 watts to 2.56 kw, and at present about 1500 surface and 216 elevated cars are in use on the Boston system. Between the best and poorest motorman the difference in power consumption for a given run may be as high as 30 per cent. The booklet also gives the following results of tests, showing the effect of keeping the brakes on: First run, brakeshoes clear of wheel, power consumed by wattmeter measurement 1.72 kw-hours per car-mile; second test, pressure of 24 lb. applied to brake handle, power required 3.54 kw-hours per car-mile, or an increase of 106 per cent over free running; third test, pressure 36 lb., power required 5.36 kw-hours per car per car mile, an increase of 212 per cent over free running.

The booklet also includes brake diagrams showing the pressures at different points in the rigging under various conditions of service and emphasizes the importance of always aiming to secure the maximum safety in operation.

Reports at the Convention of the National Association of Railway Commissioners

The Reports of Especial Interest to Electric Railway Companies Were That on Railway Taxes and Valuations and That on Railway Capitalization—Abstracts Are Presented

At the annual convention of the National Association of Railway Commissioners held in Washington, D. C., Oct. 10-13, a report was presented by the committee on railroad taxes and plans for ascertaining a fair valuation of railway properties. The report was prepared by Edward M. Bassett, formerly a member of the New York Public Service Commission, First District, and was approved by the members of the committee with one exception.

An abstract of the report follows:

USES FOR A VALUATION OF A PUBLIC UTILITY PROPERTY

"A valuation of a railroad or other public utility may be made for various purposes: (1) private purchase, including the purchase or marketing of securities; (2) public purchase for municipal or government ownership; (3) taxation; (4) rate making; (5) accounting and capitalization.

"A state commission will have nothing to do with valuations for the first purpose above stated but will be required to make valuations for any or all of the other four purposes. Thus the Wisconsin Railroad Commission has been required to make valuations of waterworks for the purpose of municipal purchase; the official valuations of railroads in Michigan and Wisconsin were for tax purposes, the official valuation of railroads in Minnesota, Washington and South Dakota primarily for rate purposes, and the official valuation in Texas for the purpose of regulating the issue of stocks and bonds.

"It is a question of prime importance whether a valuation for one of these purposes may be used for the other purposes also. It may happen that fair value for one purpose is the same as fair value for another, but in order to determine what is fair value for any specific purpose it is necessary to think it out with reference to this purpose only, and when we discuss the theory and elements of valuation it seems necessary that we should have in mind a specific purpose that the valuation is to serve. It appears to us that considerable confusion in the discussion of the subject of valuation has arisen either from lack of attention to this fact or from the false assumption that value may be ascertained without reference to purpose.

CONFUSION OF THE TERMS "COST" AND "VALUE"

"Some of the trouble doubtless arises from a confusion of the terms 'cost' and 'value.' Cost is not necessarily value for any purpose, though it is an element in estimating fair value for almost any purpose. Thus fair value for rate purposes may be based largely on actual cost or on reproduction cost or on a composite of actual cost and reproduction cost. Considerations of equity may, as to certain elements of cost, lead to the acceptance of actual cost as the fairer basis, while as to other elements the cost of reproduction may be a better indication of present fair value for rate purposes. Take for example the question of promotion and other preliminary development costs. In a valuation for rate purposes, though cost of reproduction may be used as a general rule, it may seem more equitable to use actual cost of promotion, that is, the necessary cost of promoting the small initial plant, rather than the cost to-day of promoting a plant of the size of the present one, may be taken. Or, on the other hand, promotion cost may be entirely excluded from a valuation for rate purposes and considered only in fixing the fair rate of return.

"This leads to a fundamental distinction between fair value for rate purposes and fair value for purchase, condemnation or taxation. The thing of real importance in a rate case is not the fair value of the property alone or the fair rate of return alone, but the product of the two. This product is the net return that the owners are to receive for the use of their property. If the total net return is adequate, it is immaterial, in so far at least as the justice of the result is concerned, whether, for example, there is allowed a 7 per cent return on a valuation of $1,000,000 or a 5 per cent return on a valuation of $1,400,000, as the net return is $70,000 in either case. In a case of condemnation or municipal purchase, however, the valuation is final and all important. In fixing commercial value, market value or fair value under condemnation for the purchase of a plant operating under a perpetual franchise, the net return under legal or reasonable rates is often the chief determining factor. The net return is capitalized at the rate considered fair for the purpose, and the result is taken as the fair market or commercial value. Thus, recurring to the above illustration, a net return of $70,000 capitalized on a 5 per cent basis gives a valuation of $1,400,000. And if in this case the present value of the physical plant has been found to be $1,000,000, the difference, $400,000, is attributed to franchise and going value. Owing to the fact that the rate of return ordinarily deemed reasonable in a rate case is in excess of the rate of capitalization that determines commercial value, the commercial value will ordinarily exceed the fair value for rate purposes. One rule for determining fair rate of return that has considerable merit is to allow a rate of return that would be adequate at the present time to induce investment in a new enterprise of similar character. The state must consider the effect of its action on new enterprises as well as merely seeing that the property of the present owner is not confiscated. In doing so a going value is created for purposes of sale.

VALUES FOR RATE-MAKING PURPOSES AND FOR TAXATION

"If it is decided that a public utility should be taxed on its total value as a going concern—that is, its commercial, market or sale value—then franchise and going value will be included. If, on the other hand, the public-utility plant is to be taxed precisely as other real estate, the cost of reproduction less depreciation will be the basis. There is no inherent inconsistency in using one method of valuation for tax purposes and another method for rate purposes. The tax, by whatever method assessed, is considered an operating expense in fixing rates, and is therefore borne by the user of the service wherever rates of charge are strictly regulated. Methods of ad valorem taxation must be worked out with an eye single to what is just and practicable in taxation, and methods of valuation for rate purposes must be worked out with an eye single to what is just and constitutional in rate making.

VALUE OF MISPLACED OR PARTIALLY OBSOLETE PLANT

"The misplaced or partially obsolete plant or road is the one that causes greatest difficulty in valuations for any purpose. A street railway is constructed chiefly to carry passengers to a certain terminal, but currents of travel having changed it cannot possibly earn interest on its actual cost. Under such conditions the plant or line as a whole must be recognized as partially obsolete, and the best gage of its present depreciated value will in many cases be its fair market value. A general reduction in the rates of a road or plant of this kind seldom comes up for official consideration, but it very frequently happens in valuing any comprehensive railroad or street-railway system for rate purposes that there are certain lines that are partially obsolete though the system, as a whole, is earning a profit.

For such partially obsolete or partially used lines, neither actual cost nor reproduction cost, nor reproduction cost less existing physical depreciation, furnishes any basis for fixing fair value for rate purposes. The value that will be most appropriate will be a value based on the earnings of the line as a part of the system and will thus be closely related to market or commercial value. But though in a rate case we can base the value of a particular part of a comprehensive system on earnings or market value, we cannot base the value of the whole system on market value, as the market value depends on the scale of rates charged, and the rate scale is the question at issue. The market value of the system will depend largely on the net return that may be earned under the rate scale allowed.

RELATION OF CAPITALIZATION TO VALUE FOR RATE-MAKING PURPOSES

"The books of a company, kept from the start in accordance with a correct accounting system, would show a capital account that would be closer to what seems a just, fair value for rate purposes than any other single basis. But owing, perhaps, to lack of accounts kept as above, the court decisions have given greater weight to cost of reproduction or cost of reproduction less depreciation than to actual cost in determining fair value for rate purposes. Capitalization, or the amount of stock and bonds issued (which may be a very different amount from the book assets), might also, if issued under strict supervision from the start, be a most important element in fixing fair value for rate purposes. If the bonds, however, were issued either at a premium or at a discount this fact would have to be taken into account. The same may be said of stock issued at a premium. Both brokerage and deferred interest or discount proper are a part of the amount that the company must pay on its borrowed capital. They should both be paid out of earnings during the term of the bonds.

"An ideal system of capitalization and accounting would assume that the stockholders contributed and dedicated a certain amount of money for the construction, equipment and operation of the public utility; that they added to this contribution from time to time as capital purposes demanded; that proper repairs were always made and charged to operating expense; that no deferred maintenance was allowed to creep in; that the life of each element of construction and equipment was accurately estimated and reserves out of earnings set aside, so that as each element was worn out or became inadequate or obsolete it could be exactly replaced, no more and no less, out of its respective reserve; and that all payments made for the use of money were made out of earnings and not in any case added to capitalization. Let us suppose that the stockholders of this ideal system would expect only a reasonable interest return on their investment, perhaps plus a sum to represent their service in carrying on the public utility. In such a corporation the capitalization shown on its books could be taken as a valuation for rate making, or for capitalization in case of merger, consolidation or reorganization. It would not necessarily be a valuation for taxation, condemnation, sale or sale of securities. The process of rate making would be the adjustment of rates from time to time so that they would yield a fair return to the investors. The valuation for taxation, condemnation, sale or sale of securities might be either more or less, according to supply and demand and the various causes that produce fluctuations in price. The ideal conditions of our illustration can probably never be realized either on the corporation or the governmental side. No human prescience can fix the time when construction or equipment will become obsolete or inadequate. Even the period of normal wear is at best a good guess, for wear is never uniform and materials always will vary in quality. Consequently the valuation for rate making and the capitalization and book value will tend to differ.

CONCLUSION

"We have said enough perhaps to indicate that valuation for any purpose is a very complicated matter, but that valuation for rate purposes is the most difficult and complicated of all. We have shown, too, that the term value is meaningless unless made with reference to some particular purpose, and that any attempt to find a common single basis of valuation is futile.

"We wish to acknowledge, with thanks, the assistance of R. H. Whitten, librarian of the Public Service Commission of the First New York District, in the framing of this report."

The members of the committee who signed the report are as follows: Edward M. Bassett, New York, chairman; John F. McClure, Indiana; Clyde B. Aitchison, Oregon, and G. McD. Hampton, South Carolina. Mr. Hampton added to the report that he believed in arriving at a fair and just valuation of railroad properties, and that to this end the net earnings of such railroads should be taken into consideration. John C. Lawrence, of Washington, dissented from the opinions expressed in the report.

RAILWAY CAPITALIZATION

A report of the committee on railway capitalization was presented at the annual meeting of the National Association of Railway Commissioners held in Washington, D. C., on Oct. 10 to 13. An abstract of the report follows:

REGULATIONS IN DIFFERENT STATES

"The regulation of the issuance and sale of railway stock and bonds and other forms of railway securities has been practised in Massachusetts and New York during many years. Wisconsin provides in its statutes for such regulation by its Railroad Commission, and several other states have undertaken the task. Latterly the statutes of various states have been amended, with a view to rendering more precise and effective the restrictive legislation in those states upon this subject. For a long period Massachusetts has undertaken to place regulating restrictions upon railway capitalization. In that state much of the pioneer work in the development of this class of regulation has been done. Regulation of railway capitalization by the states is extending and becoming a fixed part of effective schemes of governmental railway supervision.

"It has not been practicable for the committee to compare the work of the state commissions as relating to regulation of railway capitalization issues, but it is important that such labor of comparing statutes, extensive though it be, should be undertaken by a committee of the association at an early day, so that it may be definitely stated how far uniformity has progressed, and conclusion be reached as to the extent that greater uniformity is desirable. The committee on this subject should also take under consideration the practical necessity of uniform treatment by two or more state commissions of a stock or bond application presented by a carrier operating in each state. These applications have hitherto been given like determination in Massachusetts and New York as to lines operated in both states. This is not a matter of great difficulty, since the principles underlying the regulations are simple in the main and the object to be attained is the prevention of improper charges against the property.

INTEREST OF PUBLIC IN REGULATIONS FOR ISSUE OF SECURITIES

"In the issuance of these railway securities primarily the public is concerned in that they shall be sold for their full value and the proceeds applied to the construction or improvement of railway property. Secondarily, but in an important degree, the general public has strong interest in the proportion of stock to bonds and in the improvement of railway properties without unnecessary additions to the bond interest or fixed charge account. Unnecessary additions to the carrier's debt account impose limitations upon the ability of the carrier to keep up or improve its service and directly charge the revenues of the carrier which are derived from the carrying of passengers and property. It is not difficult to see how the existence of heavy debt

burdens impels railway managers to seek in every practical way to increase rates.

"The owners of railway stock and the owners of railway mortgage securities have direct interest in the prevention of unnecessary additions to bond and other general debt accounts. Whatever increases the equity of shareholders serves their interest, and whatever adds to the property value without increasing the debt renders more secure the investment of the bondholder. Nevertheless, the history of our railroads bristles with financial transactions inimical to the interests of the owners and creditors of these great properties. The interests of stockholders and bondholders and of the people as compulsory customers of the railways have not been, in the absence of governmental regulation, protected in any reasonable degree. That such regulation is indispensable to the conservation of the true interests of the corporation, its shareholders and creditors, and the interests of the general public, is fast coming into general recognition.

REGULATION IN NEW YORK STATE

"Regulation of railway corporations in New York in respect to capitalization may be referred to briefly. For many years the State has had upon its statute books a law prohibiting the issuance of stock or bonds except for money, property or labor performed. The law was a mere form, and its prohibitions were evaded with ease and impunity. In 1907 the public-service commissions law was enacted, providing for full investigation and restriction by the commission of the issuance and sale of stock, bonds, notes and other evidences of indebtedness for certain specified purposes, namely, acquisition of property; completion, extension or improvement of facilities; improvement or maintenance of the service, or discharge or lawful refunding of obligations. To this was added in 1910 a provision permitting reimbursement of the carrier's treasury for moneys expended from income during five years preceding for any of such purposes, except maintenance of service and except replacements.

"Under the law as it has been interpreted by the commission and courts of the State, replacements are not permitted to be capitalized. Under the most exceptional conditions and for very short terms an order may issue to cover a temporary financial exigency. The minimum price at which bonds or other evidences of debt may be sold is specified in each order, and all stock must be issued upon the basis of par value. The policy of the commission in respect of new companies authorized to build a railroad is to make such allowance for preliminary work and for organization as in each case seems reasonable. This justly takes the place of the former extravagant absorption of stock and sometimes of bonds for the purpose of satisfying individual claims for promotion services. The commission allows full and even ample compensation for such services as may be shown in each case. This fully recognizes valid claims but prevents exploitation of the corporation.

"These statutory provisions and their administration are referred to generally as an example of regulation for capitalization that is working well and without creating hardship upon the carriers. The important results are that the full money value, or as nearly as that may be estimated, is obtained for railway bonds and railway notes. All stock issued under the law represents a full par value return, the proceeds are applied to proper corporate purposes, and fixed capital accounts of the companies, which represent a statement of the cost value of the property, are growing more and more to be mathematical statements instead of estimates of value designed frequently to swell the asset side of general balance statements.

EFFECT OF PROPER REGULATION OF CAPITALIZATION

"The proper regulation of railway capitalization avoids determination as to the propriety of proposed improvements or betterments or the extension of lines by new construction, and in general those matters of corporate policy which should be left undisturbed in the judgment of the company's board of directors. On the other hand, such regulation to be effective does necessarily include prevention of the capitalization of replacements and any other part of operating expenses or any of the interest charges. While emergency measures must be recognized, and at times heroic steps to save a company from insolvency should be sanctioned, they constitute rare exceptions to be treated on their merits with a full view as to the company's ability shortly to recover from the financial embarrassment so presented. The duty of a railroad company to refrain from producing 'water' in its capitalization is so thoroughly recognized that the terms 'prevention of fraud' and 'prevention of waste' in the issuance and sale of stock, bonds and other evidences of debt and use of the proceeds may be taken as the underlying purposes of the exercise of governmental power in respect of railway securities. Such recognition has been reached through the exposition of repeated mistakes on the part of railway managers in the past, decisions of courts, frequent agitations resulting in expressions of public opinion, the concurrence of wise railway officials and of financiers, and latterly the successful operation and administration of restrictive laws in the states.

"In the operation of such laws it has been demonstrated that, after all, financial arrangements can be made as they were before, while the purchase price of new security issues is increased greatly by the knowledge of investors that the corporate purposes to which the proceeds of the securities are to be applied have been subjected to an impartial government investigation and have been found to call for expenditure of the money involved. Those only who have interest in charging the debt securities of railroads with extortionate selling discounts or in serving other personal ends opposed to the welfare of the corporation are to be counted as opposed to reasonable restrictions upon the issuance of such securities.

RELATIVE EFFECT OF THE ISSUE OF STOCK AND BONDS

"A practice followed by a great number of carriers in the past and at the present time is to issue bonds for all, or practically all, betterments and improvements. It is clear that starting with a stated amount of stock and a stated amount of bonds and constantly increasing the bonded debt as the necessity for capital expenditure arises does not operate at any time to increase the value of the shareholders' equity. It does operate to increase the fixed charges. After long operation a railroad company should be able to decrease rather than increase its mortgage debt, or at least be paying a substantial percentage of the cost of betterments and improvements from the income without issuing bonds to cover such percentage of betterment or improvement cost. It should do this while at the same time accumulating a surplus which it keeps available for use in times of sparse traffic offerings. This is no more than ordinary business prudence should dictate and a course that is pursued by prosperous business corporations. The ever-swelling fixed charge, except as met by increased traffic returns, tends constantly to diminish net corporate income. It prevents or diminishes the return to stockholders and is well calculated to destroy in the end the value of the shareholders' equity in the property. By that course the reproduction value of the property may be increased, but the net earning capacity of the property may be decreased. The real test of the commercial value of a railroad property is found in its net earnings.

"The practice of capitalizing all improvements and betterments has been followed in Great Britain to such extent as to awaken serious apprehension for the continued prosperous operation of various companies and fear that governmental aid may be necessary in the not distant future. It is encouraging to note that banking interests are not oblivious to the situation and that in the case of many smaller companies they have insisted that new mortgages

shall contain a clause that future improvements and betterments shall not be made from mortgage bonds beyond a stated per cent of their cost. A similar safeguard might well be inserted in the mortgages of all companies and the influence of financiers be directed upon boards of directors to the end that some fair percentage of the cost of improvements and betterments shall always be paid from income without subsequent capitalization.

If the railroad companies of this country had been subjected to reasonable regulation of their capitalization during all of the past five or six decades, Black Fridays would rarely appear upon the pages of financial history and sudden receiverships of railroad corporations with makeshift reorganizations would not constitute frequent blots upon the record of our greatest of business industries. With such sane regulation and common business prudence in railroad affairs, is it not altogether probable that rates scheduled upon a low basis with reference to actual transportation conditions would have remained low and the violent disruption of rate adjustments due to asserted necessity for increased revenues would rarely have occurred?

FEDERAL AND STATE REGULATION

"As all are doubtless advised, federal regulation of railway capitalization has been proposed and is now under consideration. State commissions are not necessarily opposed to a policy of federal regulation on this subject. The interests of the states are concerned chiefly in the preservation of state authority over corporations which must be organized under state laws. All questions as to the exercise of state and federal authority in matters of railway capitalization must be deferred for consideration pending the actual proposals for federal supervision which may be announced."

The members of the committee who made the report were as follows : Martin S. Decker, New York, chairman; O. P. Gothlin, Ohio; James M. Ambler, Maryland; Charles A. Prouty, Interstate Commerce Commission; H. T. Clark, Jr., Nebraska; C. L. Glasgow, Michigan, and Robert R. Prentis, Virginia.

IMPROVEMENTS OF THE INTERNATIONAL RAILWAY OF BUFFALO

The International Railway of Buffalo is reconstructing 6100 ft. of double track on Main Street, which is the principal thoroughfare in the city. Eight inches of crushed stone are placed under treated ties, which are spaced 2 ft. apart. A 124-lb., 9 in., open-hearth girder rail, section 124-432 of the Lorain Steel Company, is used. Tie plates and screw spikes are used and, at distances of 5 ft., tie rods. Concrete filling is employed between the ties and Medina sandstone blocks have been adopted for the paving. In the reconstruction a great deal of special work located in places where it was not in constant use, as at switches for emergency purposes, has been replaced by unbroken main-line frogs and switches of the Wharton type.

One of the principal changes affecting the movement of traffic which has been made by the International Railway is the rerouting of the Elmwood and Hoyt lines, two of the heaviest lines of residential traffic in the city. These lines were formerly operated on Main Street in the central business district and their transfer has relieved materially the congestion of traffic on that thoroughfare. The opening of a new street by the city permitted the company to route the two lines on Franklin Street, which is two blocks from Main Street.

L'Industrie Electrique for Oct. 10, 1911, contains an illustrated description of the single-phase traction system of the Haute-Vienne district in France. The total length of the lines is 345 km (207 miles) and comprises four lines, all starting from Limoges. Use is made of single-phase current at 10,000 volts supplied from two stations.

THE HUMANE SIDE OF ACCIDENT WORK

BY F. W. JOHNSON, SUPERINTENDENT OF BUREAU FOR PREVENTION OF ACCIDENTS, PHILADELPHIA RAPID TRANSIT COMPANY

Of the many complex problems presented by modern electric railroading, none offers wider scope for discussion or greater latitude for the exercise of genius by minds of a practical turn than does that portion of it which has to do with its resultant casualties. It is inevitable that in all manner of human progress there must be an expenditure or sacrifice of one character or another commensurate with the results obtained or sought. Whether the cost so incurred will be excessive necessarily depends primarily upon the peculiar circumstances surrounding each individual effort.

The present age, admittedly intensely practical, experiences difficulty in viewing a business proposition from any standpoint other than that of pure commercialism. Appeals to the higher emotions invariably are looked upon as evidences of weakness or of sentimentality, and therefore deserving of no special consideration in business. Selfishness, unfortunately, all too often seems to form the keystone of the standard of ethics consciously or unconsciously adopted by many who have achieved success in commerce.

Whatever may be one's views upon such matters, it is pertinent to inquire whether such standards may justly be invoked when one is charged with a high moral responsibility; when the physical well-being, nay the very existence, of another may rest in the balance. Can one consistently take into consideration only the legal aspects of so great a responsibility? Are we, as public servants, entirely fulfilling our duty toward humanity when we merely apportion a certain stipulated sum of money as recompense for the taking of a life or the infliction of severe personal injuries, when by the exercise of greater diligence we might have avoided entirely this loss to society? It is one thing to consider such matters as abstract problems. It is quite another to look upon them as concrete examples of our own shortcomings.

ITS APPLICATION TO ELECTRIC RAILWAYS

I know of no public movement which arouses within one a truer appreciation of our real duty toward others than does this. There can be no greater responsibility placed upon us than that of being intrusted with the lives and safety of our fellow beings. Whether we are proving ourselves worthy of this stewardship can best be answered by an appeal to our innermost conscience. I recall a case in point which occurred some years ago and will serve to make plain the principle involved. A carpenter, in very moderate circumstances, had fallen asleep upon the track at night, while in an intoxicated condition, and shortly thereafter had been struck and killed by a passing car. The accident clearly was of an unavoidable character, and so far as I can recall, no claim for damages ever was presented by his heirs. The matter subsequently attracted the attention of an executive. Actuated solely by humane impulses of a high order, he forthwith ordered the cars of this particular line to be equipped with headlights of a more powerful type, as a means of preventing the recurrence of similar mishaps, irrespective of any question of legal responsibility.

One can arrive at a proper appreciation of this kindliness of heart only by considering it in conjunction with other incidents of a like nature. Comparisons are odious only in so far as they reflect adversely upon ourselves, and it is but natural that we should disapprove in others what we may at times condone in ourselves. Suffice to say, the moral obligations involved in the conduct of our daily affairs are not always so clearly recognized as in this instance, nor always obeyed even when so recognized.

I cannot but look upon the man who responds to these nobler emotions, more particularly when endowed with a

special responsibility, as a public benefactor. His part in the general scheme may be ever so insignificant, yet if he is laboring genuinely and sincerely in the interest of safety for his fellows, he cannot but inspire confidence and arouse admiration. If his contemporaries are of insufficient depth of mind to appreciate his true worth, it is their misfortune and not his. The better qualities in our lives are bound to prevail, the less worthy to sink into oblivion.

AVOIDABLE ACCIDENTS

The ultimate results of serious mishaps oftentimes are so far-reaching in their effects as to seem almost incredible. I once knew of a single case which permanently changed for the worse the entire course of several persons' lives. Instances wherein a person's subsequent usefulness, either to himself or to others, has been seriously impaired or even destroyed are of too frequent occurrence to justify mention. Many of these injuries arise out of what are commonly termed "avoidable accidents," and in this sense they instantly become of vital importance to our subject. Avoidable accidents may be either liability or non-liability in character, serious or otherwise in consequences, costly or inexpensive in results, and they may occur through the negligence of either the plaintiff or the defendant. The term is a most liberal one, and its field of activity to one engaged in accident work is proportionately broad.

It is not to be inferred that I advocate the exercise of this compassion along impracticable lines or to fantastic lengths. It is neither to be expected nor desired that one shall take up with every new safety device which may be perfected or with every new theory which may be exploited. Such a course would shortly defeat its own ends. There is, however, middle ground upon which one may safely tread and which is not difficult of ascertainment if only one sincerely and conscientiously seeks it.

CAUSES OF AVOIDABLE ACCIDENTS

Many causes doubtless contribute to permit of the continued existence of a condition which makes possible the constant recurrence, without serious opposition, of severe mishaps of an avoidable character. We shall eliminate most of these for the moment and consider only such as have a more or less direct bearing upon our immediate subject. These may briefly be summarized under the following captions :

"Indolence." A disinclination to act, not openly admitted or even recognized in some instances, but constituting nevertheless a very real obstacle to the successful development of our subject. It does not necessarily extend to nor impair activities in other directions.

"Inherited acquiescence." The acceptance, consciously or unconsciously, of the erroneous impression that "accidents are a part of the business," and something, therefore, to be looked upon with feelings akin to complacency. "Inherited," because of its intimate connection with the subject of railroading in past years.

"Skepticism." A natural aversion to anything new in railroading and especially to prevention-of-accident work. Usually encountered in representatives of the old school, so to speak.

"False economy." The apparent inability to realize that good business principles are just as applicable to this phase of railroading as to any other. It requires the expenditure of money to make money, and inversely, in accident work, to save money.

The precise application of these citations may at first seem somewhat obscure until it be known that these factors have in the past militated strongly against the successful introduction into railway accident work of the broad principles of humanitarianism. Obstacles such as these may not be swept aside in a day; greater forces will eventually be brought to bear upon a subject of such vital import to society; the march of human events is irresistible, however, and it is not given to any individual long to stay its progress or to retard its ultimate destinies.

INDIFFERENCE CHANGED TO REALIZATION

I have often remarked the seeming indifference with which many successful men of affairs will regard an apparently abstract theorem until suddenly some striking incident arises which instantly gives concrete, definite existence to that which formerly had appealed to them only as a vague, intangible possibility of the future. Of incalculable assistance is this to the development of advanced accident work in the electric railway field. A simple illustration will suffice:

A prominent operating official of an interurban property had never devoted any especial thought to the accident situation upon his lines other than in so far as it directly affected his receipts and expenditures. His interest in the subject was purely a commercial one, and in this respect he differed in no essential degree from many others similarly situated. One evening, quite unexpectedly, he chanced to be an eye-witness to a most distressing fatality which might have been entirely avoided through the instrumentality of certain reasonable changes in operating conditions at this particular point. Not only were these changes immediately effected but other situations of like nature received similar consideration.

Almost against his will, and probably without realizing the fundamental changes in his very nature, that official forthwith became a humanitarian of a practical type. Equally serious accidents, almost identical in character, had produced no such startling effect upon him in past years. That the impression received that night was not of a passing nature has since been well demonstrated by the ceaseless vigilance with which he now scrutinizes every such detail of his management.

Can we say that such a man isn't bigger and broader and better in his acknowledgment of human impulses? Can we consistently compare with him the man who, under similar circumstances, considers only the financial or legal possibilities involved? Can we justly characterize such a man as being sentimental or emotional or impractical, because his dominating consideration is that of safety for the traveling public of which even the very members of our own immediate families form a part? Is he the less valuable to his employers and to the general public because he possesses sufficient wisdom to recognize the existence of a very real community of interests between the two?

There comes to mind a tragic occurrence which happened many years ago, when advanced accident work was more or less of an unknown quantity, and has ever since appealed to me most strongly. An established rule of the company concerned prescribed that motormen should pass standing cars, on double track, at a very slow rate of speed. Late one afternoon a comparatively new motorman thoughtlessly disregarded this regulation as he approached a standing car. An instant later a small child darted out from behind the stationary car, and to his horror he recognized his own daughter. Had the dramatic intensity of that tragedy been strikingly portrayed at the time to all motormen throughout that system, it could not but have proved a most powerful agent for good. But, unfortunately, there was lacking within the management the requisite germ of humaneness, for its officials concerned themselves almost exclusively with the examination of the probable legal principles involved. In other words, the commercial instinct predominated over the humanistic.

The really ideal combination in accident work comprises a happy blending of the practical with the humane, each enhancing the value of the other, and both contributing to the common good. The true significance of this will in time appeal to us with ever increasing force as the various stages of its irresistible development unfold.

In Accident Bulletin No. 40 the Interstate Commerce Commission reports 410 persons killed and 3264 injured on electric lines doing an interstate business.

Meeting of Engineering Association Committee on Standards

Eight Proposed Standards and Three Recommended Practices Submitted to the Committee for Approval Before Being Sent Out to Member Companies for Adoption by Letter Ballot Were Considered in Detail—The Proposed Standards Were Approved, but the Proposed Recommended Practices Were Rejected and Will Not Go to Letter Ballot—Manufacturers Were Called in to Discuss the Specifications for Heat-Treated Axles

The committee on standards of the American Electric Railway Engineering Association held a meeting in New York City on Nov. 6 and 7 to discuss the proposed standards and recommended practices submitted by the various standing committees and approved at the convention held in Atlantic City last month. Under the new rules of procedure which were adopted at the last convention the committee on standards is continued in office until a new committee is appointed. It is necessary under these rules for the committee on standards to pass on all proposed standards and recommended practices approved by the convention but not previously passed on by the committee on standards. Eight proposed standards and three proposed recommended practices were discussed by the committee at this meeting. The following members of the committee were present: Paul Winsor, Boston, Mass. (chairman); M. H. Bronsdon, Providence, R. I.; J. H. Hanna, Washington, D. C.; H. H. Adams, New York; M. V. Ayres, Nyack, N. Y.; J. M. Larned, Pittsburgh, Pa.; Martin Schreiber, Newark, N. J.; A. F. Hovey, New York; E. R. Hill, New York, and E. B. Katté, New York. Two members of the committee, F. G. Simmons, Milwaukee, and L. T. Crecilius, Cleveland, Ohio, were unable to be present. Charles Hewitt, Philadelphia, also was not present as he has resigned from the committee owing to his company's withdrawal from membership in the American association.

Secretary Litchfield first read the new rules of procedure for the committee on standards. Mr. Winsor pointed out that the committee on standards was not empowered to amend in any way the proposed standards submitted to it; it could only approve or disapprove. In the latter event the proposed standard would not be submitted to member companies for letter ballot and the subject would have to go over for at least one year. He requested that in order to save time the discussion be confined to the desirability of approving or disapproving the proposed standards as submitted.

SPECIFICATIONS FOR CABLES AND SECTIONS OF TROLLEY WIRE

The first proposed standard discussed was the specifications for high-tension, three-conductor, paper-insulated, lead-covered cable, submitted by the committee on power distribution. The specifications were considered paragraph by paragraph. There was some discussion as to the interpretation of the first paragraph under "Insulation." The committee on power distribution amended this paragraph on the floor of the convention in order to make it clear that the thickness of the paper insulation should be determined by multiplying the thickness of a single layer of paper by the number of layers and not by measuring the thickness of the insulation, including the gum filler, as it was laid on the cable. On motion, the specifications for high-tension cables as submitted were approved by a unanimous vote of those present. After the vote was taken it was suggested that the attention of next year's committee on power distribution be called to the possible ambiguity of the first paragraph under the heading of "Insulation."

The specifications for single-conductor, paper-insulated, lead-covered cable for 1200-volt circuits were considered next. There was only short discussion of these specifications, and they were approved by unanimous vote of those present.

The proposed standard sections for grooved trolley wire of sizes other than No. 0000 were approved by unanimous vote of those present.

SPECIFICATIONS FOR OVERHEAD CROSSINGS

The specifications for overhead crossings of electric light and power lines were then taken up. Mr. Katté, who is also a member of the committee on electricity of the American Railway Engineering Association, said that these specifications had not yet been approved by either the American Railway Association or the American Railway Engineering Association. The steam railroads had raised a number of objections to them. Among these objections Mr. Katté mentioned the following:

Section 13. The clearance between conductors carrying current not exceeding 10,000 volts should be 9 in.; that between conductors carrying current exceeding 10,000 volts but not exceeding 14,000 volts should be 12 in.

Section 18. Strong objection was made to the use of ungrounded guy wires, and the addition of the words "provided guys are not grounded to permanently damp earth" after each sentence was suggested.

Section 27. The wind pressure assumed in calculating the loads on the conductors should be 12 lb. per square foot instead of 8 lb.

Section 30. The wind loads assumed in the design of the poles and towers should be 18 lb. per square foot instead of 13 lb.

Section 49. The species of timber which may be used for wooden poles should be specified definitely.

Section 51. Open-hearth steel should be definitely specified for use in steel structures.

Section 55. The ratio of length of compression members to least radius of gyration should be reduced so as to prevent weak and flimsy structures from being used.

The members of the committee were impressed with the importance of the objections raised by Mr. Katté, but it was not believed that the objections warranted holding up the adoption of the specifications for another year. When the vote was taken Mr. Katté was the only member of the committee who was opposed to approving the specifications as submitted. He agreed to incorporate his objections in a minority report, and a motion was then passed that a recommendation be made to the executive committee to incorporate this minority report together with a majority report in the letter ballot to be sent out. Another motion was carried that a recommendation be made to the executive committee requesting it to instruct the committee on power distribution to keep in touch with the disposition of these specifications by the American Railway Association and the American Railway Engineering Association during the coming year so that such amendments to the specifications may be drafted and approved next year as will meet the objections of the steam railroads to the specifications as they now stand.

SPECIFICATIONS FOR NO. 00 COPPER TROLLEY WIRE

The next subject considered was the specifications for No. 00 round hard-drawn copper trolley wire. Secretary

Litchfield pointed out the difference between these specifications and those recently adopted by the American Society for Testing Materials. The principal difference in the two specifications was that the Engineering association specification required a torsion test whereas the American Society for Testing Materials specification did not. Mr. Winsor and Mr. Hovey spoke in favor of the torsion test, as they believed this test would disclose defects in the wire which could not be discovered by any of the other tests to which the wire might be subjected.

To ascertain the reasons for omitting the torsion test in the American Society for Testing Materials specification, Mr. Gray, of J. G. White & Company, who was a member of the committee of that society which drew up the specifications, was asked to explain the reasons why this action had been taken. Mr. Gray said that the committee of the American Society for Testing Materials originally began its work by preparing specifications for all sizes of hard-drawn copper wire. Trolley wire came under this classification, but the specifications were not meant to cover that class of wire only. His experience had been that the torsion test was easily affected by many conditions which it was impossible to control, particularly in the case of the smaller sizes of wire. For this reason the committee of which he was a member did not believe it was a very reliable test. However, he thought that there was no question about its value in detecting certain kinds of defects in trolley wire, and he had frequently purchased trolley wire under specifications requiring such tests. On motion the specifications as submitted were unanimously approved as standard.

SPECIFICATIONS FOR HEAT-TREATED AXLES

On Tuesday morning at 10:30 the committee met by appointment representatives of the Carnegie Steel Company, the Midvale Steel Company, the Standard Steel Works, Gulick-Henderson & Company, the Pennsylvania Inspection Bureau and the Jones & Laughlin Steel Company. The subject for discussion was the specifications for heat-treated shafts and similar parts. The specifications were read and discussed paragraph by paragraph.

Mr. Gulick thought that the amount of discard should be definitely stated. He suggested a minimum limit of 25 per cent. This could be obtained at all mills making blooms for axles. He favored inspection of the blooms as they were produced from the ingots.

Mr. Barba, Midvale Steel Company, said that a requirement of 25 per cent discard would be entirely acceptable to his company, but he did not believe it would produce the desired results. It was possible to discard 25 per cent on some blooms and still have segregation.

In a written communication Mr. Replogle, Cambria Steel Company, suggested that the chemical composition be changed so as to make the maximum phosphorus 0.04 per cent for steel made by the acid process and 0.02 per cent for steel made by the basic process. Mr. Winsor asked if steel made by the acid process containing 0.05 per cent phosphorus was better than steel made by the basic process but containing the same percentage of phosphorus.

Mr. Barba said that all steel for axles should be low in phosphorus. The basic process of manufacture tended to reduce the amount of phosphorus in the steel. In order to get as low as 0.05 per cent phosphorus in acid steel, careful selection must be made of the materials. Referring to the chemical composition required by these specifications he thought it would be impossible to make steel having a chemical composition with the maximum values permitted by the specification and at the same time meet the physical tests required. The manufacturers did not object to the physical tests imposed by these specifications, as they were being met every day in practice.

Mr. Gulick called attention to the requirement that the elastic limit should be determined by an extensometer. He thought an elastic limit of 50,000 lb. measured in this way was easily equivalent to an elastic limit of 58,000 lb. measured by the drop of the beam.

Attention was called to the possibility of interpreting Paragraph 6 to mean that a test should be taken from every ten axles or every 100 axles. The treating-plant heat referred to in this paragraph included at least two processes, in one of which the axles were handled in lots of ten, and in the other in lots of 100. The intention of the specification was that the test should be made from every ten axles in a heat.

F. R. Phillips, Pittsburgh Railways, wrote a letter calling attention to the fact that the methods of heat treatment of different manufacturers were widely different, and he thought that the exact method of heat treatment should be specified. The consensus of opinion of those present at the meeting was against this conclusion, as it was believed that the details of the treatment should be left to each manufacturer.

After a vote of thanks had been given to the representatives of the manufacturers, a motion was made and carried that the specification be approved for adoption as standard. The vote was unanimously in favor of adoption.

Mr. Schreiber then moved that the executive committee be requested to refer these specifications to the proper standing committee during the coming year, with instructions to keep in touch with the action of the American Society for Testing Materials, and to call the attention of the standing committee to the fact that the following points were raised in the discussion:

(1) The possibility of reducing phosphorus and sulphur in the steel.

(2) The desirability of defining a standard for extensometers to be used in determining the elastic limit.

(3) The desirability of designating precisely the number of axles represented by one treating-plant heat.

(4) The desirability of describing more exactly the round-edge mandrel used for making cold-bend tests.

(5) The necessity of limiting the number of times that steel may be re-treated if it fails to meet the requirements.

THIRD-RAIL CLEARANCES

The third-rail clearances and the definitions of third-rail gage and bond, submitted by the committee on heavy electric traction, were unanimously approved.

ACTION ON RECOMMENDED PRACTICES

The three proposed recommended practices submitted for approval included the location of automatic train stops, code of instructions to employees for fire protection, and book of rules and regulations for the government of employees of the way department.

Mr. Hill moved that in view of the fact that the American Railway Association and the American Railway Engineering Association had appointed committees to study the location of automatic train stops this subject be referred back to the committee on heavy electric traction, with instructions to confer further with the committees of those two associations. The motion was unanimously carried.

Mr. Adams opposed the adoption of the rules of instructions to employees for fire protection. He thought that the indorsement of the association in convention was sufficient in cases of this kind, and that it was not necessary or desirable to adopt such rules as recommended practices. On motion the committee on standards indorsed these instructions, but did not approve them for adoption as recommended practice. The same objections were raised to the rules for the government of employees of the way department and the same action was taken.

The meeting then adjourned.

Sir H. Bell, in his remarks as chairman at the annual meeting of the Buenos Ayres Western Railway in London on Oct. 17, stated that it was the intention of the directors to electrify the suburban system as far as Moreno, a distance of 22 miles.

ELECTRIC EXPRESS SERVICE OF BAY STATE STREET RAILWAY

The electric express service of the Bay State Street Railway Company, which was extended Sept. 11 to connect the service already established with Boston, added to the company's shipping points the important industrial centers of Quincy, Braintree, South Braintree, Randolph, Avon and Holbrook, as well as affording an outlet from Boston for the company's express service south of that city. The company now has 142 shipping points, including those of connecting electric express service by other companies.

Company's Symbol

During the season the Bay State Street Railway handled a car of peaches a day from Somerset, Mass., and Portsmouth, R. I., to the market towns in southern Massachusetts and to Boston. Other farm products handled were



Latest Type of Electric Express Car

strawberries from Dighton and cranberries from the producing centers. Industrial products from Brockton, Taunton, Providence, Fall River and other manufacturing centers are being shipped largely by the Bay State's electric service. Merchandise shipped to Boston is landed at the



Loading Peaches from Farmer's Auto Truck to Express Car

newly enlarged Neponset freight station on the southern edge of the city and thence distributed by team and auto truck to various parts of Boston. The development of the service during the first month of operation is very gratifying to the officers of the company.

CIRCULAR ON A. E. R. A. WORK

In a communication addressed to the associate members of the American Electric Railway Association under date of Nov. 6, 1911, H. C. Donecker, secretary, announces that the proceedings of the recent convention are well under way and that it is hoped to have them ready for distribution before Jan. 1, 1912. Pamphlets containing the addresses delivered at the recent convention are now being prepared as part of the publicity work of the association and will soon be ready for distribution. Attention is directed to the need of educational work by the associate members, who are requested to read the remarks made by President Brady in regard to the part that associate members should take in this campaign.

The executive committee of the association, recognizing that associate members frequently desire to secure copies of the proceedings of the affiliated associations, has ruled that these volumes be sold to associate members by the association at cost on application to the secretary.

The association is not prepared to make a definite announcement concerning its plans for the coming year, but hopes to address a communication shortly to the associate members in regard to plans for still further broadening the scope of the association. The dues of the associate members for the year ending Sept. 30, 1912, are payable. Even with the increased membership, delinquencies in the matter of dues among associate members in 1911 amounted to only 4 per cent.

Appreciation is expressed of the increase in the attendance of associate members at the various sessions at the last convention, and of the more general participation of associates in the discussions. The hope is expressed that there will be no diminution in this interest in the future years.

FARE HEARING BEFORE CONNECTICUT COMMISSION

The Public Utility Commission of Connecticut has before it for consideration the petition of residents of Manchester for a reduction in the fare from 15 cents to 10 cents over the line of the Connecticut Company between Hartford and Manchester, a distance of 9.2 miles. The first hearing was held in Hartford on Oct. 18, 1911. At this hearing it developed that there were three 5-cent zones between Hartford and Manchester. The first extended from the Hartford City Hall to Burnside, a distance of 3.8 miles with a short lap-over. The second fare zone, from Burnside to Laurel Park, was 1.6 miles, and the third zone, from Laurel Park to Manchester, was 3.8 miles. On a commutation ticket the fare was 10 cents. A transfer was given in Hartford.

On Oct. 19 M. J. Leary, general passenger agent of the company, gave some statistics on other fares in the State. He said that the rate on the Manchester line was about 1½ cents a mile. On the Farmington line the fare was 15 cents and the distance 9.332 miles. No transfer was given beyond Farmington. On the South Glastonbury line the fare was 15 cents and the distance 9.74 miles, without transfer at the terminus. On the Branford line the fare was 15 cents and the distance 9.6 miles. From New Haven to Derby the fare was 15 cents and the distance 9.3 miles, but transfers were given. From New Haven to North Haven the fare was 15 cents and the distance 8.3 miles with a lap-over.

C. V. Wood, traffic manager of the Springfield (Mass.) Street Railway, testified that it was not possible to charge less than 1½ cents a mile without jeopardizing the original investment.

L. S. Storrs, vice-president of the Connecticut Company, said at the continued hearing on Oct. 25, 1911, that it was impossible to tell just what the receipts of the Manchester line were, because they could not be isolated from the component parts of the system in Hartford.

J. K. Punderford, general manager of the Connecticut Company, said that to operate on a mileage basis would mean the establishment of many fare stations, with stops

only at the stations. Very few people were affected by the short zone mentioned in the present instance. He said that in 1904 the average wage of conductors and motormen on all the systems of the Connecticut Company was 20 cents an hour. On June 1, 1911, the average was in excess of 25 cents an hour. Last year the company paid the State about $500,000 in taxes, and about $75,000 had been paid toward a new bridge in Hartford. Street sprinkling cost the company about $20,000 a year. The company paid about $40,000 annually for the removal of snow. An appropriation of $84,000 had been made to double track the Manchester line and provide new cars. If the present conditions continued Mr. Punderford saw no way for the company to meet its obligations but to increase its fares.

On Oct. 26 Mr. Leary testified further in regard to distances and fares on other lines in Connecticut. At this hearing counsel for the petitioners asked to have the books of the company produced at the hearing. The commission took this request under advisement. Benjamin I. Spock, counsel for the company, said that he was willing to have the books on hand for convenience in answering any specific question that might be asked, but he could not see the utility of an extended investigation of the accounts of the company, as the returns of the company were all on file with the commission for reference.

STANDARD STEEL WIRE GAGE

Upon the recommendation of the Bureau of Standards, at Washington, a number of the principal wire manufacturers and important consumers have agreed that it would be well to designate the wire gage known as the Washburn & Moen gage as the "steel wire gage." In cases where it is necessary to distinguish it from the British standard wire gage it may be called the "United States steel wire gage."

The only gage for steel wire which has been recognized in acts of Congress is the Birmingham gage. The Treasury Department has for many years used this gage in connection with importations of steel wire, and the adoption of succeeding tariff acts with provisions for the assessment of duty according to gage numbers gives legislative sanction to the gage. Until certain provisions of the tariff act are amended the Treasury Department probably cannot discontinue the use of the Birmingham gage. It should, however, be abandoned by all other users, since the gage itself is radically defective, and it is nearly obsolete, both in the United States and in Great Britain, where it originated.

For copper wires and wires of other metals the gage universally recognized in the United States is the "American wire gage," also known as the "Brown & Sharpe gage." No confusion should arise between the steel wire gage and the American wire gage, because the fields covered by the two gages are distinct and definite.

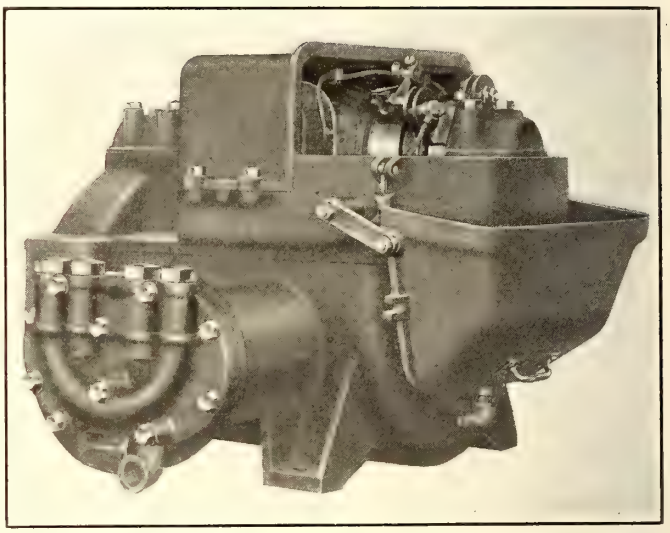
SIMMEN SIGNALS FOR INDIANAPOLIS AND CINCINNATI

The Indianapolis & Cincinnati Traction Company, Charles L. Henry, president, has arranged with the Simmen Automatic Signal Company for the installation of its protective apparatus on 18 miles of this high-speed single-phase railway. The Simmen signal system provides the dispatcher with continuous records of not only the position of each car in the protected territory, but also the speed at which it is running through the blocks; also it gives the dispatcher means for setting "proceed" and "caution" signals in the motorman's cab. The principle of operation of these signals has been described in this paper and was recently outlined in the report of the joint committee on block signals of the American Electric Railway Engineering and Transportation & Traffic associations.

A NEW TYPE OF AIR COMPRESSOR FOR CARS

A new and improved type of air compressor for car and locomotive brake equipments recently has been developed by the Allis-Chalmers Company, Milwaukee, Wis. The accompanying illustration shows the general appearance of the machine, which is designated by the makers as Type AA-7. While intended primarily for brake equipments the compressor is equally well adapted for stationary use where moderate volumes of compressed air are required at pressures up to 100 lb. per square inch.

The motor, in general, is very similar in design to railway motors. The armature is built upon a spider so that the shaft may be removed and replaced without rewinding. Particular attention has been given to the design of the brush holders and their insulation. A simple and reliable adjustment is provided for regulating the tension of the brush springs. This device is self-locking and the adjustment cannot be lost. The motor field frame is split and the entire armature may be taken out by removing the bearing caps and upper half of the field frame. The bearings are made of bronze and are of extra large size. Herringbone gears cut from solid steel blanks are used. The gear is cut from 0.40 carbon cast steel and the pinion is



New Type of Air Compressor

cut from 0.50 carbon bar steel, heat treated. The use of a large pinion and coarse pitch teeth adds to the life of the gears.

The compressor body is carefully designed to provide ample strength where needed and at the same time to eliminate unnecessary weight. An opening is provided opposite the cylinders for inspection of the crank-shaft bearings, connecting rods, etc., and to facilitate the removal of the pistons without removing the motor base. An improvement in the design of the cylinder head is the absence of all pipe connections. The suction and discharge ports in the cylinder head register with ports in the compressor body which lead to the suction and discharge pipe connections on the top and bottom of the compressor body. The cylinder head may be removed, therefore, without disturbing the piping connections.

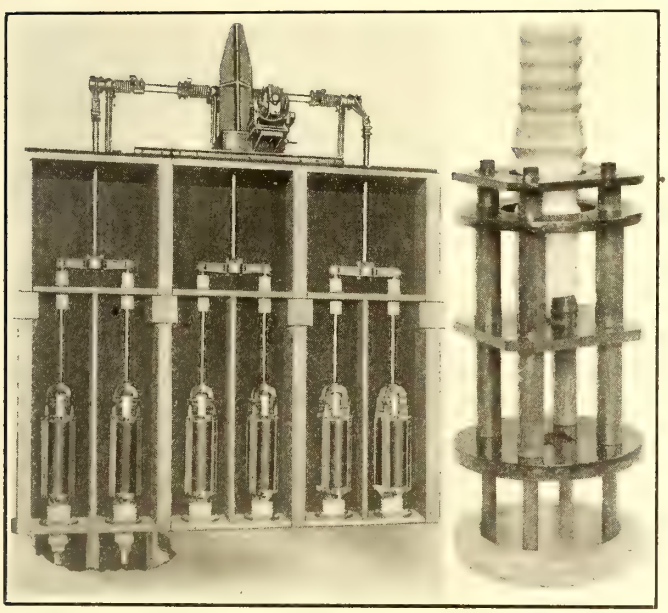
STARTING OF 20,000-KW TURBO-GENERATOR IN NEW YORK EDISON STATION

The first of the three 20,000-kw Curtis turbo-generator sets which are being installed by the General Electric Company in the Waterside Station No. 1 of the New York Edison Company was placed in regular service on Nov. 3. This is the largest turbo-generator yet built, and the three

machines with a total capacity of 60,000 kw will displace four reciprocating engine units with a total capacity of only 14,000 kw. The floor space occupied by one turbine unit is 297 sq. ft., whereas one of the 3500-kw engine-driven units occupies 918 sq. ft. The dimensions of the base of the machine are 17 ft. 6 in. x 17 ft. The weight is approximately 420 tons, of which 112 tons are in the revolving field, shaft and turbine wheels. The turbine wheels are 13 ft. in diameter, contain 7200 buckets and operate at a normal speed of 750 r.p.m. The generator is of the four-pole, three-phase, 25-cycle type, wound for 6600 volts. The turbine is of the six-stage type, designed to operate on 175-lb. gage pressure, 100 deg. superheat and 1½ lb. per square inch absolute back pressure in the exhaust chamber. The guaranteed steam consumption under these conditions is 15 lb. at half load, 14.4 lb. at three-quarters load and 15 lb. at full load. An idea of the size of the unit may be gained from the statement that if the turbine were fully loaded for twenty-four hours it would require about 7,200,000 lb. of steam, to generate which would necessitate burning 400 tons of coal in the boilers. To condense the steam 86,000,000 gal. of water would be required, and to cool the generator windings would require 115,000,000 cu. ft. of air.

RECENT DEVELOPMENTS IN OIL-SWITCH DESIGN

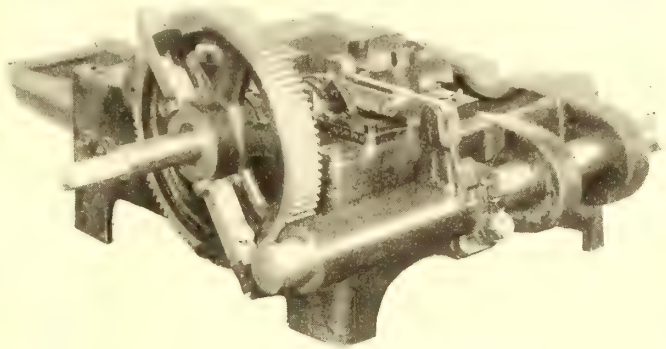
The motor-operated "H" type of oil switch for rupturing large capacities was developed by the General Electric Company at a time when the kilowatt capacity of generating units was comparatively small, the operating speeds low and the regulation poor. The introduction of large high-speed steam turbines has brought about a demand for switching apparatus of high rupturing capacity. The company has therefore added the "H-6" and "H-7" types, which are identical with other "H" switches except for



Triple-Pole, Single-Throw, 2000 Amp., 15,000-Volt Oil Switch and Baffle Plate

a few details necessary to adapt them to different styles of cell construction. Both switches carry the different phases in separate cells, but in the "H-7" oil switch further separation is secured by adding barriers between the breaks of each phase.

The secondary contacts consist of a movable cylindrical rod, which makes contact with the inner surface of four segments of a cylinder, which are secured in position by helical springs. This arrangement insures heavy and uniform contact pressure and also automatically compensates for any wear of the surface of either the stationary contact segments or the cylindrical contact rods. When the arc is ruptured any resulting burning takes place on the bell mouth of the stationary contact and the rounded tip at the lower end of the movable contact rod. In no case is damage caused to the working contact surfaces. The contacts are self-aligning and easily renewable. Additional contacts, known as primary contacts, are also provided for current capacities above 300 amp. These serve only to carry most of the entire current while the switch is closed.



Locking Device for H-6 Oil Switch

The movable primary contacts consist of double sets of contact fingers made of drop-forged copper, fastened to a movable cross-head by flat springs with copper laminations and reinforcing springs. The tension of these springs insures good contact, but does not retard the opening of the switch. The stationary primary contacts are wedge-shaped copper blades which are fastened to the top of the oil vessel. This construction imparts a distinct rubbing movement to the contacts when they open and close.

The diameter of the oil vessels has been increased from 8 in. to 10 in. and the thickness of the steel walls has also been increased. Another improvement consists of baffle plates of the new design illustrated. These plates check the movement which is imparted to the oil by the expansion of the arc-formed gases and allow the gases to escape while the oil itself drops back into the oil vessel.

The switch is opened and closed by compression springs. The operating motor does not actually throw the switch, but serves merely to compress the springs. The weight of the movable parts of the switch is counterbalanced so that when the switch operates the force of the compression springs closes the contacts by throwing the lever to approximately 1½ in. from the opposite position, after which the motor compresses the springs for the remainder of the distance. The operating springs are held in compression by the main operating toggle of the switch and by a dog bearing against a roller-stop which, when released, allows the switch to operate. The main operating toggle is slightly over center when the switch is at rest. Thus the pressure of the dog against the roller stop is merely sufficient to overcome the tendency of the main toggle to buckle.

A new locking mechanism has been developed to remove the chance of trouble which might occur with the old switches if the toggles were not properly set. Although primarily developed for the "H-6" and "H-7" switches, this feature will henceforward be embodied in the design of all switches of the "H" type. The "H" type switches are built in current capacities up to 4000 amp and 14,000 volts. They are also made for potentials up to 70,000 volts and will operate satisfactorily on systems whose combined load is not greater than 50,000 kw. In many cases, however, they can be recommended for rupturing capacities in excess of this, depending upon the particular features of the installation. They are supplied in two forms according to the character of service in which they will be used. In one form the poles are in parallel sets of two; in the other the poles are arranged in tandem.

News of Electric Railways

Progress of Negotiations for Unification in Chicago

The negotiations for the unification of the traction properties in Chicago, which were opened as a result of the joint letter from Samuel Insull, Henry A. Blair and Ira M. Cobe to Mayor Harrison, as noted in the Electric Railway Journal of Oct. 28, 1911, page 963, have resulted in a number of conferences being held. At the opening conference Gilbert E. Porter represented Mr. Insull and the elevated railroad interests, Lennard A. Busby spoke for Mr. Cobe and the Chicago City Railway, and Williston Fish represented Mr. Blair and the Chicago Railways in the absence of W. W. Gurley. Mr. Busby read a statement from all the companies as a basis for negotiations, but said that later each company might desire to speak for itself. Eight considerations were set forth by the companies as a basis on which the problem must be worked out, as follows:

1. Universal transfers, not only between surface lines, but also between surface and elevated lines for a single fare.
2. A subway system for the use of both surface and elevated lines in the congested downtown district.
3. Adjustment of all matters in controversy in connection with the elevated loop structure.
4. Rapid transit service for each of the three great divisions of the city by means of through routing over elevated lines.
5. Through car service on both elevated and surface lines to be installed from time to time and maintained to the extent necessary and economically justifiable to meet traffic conditions.
6. First-class service and maintenance of the entire system in a high state of efficiency.
7. The right on the part or the city or its licensee to purchase the entire unified system at a fixed price.
8. A division with the city of net receipts, upon a basis to be agreed upon.

The statement made by the companies follows in part:

"This statement is made on behalf of all the companies. It is not intended to cover all the various phases of the traction situation, but is limited to a brief survey of the most important matters that will be discussed by the committee and the representatives of the companies. To the extent that the subjects are treated in this communication, however, the companies are a unit in their opinions. As to other matters which may arise in the course of the discussion, the companies will speak for themselves separately.

"There has been no formal declaration on the part of the Mayor and City Council as to changes and additions desired in the present transportation facilities, but, from statements appearing from time to time in the public press and from our experience in the transportation business, it may be said that an ideal transportation scheme for the city would include the following:

"(a) Universal transfers with a single fare.

"(b) Subway system to relieve downtown congestion.

"(c) Adjustment of all elevated loop questions.

"(d) Rapid transit by means of through routing on all elevated lines.

"We are of the opinion that with the ownership of the present lines vested in the eight different companies, with interests competitive in certain localities, and at times conflicting in matters of service, it is not possible to realize an ideal system of transportation.

"It is evident therefore that in order to obtain an ideal system unification of the present system is necessary. This means physical consolidation of the properties if possible, and the operation of all lines under single franchise, or under substantial franchises and with single ownership and control.

"The companies are a unit in the belief that a subway system is necessary to relieve the congestion of the surface and elevated lines in the business district and to afford adequate transit throughout the city. We tender the committee the companies' operating executives in all subway matters so far as they involve practical transportation problems.

"These men, by virtue of their experience, the positions that they hold, and the information in their possession, are far more familiar with the practical side of transportation in Chicago than any one not engaged in the business in the city could possibly be.

"In order that the present congestion in the downtown terminals may be relieved, the city is proposing to construct a system of subways to use in connection with the elevated and surface lines. It is clear that material errors in subway construction will forever impose a heavy burden upon the traction services.

"By universal transfers we mean the right to ride in any general direction over any surface or elevated line for a single fare. This would involve transfers from surface to elevated lines, in the main using the elevated lines for long hauls and the surface lines for carriers to and distributers from the elevated lines, so that a passenger could select the most rapid and comfortable route to his destination.

"The most rapid and comfortable transportation between the three great divisions of the city can be provided best by through routing of the elevated trains. Universal transfers, subject only to restrictions necessary to prevent fraud, would work an enormous change for the better in the transit facilities of the city. They would bring distant points within easy reach of each other and would encourage removal from the congested parts of the city to the suburbs, where land is cheap and home surroundings are cheerful and healthful."

As a result of the conference between the sub-committee of the transportation committee of the City Council and representatives of the traction interests the following plan of procedure has been agreed upon:

"A commission of experts is to be selected by the city to value the elevated properties, the basis of valuation to be agreed on between the committee and the elevated companies; a tentative unification ordinance is to be drafted by the railway companies with a representative of the city's legal department for submission to the general committee; all subway plans will be submitted to the general committee and the subway commission; a series of public hearings is to be held by the general committee for discussion of all questions."

Amendments to Detroit Municipal Ownership Act

Corporation Counsel Hally of Detroit has sent to the committee on charter and city legislation of the Detroit City Council several amendments to the Glinnan municipal ownership charter amendment which had been requested by that body. One of the principal points the committee desired to cover was the privilege of granting a franchise to private parties in case that course became advisable. Mr. Hally submitted the following clause:

"Nothing herein contained shall be so construed as to prevent the city of Detroit from making a grant to private parties in relation to a street car system on its streets."

Another amendment provides for filling vacancies on the board of street railway commissioners temporarily and permanently, and still another makes it possible to condemn street railway property if it cannot be purchased. This clause follows:

"Said board may purchase or lease or by appropriate proceedings as described by law, and in the name of the city of Detroit, condemn all or any part of the existing street railway property in the city of Detroit."

Mr. Hally said that a serious legal question arises with respect to the language used in Section 8 of the charter amendment, which makes it necessary for the street railway commissioners to negotiate not longer than six months and to determine in that time what steps may be taken in condemnation proceedings. The time might be too short to accomplish this work, as the plan and purchase price would have to be submitted to the electors for approval. The question that arises is whether the Legislature has the right to limit the time for negotiations, after the con-

stitution of the State has been amended to allow cities of the size of Detroit to exercise the right of municipal ownership. Mr. Hally has suggested the following clause for the charter amendment to cover this point:

"If it shall be found impossible or impracticable to purchase or lease existing street railway properties or if it shall be found impossible or impracticable to institute condemnation proceedings as aforesaid, then said board may with the consent of the people of Detroit in the manner prescribed by law make the necessary purchase of land," etc.

The municipal ownership committee, at a meeting on Oct. 30, 1911, adopted a resolution to the effect that the Common Council be informed that the committee recommends that the proposition of municipal ownership be submitted to the people for approval before the proposed street railway settlement is put to a vote.

Labor Changes on the Riverside Traction Company's Line

An interesting development of the strike on Oct. 11, 1910, of the employees of the Riverside Traction Company, of Camden, N. J., occurred Oct. 27, 1911, when the local union, which was No. 550 of the Amalgamated Association of Street and Electric Railway Employees of America, was dissolved. This local was formed immediately after A. Merritt Taylor was elected president of the company. Prior to the strike, the Riverside Traction Company had been in the hands of a receiver for about two years, the property was very much run down and the discipline on the road was lax. Immediately after he assumed the management of the company Mr. Taylor took steps to place the property in first-class operating condition and secure efficient operation. A number of men were discharged for disregarding the rules of the company, and the men joined the union almost over night. The strike lasted thirty-six hours. At its conclusion certain of the men who were discharged were reinstated, and a committee was formed to take up all grievances with the officers of the company. Thereafter, nearly every time that the committee urged the reinstatement of a discharged employee the evidence presented against him was so convincing that the committee reported that the discharge was justified.

As a result of the improved physical condition and discipline, the business of the company began to increase very largely, and the employees realized that their condition had really been very greatly improved. Finally this feeling took concrete form in the following letter dated Oct. 27, 1911, which was addressed to A. Merritt Taylor, president of the company, and was signed by every trainman who was a member of the local union:

"We union men, who are members of Division No. 550 of the Amalgamated Association of Street and Electric Railway Employees of America, decided to notify you that when you were elected president of the Riverside Traction Company the employees of this company who did not know you and the other officers you had appointed when you took charge were afraid that their interests might not be properly looked after unless they worked in a body, and for this reason they joined the union.

"You have been running the road over a year, and your management has been so fair to your employees we have decided there is no good reason why we need to keep the union up, as we can depend on you to protect our interests and deal fairly with us.

"We beg to notify you that the union on your road has gone out of business, and we have placed our future in your hands, because you have proved to us how fair you are to your employees under all conditions and at all times, and we are willing to depend entirely on your fairness with us in the future. This is why we put our future interest entirely in your safe-keeping."

Every man who signed this letter received the following letter in reply from Mr. Taylor:

"In reply to letter addressed to me under date of Oct. 27, 1911, signed by you and others, I shall endeavor to further your interests in every way that I consistently can, so long as you remain loyal in every respect to the Riverside Traction Company and conform to the rules thereof. Therefore, the records of conduct of all employees of this company prior to Oct. 27, 1911, will be discarded and a new book of records, beginning with Oct. 27, 1911, will be opened.

"I thank you for the kind expressions contained in your letter, and I hope that your new record from Oct. 27, 1911, on will enable me to vouch for you as a loyal and efficient trainman, which I shall be glad to be able to do.

"A duplicate of this letter is being mailed to every employee who signed the letter addressed to me under date of Oct. 27, 1911."

Changes in Organization in Milwaukee

A reorganization plan under which the business of The Milwaukee Electric Railway & Light Company and of its associated and controlled companies will be divided into three main departments went into effect on that property on Nov. 1, 1911. Heretofore the plan had been in effect which was followed under former President Beggs, the twelve department managers reporting direct to the president. Under the new system the general manager will deal with only three men directly. They are R. B. Stearns and S. B. Way, assistant general managers, and C. N. Duffy, comptroller.

Mr. Stearns, as assistant general manager in charge of the railway department, will have jurisdiction over the following departments of The Milwaukee Electric Railway & Light Company and Milwaukee, Light, Heat & Traction Company: way department, building department and drafting bureau, shop department, transportation department and claim department.

Mr. Way, as assistant general manager in charge of the light and power department, will have jurisdiction in the same companies over the following departments: power plant department, electrical department and sales department. He will also have charge of the following companies, whose managers will report directly to him: Milwaukee Central Heating Company, Racine Gas Light Company, Kenosha Gas & Electric Company, Watertown Gas & Electric Company and North Milwaukee Light & Power Company.

Mr. Duffy, as comptroller, will have jurisdiction over the following departments of The Milwaukee Electric Railway & Light Company and the Milwaukee Light, Heat & Traction Company: accounting department, purchasing and stores department, printing department and advertising and publicity department.

Several other changes in the organization have been announced. One is that Egbert Douglas, having resigned as commercial engineer, has taken charge of the sales department of The Milwaukee Electric Railway & Light Company, the Milwaukee Light, Heat & Traction Company and the Milwaukee Central Heating Company, with the title of sales manager. Another is that T. D. Crocker, while retaining his position as general superintendent of the Milwaukee Central Heating Company, has also been appointed commercial engineer, and, as such, will be in charge of the commercial engineering department of The Milwaukee Electric Railway & Light Company, Milwaukee Light, Heat & Traction Company and the Milwaukee Central Heating Company.

Operating Details in Cleveland

G. M. Dahl, street railway commissioner of Cleveland, was in Buffalo on Nov. 1, 1911, to investigate the operation of a fare register which he will probably recommend for use on the cars in Cleveland.

Since the cars in Cleveland have been fitted with stoves complaint has been made because conductors close the rear doors of the prepayment cars. Mr. Dahl, who ordered the doors left open during the summer in order to secure better ventilation, has not indicated what action he will take in this matter.

Emporia Line Opened.—The Emporia (Kan.) Electric Railway, promoted by Judge Dennis Dwyer, Dayton, Ohio, and his associates, has been completed and placed in operation.

United Railroads to Appeal Geary Street Case.—The United Railroads, San Francisco, Cal., has announced that

it will appeal to the Supreme Court of the United States the decision rendered recently by the Circuit Court of Appeals at San Francisco dismissing the injunction which the company had obtained restraining the city from proceeding with the work of re-equipping the Geary Street, Park & Ocean Railroad in Market Street west of Thirty-third Street for municipal operation.

Ohio Tax Commission's Authority Questioned.—The Ohio River & Western Railroad has begun proceedings to secure an injunction against the members of the Ohio State Tax Commission to restrain them from certifying to the State Auditor a tax of $6,653 against the company. The company asserts that the law under which the commission was created violates Sections 2 and 16 of the State Bill of Rights, sections of the Federal Constitution relating to interstate commerce and the fourteenth amendment to the Constitution.

Short Strike in Augusta.—A strike which lasted only a few hours occurred among the employees of the lines of the Augusta-Aiken Railway & Electric Company, Augusta, Ga., in Augusta on Oct. 31, 1911. The men who went on strike alleged that three employees had been discharged on insufficient grounds to warrant summary dismissal. It was agreed to submit the differences to a board of arbitration to consist of five members. This board upheld the discharge of one of the men, but recommended that the other two should be reinstated.

Employers' Liability.—The federal joint commission on employers' liability and workmen's compensation has voted to recommend a bill to Congress at the opening of the next session for a compensation system based upon a specified schedule of loss of earning power due to different classes of accident. The present idea is to have the losses determined by an administrative board of some kind, thereby eliminating lawyers' fees as far as possible. The railroads asked the commission to recommend only an elective or voluntary system. Hearings are now being held in Washington before the committee.

Another New York Subway Contract Let.—A contract for the construction of another section of the Lexington Avenue subway has been let by the Public Service Commission of the First District of New York and sent to the Board of Estimate for its approval. The section is No. 15, and lies just north of the Harlem River, including the beginning of the two branches, the Pelham Bay branch as far as 138th Street, just east of the Alexander station, and the Jerome Avenue branch to River Avenue and 157th Street. The contract was awarded to the Hagerty-Drummond Company, Philadelphia, Pa., whose bid was $3,829,129.

General Franchise Ordinance Passed in Los Angeles.—By a unanimous vote the Council of Los Angeles, Cal., has passed the general franchise ordinance prescribing the mode of procedure to be followed in granting franchises. The ordinance provides that a franchise can be awarded on the basis of the net annual receipts; on the basis of the gross annual receipts; for compensation in the way of reduction of fares; for a lump sum, or for monthly or annual compensation. The right is reserved to the Council to reject any and all bids when received. The ordinance has been approved by the Mayor and will be published in full by the city by Dec. 1, 1911.

Pearson Syndicate Proposes Development Work in Spain.—The Barcelona Company has been organized under the laws of Canada with a capital of $25,000,000, and with the head office at Toronto, to develop water power aggregating over 250,000 hp and also construct hydroelectric power plants to supply light and power to Barcelona and the northeastern section of Spain. The company has acquired one of the tramways in Barcelona and valuable concessions for suburban railways. The syndicate that will finance these enterprises is headed by Dr. F. S. Pearson. Associated with him is the same group that controls the Rio de Janeiro Tramway Light & Power Company, the Sao Paulo Tramway Light & Power Company and the Mexico Tramways.

Projected Electric Freight Railway.—The Nebraska Coal Company, Rawlins, Wyo., acting as the parent company, has had plans, estimates and surveys prepared for a railroad 200 miles long, to travel the lignite fields of Central Wyoming and provide transportation for coal from the mines of the company; oil from the Larsen oil field; lime and sandstone from the Rawlins Stone Company's quarries and ore from the hematite and nitrate deposits of the Seminole region, as well as wool and other products of the district. The plans include three large gas producer power plants operating electric units, the extension of the mines and quarries and addition of machinery. About twenty miles of the system will be equipped for electrical operation. H. Larsen, Rawlins, Wyo., is president and general manager, and Captain Hiram A. R. Gray, vice-president and consulting engineer.

Proposed Panama Trip.—A trip to Panama to view the work there is proposed by members of the American Institute of Electrical Engineers. The work on the canal has reached such an advanced stage that by May, 1912, the authorities expect to begin flooding the Gatun Lake and letting water into the various levels of the canal. The coming winter will therefore afford the best, and also the last, opportunity to inspect the work, as the canal will have approached completion without any part of it being under water. The committee hopes to receive sufficient applications to cover the capacity of two ships, one from New York and one from New Orleans, making a total of 176 passengers. The probable date of sailing from New York is between Jan. 20 and 30. The round trip fare per passenger not including accommodations on the Isthmus will be $125 from New York, or $95 from New Orleans.

Investigation of Railway Values in California.—More than fifty representatives of the various railroads of California appeared at an informal conference in San Francisco on Nov. 1, 1911, called by the Railroad Commission of California to discuss preliminary arrangements for an investigation into the value of railway property within the State by R. A. Thompson, engineer of the commission. As a result of the conference the railroads promised to present within thirty days blueprints and profiles of right-of-way, station and terminal properties designated by the Interstate Commerce Commission as "useful for public purposes," and Mr. Thompson, acting for the State Commission, extended the time of ninety days designated by the commission for the submission of permanent data and records to be retained by the board for reference. Later the railroads will supply an inventory of the rolling stock and other property in California.

Plans for Improving New York's River Front Railway.—Calvin Tomkins, commissioner of docks of New York, has submitted to the Board of Estimate his plans for the improvement of the West Side, including the elimination of the tracks of the New York Central & Hudson River Railroad from Eleventh Avenue. The railroad's own proposals had been referred to him, and in reporting them he suggests important modifications. While providing for an increase of the company's facilities, he opposes the permanent acquirement by the company of control of the water front. In general the two plans are alike. The company has proposed to spend $65,000,000 in increasing to six its present two-track line from Spuyten Duyvil to the Seventy-second Street yard, and in building an elevated road along the marginal way from the end of its Sixtieth Street freight yard to Cortlandt Street, on which the tracks now running at grade along Eleventh Avenue might be placed.

State Regulation of Public Service Corporations in the City of New York.—This is the title of a sixty-page pamphlet prepared by James Blaine Walker, assistant secretary of the Public Service Commission of the First District of New York, on the work of that commission from 1907 to 1911 in supervising subways, elevated roads, street surface roads and steam railroads, carrying 1,600,000,000 passengers and collecting from the public $77,943,772 in a year, and gas companies and electric companies selling $31,843,272 worth of gas and $25,382,823 worth of electricity in a year. In an introductory summary Mr. Walker reviews the changes and improvements made in the service and property of the public service corporations in New York City and the city's rapid transit lines in the four years following the creation of the Public Service Commission in 1907. The pamphlet is subdivided under the following headings: The Commission; Corporations Subject to Regulation; Regulation of Transportation Lines; Street Surface Car

Companies; The Elevated Railroads; Elimination of Grade Crossings; Gas and Electric Companies; Regulating Security Issues, and Rapid Transit Work.

Commissioner Lane Favors National Corporation Commission.—Franklin K. Lane, of the Interstate Commerce Commission, is reported to favor the creation of a national corporation commission similar in character to the Interstate Commerce Commission, with power to control and regulate large business enterprises and prevent ruinous competition. He is reported to have said: "It is my belief that the government should have power to determine, in the first instance, whether a railroad should run. I think it is only consistent with the theory upon which we are now proceeding that we should protect the railroad that is in existence against a competition that may be ruinous to it—that we should guarantee in a sense a certain territory to a railroad whose rates and services are under control and regulation by the State. I have in mind two instances which illustrate the necessity for such protection: One a case in which a railroad was built for the purpose of holding up a competing line to which it was eventually sold; another a case in which a territory was well served and the carrier in existence preparing for improvements which had been entirely stopped by reason of its being paralleled by another line."

PROGRAM OF ASSOCIATION MEETINGS

American Society of Mechanical Engineers

At the meeting of the American Society of Mechanical Engineers to be held in the Engineering Societies Building, New York, N. Y., on the evening of Nov. 14, 1911, three papers will be presented on autogenous and electric welding. One will deal with the general aspects of the subject, the origin and principles of each process and the apparatus used in each. The other two papers will deal with special phases of the subject. The paper on the origin and principles of each process will be presented by H. R. Cobleigh, of the International Steam Pump Company. The other papers will be presented by G. E. Pelissier, superintendent of the Goldschmidt Thermit Company, and C. B. Auel, assistant manager of works of the Westinghouse Electric & Manufacturing Company. These papers will be entitled, respectively, "Thermit Welding" and "Electric Welding." It is intended to confine the discussion to the topics of electric resistance welding; electric arc welding; thermit welding; oxy-acetylene welding; oxy-hydrogen welding.

Central Electric Railway Association

The following program has been announced for the meeting of the Central Electric Railway Association, which is to be held on Nov. 23, 1911, in Parlor D of the Galt House, Louisville, Ky.:

MORNING SESSION, 9:00 A. M.

Business session and reports of committees.

Paper, "Publicity," by J. J. Rockwell, of the special service department of the McGraw Publishing Company, New York, N. Y.

Paper, "Traffic," by F. D. Norviel, general passenger and freight agent of the Indiana Union Traction Company, Anderson, Ind.

AFTERNOON SESSION, 1:00 P. M.

Paper, "Electric Locomotives for Interurban Freight Haulage," by F. E. Wynne, of the engineering department Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa.

Paper, "Lightning Protection," by E. J. Burdick, superintendent of power of the Detroit United Railway.

Paper, "Substation Operation," by J. E. Cochran, superintendent of lines and substations of the Ohio Electric Railway, Lima, Ohio.

This is the last regular meeting of the association for 1911 and the first meeting to be held in Louisville. The executive committee of the association will meet at 7:30 p. m. on Nov. 22, 1911, at the Galt House. Space for exhibits should be secured from Frank Eckert, manager of the Galt House.

Financial and Corporate

New York Stock and Money Markets

November 8, 1911.

Trading has broadened and prices until to-day have been on an upward scale. Steel shares, Reading and Union Pacific headed a downward movement in the early trading to-day, and, while partial recovery was made later on, many of the active stocks showed losses at the close. Approval of the reorganization plan for the American Tobacco Company was given by the United States Circuit Court to-day. The money market is devoid of feature. Quotations to-day were: Call, 2¼@2½ per cent; ninety days, 3½@3¾ per cent.

Other Markets

The railway securities figured prominently in the Chicago market to-day. The Chicago Railways series 1 and 2 made advances of 2 points, and the series 4 made a slight advance. Trading was fairly active throughout the entire list in Chicago.

Philadelphia Rapid Transit certificates advanced to 23¾ to-day, and Union Traction sold at 51⅝.

Business on the Boston Exchange has been brisk, and prices have been well maintained. United States Steel was the leading issue in to-day's market.

Demand for bonds in Baltimore has been fair, but otherwise the market has been without feature.

Quotations of traction and manufacturing securities as compared with last week follow:

	Nov. 1.	Nov. 8.
American Light & Traction Company (common)	a291	a296
American Light & Traction Company (preferred)	a107	a107
American Railways Company	a44½	a44
Aurora, Elgin & Chicago Railroad (common)	a43	40
Aurora, Elgin & Chicago Railroad (preferred)	a85	a84½
Boston Elevated Railway	a126	a127½
Boston Suburban Electric Companies (common)	a15	a15
Boston Suburban Electric Companies (preferred)	a75	a75
Boston & Worcester Electric Companies (common)	a12	a8
Boston & Worcester Electric Companies (preferred)	50	a58
Brooklyn Rapid Transit Company	75½	77¼
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	*84¼	84⅝
Capital Traction Company, Washington	127½	125
Chicago City Railway	a180	180
Chicago & Oak Park Elevated Railroad (common)	3	3
Chicago & Oak Park Elevated Railroad (preferred)	5	5
Chicago Railways, ptcptg., ctf. 1	a96	a98
Chicago Railways, ptcptg., ctf. 2	a32¼	a34
Chicago Railways, ptcptg., ctf. 3	a11	a11
Chicago Railways, ptcptg., ctf. 4	a7	a6¼
Cincinnati Street Railway	132½	129½
Cleveland Railway	a100¼	a104½
Columbus Railway (common)	83	83
Consolidated Traction of New Jersey	a75½	a75½
Consolidated Traction of N. J., 5 per cent bonds	a104½	a104½
Dayton Street Railway (common)	a25	a25
Dayton Street Railway (preferred)	a101	a101
Detroit United Railway	a79	a79
General Electric Company	150½	153¾
Georgia Railway & Electric Company (common)	a160	a160
Georgia Railway & Electric Company (preferred)	a93	a93
Interborough-Metropolitan Company (common)	15	14⅜
Interborough Metropolitan Company (preferred)	45⅛	46
Interborough Metropolitan Company (4½s)	79½	79⅛
Kansas City Railway & Light Company (common)	a16¼	*16¼
Kansas City Railway & Light Company (preferred)	a44½	a44
Manhattan Railway	a136	a140
Massachusetts Electric Companies (common)	a22¼	a22
Massachusetts Electric Companies (preferred)	a94	a94½
Metropolitan West Side, Chicago (common)	*27	*27
Metropolitan West Side, Chicago (preferred)	*75	*75
Metropolitan Street Railway, New York	8	*8
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	a74	a73
Northern Ohio Light & Traction Company	*57½	a57½
Northwestern Elevated Railroad (common)	*30	*30
Northwestern Elevated Railroad (preferred)	*70	*70
Philadelphia Company, Pittsburgh (common)	a52¾	a53⅜
Philadelphia Company, Pittsburgh (preferred)	a42¾	a43
Philadelphia Rapid Transit Company	a23⅝	a23⅜
Philadelphia Traction Company	84½	84¾
Public Service Corporation, 5% col. notes (1913)	*94	*94
Public Service Corporation, ctfs	a110	a110
Seattle Electric Company (common)	a108	a108
Seattle Electric Company (preferred)	a101	a101
South Side Elevated Railroad (Chicago)	*95⅛	*95⅛
Third Avenue Railroad, New York	9½	11
Toledo Railway & Light Company	10	10
Twin City Rapid Transit, Minneapolis (common)	a107	a108
Union Traction Company, Philadelphia	a51¼	a51⅜
United Ry. & Electric Company (Baltimore)	18	18½
United Rys. Inv. Co. (common)	34¼	35
United Rys. Inv. Co. (preferred)	58	60½
Washington Ry. & Electric Company (common)	a41⅛	a43⅛
Washington Ry. & Electric Company (preferred)	a91	a90
West End Street Railway, Boston (common)	a87½	a88
West End Street Railway, Boston (preferred)	a102	a102
Westinghouse Elec. & Mfg. Co.	64⅞	65
Westinghouse Elec. & Mfg. Co. (1st pref.)	a120	a115

aAsked. *Last sale.

ANNUAL REPORTS

Montreal Street Railway

The annual report of the Montreal Street Railway for the year ended Sept. 30, 1911, makes the following showing:

Gross earnings		$4,775,300
Operating expenses		2,679,806
Net earnings		$2,095,494
Interest from Montreal Park & Island Ry. Co.		114,808
Total income		$2,210,302
From which deduct:		
City percentage on earnings	$325,194	
Interest	185,087	
Rental leased lines	7,123	
Taxes	56,500	
		583,904
Net income		$1,626,398
Dividend 10 per cent.		1,000,000
Surplus		$626,398
From which has been appropriated for		
contingent account	$250,000	
Fire insurance fund	25,000	
		275,000
Transferred to general surplus		$351,398

E. A. Robert, the president, says in part in the report:

"The gross earnings increased during the year $422,749, or 9.71 per cent; the operating expenses $224,504, or 9.14 per cent; the net earnings $198,245, or 10.45 per cent.

"The gross earnings continue to show very satisfactory increases. The percentage of expenses to gross earnings is 56.12 per cent, against a percentage of 56.41 for the previous year.

"Your directors appropriated $25,000 from the surplus earnings as a credit to the fire insurance fund. The amount now at the credit of the fund is $571,539.

"During the past year the company secured an amendment to its charter, authorizing the sale, lease or transfer to any person or company of all its undertakings upon such terms as may be approved by the majority of the holders of the shares.

"On Oct. 5 last a special general meeting of the shareholders of the company was held for the purpose of considering the sale of the whole of its undertakings to the Montreal Tramways Company. The proposition as submitted was carried by the majority of the issued shares of the company.

"Owing to the continued rapid growth and congestion of the city our directors during the past year negotiated with the city of Montreal for the purpose of making a new contract which would be more applicable to the present day conditions.

"It is hoped that the amalgamation of this company with its subsidiary companies under the name of the Montreal Tramways Company will help speedily to complete the negotiations for a new franchise.

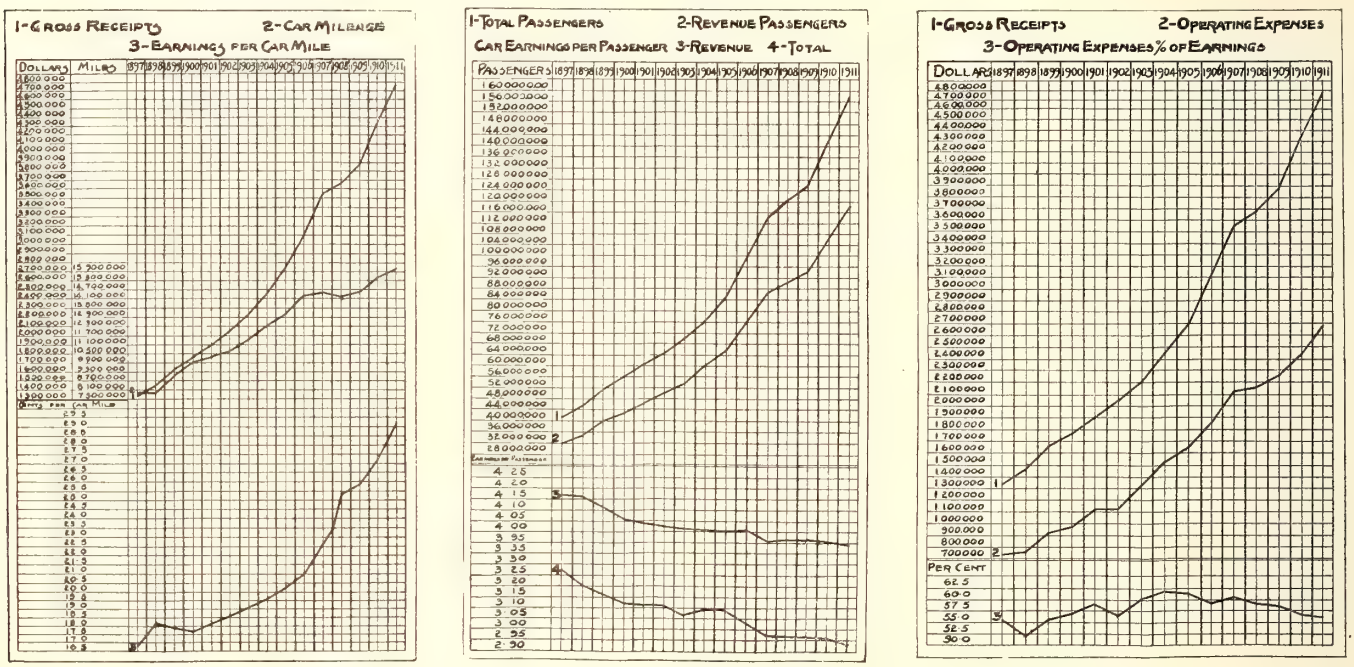
"The property has been maintained in a high state of efficiency, and a considerable sum has been spent in the upkeep of the track and rolling stock; the power plants and buildings are in excellent condition, it being the policy of your directors to spare no efforts or expense in this direction; yet, notwithstanding this the surplus earnings of the company are the largest in its history.

"Notwithstanding the above the operating expenses percentage of earnings has decreased.

"The company has continued its liberal policy toward its employees in respect to their wages, having increased them during the year.

"The company has paid to the city of Montreal taxes and percentage on earnings amounting to $380,678, on account of snow removal $73,364, a total of $454,043, being an increase over the previous year of $15,860.

"The gross earnings of the Montreal Park & Island Railway show an increase of $60,973, the operating expenses an increase of $27,843, the net results being $114,807, against $85,878 for the previous year.



Diagrams of Statistics of the Montreal Street Railway Covering the Years from 1890 to Date.

"Gross earnings of the Montreal Terminal Railway for the year are $134,019, the operating expenses $122,116, and taxes and percentage on city earnings $4,279, leaving a net result of $7,624."

In the table which follows there is given a comparison of traffic and other statistics of the Montreal Street Railway for the last three years:

	1911	1910	1909
Gross earnings	$4,775,300	$4,352,551	$3,874,838
Operating expenses	2,679,806	2,455,301	2,255,019
Expenses per cent of earnings	56.12	56.41	58.20
Net earnings	2,095,494	1,897,250	1,619,819
Passengers carried	118,268,080	107,241,406	95,376,373
Car earnings per passenger—cents	3.94	3.95.	3.96
Transfers	40,488,545	36,437,123	32,285,208
Total passengers carried	158,756,625	143,678,529	127,661,581
Car earnings per passenger total carried —cents	2.93	2.95	2.96

As will be seen there has been a continuous increase in gross and net earnings. The increase in transfers issued in 1911 over 1910 is about the same as the increase in 1910 over 1909.

J. M. McIntyre has been elected to the board of directors of the Montreal Street Railway to succeed D. Lorne McGibbon, resigned.

Boston Elevated Railway

A summary of the business of the Boston Elevated Railway for the year ended June 30, 1911, follows:

Gross revenues from operation		$15,635,965
Operating expenses		10,119,064
Net operating revenue of owned and leased lines		$5,516,901
Interest on deposits, and from securities owned and interest charged to construction		344,742
		$5,861,643
Tremont Street subway rental	$211,750	
Less amount collected from Boston & Northern St. Ry	26,445	
	$185,304	
Interest on funded debt of West End St. Ry	716,180	
Dividend on preferred stock of West End St. Ry., 8 per cent	512,000	
Dividend on common stock of West End St. Ry., 7 per cent	846,848	
Dividend on stock of Somerville Horse R.R., 6 per cent	9,180	
Taxes on West End St. Ry	662,262	
Interest and taxes on leased property of Old Colony St. Ry	48,423	
Interest on leased property of the Boston & Northern St. Ry	904	
Rent of Newtonville & Watertown St. Ry	9,727	
Total payments on account of leased railways		2,990,828
		$2,870,814
Interest on funded debt	$556,000	
Taxes Boston Elevated Ry. Co	437,462	
Tax on earnings and U. S. corporation tax	145,109	
Washington Street tunnel rental	324,000	
East Boston tunnel rental	57,782	
		1,520,353
		$1,350,461
Dividend No. 21, paid Aug. 15, 1910, 3 per cent	$598,500	
Dividend No. 22, paid Feb. 15, 1911, 3 per cent	598,500	
		1,197,000
Surplus for the year		$153,461

The details of the gross earnings and operating expenses follow:

Earnings from operation:	
From passenger revenue	$15,199,971
From parlor, chair and special car revenue	28,013
From mail revenue	37,290
From miscellaneous transportation revenue	3,669
From station and car privileges	187,818
From rent of tracks and terminals	46,193
From rent of buildings and other property	106,652
From power	26,358
Total	$15,635,964
Operating expenses	
For maintenance of way and structures	$1,556,163
For maintenance of equipment	1,269,899
For general expenses	1,645,023
For traffic expenses	105,730
For transportation expenses	5,542,249
Total	$10,119,064

William A. Bancroft, the president, states in part in his report to the stockholders:

"The fiscal year now ends on June 30, and the annual meeting of the company is held on the first Monday of November.

"By vote of the stockholders of this company and of the West End Street Railway, Chapter 740 of the Acts of 1911 has been accepted by the respective companies. By vote of your directors and by vote of the City Council of Boston, approved by the Mayor, Chapter 741 of the Acts of 1911 has been accepted also. By these acceptances the consolidation of the properties and franchises of the Boston Elevated Railway and the West End Street Railway, amounting to a sale of the latter to the former, has been provided for in accordance with the terms of the act, and authority has been given for the construction of certain additional tunnels or subways, to be leased to this company, as well as for the extension of certain existing leases.

"No additional stock or bonds were issued during the year.

"Work has been prosecuted on the Cambridge subway and its attendant provisions, which are built by the company, as well as upon its connecting tunnel under Beacon Hill and the station under Boston Common and Tremont Street, which are built by the Boston Transit Commission under, or near, the existing Park Street subway station.

"The construction of the East Cambridge elevated extension is progressing. There remains to complete the station at Causeway Street, and to supply the ballast, track, signal equipment, and such other minor provisions as are necessary for operation. While it cannot now be determined with certainty at what time both these Cambridge thoroughfares will be in operation, it seems likely that they will be ready not later than next spring.

"Some expenditure has been made and some work done upon the Everett and Malden elevated extension. Land has been bought and considerable work done in the alteration of the Sullivan Square terminal, to adapt it to the operation of this new service. The company has nearly three years in which to build this extension.

"The company has had built fifty pre-payment cars, so called. They are an adaptation of the principle of the pay-as-you-enter cars, without the barriers and passages provided in cars so named, and which would make such cars unsuitable for our summer service. These cars are of the semi-convertible type, and are somewhat longer and wider than our previous types. The advantage of these cars, both to the public and to the company, is considered to be great. Fifty more of these cars have been ordered.

"To meet the requirements of our increasing patronage we have ordered twenty additional elevated cars, and deliveries are expected soon. We have ordered forty cars of unusual length and width and of large seating capacity for the Cambridge subway. As this subway will have no track connection with the Washington Street tunnel, it is feasible to operate such cars on this line and on its extensions, as provided by the recent legislation.

"The Stone & Webster Engineering Corporation has prosecuted with vigor the erection of the new power station at South Boston. The company is installing two 15,000-kw turbo-generators, and has an option on a third, room for which has been provided, although the boiler supply is intended for two units only. The main building is now approaching completion, and the construction is well advanced upon the necessary substations. About 150 miles of underground conduit have been laid to convey feeders.

"The several increases in wages have been maintained. We have made the usual contributions to meet the expenses of the two employees' mutual aid associations. We have continued our allowances to aged and worthy employees, incapacitated for further service, and awarded in satisfactory service money in December, in sums of $20 or $25, to such of the employees deemed worthy thereof, the sum of $79,765."

Traffic statistics compare as follows:

Round trips	5,990,691
Revenue car miles, elevated	8,523,434
Revenue car miles, surface	45,895,457
Revenue car miles, U. S. mail cars	228,305
Total revenue car miles	54,647,196
Revenue passengers on elevated and surface cars	305,098,665
Total revenue from car operation	$15,265,274
Average receipts per revenue passenger	4.991 cents

The meeting at which the report was presented was held on Nov. 6, 1911. It was voted to increase the number of directors from ten to twelve. Charles P. Hall was elected to the board to succeed Quincy A. Shaw, resigned, and George P. Gardner and Eugene V. R. Thayer were elected as the new members.

Chicago & Milwaukee Electric Railroad, Chicago, Ill.—Judge Carpenter, of the United States District Court at Chicago, set Nov. 9, 1911, for a hearing of the motion of attorneys for the Merchants' Loan & Trust Company to set aside an order made on June 23, 1911, to take the Chicago & Milwaukee Electric Railroad foreclosure case out of the hands of Master Morrison for the purpose of endeavoring to have a final decree of sale passed by the federal court. Inasmuch as the decree was not signed, the Merchants' Loan & Trust Company desired the matter to be placed again in the hands of the master.

Chicago & Southern Traction Company, Chicago, Ill.—Judge Walker of the Circuit Court at Chicago has signed a decree authorizing the sale of the property of the Chicago & Southern Traction Company under the mortgage to the Western Trust & Savings Bank. The amount of this mortgage is $2,500,000. At the date of the filing of the bill the amount of the unpaid coupons was $403,875 and the interest due thereon was $34,299. There is now due under the mortgage a total of $3,138,761.

Devils Lake & Chautauqua Transfer Company, Devils Lake, N. D.—The Stotlar Investment Company, Devils

Lake, N. D., has purchased the property of the Devils Lake & Chautauqua Transfer Company, which operates a five-mile railroad between Devils Lake, Greenwood, North Dakota Chautauqua Grounds and the State Military Grounds. It is proposed to electrify the line in 1912.

Georgia Railway & Electric Company, Atlanta, Ga.—Charles C. Harrison, Jr., & Company, Philadelphia, Pa., have purchased $519,000 of the refunding and improvement mortgage 5 per cent bonds of the Georgia Railway & Electric Company, due 1949, and sanctioned by the Railroad Commission of Georgia in July, 1911, on account of recent extensions and additions.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—The Wisconsin Railroad Commission has authorized The Milwaukee Electric Railway & Light Company to issue an additional block of its 4½ per cent refunding and extension mortgage bonds dated Jan. 1, 1906, and due 1931. The authorized issue is $20,000,000 and with the $2,000,000 now to be put out there will be outstanding $9,728,000. Part of the issue is reserved to take up the $6,500,000 of first consolidated 5 per cent bonds.

New Hampshire Electric Railways, Haverhill, Mass.—Judge William M. Chase, Burns P. Hodgman and Albert S. Batchelder, masters appointed by the United States court to determine the facts on the motion of the New York Trust Company against the Portsmouth & Exeter Street Railway for a final degree of foreclosure and sale, have filed their report with the United States Court, in which is detailed the condition of the property and the masters' finding that the road can never be made to pay.

Salisbury & Spencer Railway, Salisbury, N. C.—Bird S. Coler, of Coler & Company, New York, N. Y., and president of the North Carolina Public Service Company, Greensboro, N. C., has concluded negotiations whereby Coler & Company have acquired a controlling interest in the Salisbury & Spencer Railway, which operates between Salisbury and Spencer. The company also operates a gas plant at Salisbury and does electric lighting.

Slate Belt Electric Street Railway, Pen Argyl, Pa.—A syndicate composed of L. H. Mountney, general manager of the Slate Belt Electric Railway, and E. A. Spear, Pen Argyl; Milton Flory and W. F. Jordan, Bangor; Dr. J. C. Keller, Wind Gap; G. A. Schneebeli, E. Schneebeli, D. M. Leopold and Dr. O. D. Schaeffer, Nazareth, and others is said to have concluded negotiations for purchasing a controlling interest in the Slate Belt Electric Street Railway.

San Francisco, Vallejo & Napa Valley Railroad, Napa, Cal.—M. McIntyre, of the San Francisco, Vallejo & Napa Valley Railroad, Napa, Cal., wrote as follows under date of Nov. 1, 1911, in regard to the affairs of the company: "The road defaulted on its interest of $1,500,000 in bonds and was sold at public auction in San Francisco for $700,000, the purchaser taking care of the floating debt of $400,000. Three bids were received, one for $500,000, a second for $600,000 and a third for $700,000. The first and third bids were made by the bondholders' committee consisting of James Irvine, John McKee, San Francisco, and G. R. Sheldon, New York. Mr. McKee is vice-president of the Mercantile Trust Company. The bondholders held all the stock of the company. The bondholders are to organize a new corporation. The bondholders' committee has appointed M. McIntyre as general manager of the property and T. V. Maxwell and M. McIntyre as direct agents of the San San Francisco, Vallejo & Napa Valley Railroad."

Toledo, Ann Arbor & Jackson Railroad, Toledo, Ohio.—The Toledo, Ann Arbor & Jackson Railroad, which was incorporated on Sept. 21, 1911, has taken over the property of the Toledo, Ann Arbor & Detroit Railroad, sold under foreclosure recently. The Toledo, Ann Arbor & Jackson Railroad will connect Toledo, Lambertville, Petersburg, Dundee, Azalia, Milan, Ann Arbor and Jackson, and Britton, Ridgeway, Tecumseh, Tipton and Jackson. The property of the Toledo, Ann Arbor & Detroit Railroad, which it took over, consisted of 18 miles of road, partly constructed. The line as now proposed will be 50 miles long.

Trenton & Mercer County Corporation, Trenton, N. J.—The Trenton & Mercer Traction Company, which operates the Trenton Street Railway under lease, has filed with the Secretary of State of New Jersey a certificate of increase of its capital stock from $10,000 to $400,000, consisting of $200,000 of preferred stock and $200,000 of common stock.

Wichita Railroad & Light Company, Wichita, Kan.—The Public Utilities Commission of Kansas has granted the Wichita Railroad & Light Company permission to issue $165,000 in bonds to refund outstanding bonds and improve the plant.

Dividends Declared

Northern Texas Electric Company, Ft. Worth, Tex., quarterly, 1½ per cent, common.

Pensacola (Fla.) Electric Company, 3 per cent, preferred.

Portland Railway, Light & Power Company, Portland, Ore., quarterly, 1 per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

BANGOR RAILWAY & ELECTRIC COMPANY.

Period.			Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1 m.,	Sept.,	'11....	$57,994	*$22,885	$35,109	$13,159	$21,950
1 "	"	'10....	54,806	*21,998	32,808	12,005	20,803
3 "	"	'11....	173,719	*73,768	99,951	39,235	60,716
3 "	"	'10....	166,878	*72,688	94,190	35,720	58,470

CHATTANOOGA RAILWAY & LIGHT COMPANY.

1 m.,	Sept.,	'11....	$83,116	*$48,959	$34,157	$20,134	$14,023
1 "	"	'10....	77,022	*43,541	33,481	18,537	14,944
9 "	"	'11....	697,236	*406,756	294,180	177,933	112,547
9 "	"	'10....	650,947	*379,897	271,050	164,523	106,527

CLEVELAND, PAINESVILLE & EASTERN RAILROAD.

1 m.,	Aug.,	'11....	$39,901	*$20,058	$19,843	$8,705	$11,138
1 "	"	'10....	40,275	*19,052	21,224	8,163	13,061
8 "	"	'11....	244,915	*131,592	113,323	65,734	47,590
8 "	"	'10....	235,734	*120,879	114,855	64,491	50,364

COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY.

1 m.,	Sept.,	'11....	$473,287	*$268,557	$204,730	$108,382	$96,348
1 "	"	'10....	428,778	*250,927	177,851	100,624	77,227
9 "	"	'11....	3,980,458	*2,304,382	1,676,076	939,646	736,430
9 "	"	'10....	3,695,777	*2,109,972	1,385,805	910,749	675,056

GRAND RAPIDS RAILWAY COMPANY.

1 m.,	Sept.,	'11....	$107,168	*$55,497	$51,671	$15,007	$36,664
1 "	"	'10....	101,019	*56,669	44,350	15,286	29,064
9 "	"	'11....	872,874	*492,785	380,089	135.361	244,728
9 "	"	'10....	856,661	*457,896	398,765	136,830	261,935

LAKE SHORE ELECTRIC RAILWAY.

1 m.,	Aug.,	'11....	$143,584	*$68,508	$75,077	$34,913	$40,164
1 "	"	'10....	139,896	*59,962	79,934	34,719	45,215
8 "	"	'11....	837,469	*443,620	393,849	277,687	116,162
8 "	"	'10....	198,656	*418,744	379,912	280,081	101,831

LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY.

1 m.,	Sept.,	'11....	$54,924	*$29,568	$25,356	$14,559	$10,797
1 "	"	'10....	53,599	*25,084	24,515	13,149	11,366
3 "	"	'11....	178,907	*91,236	87,671	43,399	44,272
3 "	"	'10....	174,621	*92,610	82,011	39,415	42,596

MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY.

1 m.,	Sept.,	'11....	$442,099	$229,850	$212,250	$135,091	$76,758
1 "	"	'10....	407,651	203,364	204,287	116,123	88,164
9 "	"	'11....	3,739,981	1,985,576	1,754,405	1,126,657	627,748
9 "	"	'10....	3,504,128	1,861,724	1,642,404	1,017,941	624,463

MILWAUKEE LIGHT, HEAT & TRACTION COMPANY.

1 m.,	Sept.,	'11....	$157,357	$46,094	$111,264	$75,214	$36,050
1 "	"	'10....	154,076	42,817	111,259	73,532	37,727
9 "	"	'11....	1,301,312	371,541	929,772	652,793	276,979
9 "	"	'10....	1,227,795	350,733	877,063	637,380	239,682

NORTHERN OHIO TRACTION & LIGHT COMPANY.

1 m.,	Aug.,	'11....	$272,624	*$143,666	$128,958	$4,321	$84,638
1 "	"	'10....	263,149	*135,833	127,316	43,496	83,821
8 "	"	'11....	1,773,731	*981,692	792,039	354,749	437,290
8 "	"	'10....	1,612,504	*892,000	720,504	346,769	373,734

PORTLAND RAILWAY, LIGHT & POWER COMPANY.

1 m.,	Sept.,	'11....	$517,830	*$261,841	$255,989	$127,604	$128,385
1 "	"	'10....	490,209	*253,424	236,785	119,784	117,001
9 "	"	'11....	4,697,608	*2,298,416	2,399,192	1,119,544	1,279,648
9 "	"	'10....	4,106,489	*1,979,753	2,126,736	1,034,480	1,092,256

ST. JOSEPH RAILWAY, LIGHT & POWER COMPANY.

1 m.,	Sept.,	'11....	$96,209	*$65,508	$30,701	$19,381	$11,320
1 "	"	'10....	92,034	*50,932	41,102	18,558	22,544
9 "	"	'11....	811,865	*510,294	301,571	173,475	128,096
9 "	"	'10....	766,750	*453,350	313,400	164,859	148,541

TWIN CITY RAPID TRANSIT COMPANY.

1 m.,	Sept.,	'11....	$689,096	$315,396	$373,699	$140,079	$233,621
1 "	"	'10....	694,853	323,061	371,792	140,286	231,505
9 "	"	'11....	5,852,439	2,898,788	2,953,651	1,260,713	1,692,939
9 "	"	'10....	5,620,369	2,688,107	2,932,262	1,261,653	1,670,609

UNION RAILWAY, GAS & ELECTRIC COMPANY, ROCKFORD, ILL.

1 m.,	Sept.,	'11....	$257,203	*$140,513	$116,690	$64,297	$52,393
1 "	"	'10....	241,764	*137,616	104,148	58,502	45,646
9 "	"	'11....	2,275,402	*1,322,692	952,710	552,772	399,938
9 "	"	'10....	2,137,596	*1,266,694	870,902	523,930	346,972

*Including taxes.

Traffic and Transportation

New Folder of Cleveland, Southwestern & Columbus Railway

The Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio, of which E. F. Schneider is general manager, and J. O. Wilson general passenger agent, has issued a new twelve-page, two-color timetable folder which contains in addition to the train schedules a list of the officers and station agents, a double-page map of the interurban railways in Ohio with its own lines printed in red, an advertisement of the chartered-car service, general information and the following concise statement of the safety work which has been done by the officers of the company:

"The Southwestern has developed in its employees in all departments a high degree of efficiency and caution which has thereby reduced the accidents on its property to a very marked degree; likewise, with the hearty co-operation of superintendents, teachers and boards of education of all the schools along its property, has reduced the accidents to school children to the extent that not a single boy or girl has been injured or killed for over two years.

"This company now asks for the support and co-operation of the passengers and the public in order to make still further reductions. Therefore, any suggestions from our patrons upon any subject will be gratefully received and promptly acknowledged by the management.

"Thousands of people are injured or lose their lives each year on the railroads through their own acts of carelessness.

"Passengers are asked to be very careful when boarding or alighting from cars. Wait until the car stops. Better safe than sorry.

"The public, especially children, are warned to keep away from any and all wires.

"Drivers of automobiles and vehicles, as well as pedestrians, are asked and urged to keep a sharp lookout in each direction before crossing a car track.

"Stop, look and listen!"

Accident Prevention Campaign in Lexington, Ky.

The Kentucky Traction & Terminal Company, Lexington, has begun an aggressive campaign of education to prevent accidents on its lines. Several thousand placards which contain suggestions for getting on and off cars have been printed and posted in the cars and in conspicuous places, and a special campaign is being conducted among the school children of Lexington, 10,000 cards about the size of post cards caving been distributed among them. The advice on these cards follows:

"Don't play on the car tracks.
"Don't hang on behind the car.
"Don't stand on the car steps or platform.
"Don't touch a wire; it may be a live one.
"Don't put your head or arms out of a car window.
"Don't cross the track in front of an approaching car.
"Don't cross immediately behind a standing or moving car.
"Don't drive across the track without looking to the rear.
"Don't jump on or off a moving car.
"Don't take any chances.
"Stop! Look! Listen!"

The newspapers of Lexington are co-operating with the company, and have printed news stories describing the work of the company and urging the public to take heed.

Readjustment of Owl Service in Boston.—The Boston (Mass.) Elevated Railway has found it necessary to readjust to traffic needs the increased night service made effective in December, 1910, for experimental purposes, and to divert to the subway some of the night cars which leave Adams Square.

Petition to Discontinue Line During Winter.—The Exeter, Hampton & Amesbury Street Railway Company, Exeter, N. H., has petitioned the Public Service Commission of New Hampshire for permission to discontinue the operation of the Seabrook & Hampton Beach Street Railway until April 1, 1912.

Fare Inquiry Ordinance Introduced in Los Angeles.—The ordinance has been introduced into the Council of Los Angeles, Cal., which provides for an investigation by the Public Utility Commission of Los Angeles of the reasonableness of the present fare of 5 cents charged by the street railways which operate in that city.

Automatic Bell Ringers Constitutional.—The Indiana Supreme Court has declared constitutional the law passed by the last Legislature which requires locomotives to be equipped with automatic bell ringing devices. The railroads contended that the law was unconstitutional because it undertook to control the construction of engines to be used in other states.

Reasonableness of Freight Charge Questioned.—The Philadelphia *Record* has requested the Railroad Commission of Pennsylvania to inquire into the reasonableness of the charge made by the Bangor & Portland Traction Company, Bangor, Pa., for transporting newspapers. The *Record* alleges that it is being charged for this service at the rate of 84 cents per 100 lb.

Fenders in Terre Haute.—T. F. Grover, general manager of the Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., has announced that the company feels that the fenders in use on its cars which operate in Terre Haute comply with the provisions of the fender ordinance passed by the Council recently giving the company three months in which to comply with the new ordinance.

Wheel Guards in Philadelphia.—The Philadelphia (Pa.) Rapid Transit Company has sent to the Councils of Philadelphia a letter stating that the promise which was made on June 5, 1911, by the company to equip all of its cars with fenders or wheel guards by Nov. 1, 1911, has been fulfilled. Of the 2000 cars which the company has in operation, 1800 are equipped with H-B wheel guards and the remaining 200 are equipped with Parmenter wheel guards.

Village Opposes Detroit United Railway.—The village of Hamtramck has placed a guard on duty to prevent the Detroit (Mich.) United Railway from building across the Michigan Central Railroad tracks on Joseph Campau Avenue into the town. The company collects an extra fare from people who board the cars in Hamtramck and only every fourth car is run through. The village desires the Detroit United Railway Company to carry passengers between Hamtranck and Detroit for one fare and establish through service.

New Destination Signs in Reading.—The Reading (Pa.) Transit Company is equipping its cars with new destination signs similar to those in use in Harrisburg and Lancaster. The new signs indicate the routes by a large initial which stands for the terminal town to which the car operates. The three terminal towns Annville, Meyerstown and Palmyra are designated by A, M and P, respectively. The names of the towns reached by the cars were printed on the signs previously in use, but the letters were not large enough to permit the names to be distinguished at a distance.

Traffic on Subway and Elevated Lines During Fleet Days.—Traffic was very heavy on the subway and elevated lines of the Interborough Rapid Transit Company, New York, N. Y., during the time that the warships were anchored in the Hudson River off New York City for review, the riverfront being especially accessible to patrons of the subway. In commenting on the work of the company in handling the extra traffic so suddenly imposed upon it, Frank Hedley, vice-president and general manager, said: "On Oct. 27, 1911, we carried more than 1,000,000 people in the subway and more than 1,000,000 people on the elevated, and on Nov. 1, covering a twenty-four hour period, the entire equipment on the elevated and subway ran without a single failure, the subway carrying 1,039,832 passengers with a car mileage of 180,000 miles. The elevated carried 930,415 passengers with a car mileage of 195,000 miles, making the total car mileage for the day 375,000 car miles. The record was made possible by the concerted action and efficient performance of the employees of the company, and the management appreciates the care and attention which it is apparent were exercised by every man in its employ."

Personal Mention

Mr. G. E. Bernsmeyer has been appointed storekeeper of the Wichita Railroad & Light Company, Wichita, Kan., a newly created position with the company.

Mr. Charles H. Smith, general superintendent of the United Traction Company, Albany, N. Y., has been appointed assistant general manager of the company, a newly created position.

Mr. A. C. Kingman, Battle Creek, Mich., has been elected president and general manager of the Battle Creek, Coldwater & Southern Railway, Coldwater, Mich., to succeed Mr. E. F. Pangborn.

Mr. John T. Straub, acting treasurer of the United Railways & Electric Company, Baltimore, Md., is the subject of a brief biographical sketch which appeared in the Baltimore *Star* of Nov. 2, 1911.

Mr. Edgar M. Graham, Muskogee, Okla., has accepted the position of chief engineer of the Rapid Transit Interurban Company, Tecumseh, Okla., in charge of the work of locating and constructing the lines of the company.

Mr. Arnold von Schrenk, who has been general manager of the Plattsburgh (N. Y.) Traction Company, has been appointed general superintendent in charge of the Troy division of the United Traction Company, Albany, N. Y.

Mr. C. H. Lewis has been appointed superintendent of transportation of the Wichita Railroad & Light Company, Wichita, Kan. Mr. Lewis was formerly superintendent of the Troost Avenue division of the Metropolitan Street Railway, Kansas City, Mo.

Mr. H. L. Barber has been appointed general manager of the Plattsburgh (N. Y.) Traction Company, to succeed Mr. Arnold von Schrenk, whose appointment to the Troy division of the United Traction Company, Albany, N. Y., is noted elsewhere in this column.

Mr. J. H. Butterfield, formerly city clerk of Hot Springs, Ark., and son of a former general manager of the Hot Springs Street Railway, has been appointed superintendent of the company to succeed Mr. Edward Hardin, whose resignation was noted in the Electric Railway Journal of Oct. 28, 1911.

Mr. Addison L. Gardner, of the law firm of Gardner, Foote & Burns, Chicago, Ill., has been appointed general counsel of the Chicago elevated railways. Mr. Gardner has been the general attorney for the Metropolitan West Side Elevated Railway and counsel for the South Side Elevated Railroad, Chicago.

Mr. Albert Sherman, who for twenty years has been in the employ of the street railway companies operating in Toledo, Ohio, and for the last six years division superintendent of the Toledo Railways & Light Company, Toledo, Ohio, has been appointed superintendent of transportation of the Saginaw-Bay City Railway, Saginaw, Mich.

Mr. S. E. Dillon, general manager of the Hot Springs Western Railroad, Hot Springs, Ark., before that line was taken over by the Iron Mountain system, has been appointed general manager of the Hot Springs Water Company, Hot Springs, Ark., which controls the local central-station, gas, water and street-railway utilities. Mr. Dillon succeeds Mr. H. E. Martin, whose duties have been divided between Mr. W. C. Fordyce and Mr. H. J. Lehman.

Mr. Walter H. Evans, formerly superintendent of motive power of the Indiana Union Traction Company, Anderson, Ind., has accepted the position of manager of the motor gear department of the Edgar Allen American Manganese Steel Company. The headquarters of Mr. Evans will be at the general offices of the company in the McCormick Building, Chicago. A biography of Mr. Evans was published in the Electric Railway Journal for Sept. 10, 1910.

Mr. A. B. Coryell, who has been general manager of the Dayton Construction Company, the Greenville Railway & Light Company and the Greenville Amusement Company, Greenville, Tex., and built an 8-mile street railway and a park at Greenville this year, has resigned, effective on Dec. 1, 1911. Mr. Coryell has been connected with the railway and lighting business for more than twenty years. He has not yet decided on his plans for the future.

Mr. J. R. Ong, superintendent of substations of the Ft. Dodge, Des Moines & Southern Railroad, Boone, Ia., has been appointed assistant electrical engineer of the company. Mr. Ong is a graduate of Purdue University. Previous to his present connection he filled various positions with the Indianapolis & Cincinnati Traction Company, Indianapolis, Columbus & Southern Traction Company, Chicago, Lake Shore & South Bend Railway and the Westinghouse Electric & Manufacturing Company.

Mr. James F. Hamilton, who has been superintendent of transportation of the Schenectady (N. Y.) Railway since November, 1908, has been appointed general superintendent of the United Traction Company, Albany, N. Y., to succeed Mr. Charles H. Smith, whose appointment as assistant general manager of the company is noted elsewhere in this column. Mr. Hamilton entered the employ of the Schenectady Railway in May, 1902, as assistant superintendent. He had previously been connected with the operating department of the International Traction Company, Buffalo, N. Y., for six years.

Mr. W. R. Morrison, whose appointment as the representative of Mr. William B. McKinley and his associates, in the Barbados Islands, was referred to in the Electric Railway Journal of Oct. 14, 1911, page 886, has relinquished his duties as general superintendent of the Wichita Railroad & Light Company to leave for Bridgetown, where it is proposed to establish an electric railway. Mr. Morrison has been connected with the Wichita Railroad & Light Company for eleven years. His duties with the company will hereafter be performed by Mr. A. M. Patten, general superintendent of the Topeka (Kan.) Railway, who will divide his time between Wichita and Topeka.

Mr. Milan V. Ayres has just accepted an offer to become connected with the Mobile Light & Railroad Company, Mobile, Ala. Mr. Ayres will have charge of the power station, track and other engineering work of the company. Mr. Ayres was electrical and mechanical engineer of the Boston & Worcester Street Railway for many years, but resigned that position last July to undertake the creation of a department of scientific management for the Rockland Light & Power Company, Nyack, N. Y. He is a graduate of the Massachusetts Institute of Technology and is chairman of the equipment committee of the American Electric Railway Engineering Association. He has been a frequent contributor to the proceedings of that association and to the technical press. His title with the Mobile Light & Railroad Company will be that of chief engineer.

Mr. L. D. Mathes, who has been manager and purchasing agent of the Union Electric Company, Dubuque, Ia., since 1903, has been appointed general manager of the Montgomery (Ala.) Traction Company and the Citizens' Light, Heat & Power Company, Montgomery, Ala., effective Dec. 1, 1911. Before becoming connected with the Union Electric Company Mr. Mathes was general superintendent of the Trenton & New Brunswick Railroad. He was graduated from the University of Tennessee and gained his first experience with the Memphis & Charleston Railroad at Memphis, Tenn. He became connected with the Edison General Electric Company and also served the General Electric Company and the Westinghouse Electric & Manufacturing Company, engaging for five years in the construction, equipment and operation of electric railways in various parts of the country. He accepted an important position with the construction department of the Buffalo & Niagara Falls Electric Railway at the time of the construction of that road. Later he was appointed superintendent of the Norfolk & Ocean View Railway. After a short connection as general superintendent with the Charleston & Sea Shore Railroad, Charleston, S. C., Mr. Mathes accepted the position of general superintendent of the Norfolk & Atlantic Terminal Company. During his connection with the Union Electric Company at Dubuque, Mr. Mathes has been very active in the work of the Iowa Street & Interurban Railway Association. He was secretary and treasurer of the association for several years and at the meeting of the association in Sioux City, Ia., in April, 1910, he was elected president of the association.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Cement, Tolenas & Tidewater Railroad, Cement, Cal.**—Incorporated in California to build a 6-mile electric railway from Cement to Tidewater. Capital stock, $500,000. R. B. Henderson, A. D. Plaw, W. T. Barnett, Paul C. McCarthy and F. D. Madison, all of San Francisco.

Modesto & Empire Traction Company, Modesto, Cal.—Incorporated in California to build an electric railway between Modesto and Empire. Capital stock, $20,000. Incorporators: T. K. Beard, W. H. Frazine, J. M. Waithall and L. L. Dennett. [E. R. J., Oct. 28, '11.]

Florence & Interurban Electric Railway, Florence, Col.—Application for a charter has been made by this company in Colorado to build an electric railway to connect Florence, Rockvale, Williamsburg, Coal Creek, Lincoln Park, Portland and Concrete. Capital stock, $125,000. Incorporators: D. F. Floor, J. V. McCandless, H. A. Hicks, Charles Roach and W. K. Hurd. [E. R. J., Aug. 5, '11.]

***Scenic Incline Railway, Manitou, Col.**—Incorporated in Colorado to build a cable railway to the top of Pike's Peak. Incorporators: J. Frank Campbell, Oliver D. Dick and D. H. Rupp.

***Alton & Southern Railway, Springfield, Ill.**—Incorporated in Illinois to build an electric or steam tramway from a point on the easterly banks of the Mississippi River in St. Clair County, opposite St. Louis, Mo., and extending in an easterly and northerly direction to a point in St. Clair County, near the northeasterly limits of East St. Louis. Headquarters, East St. Louis. Capital stock, $10,000. Incorporators and first board of directors are: Arthur V. Davis and R. Mellon, Pittsburgh; Charles M. Hall, Niagara Falls, N. Y.; C. B. Fox, Gilbert McCulloch, C. B. Hodgson, and Charles W. Souder, all of East St. Louis, Ill.

Eugene Belt Line & Interurban Railway, Eugene, Ore.—Incorporated in Oregon to build an electric railway to connect Eugene, Springfield, Coburg and Junction City. Capital stock, $250,000. Incorporators: P. C. Lavey, J. H. Tingle and C. H. Lavey, all of Portland. [E. R. J., April 16, '10.)

Washington Trunk Railway, Olympia, Wash.—Application for a charter will be made in Washington by this company to build an electric railway from Vancouver, Wash., to North Yakima and Ellensburg, also an extension to Portland. Capital stock, $5,000,000. Incorporators: Lawrence Harmon and E. R. Ernsberger. [E. R. J., Oct. 28, '11.]

FRANCHISES

Los Angeles, Cal.—The City Council has been asked to grant a franchise for new cross-town lines on Jefferson Street, Vernon Avenue and Vermont Avenue.

Oakland, Cal.—The Oakland Traction Company has asked the Board of Supervisors for a fifty-year franchise for an extension of its line.

Boulder, Col.—The Boulder Electric Light & Power Company has received a franchise from the City Council to extend its lines into the northern section of Boulder.

East Pueblo, Col.—The East Pueblo Tramway has asked the City Council for a railway franchise in East Pueblo.

Centerbrook, Conn.—The Shore Line Electric Railway, Saybrook, has asked the Selectmen for a franchise in Centerbrook and to cross the highway in Ivoryton with its Chester extension.

Norwich, Conn.—The Connecticut Company has asked the Common Council for a franchise to extend its tracks down Shetucket Street in Norwich.

Tallahassee, Fla.—The Palm Beach, Okeechobee & Western Railway, Palm Beach, has asked the Council for a franchise in Tallahassee. This is part of a plan to build a 140-mile electric railway from West Palm Beach across the peninsula with terminus at Fort Myers on the west coast. R. J. Martin is interested. [E. R. J., Oct. 28, '11.]

Huntington, Ind.—A. B. Terrill & Company, purchasers of the Marion, Bluffton & Celina Traction Company lines, have petitioned the Commissioners of Huntington County for an amended franchise permitting the electrification of the Chicago, Bluffton & Cincinnati steam road through the county. The plan is to purchase the road and convert it into an electric road.

Valparaiso, Ind.—The Indianapolis, Chicago & Meridian Railway, Indianapolis, has received a fifty-year franchise from the City Council in Valparaiso. This line will connect Indianapolis, Sheridan, Gary, Valparaiso, Hammond, Monticello and Warsaw. M. J. Mooreland, secretary. [E. R. J., Oct. 21, '11.]

Northampton, Mass.—The Northampton Street Railway has asked the Board of Aldermen for a franchise to extend its lines in Northampton.

Orange, Mass.—The Miller's River Street Railway, Miller's Falls, has asked the Railroad Commission for a location of its tracks in Orange. This line will connect Miller's Falls, Montague, Irving and Orange. D. P. Abercrombie is interested. [E. R. J., Oct. 7, '11.]

Romeo, Mich.—L. A. Clark, Detroit, has received an extension of his franchise to Sept. 1, 1914, in Romeo. This is part of a plan to build a gasoline-motor railway between Romeo, Imlay City and Almont. [E. R. J. Oct. 28, '11.]

Nashua, N. H.—The Nashua Street Railway has asked the Public Service Commission for authority to extend its Lake Street line in Nashua.

Orange, N. J.—The Orange Mountain Traction Company, South Orange, has asked the Common Council for a franchise over several streets in Orange.

Monongahela, Pa.—The Pittsburg, Monongahela & Washington Street Railway has asked the Common Council for a franchise to extend its lines up Pigeon Creek, via Ellsworth and Marianna to the county seat.

Pittsburgh, Pa.—The Monongahela Street Railway has received a franchise from the City Council over certain streets in Pittsburgh.

Williamsport, Pa.—The Williamsport (Pa.) Passenger Railway has applied for a franchise through the borough of South Williamsport and through Du Boistown. The company already has a franchise through South Williamsport as far as Maynard Street.

Dallas, Tex.—John T. Witt, Dallas, has asked the County Commissioners for a thirty-year franchise over the right-of-way of the West Dallas-Commerce Street pike from the Trinity River westward to the west line of Beckley Avenue. [E. R. J., Sept. 16, '11.]

Keyser, W. Va.—The Ridgeley & Miller Avenue Railway, Ridgeley, has received a franchise from the Commissioners of Mineral County to build a 3-mile electric railway from the bridge crossing the Potomac River at Cumberland, Md., to Knobmont, W. Va. It is expected that the line will connect with the Cumberland Electric Railway. John L. Miller is interested. [E. R. J., Nov. 4, '11.]

TRACK AND ROADWAY

Mobile (Ala.) West Shore Traction Company.—Surveys have been begun by this company on its proposed route from a point a few miles south of the city limits of Mobile to Pascagoula. George H. Clark, engineer. [E. R. J., Oct. 28, '11.]

Alberta Electric Railway, Calgary, Alta.—Surveys are being made by this company for a line between Carbon and the Red River. [E. R. J., May 27, '11.]

Jonesboro-Nettleton Electric Railway, Jonesboro, Ark.—Work has been begun by this company on its 3-mile line between Jonesboro and Nettleton. Preston Hatcher, Jonesboro, is interested. [E. R. J., Sept. 30, '11.]

British Columbia Electric Railway, Vancouver, B. C.—Plans are being made by this company for an extension of its Main Street line in South Vancouver at Sixty-third Street to meet the New Westminster-Eburne line.

Pacific Electric Railway, Los Angeles, Cal.—Plans are being made by this company to build an extension from its present terminus on Colorado Street at Lamanda Park, Pasadena, to the west city limits of Monrovia.

Redlands University Railroad, Redlands, Cal.—This company advises that it will award a contract about Dec. 1 for overhead equipment and the construction of its 3-mile electric railway between Redlands and Crafton. Rails and ties have been ordered. The company's repair shop will be located at Redlands and it will purchase power from the Edison Company. Capital stock authorized, $150,000. Officers: Gardner S. Turrill, Redlands, president and general manager; J. W. Curtis, San Bernardino, secretary, and E. A. Moore, Redlands, treasurer. [E. R. J., Oct. 28, '11.]

Point Loma Railroad, San Diego, Cal.—A 3-mile extension is being planned by this company from Roseville Junction, where the present line starts, through Carlson Canyon to Ocean Beach, southwesterly around through Roseville and La Playa to Fort Rosecrans at Ballast Point.

Vallejo & Northern Railway, Vallejo, Cal.—Hard Brothers have been awarded the contract for 5 miles of the Woodland-Sacramento branch of this railway. The contract covers that section of the line between Russell Flint farm, north of Washington, and a point 1 mile south of Elkhorn. The company is receiving bids for the construction of 10,000 ft. of trestle.

***Colorado Springs, Col.**—It is reported that Eastern capitalists, through F. H. Dunnington, are considering plans to construct an electric railway between Manitou and Cripple Creek.

St. Petersburg Railway & Electric Company, St. Petersburg, Fla.—This company has awarded a contract to Messrs. Snell and Hamlett to build a 1½ mile extension from Second Street and Seventh Avenue in St. Petersburgh north to Coffee Pot Bayou

Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind.—Work has been begun by this company to improve its lines in Lafayette.

Capital Circuit Traction Company, Indianapolis, Ind.—U. Z. Wiley has been appointed receiver for this company, organized to build an electric line around Indianapolis at an average distance of 25 miles to connect eight county seat towns. The petitioners for a receiver are employes and the secretary, who allege that the company is insolvent. The assets of the company consist of franchises and the right-of-way. [E. R. J., Aug. 26, '11.]

Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.—It is stated that the route for an extension of this company's line to Cincinnati has been decided upon and contracts will be awarded this year.

Louisville (Ky.) Railway.—This company and the city officials of Louisville have agreed upon a route for the proposed cross-town line, which will be about 6 miles long.

Bangor Railway & Electric Company, Bangor, Maine.—The Railroad Commissioners of Maine have ordered the construction of a new highway and electric railway bridge at Stillwater to cost $30,000, the cost to be shared by this company and the town in the ratios of 60 per cent and 40 per cent.

Detroit (Mich.) United Railway.—Plans are being made by this company for the construction of a crosstown line dividing Woodward Avenue, between Bagg and High Street, and connecting the Mack Avenue and Myrtle Street lines. Another crosstown line is being planned north of Forest Avenue in Detroit.

***Manistee, Mich.**—Plans are being considered for the construction of an electric railway to connect Muskegon, Ludington, Manistee, Arcadia, Onekama, Frankfort and Traverse City. J. C. McLaughlin is said to be interested.

St. Louis, St. Charles & Northern Traction Company, Mexico, Mo.—Preliminary arrangements are being made by this company for the construction of its 77-mile electric railway to connect St. Louis, St. Charles, Old Monroe, Middletown, Laddonia and Mexico. C. B. Duncan, Corso, president. [E. R. J., Sept. 2, '11.]

Reno (Nev.) Traction Company.—The immediate construction of an extension from Sparks to the Arkell mine in the Wedekind district is being planned by this company.

Atlantic Coast Electric Railroad, Asbury Park, N. J.—Plans are being made by this company for an extension through the western part of the State encampment grounds at Sea Girt for the purpose of connecting Manasquan and Sea Girt.

Jersey Central Traction Company, Keyport, N. J.—Negotiations are being made by this company to build a new Long Branch-Red Bank route through Little Silver and Elkwood Park. It is proposed to enter Long Branch at Myrtle Avenue and to continue down Broadway to the new pier, which is now nearing completion.

Oneida (N. Y.) Railway.—This company placed in operation on Nov. 1 its new Madison Street extension in Oneida.

Durham (N. C.) Traction Company.—Construction has been begun by this company on a 2-mile extension from Durham to Watts Hospital.

Devils Lake & Chautauqua Transfer Company, Devils Lake, N. D.—The Stotlar Investment Company, which has recently purchased the property of this company, advises that the 5-mile railway between Devils Lake, Greenwood, Chautauqua grounds and the state military grounds, which has been operated by steam, will be electrified probably about May 1, 1912. [E. R. J., Oct. 14, '11.]

North Randall Railway, Cleveland, Ohio.—Plans are being made by this company to begin soon on the construction of its 3-mile electric railway from Windfall Avenue, Cleveland, to the Randall race track. [E. R. J., May 20, 1911.]

Oregon Electric Railway, Portland, Ore.—This company has ordered 284 tons of structural steel from the American Bridge Company for the bridge over Rock Creek.

Petersburg, Pa.—A company with a capital of about $400,000 is being formed for the construction of a 15-mile electric railway to connect Petersburg and McAlevy's Fort, via Shavers Creek Valley. Samuel Longnecker, Petersburg, and Albert Myton, Huntingdon, are interested. [E. R. J., Oct. 28, '11.]

Pittsburgh (Pa.) Railways.—Plans are being considered by this company to construct a belt line to Pittsburgh between downtown sections and the North Side.

Westmoreland County Railway, Pittsburgh, Pa.—It is reported that this company is considering plans to construct an extension from Latrobe to Perry and Blairsville.

Sioux Falls & Southern Minnesota Traction Company, Pierre, S. D.—Surveys have been completed by this company from Worthington, Minn., to Albert Lea, Minn., and engineers are now engaged in looking over the territory west and northwest of Albert Lea for the most advantageous routes for entering the city limits of Albert Lea. This line will connect Sioux City, S. D., and Albert Lea, Minn., via Worthington, Sheppard, Spring Valley, Dresden, Loon Lake, Petersburg, Dwinnell, Ceylon, Silver Lake and Pilot Grove, Minn. G. P. Peterson, Pierre S. D., is interested. [E. R. J., Oct. 21, '11.]

Chattanooga (Tenn.) Traction Company.—This company has announced that its line up Lookout Mountain will be built over a circuitous route to enable its regular service cars to make the ascent. It is stated that work will be begun as soon as the city commissioners issue the necessary permits.

Clarksville, Tex.—A company is being formed to build a 100-mile electric railway to connect Clarksville, Paris, Greenville, Rockwell and Dallas. Preliminary arrangements are well advanced. Joseph F. Nichols, Greenville, is interested. [E. R. J., Oct. 21, '11.]

Houston (Tex.) Electric Railway.—This company plans to expend about $750,000 for the betterment of its lines in Houston before 1912.

Gray's Harbor Railway & Light Company, Aberdeen, Wash.—The Federal Light & Traction Company, New York, N. Y., which controls the Gray's Harbor Railway & Light Company, has announced that it will build an interurban railway from Aberdeen to South Bend and Raymond, on Willapa harbor; also an interurban line from Aberdeen to Puget Sound. In addition, the company is considering, besides its B Street extension now in course of construction, an extension on West Sixth Street to cross the gulch, and an extension in Hoquiam, and will within a year replace its rails on Heron Street west from K Street with new rails.

*Lancaster, Wis.—Thomas McDonald, Lancaster, is promoting an electric railway proposition in Grant County. It is proposed to build a belt line from Lancaster through South Lancaster, Beetown, Glen Haven, Bloomington, Patch Grove, Mt. Hope, Mt. Ida, Fennimore, North Lancaster and returning to Lancaster. The main line will extend through La Fayette County, connecting with the Chicago & Great Western Railway at Warren, Ill. The power is to be supplied from two dams on lower Grant River, one on Platte and one on Apple River, with a large auxiliary steam plant at Lancaster.

SHOPS AND BUILDINGS

Vallejo & Northern Railway, Vallejo, Cal.—Bids will soon be asked by this company for the construction of a new station in Woodland. The structure will be 150 ft. x 80 ft., and will be located on the block bounded by Main Street, Second Street and Lincoln Avenue. The cost is estimated to be about $15,000.

Philadelphia & Wilmington Traction Company, Wilmington, Del.—This company has completed the addition to the machine shop at the rear of its carhouse on Delaware Avenue and Du Pont Street in Wilmington.

Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind.—Bids are asked by this company for the construction of a new carhouse in Peru.

Union Street Railway, New Bedford, Mass.—This company has completed its new carhouse at Weld Square, which will house 85 cars.

Ohio Electric Railway, Cincinnati, Ohio.—This company has begun the construction of its new carhouse and repair shop at Berkeley Heights, south of Dayton.

Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont.—This company plans to replace its present depot in Welland with new passenger and freight depot. E. F. Seixas, St. Catharines, general manager.

Pittsburgh, McKeesport, & Greensburg Railway, Pittsburgh, Pa.—Work has been begun by this company on its new carhouse and repair shop in Irwin.

Pittsburgh (Pa.) Railways.—The West Park carhouses of this company in McKees Rocks were damaged by fire on Oct. 26. The loss is estimated to be about $32,500.

Everett Railway, Light & Water Company, Everett, Wash.—This company is now occupying the new two-story brick building erected by Stone & Webster on Colby Avenue and Pacific Avenue in Everett. In this building are located the operating department of the Seattle-Everett Traction Company, the waiting room and ticket office of the interurban lines and the general offices of the Everett Railway, Light & Water Company.

Ridgeley & Miller Avenue Railway, Ridgeley, W. Va.—It is expected that this company will build its carhouse near Knobmont. John L. Miller is interested. [E. R. J., Nov. 4, '11.]

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—Among the improvements planned by this company in the near future will be the construction of a new carhouse at Fond du Lac Avenue and Thirty-fifth Street in Milwaukee.

POWER HOUSES AND SUBSTATIONS

People's Railway, Wilmington, Del.—This company will build a 150-ft. brick smokestack in the rear of its power house at Sixth Street and Hawley Street in Wilmington.

Wilmington & Philadelphia Traction Company, Wilmington, Del.—The General Electric Company, Schenectady, N. Y., is delivering to this company the 4000-kw turbo-generator ordered in January, 1911, to be installed at the Brandywine plant in Wilmington. [E. R. J., Jan. 3, 1911.]

Portland & Brunswick Street Railway, Freeport, Maine.—This company has ordered a motor-generator to replace the steam-generating plant at Freeport so that the current to operate the line can be taken from Brunswick for use at Freeport.

Rochester, Syracuse & Eastern Railroad, Syracuse, N. Y.—Work has been begun by this company on a change of location of the pumping station of its power plant located in Lyons.

Manufactures & Supplies

ROLLING STOCK

Elgin & Belvidere Electric Company has ordered two single-truck cars from the St. Louis Car Company.

Oregon Electric Railway, Portland, Ore., has ordered sixteen large interurban cars from the American Car Company.

Bartlesville (Okla.) Interurban Railway has ordered one 28-ft. car body mounted on No. 47 St. Louis trucks from the St. Louis Car Company.

Bellingham & Skagit Interurban Railway, Bellingham, Wash., has issued specifications through Stone & Webster, Boston, Mass., for five 57-ft. cars.

Chicago (Ill.) City Railway has ordered four GE-210 motors with K-36 controllers and one straight-air-brake equipment from the General Electric Company.

Chillicothe Electric Railroad, Light & Power Company, Chillicothe, Ohio, has ordered two 25-ft. 4-in. pay-as-you-enter car bodies from the G. C. Kuhlman Car Company.

Honolulu Rapid Transit & Land Company, Honolulu, Hawaii, has ordered twenty-one straight-air brake equipments for double-end operation from the General Electric Company.

Fitchburg & Leominster Street Railway, Fitchburg, Mass., has ordered three 30-ft. 8-in. semi-convertible pay-as-you-enter motor car bodies mounted on Brill 27-GE-1 trucks from The J. G. Brill Company.

Fresno (Cal.) Traction Company has ordered, through Pierson, Roeding & Company, three 38-ft. 8-in. California type motor car bodies mounted on Brill 27-G-1 trucks from the American Car Company.

Pueblo & Suburban Traction & Lighting Company, Pueblo, Col., has ordered six 28-ft. 10-in. semi-convertible pay-as-you-enter car bodies mounted on Brill 27-GE-1 trucks from the American Car Company.

Walnut Ridge & Hoxie Light, Power & Transit Company, Walnut Ridge, Ark., has ordered one 29-ft. combination passenger and baggage car mounted on Brill 27-G-1 trucks from the American Car Company.

Poughkeepsie City & Wappingers Falls Electric Railway, Poughkeepsie, N. Y., has ordered one 18-ft. 3-in. semi-convertible motor car body mounted on a Brill 21-E truck without wheels and axles from The J. G. Brill Company.

Toledo, Bowling Green & Southern Traction Company, Findlay, Ohio, has ordered four quadruple equipments of No. 304 interpole railway motors with type HL control from the Westinghouse Electric & Manufacturing Company.

Norwich & Westerly Railway, Norwich, Conn., has ordered four 30-ft. 8-in. semi-convertible motor car bodies mounted on Brill 27-GE-1 trucks from The J. G. Brill Company and one 32-ft. express car body from the Wason Manufacturing Company.

Central Pennsylvania Traction Company, Harrisburg, Pa., reported in the ELECTRIC RAILWAY JOURNAL of Aug. 20, 1911, as having ordered six semi-convertible pay-within cars has specified the following details for these cars:

Weight (car body only) 16,000 lb.	Gears and pinions.....solid
Length of body.....25 ft.	Gongs .....Dedenda
Over vestibule....37 ft. 6 in.	Hand brakes.....Peacock
Width over sills.7 ft. 7¾ in.	Heaters .....Consol.
Over all.....8 ft. 2 in.	Headlights ....Crouse-Hinds
Sill to trolley base.11 ft. 9 in.	Journal boxes .....Sym.
Body .....wood	Motors.....2 West. 101-C
Interior trim.....mahogany	Motors .....outside
Headlining .....Agasote	Paint.....Ry. co's Std.
Roof .....Brill plain arch	Registers .....Internat.
Underframe .....wood	Sanders .....Ohio
Air brakes.....Nat.	Sash fixtures .....Edwards
Axles.....4½ in. and 3⅞ in.	Seating material.....rattan
Bumpers Hedley anti-climber	Springs .....Brill
	Step treads .....Mason
Cables .....Brill	Trolley base .....Union
Couplers .....Brill	Trucks .....Brill 39-E
Curtain fixtures.....Nat.	Ventilators .....Globe
Curtain material...Pantasote	Wheels 33-in. and 21-in. St. Louis

TRADE NOTES

H. W. Johns-Manville Company, New York, N. Y., has removed its branch office in Birmingham, Ala., from 1220 Empire Building to 606 Chamber of Commerce Building. This office will continue under the management of H. W. Fleming, who was connected with the New Orleans branch of the company for a long time.

St. Louis Car Company, St. Louis, Mo., has shipped one train of twelve cars and one train of thirteen motor cars on their own wheels for the San Francisco, Oakland & San Francisco Railroad, San Francisco, Cal. These cars are 70 ft. long, seat 86 passengers and each has spring buffer platforms, mounted on St. Louis 23-B MCB type trucks.

Ackley Brake & Supply Company, New York, N. Y., was awarded a gold medal for the exhibit of the Ackley adjustable brake made at the recent meeting of the International Congress for the Application of Electricity at Turin, Italy. The company received a silver medal for the same type of brake at the International Railway Congress at Brussels last year.

McGraw-Hill Book Company, New York, N. Y., has purchased the book department of the Engineering News Publishing Company, New York. This adds to the list of the McGraw-Hill Book Company a considerable number of important standard treatises, primarily in the field of civil engineering. The transfer of this business was made on Nov. 6, 1911.

American Ship Windlass Company, Providence, R. I., manufacturer of the Taylor stoker, announces that its plant at Providence is being abandoned and the entire business is being removed to Philadelphia, where the company has a large plant in operation. A foundry was recently erected in Philadelphia to accommodate the growing business of the company.

Union Switch & Signal Company, Swissvale, Pa., announces the following changes in the personnel of its engineering department: J. P. Coleman has resigned as chief engineer of the company and has been appointed consulting engineer. L. F. Howard has been appointed engineering manager, in charge of the engineering department. F. B. Corey, for some years with the General Electric Company, entered the service of the company on Nov. 1. His immediate duty will be the reorganization of the inspection department as engineer in charge of inspection.

The J. G. Brill Company, Philadelphia, Pa., has received the following foreign orders for equipment: E. G. Long Company, from Koya-Tozan Railway, Japan, twenty-four Brill 27-GE-1 trucks; Noyes Brothers, Australia, twenty Brill 39-E trucks; Societa Italiana Westinghouse, Italy, eight Brill 27-GE-1 trucks without wheels and axles; A. E. G. Thomson-Houston Iberica, Madrid, Spain, two 16-ft. semi-convertible motor car bodies mounted on Brill 21-E trucks; Lisbon (Portugal) Tramways, seven 17-ft. 6-in. closed motor car bodies mounted on Brill 21-E trucks.

Power Specialty Company, New York, N. Y., has recently received contracts for Foster superheaters from the following companies: New York, New Haven & Hartford Railroad at Cos Cob and Bridgeport plants, 10,620 hp in Bigelow-Hornsby and B. & W. boilers; Delaware, Lackawanna & Western Railroad, at Loomis Colliery, 900 hp in Erie City boilers; Indiana & Michigan Traction Company, 3200 hp Wickes boilers; Wilmington & Philadelphia Traction Company, 2400-hp Edge Moor boilers; Penn Central Light & Power Company, 2400-hp Edge Moor boilers; Citizens' Light & Power Company, Montgomery, Ala., 3200-hp Stirling boilers.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., announces that it has either shipped or has on order 3000-kw rotary converters for the following companies: Brooklyn Rapid Transit Company, three; Chicago Railways Company, two; Philadelphia Rapid Transit Company, two; Metropolitan Street Railway, Kansas City, one. As noted on page 83 of the Electric Railway Journal for Jan. 14, 1911, two rotaries of this size were installed by the Interborough Rapid Transit Company, New York, N. Y., at the end of 1909. Since then the company has ordered seven more of the same type and two are in service in the Hudson substation of the Brooklyn Rapid Transit Company.

General Railway Signal Company, Rochester, N. Y., has appointed A. G. Moore advertising manager with headquarters at Rochester. Mr. Moore began his signaling experience in 1901 with the Pneumatic Signal Company, and for two and one-half years was engaged in construction work. He then became a draftsman with the Taylor Signal Company, and after three years of service in various lines of work for that company was appointed chief draftsman of the signal department of the Illinois Central Railroad at Chicago. In September, 1910, Mr. Moore became connected with the General Electric Company, where he was identified with the design and manufacture of that company's signal apparatus, from which position he has recently resigned.

ADVERTISING LITERATURE

Tool Steel Gear & Pinion Company, Cincinnati, Ohio, has issued a booklet which contains records of tool steel gears and pinions.

Ingersoll-Rand Company, New York, N. Y., has issued a bulletin which describes and illustrates its Imperial type X duplex steam-driven air compressors.

Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., has issued the second edition of its Bulletin No. 1002, describing local battery telephones. This bulletin has been revised to include one or two instruments of improved types which have been developed since the first edition was issued.

Hayes Track Appliance Company, Richmond, Ind., has issued Circular No. 66, which describes double-end Hayes derails. These are designated as models CX and EX. Model CX is for operation by switch stand or pipe line; model EX is for direct hand operation. These double-end derails are a combination of a right-hand and a left-hand derail and will derail in either direction.

National Metal Molding Company, Pittsburgh, Pa., has issued a catalog which lists and illustrates the various types of National metal molding. Attention is called to the many improved National metal molding fittings with particular reference to No. 363, which has been designed to permit extension work from existing fixture outlets in National metal molding without removal of the fixture. The company has also printed a folder which shows a complete line of its products.

Westinghouse Electric Manufacturing Company, Pittsburgh, Pa., has issued descriptive leaflet No. 2373, which describes the No. 303-A box frame interpole motor manufactured by that company. Complete specifications for the motor, brief descriptions of the important parts and performance curves are given on the sheet. Another descriptive leaflet, No. 2374, gives specifications and brief descriptions of the parts of the company's box frame interpole railway motor No. 310-C.

Jeffrey Manufacturing Company, Columbus, Ohio, has issued Catalog No. 50, which describes the complete line of Jeffrey power transmission machinery. Besides listing dimensions and sizes of every part in this line tables are presented giving the horse-power of steel shafting, belts, standard sizes of key seats for shafting, gears, pulleys, etc. Among the parts listed are couplings, hangers, pillow blocks, counter shafts, belt tighteners, clutches, quills, Jeffrey improved split iron pulleys, wood split pulleys and rope driving. The catalog also lists a complete line of Jeffrey gears, including spur, bevel miter, angle reduction and angle miter types.

Westinghouse, Church, Kerr & Company, New York, N. Y., has issued a 50-page catalog entitled "Central Power Stations," which describes and illustrates ten steam turbine power stations built by the company for railway, light and power service in various parts of the country. These stations have been selected as they represent a wide range of sizes and combinations of equipment. Comparisons of these stations bring out the following facts: Four types of building construction are used; six types of boilers; three methods of stoking; three kinds of draft for furnaces; ten methods of handling coal; two types of turbines and generators; seven types of condensers; exciters of four types and various characteristics appertaining to electrical equipment.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVIII NEW YORK, SATURDAY, NOVEMBER 18, 1911 No. 21

PUBLISHED WEEKLY BY

McGraw Publishing Company

JAMES H. MCGRAW, President; C. E. WHITTLESEY, Sec'y and Treas.

239 WEST THIRTY-NINTH STREET, NEW YORK

TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1021 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Wednesday, 9 a. m., of the week of issue.

Copyright, 1911, by MCGRAW PUBLISHING COMPANY.

Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

The Association of American Advertisers has examined and certified to the circulation of this publication. The figures of circulation contained in the Association's report only are guaranteed.

ASSOCIATION OF AMERICAN ADVERTISERS.
No. A—82. *Whitehall Bldg., N. Y. City.*

NEW YORK, SATURDAY, NOVEMBER 18, 1911.

CONTENTS.

The Los Angeles Report..... 1049
An Annual Report..... 1049
Committee on Safety..... 1050
Two Recent Strikes..... 1050
Lessons from the Catenary Experiences of the Connecticut Company 1051
D. C. Catenary Experiences of the Connecticut Company..... 1052
Automatic Block Signals on Iowa Line..... 1056
The Strike on the Coney Island & Brooklyn Railroad..... 1057
Electric Welding in Pittsburgh..... 1059
The Recent Strike Siege in Des Moines..... 1060
Treatment of Tool Steel..... 1062
Idaho Cedarmen's Convention..... 1062
Transportation Problem of Los Angeles..... 1063
Changes in the Cleveland Franchise..... 1068
Committee on Passenger Accounts of the Central Electric Accounting Conference..... 1069
A Forced-Ventilation Hot-Air Heater..... 1070
Toledo Line Car..... 1070
Electric Railway Legal Decisions..... 1071
News of Electric Railways..... 1074
Financial and Corporate..... 1075
Traffic and Transportation..... 1079
Personal Mention..... 1081
Construction News..... 1083
Manufactures and Supplies..... 1086

The Los Angeles Report

The report just submitted by Mr. Arnold for the reorganization and extension of the Los Angeles transportation lines advocates a most comprehensive system. The city has grown rapidly during the past ten years, and the riding upon its magnificent electric railway lines has increased in greater proportion, so it is not surprising that congestion within the city streets has been the result. But the remedies suggested are as radical as the difficulties are serious. In few other cities in this country of the size of Los Angeles, or in even larger cities, would such a proposal seem commercially practicable as the construction to a neighboring suburb (in this case part of the city) of an eight-track interurban line and its extension into the center of the city as a four-track line built there as a subway or elevated railway. Nor in many if any other cities would the double-decking of certain streets so as to provide an electric freight service on the lower deck and vehicle and pedestrian traffic on the upper deck appear financially feasible to the majority of the citizens. But Los Angeles is used to doing things, especially electric railway construction, on a large scale. The city needs double-decked streets and an eight-track line to its seaport so as to be ready to handle the traffic which it is expected will come to it with the opening of the Panama Canal. The development of its interurban lines is being hampered by the necessity for slow speed within the thickly populated portions of the city, and, as the limits of these districts are constantly extending, this improvement should come soon. For the city lines the report recommends universal transfers and for all of the transportation systems public supervision and control, with the possibility for municipal ownership of the city lines and of the city terminal of the interurban lines.

An Annual Report

An annual report of an electric railway company is the chief source of information regarding the results of operations which is available to the great body of holders of bonds and stocks. It should therefore be made as complete as possible in its presentation of all essential details. It should give the principal classes of earnings and always the full expenditures charged to each general operating expense account. A condensed balance sheet should be furnished, not entirely in a skeletonized form, but with sufficient items to enable the security holder to determine the kinds of property of which the assets are composed. A clear statement of miles of track owned and operated, with additions during the year and average mileage operated during the twelve months, should be included. Another table, relating to traffic statistics, should show the numbers of revenue passengers and transfer passengers carried, the

number of car miles run and also unit results that are computed ordinarily from these totals. The annual charges to capital account, set forth in detail, are items that the creditors and owners of the property are fairly entitled to have in their possession. In addition to these fundamental points, a discussion by the chief executive or operating official regarding the principal developments of the year will be of distinct interest. The security holders will be in closer touch with the property if they know the authorized and outstanding amounts of bond and stock issues, rates of interest or dividends, etc. A comprehensive map will lead to a greater familiarity on the part of these interested persons with the actual property operated. Of all the facts to which the owner of securities is most justly entitled, none is more important than an understanding of the policy of the management toward the upkeep of the property. If an increasing burden of deferred maintenance is being added each year he will then know that in time, unless there is a reversal of policy, the loss will be so great that bankruptcy will be inevitable; while if the management is at least taking care of the depreciation that accrues now, the property is becoming no worse in condition and through future earnings may, if managed wisely, be made better.

COMMITTEE ON SAFETY

The increased attention that has been devoted to the problem of making electric interurban travel safer has resulted in many novel practices and some very effective methods. Probably the most noteworthy results have been obtained by instructing the trainmen in the rules and the use of apparatus and in general vigilance. This schooling is, of course, supplementary to the general discipline which is or should be maintained at a high standing on every road which attempts to handle passengers at high speeds or over hazardous track.

Another and a novel means for increasing the safety of travel is the formation of committees on safety among the employees. In an editorial in the Electric Railway Journal for Feb. 18, 1911, the inauguration of a scheme of this kind by the Chicago & North-Western Railroad was commented on. The Baltimore & Ohio Railroad recently has put the same plan into effect on its entire system, and at least one electric railway, the Fort Dodge, Des Moines & Southern Railroad in north-central Iowa, has also adopted this means of preventing accidents. On this road a committee on safety, with the vice-president of the road as chairman, has been made up of five men from the general office, with one motorman and one conductor, and this committee inspects the entire property once a month. The men from the general office are the heads of the executive and operating departments, and the trainmen are chosen by the chairman of the committee and serve one month each.

On the days of inspection the committee rides regular trains at random, sees the orders delivered to train crews by the station agents, surprise-checks with regard to train numbers, lamps, markers and signals, and inspects the right-of-way and the equipment so far as this may be done easily on the road. Two days are required for this work, one for an inspection of the north half of the property and the other for an inspection of the south half of the property. After each inspection trip a conference is held in the general manager's office, where the independently kept notes of the committee members are compared, and suggestions received from employes of the road and from the members of the committee are considered. It is clearly understood on this road that every employee is invited to make suggestions to the committee on safety, and that such suggestions, if presented through a superior officer, will be transmitted to the committee and will be considered at its first meeting. The conductors and motormen hand their suggestions to their representatives on the committee.

This form of holding regular inspection trips and conferences on the safety features of an interurban system has brought excellent results and is a work in which the department heads and employees on the road mentioned have willingly engaged. It affords a means of reporting promptly any dangerous condition of track, equipment or operation, and what is of most importance, these reports receive immediate attention from the management. The results of the pioneer work on Chicago & North-Western are said to have been very beneficial, especially in the reduction of minor accidents, which form by far the largest proportion of the annual total of claims for damages.

TWO RECENT STRIKES

Like all kinds of warfare, a strike is nearly always expensive to the winner and is usually disastrous to the loser. A manager is warranted in making every effort within reason and honor to avoid such a conflict, but if he has done this without success, we do not know of any other circumstances where the old proverb "Be sure you are right and then go ahead" applies with greater force. The inauguration of a strike means that the public will be inconvenienced to some extent and that the receipts from operation will reflect the consequent lack of patronage; hence it is safe to expect that many influences, political and other, will be brought to bear upon the management, directors and anyone else who may be thought to have some influence in making the company surrender. Capital is proverbially timid, and the experience in strikes has usually been that those representing the financial interests are the ones who first show the white feather. For this reason the next step for a management to take, after it is sure that it is right, is to convert and retain in the support of this position all of the principal persons interested financially in the property. In many cases where a company has been defeated in a strike we have heard the manager declare that he would have won if he had not been compelled to surrender by some timid but financially or politically important man or group of men in the board of directors.

Accounts of two strikes on electric railway properties are published elsewhere in this issue. One was settled by arbitration and the other by a complete rout of the strikers, but in both the company was successful. Each strike possessed unique features. In Des Moines an injunction was issued at the request of the city authorities soon after the strike began, not to enjoin the strikers and their sympathizers against the commission of violence, but to require each party to the dispute to re-establish the original status. That is to

say, the company was required to reinstate the discharged employees over whom the dispute had arisen, and the men were required under penalty of the law to return to work. As we pointed out at the time, the constitutionality of such an injunction is open to very serious question, but the author of the article on the Des Moines strike in this issue says that its legality has not yet been adjudicated in a higher court. At best it could only postpone the real crisis, which came when the same employee over whom the first strike occurred was discharged in company with others about five weeks later for an infraction of the same rule which caused his original discharge. At this time arbitration was the resort, and the decision of the arbitrators upheld the company in two of the three cases which it considered and in all of those in which there was more than one witness to the violation of the rules.

One of the most interesting features of the other strike, that on the Coney Island & Brooklyn Railroad, was that the men who took the place of the strikers were engaged by the company entirely without the assistance of any detective bureaus. This plan not only saved the commissions which are paid to the bureaus, but also enabled the company to get its information in regard to strike conditions directly from its own men. Of course, the Coney Island & Brooklyn Railroad was in an especially favorable condition to secure new men, being close to the headquarters of the labor market in New York, but the plan is worth consideration in other places. Another novel feature in the strike on the Coney Island & Brooklyn Railroad was a change from the usual method of police protection. The officers were stationed along the roadway instead of on the cars, and this enabled them more readily to close in upon the lawless element which attacked the cars.

LESSONS FROM THE CATENARY EXPERIENCES OF THE CONNECTICUT COMPANY

There is no question that some form of catenary suspension is advantageous for high-tension, high-speed railways, but many line engineers have felt that it is of doubtful value for standard direct-current lines where moderate-speed cars with wheel collectors are used. A great deal of light has now been thrown on this question by the frank account published elsewhere in this issue of the Connecticut Company's experiences with six different types of catenary construction. The likelihood that all, or nearly all, of the short steam cross-country lines in the thickly populated sections of Connecticut would be electrified eventually led the company to consider the possibility of developing a standard system of d.c. catenary construction suitable for all-electric or mixed steam and electric service on railways of this character. The company determined to try six different designs, as no one catenary system had then shown itself adapted in all respects to low-tension work. The equipments, therefore, were installed with the deliberate intention of permitting the merits and defects of each set of designs to disclose themselves by the simple process of the company refraining from all adjustments and repairs beyond those absolutely necessary for the safety of the public and of the company's own employees.

The results of this remarkable experiment are given at length in the article, but it may be well to call attention here to some of the most important observations. Perhaps the most gratifying fact is that the simplest devices generally proved to be the most satisfactory. The best hanger, for example, was a plain strap design, having a loop or slot at the top to permit vertical movement at the catenary and a plain screw clamp ear to hold the trolley wire. Other hangers had very ingenious clamps for gripping the trolley wire, but they were unable to stand up in service without constant tinkering. Furthermore, some clamps actually interfered with proper clearances to the trolley wheels. The large number of bent hangers which developed demonstrated that the connections between the catenary and trolley wires should be so designed that they will return to their normal vertical position despite severe blows from the trolley poles. These troubles strongly emphasized the desirability of combining elasticity with strength.

The experience with brackets was another example of the simplest equipment proving the best. The single-piece brackets made of I-beams or T-beams were found to be of ample strength to carry the line. At the same time they were much easier to inspect and paint than the more elaborate two-piece brackets. The study of anchorage devices brought out clearly the fact that anchorages should be installed at the poles and not in the middle of long sections. Unless constantly watched, the anchorage wires soon begin to sag, so that in a short time they interfere with the action of the trolley wheel. The only important case where an additional number of parts seemed desirable was in the number of suspension points. It is believed that a ten-point or an eleven-point suspension between the span supports is preferable to a three-point suspension because each hanger in the latter type of suspension carries so much weight that there is danger of rigid points. Another most interesting result is the successful use on one section of a copper messenger and a steel trolley wire. The copper messenger showed enough tensile strength for service of this character and the steel wire did not give any noteworthy trouble from sparking on account of collector contact or from rusting. It was just as successful as on the high-tension lines of the New Haven Company, where a steel trolley was first used in catenary construction.

On the whole, the experiences gained by the Connecticut Company indicate that the ideal catenary system for low-tension d.c. work can be made with fewer parts than has heretofore been deemed necessary. In any event, catenary construction necessarily costs more than the ordinary types of suspension, although this difference might be reduced to a minimum if the copper feeder were used as a catenary. No matter what the merits of catenary construction may be, one cannot help but feel that if the ordinary span or bracket construction had been installed on a line of this character and left alone for an equal period there would have been far less work to do to restore the original conditions. It is apparent that, owing to the great number of places where adjustment must be made, a catenary line needs the most painstaking maintenance. Therefore, those who are contemplating the installation of new overhead work on low-speed lines should consider seriously every aspect of the question instead of blindly adopting designs which have really been developed for entirely different conditions of speed and potential.

D. C. Catenary Experiences of the Connecticut Company

This Article Describes the Results to Date of an Experiment Made with Six Different Types of Catenary Line Construction for the Same Service Conditions

In the Electric Railway Journal of Feb. 26, 1910, an article was published entitled "The Experimental Catenary Line of the Connecticut Company." This article described six different forms of catenary construction for 600-volt d.c. operation which had been placed in service in May, 1909, between Middletown and Hartford, Conn., on about 11,000 ft. of single track, 10,050 ft. of which are over the Valley Branch (steam) of the New York, New Haven & Hartford Railroad and 950 ft. over public highways. All of this catenary construction was installed by the railroad company's contractor, whose work, however, was subject to the approval of the individual supply companies. The object of the experiment was to determine the behavior of various forms of catenary construction on a line operating low-voltage, moderate-speed suburban cars at hourly intervals. Incidentally, an opportunity was given to note the effect of locomotive gases on the line material and to try a copper messenger and steel trolley wire on one of the sections. It was planned to make no adjustments or repairs whatsoever except those necessary to insure safety in operation. The following particulars are now available on the experiences gained up to October, 1911, as a result of this policy.

EARS

Ear No. 1 consists of two clamping jaws and a 1-in. threaded and tapped stud with a compression cup and hexagon nut for interlocking all parts and clamping the trolley wire. The locking is completed by bending down one of the small clinch points of the hexagon nut. The forcing nut acts directly on the stud so that no strain is imposed on the threaded end of the hanger rod. This clamp has no exposed threads nor pockets to retain moisture. It has been found too heavy, nor does it give perfect wheel clearance.

Ear No. 2 is similar in design to No. 1. It has a hinged clamp which is closed by a conical wedge screwing into conical jaws. The linemen report that some of these ears give a little trouble by slipping off the trolley wire. It is difficult to state, however, whether this trouble is due to the design or to extraordinary conditions. Thus, a certain amount of movement in the line resulted from rebuilding the overhead construction to accommodate a girder bridge which was substituted for a covered bridge. Elsewhere on this section a break in the trolley wire caused the distortion of several hangers, while at a third place the same effect was due to the bending of the hangers by a trolley pole.

Ear No. 3 is a 3½-in., three-screw mechanical clamping design similar to the screw-clamp for grooved wire. Although this pattern seems to be very light in construction, it has given no trouble beyond the breaking off of the screws on two or three ears. The principal merits of this design are lightness, the good clearance for the trolley wheels secured because of the very thin cross-section, the low cost, ease of installation and maintenance, simplicity and high efficiency.

Ear No. 4 proved so light and otherwise unsatisfactory that over 50 per cent which came off the wire have been replaced by other designs. As these clips consist of two parts which are threaded on a shank, the threads on each must be accurately matched before they can be screwed into the socket or else they will fail to grip the wire properly. Furthermore, these ears have not shown the necessary gripping strength, as the clips are soon worn off by the action of the trolley wheel and the nuts are loosened by vibration.

Ear No. 5 has hinged ear plates with interlocking fingers. It has been found that this design does not give a positive grip on the wire nor does it possess any means of adjustment. The great defect is that there is no chance of tightening an ear after it has become loosened in service.

Ear No. 6 has jaws which rock on a ball-and-socket joint and are locked by means of a lug on one of the jaws. These clips have not loosened to any great extent, but there has been difficulty from pounding because of a certain lack of wheel clearance.

Ear No. 7 proved satisfactory in itself, but its hanger has certain faults, as will be noted later. This ear secures the grip on the wire by means of a pair of toggles, the clamping effect increasing automatically with the load. A nut and lock washers prevent the jaws from opening with the upward pressure of the trolley wheel.

Ear No. 8, which was installed with a flexible hanger, includes a pair of clamping plates and two flat-head machine screws. Flexibility is obtained by a finger from one of the plates passing through a rectangular hole in the lower end of the hanger and through a rectangular hole in the other plates. This type has suffered from a good deal of rattling, which tends to loosen the clips on the wire. It is believed that much of this trouble can be avoided if screws of greater length are provided. The large amount of metal at the clips has interfered with proper wheel movement. In fact, the marks observed on that portion of the hanger which enters the clip indicate that in time the wear will be very appreciable on account of the thin stock (1-in. x ⅛-in. section) and also because rusting and increased wear must follow from the rubbing off of the galvanizing.

STRAIGHT LINE HANGERS

The most satisfactory straight line hanger is made of ⅝-in. x ⅛-in. steel strap, bent to form an open loop 2½-in. long at the upper end and so shaped that the hanger will not unhook. As these hangers are free to move on the messenger, no trouble has been experienced from bending caused by the relative movement between the catenary and the trolley wire. This flexibility has been found to be a most advantageous feature because it is this movement which has been responsible for much of the bending of the various hangers which are rigidly fastened on the catenary. An interesting point of this design is the extreme lightness, the longest hanger not weighing more than 8 oz. It is felt, however, that it would be well to make the lower part of the hanger somewhat heavier for service where allowance must be made for corrosion from locomotive gases.

Hanger No. 2 is of the rigid type with a sister-hook-top connection. It has been found that while this hanger does not grip the messenger wire, it is not likely to slide on it if the trolley moves longitudinally because a slight tipping of the rod will result in a good grip. Several of these rods were found badly bent, but as there was a break on the trolley wire on the section affected, it would not be fair to ascribe the bending to faulty design entirely. Other distortions were due to the striking of the hangers by the trolley pole. Some of the sister hooks on this style of hanger were found to be so loose as to make their ultimate replacement probable. It was suggested that this loosening might be avoided if the rods were run through these

hooks so as to grip the messenger wire, but experience seems to indicate that such an installation would not be desirable.

Hanger No. 3 is of strap with a saddle-top design to grip the messenger, and it is furnished with a hinged ear.

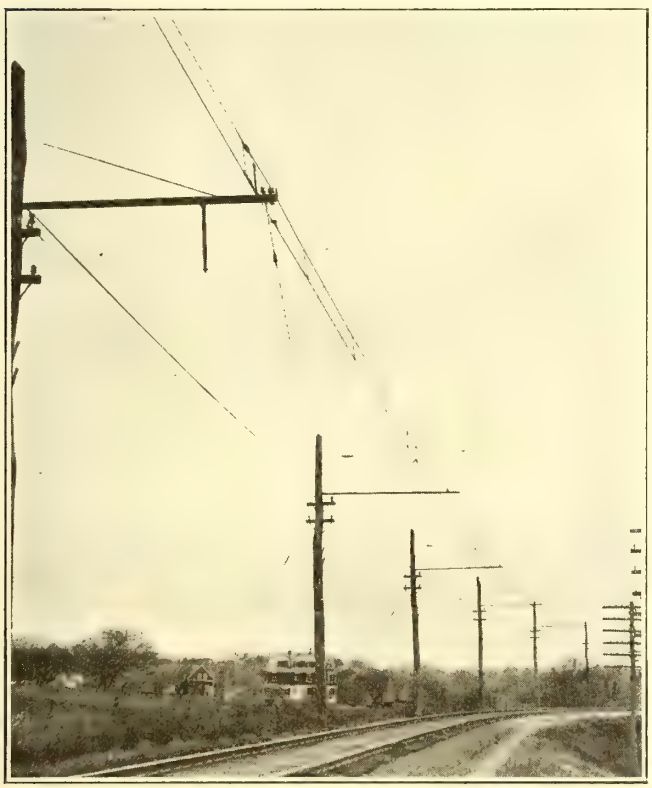
The drawback of this type is that there is liability of the strap bending whenever there is a longitudinal movement of the trolley or messenger wire or a vertical movement of the trolley wire due to wheel action.

Hanger No. 4 is of strap construction with a looped top. In general it is similar to hanger No. 3, except that the upper end does not grip the messenger. Vertical movement of the trolley wire is made possible by means of the loop on the end of the strap. In this construction bending is avoided to some extent, but trouble of this kind is still likely because the hinging of the hanger at the trolley wire permits it to tip one way or the other with reference to the messenger wire when the trolley wire is raised by the wheel.

Hanger No. 5 is of the rocker type. This hanger grips the messenger wire and is hinged at the rocker arm which carries the clips. This construction gives rise to the possibility that the strap which suspends the rocker arm will bend, should the trolley wire or messenger move longitudinally because of wheel movement.

Hanger No. 6 is a saddle-top rod design with flat ends and a pin-hinged bottom used in connection with the interlocking ear No. 5, previously described. It is installed on the same section as hanger No. 7, which is similar in top construction but rigidly connected to ear No. 6, also previously described. As they grip the messenger wire, both designs, and particularly hanger No. 7, are subject to the troubles referred to in connection with the relative movement between the messenger and trolley wire.

Hanger No. 8 is installed in ½-in. rod and ¼-in. strap



Catenary Lines After Test—Section of Line with Broken Steady Strain

forms with sister-hook tops. These sister-hooks are locked on the messenger by two small clinching points. This rigid connection to the messenger wire has proved undesirable for the reasons already noted in referring to the other rigid hangers. The design was also heavier than necessary.

Hanger No. 9 is of 1-in. x ⅛-in. strap which is fastened to the messenger cable by a loop of flat stock, a bolt passing through the two loops and the upper end of the strap. Consequently this hanger grips the messenger and has also given trouble from bending on account of its strap con-



Catenary Lines After Test—Section of Line with Bent and Loosened Hangers

struction. It is used with ear No. 8, previously described.

Hanger No. 10, which is used with the toggle-clamp ear No. 7, previously described, is a rigid form of rod hanger. Its messenger clamp consists of a malleable-iron hook which is screwed to the end of the hanger rod. A grooved hollow casting inside the base of this hook is forced to hold the messenger firmly against the top of the hook. This hanger has given no particular trouble except that due to its rigid grip on the messenger wire. The principal fault is the weak construction at the place where the hinged pin goes through the lower end of the suspension rods. Generally speaking, this hanger is not considered heavy enough for No. 0000 wire.

CURVE PULL-OFF AND ANCHOR CONSTRUCTION

The most satisfactory curve and anchorage construction is used on a section with a 4-deg. curve. The pull-off hangers consist of a sister-hook-rod-top hanger double-grip screw curve ear and a spool above the ear for the bridle. This scheme proved the most flexible in application. The anchor hangers, which are located at the brackets, also have a sister-hook-top rod hanger and soldered half-ears with an eye at the butt end. A guy with a turnbuckle leads from this eye over the insulator to the anchorage on the next pole. No steady strains are used. In general this anchorage method is very satisfactory if the uplift of the trolley wire is neglected. This exception, of course, applies to all other anchorage contrivances.

On a section with a 2-deg. curve an attempt was made to trim the curve by installing steady braces at every pole, the poles being spaced about 75 ft. apart. This spacing, however, has not given a smooth running wire. The anchor hanger used on this section has heavy clamp grips for the trolley wire and the messenger, the trolley wire ears being made with eyes for the attachment of guy cables. This anchorage is located at the center of a long section and

has not proved satisfactory on account of the necessarily small angle between the trolley wire and the wires which lead from the anchor to the messenger. As anticipated by the Connecticut Company's engineers, these anchorage wires have sagged until they interfere with the trolley



Catenary Lines After Test—View of Anchorage on Section of Span Construction

wheel. In order to keep them clear, it has been necessary to bind them to the messenger between the point of attachment to the messenger and the anchor ear. Considerable slack is left in the anchorage, thus offering the likelihood of trouble if a break in the lines should occur.

On an all-tangent section with span construction the anchorage as installed in the middle of a span consists of a strain plate which is clamped securely to the messenger. Guys from each corner of this plate lead to the four adjacent poles, while from a pair of eyes in the center of the plate guys lead down to half ears in the trolley close to the regular hangers. Thus the anchor plate is not only in the center of the span, but also midway between the hangers. The same difficulty has been found here as in other instances where the anchor is placed in the middle of the span, because the slackening of the guys allows them to drop into the way of the trolley wheel.

On another section there is installed a semi-flexible pull-off hanger which consists of a 10-in. curve screw clamp ear, a ⅝-in. stem and clamps for gripping the messenger and adjusting the hanger lengths. The stem has an eye at one end and a "T" at the other, the eye being bolted to a clevis on the trolley clamp to allow movement parallel to the trolley wire, while the "T" is passed through the messenger clamp to limit the travel of the stem after a wheel has passed under the hanger. This pull-off hanger is entirely too heavy; furthermore, it does not permit in practice the intended freedom of movement between the trolley and messenger wire. Steady strains are not installed on this section. A malleable-iron, two-piece clamp piece with eye is used to anchor the messenger wire and a single soldered strain ear for the trolley wire. A turnbuckle is used in each anchor wire, and these turnbuckles are attached to the bracket. The strain plate is secured to the bracket by the insulator-pin bolt. A separate plate is bolted to the bracket on which the guys are run to adjacent poles. This anchorage device, which is always installed at a pole, is satisfactory except that there is a slight lift in the trolley wire at the anchor ear. However, as previously observed, this lifting is common to practically all forms of anchorages.

There is another design which is not very different from that just described. In this installation a plate on the bracket gives attachment first to a turnbuckle and then to a wood strain with two strands at its outer end. One strand goes to the half ear on the trolley and the other to a three-bolt clamp on the messenger. Still another construction is quite similar, but omits the turnbuckle, has a spreader a couple of feet from the attachment to the messenger and trolley wire and uses a special anchor hanger to obviate the tipping up of the ear.

BRACKETS

The two brackets which seem to give the best results are of the T-iron type with iron sockets at the pole. All parts of these brackets are accessible for painting and can be easily inspected to determine if any rusting has set in. Bracket No. 3 is of I-beam construction and has also proved satisfactory for the same reasons.

Bracket No. 4 is composed of two small channels riveted together with spacing blocks which were installed to help in fastening the fittings. Bracket No. 5 consists of two angles which are spread apart at the pole ends. It is also provided with spacing blocks. These two patterns have been found to be more susceptible to rust and locomotive gases than the single-beam designs, because their inner surfaces cannot be easily inspected or painted by the linemen. Some brackets of type No. 4 were furnished with composition yokes which did not have the required strength such as could be obtained from malleable-iron yokes.



Catenary Lines After Test—Sagging Wires at Anchorage Approaching the Trolley Wire

Bracket No. 6 resembles No. 5 only in that both used two pieces for the arm, the pole being located between these pieces at the places of attachment. This last bracket not only possesses the faults of No. 5, but is also too heavy, and its connections at the arm and pole are poorly designed.

MESSENGER WIRE

The steel messenger wire seems to be in as good condition as when it was installed. There has been no wear on it from any of the hangers, and it is only slightly blackened from the weather and locomotive gases. The copper messenger is also in very good condition, as it is slightly blackened in the same way as the steel messenger. No chemical action was observed on the section where a copper messenger is installed between galvanized hangers. There is observable only a slight rubbing on the top of the messenger wire at the point where the hanger rests. This was a point on which information was particularly desired, as it was feared the sliding hangers might cause sufficient wear to preclude their use under such conditions.

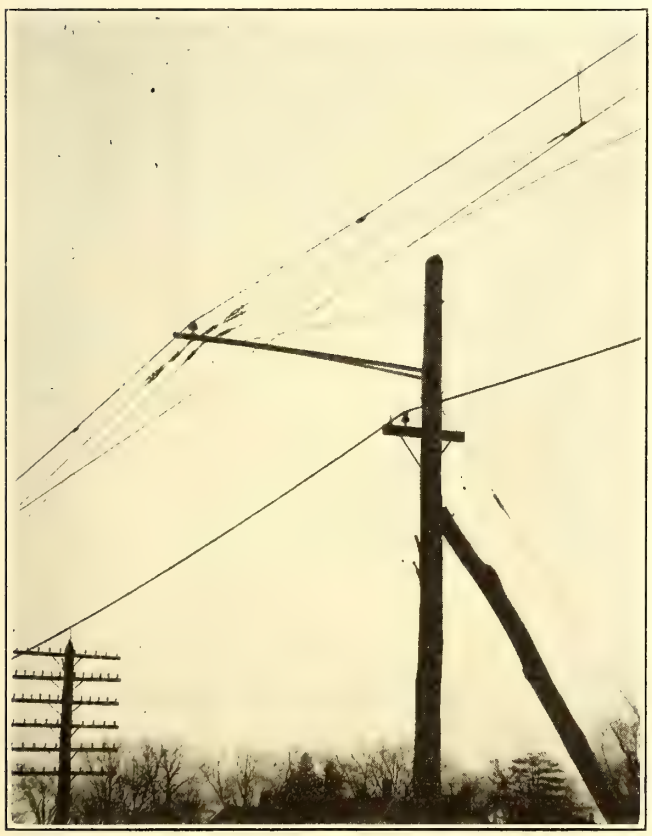
TROLLEY WIRE

Up to the present time there has been very little wear on either the copper or steel trolley wires. There is a slight wear on the copper trolley wire section at those points where a few ears have a slight vertical tip on account of the bending of the hangers. The steel trolley wire shows some rusting on the top, but the under surface is smooth and there is no appreciable wear. The steel wire also shows no roughness such as would have been caused by pitting, due to the arcing of trolley wheels.

RECAPITULATION

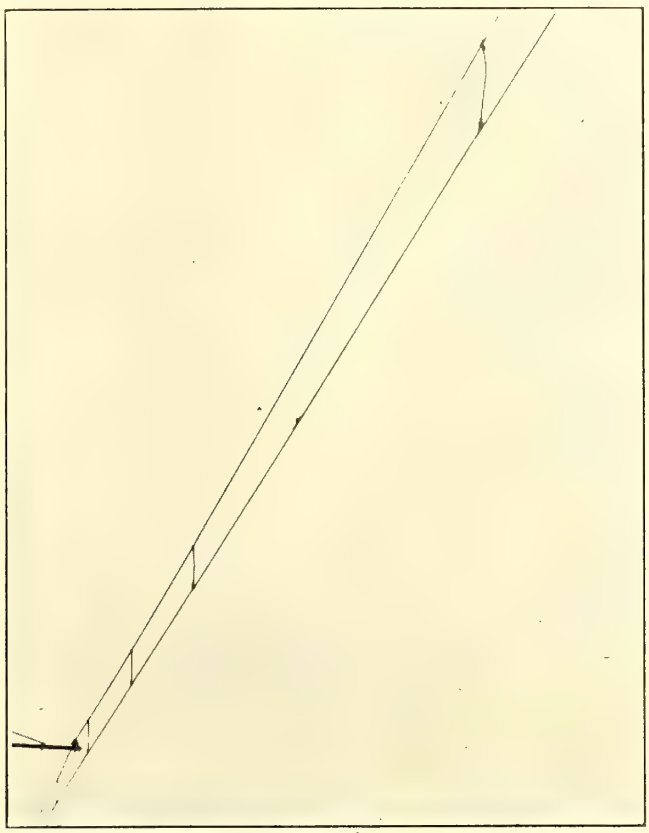
After the various inspections during which the facts hereinbefore given were determined, the engineers of the Connecticut Company have reached certain conclusions on the catenary construction, although they appreciate that the observations have been made on relatively small amounts of material.

It is suggested that the most desirable type of construction for interurban trolley wheel operation is a copper mes-



Catenary Lines After Test—Condition of Wires at Anchorage

senger, steel trolley, ten-point or eleven-point suspension, in spans of approximately 150 ft. length and a strap type of hanger slotted or looped at the top to allow vertical movement. It is believed that it would be more desirable to secure this movement at the trolley end of the hanger, since this would make it unnecessary to lift the hanger, but, on the other hand, no satisfactory ear has been developed which permits a longitudinal movement along the trolley wire. It does not seem desirable to have a hinge at the lower end, when there is a loop at the top, as this permits



Catenary Lines After Test—Section with Bent and Missing Hangers

the latter to tip over when the trolley wire rises and, under certain conditions, to bind. As described, the best results have been obtained with a simple screw ear to which is rigidly attached a strap, the top of which loops over the messenger to give about 2 in. play. This device rises sufficiently to relieve the blow when the trolley passes the ear, and, if there is any creeping between the trolley and messenger, it travels along the messenger without binding, owing to its rigid connection to the trolley wire. In theory, the messenger and trolley should maintain their relative positions, but in practice slips will occur from various causes. If the hanger is rigid and grips both the messenger and trolley, a bent or broken hanger rod results; if hinged, the rod is inclined, which gives a bad appearance and causes a slight pick-up in the trolley wire. It would seem that for a trolley clamp there is nothing better than a plain screw ear with a screw of sufficient length and clinched after the ear has been tightened upon the wire. In any event, the clamp should provide opportunity for adjustment should it grow loose. It should be as simple as possible and should have few parts to work loose.

The construction used on curves varies from special eyes at the ear and at the top clamp to the tangent hanger rod to which the pull-off is tied. The last mentioned construction, which is the first described in the chapter on "Curve Pull-off and Anchorage Construction," does not add to the weight of the line and is easily adapted to any degree of curvature. For pantograph operation, such a design could probably be replaced by braces at the brackets or pull-offs at the spans. It was found, however, that a little better connection for the pull-off wire was obtained if it was tied to a curved spool, screwed on to a hanger rod, rather than if the wire was tied to the rod itself.

The question of anchoring the line proved quite a serious matter. The wires of nearly every anchorage became slack and were in poor condition due to lack of maintenance. In two or three cases where an anchorage was installed in the middle of a section, the weight of the slackening anchor wires caused the messenger wire to sag until it almost touched the trolley. Hence short hangers had to be inserted to keep the messenger and trolley wire apart. This experience indicated that in order to avoid trouble from slack wire such device should be located at either a bracket or a span, or, if in the center of the span, the latter should be short and have messenger and trolley wire widely separated. It also seems desirable, where anchor ears are installed on the trolley wire, to add a hanger at or near such ears or use a spreader to obviate the vertical tip in the trolley wire where these hangers are not installed.

Perhaps the best design of all would be a standard double-boss anchor ear soldered to the trolley wire midway between poles not over 50 ft. apart and fitted with the standard strain plate, while level guys are laid to attachments on the four adjacent poles. Similar anchor plates with a clamping device would be attached to the messenger immediately over the trolley anchor and its guys laid to the same poles at points above the trolley guys for a distance equal to the distance between the trolley and the messenger.

None of the half-ear anchor designs gives a direct pull. The bending moment is small, but after a little time the ear takes up slightly and kinks the wire. Where this type of anchor is used, the guys usually are led to the brackets, and another guy from the corresponding anchor clamped on the messenger is brought to the same point, light turnbuckles being cut in to take up the slack if necessary. This anchor is very satisfactory aside from the tipping of the ear.

The experience with the brackets in general is that the one-piece bar is preferable to a multi-piece bar since it does not offer the same opportunity for corrosion. The support should be attached to this bar by a positive connection not depending upon a set screw. Pole collars are not considered desirable because the wood is compressed under them so that eventually there is much more slack than in the construction where the rod is passed through the pole and is held by a washer and nut on the other side. Of course, the latter construction is also open to criticism in that it weakens the pole and offers an opportunity for decay.

The reason for advocating a ten-point or eleven-point suspension rather than a three-point suspension is that on the latter the weight of the trolley wire on each hanger is so great that it is not overcome by the pressure of the trolley poles underneath, and consequently there is no vertical movement. This constitutes a rigid point in three-point suspension. In the multiple-point suspension there is very little weight on any one hanger, and hence there is less resistance to the pressure exerted by the trolley wheel when it passes under these points.

The arguments in favor of the steel trolley are that it presents a smoother running surface, is more rigid than copper, gives very little trouble from expansion or contraction and ought to show much longer wear than copper. Of course, the installation of a steel trolley makes it practically necessary to install a copper messenger to secure the proper conductivity. The copper messenger used in this case showed that it had sufficient tensile strength for the type of construction recommended.

A final important consideration in favor of the steel trolley is that it is not so liable to break as copper because of its greater tensile strength. Even if the wire should break it would tend to stay almost in its original position because of its stiffness and the close spacing of the hangers. It is likely that the hangers would merely slide a little on the messenger as the slack was thrown in.

The experimental catenary line described was installed under the direction of the construction department of the Connecticut Company.

AUTOMATIC BLOCK SIGNALS ON IOWA LINE

The Ft. Dodge, Des Moines & Southern Railroad has just contracted for the equipment of 18½ miles of its main line with automatic block signals controlled by continuous track circuits. The installation will be made by the General Railway Signal Company under the supervision of H. U. Wallace, vice-president Ft. Dodge, Des Moines & Southern Railroad and consulting engineer. The notable feature in connection with this automatic block signal installation is the use of light signals on a road operating high-speed single-unit passenger trains and 1600-ton freight trains.

The Ft. Dodge, Des Moines & Southern is now completing the reinsulation and re-equipment of its electrified steam lines for operation with direct current at 1200 volts. This road has an 87-mile line from Des Moines extending north to Ft. Dodge with a 30-mile branch from Hope to Rockwell City, an 8-mile branch from Kelley to Ames and another 8-mile branch from Fraser Junction to Ogden. These lines are all operated by 1200-volt current supplied from substations which are fed with 33,000-volt current from a central generating station at Fraser. The territory to be signaled at present includes the sections from Fraser to Boone and from Roberts to Ft. Dodge. These parts of the track include practically all of the curves on the main line and also the sections on which the larger part of the switching is done in collecting and making up freight trains.

The signaled territory will be subdivided into eight blocks averaging about 2¼ miles in length. The maximum block is about 4 miles long and the minimum block about ¼ mile long. The latter block is close to the station at Boone and will permit of trains closing up on each other when approaching this station, which is the headquarters of the operating department. The signal installation will be designed for absolute blocking for following as well as for opposing movements, and the control circuits, which will include some novel features peculiar to electric railway work and the combined passenger and freight service on this road, are now being prepared by the engineering department of the General Railway Signal Company.

The signal installation will be fed from a 2200-volt single-phase line which will receive its energy from the three-phase high-tension system of the road. This 2200-volt line through local transformers will feed the track circuits and the signal and switch lamps. By the use of the lamp signals considerable first cost for semaphore operating mechanism is avoided, and decreased maintenance of operation is anticipated. The type of reactance bond to be installed will have sufficient capacity for conducting the return current from two 40-ton locomotives drawing a 1600-ton freight train.

The signal indications will be given by red and green lenses 8½ in. in diameter, illuminated by 60 or 80-watt tantalum or tungsten lamps mounted in front of reflectors so designed as to make the intensity of illumination sufficient for an arrestive daylight indication under the most severe high-speed operating conditions. The lamp boxes of cast iron will be mounted on steel masts 12 ft. or 15 ft. high, supported on concrete foundations. Cast-iron pedestals will protect the relays and more delicate signal apparatus.

The single-phase transmission line for the signals will be built of No. 9 copper wire, and the signal control wires will be No. 10 "copper-clad" wire. Some of the longer blocks include stub sidings not regularly used, and to avoid the expense for switch-circuit controllers and distant indications of the switch position it is planned to light the switch lamps on these blind sidings through back contacts on the relays at the ends of the blocks. Thus, if a train is standing on the intermediate siding it will be advised of the presence of another train in the block by the illumination of a lamp on the switchstand.

The Strike on the Coney Island & Brooklyn Railroad

The Company Opened an Employment Bureau in New York and with Good Police Protection Soon Had Cars Running—A Number of Novel Features in Handling a Strike Were Followed

Up to Aug. 5, 1911, when the strike on the Coney Island & Brooklyn Railroad was officially declared in force, there had been no strike of street railway employees in Greater New York since 1905. In that year there was one on the subway and elevated lines in Manhattan. It lasted about three days and ended in the utter defeat of the strikers. The Coney Island & Brooklyn Railroad Company was not affected. The Coney Island & Brooklyn strike of 1911 lasted officially seventy-eight days—from Aug. 5 to Oct. 21—but, as will be described, it did not interfere materially with the traffic on the road for more than a few days or, at most, a week. As with a great many other strikes, there was no real excuse for its occurrence and if, in the lottery of the assignment of union organizers, the company had drawn one who had been more far-seeing or conservative, there probably would have been no strike. It has been thought that the following account of the events leading up to the strike and of the strike itself would be of general interest.

THE CONEY ISLAND & BROOKLYN RAILROAD SYSTEM AND ITS LABOR CONTRACTS

The Coney Island & Brooklyn Railroad Company operates about 50 miles of track in Brooklyn and over two bridges into Manhattan, and is one of the smaller companies of Greater New York, yet is the only one which at the time of the strike had a labor organization, and it had two. One of these, a Knights of Labor local, had been in existence since 1887 and was one of the few remaining branches on street railways, if not the only one left, of that once extensive organization. This union included most of the trainmen on what is known as the De Kalb Avenue division of the system. The other union was a local of the Amalgamated Association and was founded in 1903. It was made up largely of men working on the Smith Street and Franklin Avenue divisions of the Coney Island & Brooklyn Railroad.

The company had contracts with both these organizations, and as these contracts were renewed yearly they became so favorable to men in many respects, particularly in the matter of hours, runs, etc., as to work a considerable hardship upon the company. Nevertheless, as the time for each renewal arrived, employees' committees, particularly that of the Amalgamated Association, became very active in their demands for additions to the contract. The Knights of Labor committee, although anxious to secure everything within reason for its members, was always more conservative, and as a result that committee was often severely criticised by the other, and if it signed an agreement which was satisfactory to its members before the other contract had been signed it was accused of giving away its own opportunities and those of the other organization.

EVENTS WHICH LED UP TO THE 1911 STRIKE

In June, 1911, the company notified both organizations that it would renew its existing contracts for another year, but that it would be unable to do more than that. The men were quieter at this time than they had been for several years previous. The Knights of Labor local, appreciating that the company had done all it could afford to do, was willing to renew the old agreement and did renew it. The Amalgamated Association local consulted with President Mahon and, it is understood, was advised that the conditions under which the men were working were very favorable, and that it would be unfortunate from an organization point of view to have any trouble at that time. Nevertheless, an organizer was sent to assist them in getting the best they could. The men at this time were comparatively quiet, and if properly advised there would have been no trouble, but the organizer arrived, and although he was told of the favorable conditions he assured the men that it was only necessary to put up a "stiff bluff," and that they then could secure compliance with their demands. After some days and nights of haranguing, during which time the men were becoming demoralized and the company's service suffered, they took a vote on striking which resulted in more than two-thirds being recorded in favor of a strike. By this time the younger men had become thoroughly belligerent and were anxious to strike, but the older men, who had been the backbone of the organization for years, realized the seriousness of the situation and were very much opposed to such action. After the vote had been taken the organizer held out hopes that the men might be able to secure all they desired by intervention brought about through influential people both inside and outside of the company. Matters drifted on in this way for several weeks. Finally the local organizer, disregarding the danger signals of the situation generally, and the evident readiness of the company, which would have been evident to a man of keener perception and less self-confidence, determined either with or without the approval of the other officers of his organization to pull off a strike. Accordingly, instead of voting again as to whether or not they would strike (it required a two-thirds vote to call a strike), the men voted on whether they should rescind the former resolution by which a strike vote had been carried, and in this way a majority vote only was necessary in order to call a strike. The result of this vote was said to be eighty-four for a strike and seventy-six against a strike, and it is claimed that quite a number of men who voted for the strike had not paid up their dues and were not entitled to vote. In any event, eighty-four men carried more than 400 men out on a strike, seventy-six voting against it and the remainder not voting at all.

Without any notice the men left their cars at 4 o'clock on the morning of Saturday, Aug. 5. Some of the old men of the Amalgamated Association and the members of the Knights of Labor on the Franklin Avenue line made several trips, but very soon the strike was complete over both the Smith Street and Franklin Avenue divisions. The De Kalb Avenue division, the home division of the Knights of Labor, was not affected.

PRECAUTIONS OF THE COMPANY

Fortunately a considerable number of the officials of the company, including President Huff, had had strike experience. They decided some weeks prior to the actual vote in favor of the strike to handle the situation entirely themselves and not to rely on detective agencies for men of any description. They had got in touch with a number of the strike breakers and kept lieutenants in touch with them ready for any emergency. The result was that while the final strike vote was being taken strike breakers were being hired at an office which the company had opened in New York, and within an hour after the strike order went into effect these men were on their way to the carhouses in considerable numbers. These strike breakers were paid the usual wages of $2.50 a day and board.

There has probably seldom if ever been a strike in which the strikers made so little effort as in this to conceal their identity while committing violence. They assembled at their headquarters on the Smith Street line and immediately upon the operation of the cars by strike breakers began assaults upon them. Neither the police nor the company was prepared for this early violence, and the police protection was small compared with that furnished later. Violence was almost unprecedented during the first day, yet the nerve of the strike breakers was not shaken. After some hours of lawlessness seventeen strike breakers lay on stretchers under medical treatment in an improvised hospital in one barn, yet there were plenty of others willing and anxious to take their places on the cars. The rioting had been so persistent during the first day that at night the company considered it advisable to pull the cars in. By the following day the policing of the city lines had become very thorough and efficient, and the outbreaks were spasmodic rather than continual, although Coney Island Avenue (a 5-mile stretch to Coney Island) had not been covered so thoroughly, and there was persistent rioting on this avenue during Sunday afternoon. The following day this line was heavily policed by mounted officers as well as by foot men. This brought rioting practically to an end, although there were occasional outbreaks for several days, and, later, occasional railroad torpedoes or explosives were placed on the track. In two cases small bombs were placed under the seats of summer cars, but none of these attempts resulted in serious injury to passengers nor were they effective to any great extent in keeping passengers off the cars.

ACTION OF THE KNIGHTS OF LABOR

The De Kalb Avenue line, the home division of the Knights of Labor local, operates a line of cars to Coney Island during the summer. On the night of the first day of the strike a committee of the Knights of Labor met the president of the company and asked him not to insist upon the operation of these cars to Coney Island during the period of extreme violence. The committee said that the men whom they represented were anxious to operate the cars and thus to hold to their agreement with the company, but that they were singled out for attack. The committee was afraid that it could not get men who would stand the punishment if the cars were run through to Coney Island under the conditions then existing. President Huff replied that, if it was a question of sympathy with the strikers, either the men would run the cars through or the company would run them through with strike breakers and their agreement would be at an end but if it was a question of fear of violence only, the service would be discontinued until the extreme violence subsided.

On the following Wednesday the men of the De Kalb Avenue line were notified that the lines were then well protected and that they would be expected to take their cars through to Coney Island. On the first day there were several refusals to do so, and on the second day a general refusal to take cars out. As fast as the men refused to take their cars they were suspended and later discharged, and the committee of the union urged other men to take their places. This resulted in the sifting out of something over forty men, all of whom were discharged and not considered for re-employment. Although the situation looked a little serious at one time so far as the De Kalb Avenue men were concerned, those on the cars who declined to serve were the more undesirable men on the force, and it was a great relief to the older and more conservative employees on this division to have them go. In fact, the company has reassured all of its employees since the strike that in the future whether there is a union or not they shall not be harassed or their positions jeopardized by agitators who might work up a following among the younger men, but that hereafter throughout the system men will be discharged for agitation as promptly as for stealing or for accidents. With this basis established for the mutual protection of the company and its faithful employees the relations between the company and the men are very harmonious.

HOUSING THE STRIKE BREAKERS

The methods employed to house the new men during the strike on the lines affected by the strike were systematic. Fortunately, the principal carhouses of the company had flat roofs on which cots were placed. The municipal regulations as to housing were rigorously followed. The cots, which had been purchased in New York, were arranged in rows, with a space of 2 ft. between the cots on the side and of 1 ft. between the cots at the ends. It was found that only about one-fifth of the top of each carhouse had to be utilized in this way to accommodate all the men needed at the respective depots. As a protection against rain a large tarpaulin was stretched over the cots. As the strike occurred in August, these accommodations were very comfortable.

During the first day or two the men were supplied with food which was purchased at restaurants and was rushed into the carhouses in automobiles. After that the company had a well-equipped commissary department. Fortunately it had in its employ a man who had had experience along these lines with traveling shows and as concessionaire of the company at Coney Island. He was put in general charge of the department, the purchasing agent of the company attending to the purchase of supplies.

POLICE SERVICE

The service of the police was good. The responsibility of the strikers for the violence of the first two days was well understood, and within a short time a number of the men who were most active in the disturbance were serving jail sentences. Through this violence the strikers soon lost to a very great extent the public sympathy which they might otherwise have expected, and with the assistance of the police department there was a prompt resumption of travel by the public. On the tenth day of the strike the barracks at the Franklin Avenue depot were closed and the line as a whole was being operated by regular motormen and conductors employed at the main office. On the thirteenth day after the strike was inaugurated the barracks at Smith Street were closed, and the following day this line was operated normally by regular motormen and conductors employed in the usual way at the main office. Thus, within two weeks, the cars had been operated under normal schedules with three distinct sets of men; first by the strikers, a week later by the professional strike breakers and two weeks later by regularly employed men.

COST OF THE STRIKE

The strike breakers called it a "cheap" strike because of the short time they were employed. The company might also properly regard it as a "cheap" strike partly for the same reason, and also because it paid no commissions to detective agencies and was in control of its own situation.

The strike of necessity cost the company money, but the conditions might have been very much worse. As a matter of fact, although the strike began on Aug. 5, and therefore almost the entire month of August was included in the severest portion of the trouble, the reports of the company to the Public Service Commission show that it made its operating expenses and taxes, including in such operating expenses the wages to the strike breakers during August. During September the company earned its operating expenses, taxes and interest and showed some surplus, and it is not anticipated that any unfavorable financial effect of the strike will be noticeable over an extended period.

Contrary to what is usually expected, the official conclusion of the strike and of the boycott did not noticeably improve the receipts.

NUMBER OF STRIKERS RE-EMPLOYED

In the early stages of the strike the company re-employed about fifty strikers, most of whom had been in the

service of the company only a few days at the time of the strike and had not been identified to any great extent with the strike movement. The applications of others were refused as long as the strike was officially on, but when it had been officially declared off their names were taken for consideration, and about a dozen of them each week have been put back to work. As the company has all the men it needs at the present time, the re-employment of these men will be slow and they will be accepted only after a rigid investigation and physical examination.

STRIKE RELIEF PAYMENTS

The fact that the international organization paid the men on strike regularly $5 per week for something like twelve weeks had the effect of holding well together a body of men who, as a whole, were never especially enthusiastic over the strike. They hung to this source of supply with great regularity, but the jail sentences which a number of them received during the early stages of the strike were weighty arguments against any further lawlessness. The present system of $5 per week relief payments is undoubtedly a factor which will have to be considered by a company which is to any considerable extent dependent upon the re-employment of its former employees for the reorganization of its force. In New York, where so many men are available, it was a matter of little consequence whether the old men returned or not.

NEW FEATURES IN THE PROTECTION OF THE LINES

The police protection during the strike was unique in several respects. Contrary to the usual custom, uniformed officers were not placed upon the cars, but the districts through which the cars operated were thoroughly policed, there often being as many as six patrolmen as well as mounted officers upon one block. When rioting occurred the police rushed in from different directions, rendering it very difficult for rioters to escape being caught. The result was that there was an unprecedented number of arrests and convictions. This had a very sobering effect upon those who were riotously inclined.

To break the strike the company selected what it believed to be the pick of the professional strike breakers, and although occasionally things became so hot that the crews would desert the cars the company was never without an abundance of men who were willing to face almost any danger. The automobile was found quite valuable in some phases of the work. As already described, it was used with great success in conveying meals into the carhouses during the early days of the strike. The company also found that much time was saved and a tie-up of the line often avoided by sending relief crews in automobiles to points where cars had been abandoned or the crews beaten up, and during one stage of the strike three automobiles with reserve crews were held in waiting at three convenient points over the system, ready to be rushed to the relief of cars that might be in distress. These automobile assignments were especially attractive to the strike breakers. So much was this the case that there was a tendency of those in charge to keep on the move up and down the line rather than to remain at the point of assignment. One of these automobile crews, seeing a car surrounded by a mob, rushed up, and the mob, mistaking them for strong-arm men, gave warning, and the two leaders of the riot fled into a saloon. The two strike breakers, to whom the rôle of "strong-arm men" had strongly appealed, liked the part, and, rushing into the saloon, grabbed the riot leaders, dragged them out and turned them over to the police, who had arrived at that time.

GENERAL REMARKS

The strike situation as a whole was not complicated or difficult. There were no side issues or interference, and the strike soon settled itself down to a matter of financial loss on both sides. The directors of the company had considered the situation carefully when it became probable that the contest would be forced upon them and determined to meet it squarely and make a finished fight regardless of complications that might arise. They instructed their president accordingly, giving him full power and leaving all matters of negotiation and detail to him, and throughout the entire contest there was no wavering from this determination nor a question as to what the outcome would ultimately be.

All of the various heads of departments of the company entered into the work of maintaining the car service with great enthusiasm and did excellent work throughout the critical period covered by the strike. The general direction of affairs, of course, was in charge of President S. W. Huff, to whom the directors of the company gave a free hand in the strike management. His previous experience with a strike in Richmond, Va., was of great assistance in this crisis. He was the right man and in the right place, and was a host in himself. It would be invidious to particularize among the other officers of the company, all of whom did their full duty and more in this trying period. It might be said, however, that Acting Superintendent of Transportation W. E. Thompson was responsible for the organization of the strike-breaking force and the reorganization of the men that succeeded them, and that G. M. Kirshner, claim agent of the company, had charge of the relations of the company with the police and press, a duty for which he was especially fitted.

ELECTRIC WELDING IN PITTSBURGH

Since Sept. 18, 1911, the Pittsburgh Railways Company has been using an electric welding outfit at its Homewood shops for the successful repair and reinforcement of all classes of metal equipment except those made of gray iron castings. During its first week this welding system saved about $237 and every bit of material, the flux excepted, was taken from the scrap pile.

Current for welding is furnished by an old GE booster set consisting of a 30-hp shunt-wound motor and a 60-volt, 300-amp generator. Nevertheless, the actual output of the generator can be varied from 300 amp to 700 amp at 80 volts to 110 volts, according to the conditions desired. There is enough reactance in the generator to take care of sudden surges when the welding arc is broken. The shunt field of the booster is directly excited from the trolley circuit through a resistance connected in series with it across the line instead of being shunted around the series winding of the generator. The switch controlling this separately excited shunt-field circuit is locked to prevent anyone from breaking this circuit when the set is running free. The grid resistances, which are inserted in the series field in series with the armature, can be varied from 0.02 ohm to 0.045 ohm, depending upon the amperage desired.

The welding flux consists of 17 parts borax, 1½ parts brown oxide of iron and 1½ parts red oxide of iron. The electrodes are usually of carbon, but cold rolled steel is used for such work as welding sheet steel on a gear case, the melting of the electrode itself furnishing the required new metal.

The economies of this method of welding may be appreciated from the following typical cases, which give the price of certain parts new, their value as scrap and the cost of rehabilitating them for service. In each case 15 per cent is added to the shop cost to allow for overhead shop charges. Welding labor is figured at 30 cents an hour and electrical energy at ½ cent per kw-hour.

Article.	New.	Scrap Value.	Labor, Welding.	Carbons and Flux.	Power.	Overhead Charges.	Saving.
Bemis side frame	$26.25	$2.18	$0.88	$0.37	$1.92	$0.48	$20.42
Lord Baltimore side frame	28.00	1.83	0.33	0.05	0.72	0.17	24.90
McGuire Columbian side frame	35.00	1.83	0.33	0.05	0.72	0.17	31.90
Westinghouse No. 56 motor frame	....	...	0.99	0.17	2.16	0.50	....
Westinghouse No. 62 motor gear case lugs	....	...	0.22	0.21	0.48	0.14	...

The Recent Strike Siege in Des Moines

The First Strike Was Settled by an Injunction Which Left Matters as They Were—A Second Threatened Strike Was Settled by Arbitration in Favor of the Company

BY CHAS. L. SNYDER, CHIEF CLERK DES MOINES CITY RAILWAY

Des Moines, Iowa, was recently the scene of a ninety-eight day labor siege between the Des Moines City Railway and union car men employed on that system. The result was an overwhelming victory for the company and especially for General Manager J. R. Harrigan and General Superintendent W. E. Rolston, who bore the brunt of the company's battle, and the victory was won in the face of great odds. During this short but critical siege the company officials had to contend with one actual strike and one threatened subsequent strike. A court order forced the company to take back discharged employees, and the local municipal government refused police protection of any kind to the company in the operation of its cars.

THE EVENTS WHICH LED UP TO THE STRIKE

From July 23 to Oct. 28 Des Moines was literally a boiling caldron of street railway trouble. Encouraged by affiliated unions, local political factions, International Organizer Fred Fay and the national executive committee, the union car men, Division 441 of the Amalgamated Association of Street and Electric Railway Employees of America, made upon the management of the Des Moines City Railway one of the bitterest organized attacks that were ever repelled by any company. The initial trouble between the company and its employees commenced July 23, 1911, when Conductor B. L. Hiatt was discharged for shortage of three fares collected but not registered and discourtesy shown to his superior officer.

Hiatt had been caught short upon a car, and when openly accused by his superior officer, the division foreman who was on the car at the time, Hiatt denied the charge and cursed his superior in loud tones. General Superintendent Rolston called Hiatt into the office and Hiatt admitted that he had been discourteous to his superior officer and was discharged immediately. Hiatt then requested a hearing before General Manager Harrigan and was given it promptly. The discharge was sustained by the general manager.

The committee, headed by Fred Fay, demanded that the matter be arbitrated, but as the contract existing at that time between the company and the union did not call for arbitration as to the proper discharge of any employee but gave to the general manager the full power to discharge, subject only to the grant to the discharged employee of a hearing upon proper request, the company justly refused to allow the matter to be arbitrated. On July 26 the reinstatement of Conductor Hiatt was demanded by the union and refused by the company. On July 28 the aid of the international union executive committee was sought by the local union. On Aug. 1 the local executive committee of the union was empowered to call a strike by a mass meeting of the men. On Aug. 2 Louis Christiansen arrived from Chicago with 100 strike breaekrs. On Aug. 4 a strike order was issued, effective at 1:15 a. m. on Aug. 5. On Aug. 5 the men struck at 1:15 a. m.

THE STRIKE AND INJUNCTION

A bona fide attempt was made by the company at 6 o'clock on the morning of Aug. 5 to operate its cars. But the lack of police protection allowed the mobs to interfere to such an extent that trolley ropes were cut, brushes were taken out of motors, car windows were smashed and even the regular inspectors of the company, as they attempted to board the cars, were arrested by the police. The streets were in a condition that would have shamed a Russian revolution, due principally to the inefficiency of the police department.

At this point Judge Lawrence DeGraff, of the Equity Division of Polk County District Court, issued a temporary injunction that will go down in the annals of history and equity jurisprudence as one of the most unusual ever rendered. The injunction was invented by the city legal department and was drawn up with the sole purpose of compelling the company to reinstate the discharged employee Hiatt, and in turn, required the striking employees to return to work against their will. The City of Des Moines appeared as plaintiff against the Des Moines City Railway and the union car men as joint defendants. The plea for the temporary injunction made by the city was that street railway service was a public service and, therefore, that the city had a right to intervene as a third party to maintain the public service for the benefit of its citizens.

Whether such a temporary injunction would ever have become permanent is doubtful, but the legality of the novel suit was never contested by either defendant nor was a hearing ever held on it. The company would have preferred to fight out the issue without the intervention of the courts, and President Gompers, of the American Federation of Labor, in a newspaper interview, declared the injunction to mean "back to slavery" for the union men, because it gave the court power to force them to return to work against their will. Lawyers of prominence disagreed over the legality of the injunction. The majority, however, believed that the court had probably extended its power further than precedent would allow; thus the injunction stands at the present time uncontested and not approved at any hearing or by any superior court.

This famous injunction was issued Aug. 5 at 10 p. m., while just outside of the court house the street was filled with rioting strikers and strike sympathizers and while the city police department stood by without attempting to disperse the mobs. The office windows of the Des Moines City Railway were riddled with stones and missiles. It is true that many participating rioters were boys and the younger tough set of the city, yet photographs taken at the time show thousands of workingmen and not a few actual strikers engaged in the destruction of property. The injunction became effective on Sunday, Aug. 6, at 5 p. m., and with the resumption of service the better class of citizens prevailed and began to stamp their disapproval upon the law-breaking.

PEACE AND THEN A RECURRENCE OF TROUBLE

On Aug. 2 the Des Moines City Railway granted a new contract to the men effective on Oct. 11, 1911. This contract covers a period of five years and has a clause requiring arbitration of the discharge of any man who feels himself aggrieved. The matter of wages was not disturbed during the trouble and was left to be decided in March, 1912. The matter of hours was also not contested and remains practically the same under the new contract, altered only by the changes made necessary by new service on the lines.

Motorman Watson Roberts was discharged on Sept. 1 for violating a rule of the company as to smoking on duty. The discharge was based upon evidence of three detectives who were eyewitnesses. Shortly after this Conductor B. L. Hiatt was discharged the second time for shortages of fares upon five separate occasions.

Conductor J. E. Bruce was also discharged in company with some half-dozen other conductors shortly after upon a similar charge. Only the three men, however, Roberts, Hiatt and Bruce, were selected by the union to have their cases arbitrated. Most of the other discharged men turned in their badges voluntarily and thereby admitted their guilt.

SELECTION OF ARBITRATORS

A meeting was held between the men and Mr. Harrigan and Mr. Rolston to decide on some method of settling the trouble. Mr. Harrigan, upon request of the union, agreed to allow the three cases to be arbitrated, although there was no clause in the existing contract calling for arbitration of the discharge of any employee. The union agreed to select one member of the arbitration committee, the company was to select the second member, and these two members were to select a third member.

On Sept. 14 A. L. Urick, president of the Iowa State Federation of Labor, was selected by the union as its member of the arbitration board. N. T. Guernsey, attorney and secretary of the Des Moines City Railway, was then selected by General Manager Harrigan as the company's member on the board. These two arbitrators, working under the terms of agreement between the company and the men, met at their earliest convenience to select a third man. This proved a futile task, as the union sought to secure as the third arbitrator a local politician or some local man dependent upon their patronage, whereas the company insisted upon an outside man or else some local man not dependent upon local patronage. Another strike was called by the union car men on Oct. 6, to be effective at the executive committee's order. Judge W. H. McHenry, of the criminal division of the Polk County Court, was suggested on Oct. 8 by the union as the third arbitrator, and was accepted the same day by the company, but he refused to serve. G. S. Gilbertson, formerly state auditor, was suggested on Oct. 9 by the union and was accepted by the company, but he could not be located.

The union executive committee then served notice upon Mr. Harrigan that unless Hiatt, Roberts and Bruce were reinstated by 5 p. m. on Oct. 7, pending the arbitration, a strike would be called immediately. This demand was flatly refused by Mr. Harrigan. The committee then issued an order for a strike to be effective on Oct. 11. On Oct. 10 the union men prepared to strike, and notified the company of their intention, but the company ordered that all cars should be run to the carhouses at the hour appointed for the strike, and that they should be kept there until the police should give proper protection to the company's property. At the hour appointed for the strike the executive committee of the union called at the railway offices and stated that they had decided not to strike. Mr. Rolston told the committee that all cars had been ordered to the carhouses, and the committee again asked him to allow them to run the cars, as they thought the probability of a strike had passed. This was the first plain indication of the weakening of the union.

John A. Guiher, a lawyer, residing at Winterset, Iowa, a small town about 40 miles from Des Moines, was suggested as third arbitrator by the company on Oct. 11 and was accepted by the union. He accepted the position on the same day, and the hearing of the three cases was set for Oct. 18. A special agreement was drawn up, whereby the company and the men agreed absolutely to abide by the decision of the majority of the arbitration board as to the rightfulness of the discharge of Roberts, Hiatt and Bruce. The latter two men were accused of shortage of fares and the first of smoking while on duty.

Motorman Roberts was the organizer of the Des Moines car men's union. He was one of the early presidents of the union and was a member of the union executive committee at the time of his discharge. Hiatt was the bone of contention in the first strike and had also been an agitator in the union. Upon these two cases the interest of both sides and of the general public was hinged. Bruce was a new man running extra, and neither the company nor the men contested his case with the intensity of the other two.

THE ARBITRATION CASE

The company introduced its evidence first, and after placing former officers of the road on the stand to show that the rules regarding shortage and smoking had been properly issued, the company placed upon the stand three detectives who testified to having seen Motorman Roberts smoke while on duty and to having caught Conductor Hiatt short. The evidence against Conductor Bruce also related to a shortage of fares. There were three charges against him, but they were brought by only one operative, and the board held that in this case, as in the other two cases, the burden of proof was upon the company and that the company did not have a preponderance of evidence against Bruce.

Both sides awaited the verdict of the arbitration board with eagerness, and the citizens of Des Moines were ready to give their final support to whichever side was decided by the board to be right in the matter. The majority of the leading and better class of citizens, however, had already taken a stand in favor of the company after reading newspaper accounts of the evidence introduced by the company against the three men on trial.



Scene in Des Moines on First Day of Strike

THE DECISION OF THE BOARD

The arbitration board concluded its hearing of evidence on Oct. 28 at noon. John A. Guiher, who had acted as chairman throughout the trial, issued a statement at the conclusion of the trial to the effect that he was ready to render his verdict after consultation with the other members of the board. The decision of the entire board was published in the newspapers the same afternoon and was recognized by both parties in controversy as a distinct victory for the company.

The decision approved the discharge of Motorman Roberts and of Conductor Hiatt, but ordered the reinstatement of Conductor Bruce. It also held, in effect, that when rules are issued by a company in book form and are reissued through bulletins the company does not waive a violation of any rule by its subsequent reiteration of a previous rule; second, that statements by a company's detectives and inspectors are sufficient evidence to convict men of violating the rules; and, third, that Roberts smoked on duty.

THE COST

Arbitration proved a very expensive matter to the union. Local newspapers stated that the union's expense was

$2,300, not including the expense of Organizer Fay or any of the expenses during the strike trouble. The union executive committee was in session almost daily from July 23 to Oct. 28, and this alone must have cost the union $19 a day. Including attorneys' fees and many other miscellaneous expenses brought the total expense of the employees up to approximately $3,000.

The company's expense was heavy, but not proportionately as heavy as that of the union, since the company did not have a committee nor an international organizer nor many other expenses such as the union had to meet.

On Oct. 30 Conductor Bruce, after being re-instated by the arbitration board's decision on Oct. 28, turned in his badge to the company and stated that he desired to quit the service while his standing was good. Thus the company has disposed of all three cases of the discharged men.

On Nov. 13 Councilman Zell Roe, who was in charge of the police department as Superintendent of Public Safety when the mobs were allowed to destroy the street railway property, was replaced by John MacVicar. The inability of Councilman Roe to cope with the strike trouble of the street railway was given by many as the reason for retirement. Thus, the street railway company is assisting in cleaning up the politics of our fair city.

The company entered the siege with one end in view only, and that was to secure proper discipline upon the system. On the other hand, the union seemed determined to disregard all rules of the company and put up a bitter fight to support all such violators. General Manager J. R. Harrigan and General Superintendent W. E. Rolston have gained the confidence and warm personal friendship of all the leading public men in Des Moines by the fair and impartial manner in which they conducted the company's side of the matter throughout the entire trouble, and the city railway service of Des Moines has already taken on the aspect of a metropolitan system.

TREATMENT OF TOOL STEEL

At a meeting of the New York Railroad Club held on Friday evening, Nov. 17, 1911, W. B. Sullivan, Carpenter Steel Company, Philadelphia, read an interesting paper on "Tool Steel." The author pointed out the necessity of accurate control of the temperature at which steels of different carbon content are forged and annealed in order to secure uniform and satisfactory results from the tools. Steel containing 0.90 per cent carbon remains unchanged in structure until heated to about 1360 deg. Fahr. As the temperature of the furnace is increased beyond this point the ferrite and pearlite suddenly begin to decompose. The reaction is completed at a temperature of about 1460 deg. Fahr., which is called the critical point. The ferrite and pearlite change to martensite. By quenching at this point the martensitic condition of the grain structure will be preserved and the steel will be hard and brittle. If the steel be again heated to a still higher temperature the martensite in turn will be decomposed and the original ferrite and pearlite condition will be restored. If the steel is annealed at a temperature where martensite is formed it will contain a portion of the hardening element. By a judicious application of heat it is possible to obtain almost any desired combination of ferrite, pearlite and martensite. Tools when properly handled should be heated first to the proper temperature or critical point, and then quenched. Heating above this point tends to produce decarbonization. If a tool is heated too hot and then allowed to cool slowly before quenching it will have a grain structure developed by the higher temperature which is not corrected by allowing the tool to cool before quenching. Tools should not be allowed to soak too long even at the proper temperature, as this tends to produce decarbonization on the surface.

The hardness of a piece of steel properly treated is governed by the size, character of steel, temperature of bath and character of bath. In general, for small sections lower temperatures should be used than for large pieces. The degree of hardness depends on the rapidity with which the heat is extracted from the steel. A bath of high temperature will produce less hardness. A piece of steel quenched in water will be harder than one quenched in oil. Tests made by the Carpenter Steel Company showed that, compared with water on a basis of unity, No. 1 mineral oil had a tempering quality of 0.241; cottonseed oil, 0.161; fish oil, 0.149.

The author included an outline of the proper grades and tempers of carbon tool steel for various uses. Temper No. 1 contains 0.70 to 0.80 per cent carbon; No. 2, 0.80 to 0.90 per cent carbon; No. 3, 0.90 to 1 per cent carbon: No. 4, 1 to 1.15 per cent carbon; No. 5, 1.15 to 1.25 per cent carbon. Grade A is the highest grade steel, selling for about 16 cents per pound. Grade B sells for 13 cents per pound and Grade C for 10 cents per pound. Grade D is ordinary tool steel selling for about 7 cents per pound. The following outline shows the proper selection of temper and grade and the proper heat treatment:

Temper No. 1.	Grade	
Crowbars	D	
Pinchbars	D	Should not be heated over 1800 deg. Fahr. for forging. Hardens at 1485 deg. Fahr. Temper drawn to suit character of work. Should be annealed at 1300-1350.
Pick Points	D	
Wrenches	D	
Sledges	C	
Hammers	C	
Rivet Sets	B	
Temper No. 2.		
Smith Tools	C	Should not be heated over 1800 deg. Fahr. for forging. Hardens at 1480 deg. Fahr. Temper drawn to suit character of work Should be annealed at 1300-1350.
Track Tools	C	
Boilermakers' Tools	C	
Temper No. 3.		
Cold Chisels	C	Should not be heated over 1750 deg. Fahr. for forging. Hardens at 1465 deg. Fahr. Temper drawn to suit character of work. Should be annealed at 1300-1350.
Hot Chisels	C	
Rock Drills	C	
Shear Blades	B	
Punching Tools	B	
Temper No. 4.		
Machine Drills	B	
Counter Bores	B	
Milling Cutters	B	Should not be heated over 1700 deg. Fahr. for forging. Hardens at 1460 deg. Fahr. Temper drawn to suit character of work. Should be annealed at 1300-1350.
General Machine Shop Tools	B	
Carbon Lathe Tools	A	
Taps	A	
Dies	A	
Reamers	A	
Temper No. 5.		
Brass Tools	A	Should not be heated over 1700 deg. Fahr. for forging. Hardens at 1455 character of work. Should be annealed at 1300-1350. deg. Fahr. Temper drawn to suit
Finishing Tools	A	
Small Machine Shop Tools	A	

IDAHO CEDARMEN'S CONVENTION

The Idaho Cedarman's Association met Nov. 7, in Spokane, at the call of President Lindsley. Several matters of interest were taken up and considered, among them the adoption of a standard list of weights for poles. In the past it has been the custom for each concern to use its own weights and it was deemed advisable to adopt a standard similar to that of the Eastern cedar dealers.

A committee on publicity was appointed by the president, consisting of J. C. Davis, of the Humbird Lumber Company; H. C. Culver, of the Sand Point Lumber & Pole Company, and R. L. Bayne, of the Lindsley Brothers Company, to look into the matter of securing a greater publicity of the merits of the Western cedar poles. It is claimed that the Idaho cedar is not only superior in quality of material but is straighter, more symmetrical, has less butt rot, and is stronger by tests made by the United States Forestry Service than poles grown elsewhere in the country. It is to give publicity to these and other claims of merit for the Western pole that the committee was appointed.

The following companies were represented at the convention: Humbird Lumber Company, Valentine-Clark Company, Sand Point Lumber & Pole Company, National Pole Company, B. J. Carney & Company, the Lindsley Brothers Company, Northern Mercantile Company and E. T. Chapin Company.

Transportation Problem of Los Angeles

The Recommendations Include a Municipal Eight-Track High-Speed Railway to San Pedro with a Four-Track Entrance by Elevated and Subway Into the City, Double Decking of Certain Streets to Provide Tracks on the Lower Deck and a Highway Above, Special Right-of-Way in the City for the Interurban Lines, Free Transfers, Etc.

An abstract of the preliminary report which Bion J. Arnold, Chicago, has just rendered the City Council of Los Angeles was published in the ELECTRIC RAILWAY JOURNAL for Oct. 21. A full report is now available.

PURPOSES

In his introduction Mr. Arnold states that two-thirds of the growth of the population in the district of Los Angeles has occurred within the past ten years, so that the question is not only new, but is pressing for solution. The problem is, on one hand, not to hamper the transportation of passengers and freight, which is the very lifeblood of the district, and, on the other hand, not to provide facilities too far in advance of actual needs so as to lay a burden of unproductive investments on the transportation facilities.

MUNICIPAL RAILROAD

The first subject discussed by the report is that of a municipal railroad to connect the business section of the city, which is 20 miles inland from the Pacific Ocean, with the new city-owned harbor at Wilmington and San Pedro. Such a line would be built generally through what is known as the shoe-string strip of the city, a section annexed in 1906 to connect the city with the coast. The report says that the location and construction of such a railroad between Los Angeles and the sea are comparatively easy, as there are no engineering difficulties of any moment to be overcome. The right-of-way can be located through comparatively inexpensive territory and the maximum grade can be kept down to 0.4 per cent.

The report recommends the acquirement of a right-of-way at least 250 ft. in width to provide for eight railroad tracks and two automobile highways. These highways would serve not only for pleasure traffic, but for automobile trucks, because it is reasonable to expect that a large amount of the tonnage between the harbor and local delivery and collection points will be handled by means of the auto-truck. The auto-truck will make it possible to deliver from the wharf or warehouse directly to the store or factory. These highways and eight tracks would be free of grade crossings. Just before the tracks reach the residential district of the city there would be a storage and classification yard. Thence the line would extend as four tracks through an open cut or by an elevated line for about 1½ miles and then by an open cut or subway for 3½ miles through the business district to the Plaza. A subway is necessary for the latter part of the distance. It should be built by the city and rented to an operating company for a sufficient return to provide for interest on the cost and for a sinking fund of say 1 per cent per annum, which will retire the investment inside of fifty years. With an assured arrangement of this kind it would be possible, if the city charter permitted, for the city to finance the expenditure by issuing bonds outside of the debt limit and thus the city's credit could be used to secure these transit improvements without adding to the city's actual debt burden.

STEAM RAILROAD PASSENGER STATION

Each of the three transcontinental lines entering Los Angeles—the Atchison, Topeka & Santa Fé, the Southern Pacific Railroad, and the San Pedro, Los Angeles & Salt Lake Railroad—has its own independent passenger terminal and depot. The report recommends that these be consolidated into one station to be located either at the side of the present Arcade depot or contiguous to the present Pacific Electric Terminal Building at Sixth and Main Streets. The report recommends that the railroads should be encouraged to develop the subway plans for a Union Terminal Station and adds: "If a Union Station is not possible, then it would appear better to encourage the Southern Pacific and Salt Lake roads to combine with the Pacific Electric in a splendid station adjoining and becoming part of the Pacific Electric Terminal Building. Such a station, it is believed, should have a monumental portal with an appropriate setting of open spaces, parkways and surrounding buildings.

"This gateway to the city should be convenient to the business district with plenty of main arteries leading to and from it; it should be easy of access from the street railway system, and, particularly in the case of Los Angeles, it should be a mixing chamber or clearing house between transcontinental and interurban passenger traffic."

GRADE CROSSINGS

The report states that it would be desirable to eliminate as far as possible the grade crossings within the city. On this point Mr. Arnold says: "I would class the crossings of the high speed electric interurban system as the most dangerous, the steam freight main lines and switching tracks as the most inconvenient, and the transcontinental passenger traffic at grade as the least justifiable. As a general rule I would say that it will not only be desirable but should be compulsory to bring the electric interurban roads into the city without a single grade crossing. The methods of accomplishing this result are discussed in a separate part of this report.

"The grade crossings of freight tracks could be largely eliminated by viaducts and the others to a considerable extent by the same means. The expenses of grade crossings by viaducts should be shared by the railroad companies, by the city and by the local street railway company."

FREIGHT HANDLING BY ELECTRIC LOCOMOTIVES

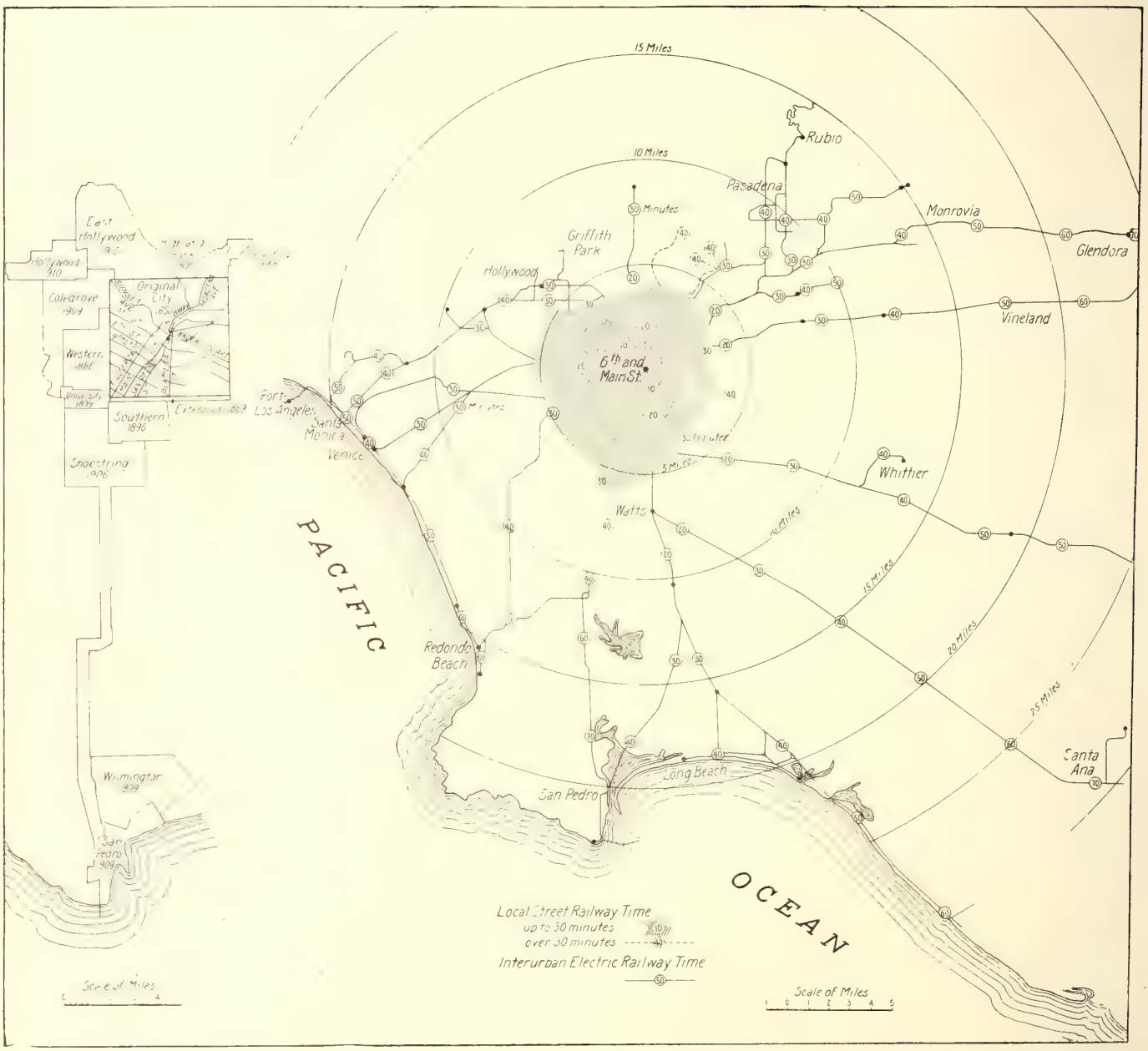
In most parts of the city there is plenty of room for extension of switch track systems, but the report says that there is one district directly contiguous to the retail streets which has heretofore been used largely for residents and retail business purposes but is naturally adapted for wholesale business and manufactories, if it only had the advantage of carload freight delivery. To supply this district with freight service will require the use of some of the city streets for railroad tracks, as the reaching of each parcel of property over a private right-of-way is becoming more expensive year by year. Such a plan can be justified only if this switching is done by electric locomotives on an elevated structure. The report therefore recommends double-decking Los Angeles Street between First and Sixth Streets. This would permit the handling of heavy freight on the present street level and of vehicles on an unobstructed highway at the level of the present second stories of the buildings on that street. The upper deck suggested is to be connected with proposed overhead vehicle highways at two other streets. The report adds:

"If the double-decking of some of the main thoroughfares through the industrial district should become an accomplished fact, it is very probable that the railroad officials will recognize the advantage of this arrangement and provide two-story freight houses with mechanical freight handling devices to take the place of the one-story freight depots and the hand trucks which are to-day the most effective package handling equipment available.

"In this connection the city street car lines should be encouraged to develop a system of package and light freight delivery in order to reduce the cost of staple household commodities and use the local surface lines to their full

advantage. There is no reason why such a system should not be extended to include express parcels, delivery from department stores, food supplies, ice, papers and all other articles of every-day consumption. Department stores in other cities are now loading their motor trucks for delivery to substations by means of racks on what may be termed the cartridge principle, thus saving time at both ends of the line, and this same idea could be used to advantage for a similar service on the local car lines.

"The street car companies use their own tracks for the delivery of construction material for their own use and thus secure a considerable saving. The same class of equipment which they use for this purpose could be used to equal advantage for the delivery of materials for street work and paving—and if the contractors on this kind of city work had the privilege of using the local street car tracks for carload delivery the city itself would get the benefit of the economy."



Los Angeles Report—Maps Showing Territory Annexed to City and Time-Zones from the Corner of Sixth and Main Streets

The report points out that the city system, now controlled by H. E. Huntington, is equipped with a narrow gage and the number of rides approximates nearly 365 per capita per annum. This is more than in most other cities of the same size. It continues:

"The present city problem, so far as concerns transit requirements, is to do away with the present and future congestion in the business district; to reach a better understanding with the city in regard to future extensions, including the building of crosstown and outside circuit lines, and to provide a better pavement between and contiguous to the rails.

"The surface system is singularly lacking in crosstown and circuit lines, particularly inside the 4-mile circle. Radiating lines have been provided with liberality and extensions into the non-paying outlying districts have been built even when the long haul and the small amount of business could mean nothing but loss to the company, but the cross-connecting lines which are usually considered as desirable parts of a system of this size have been neglected.

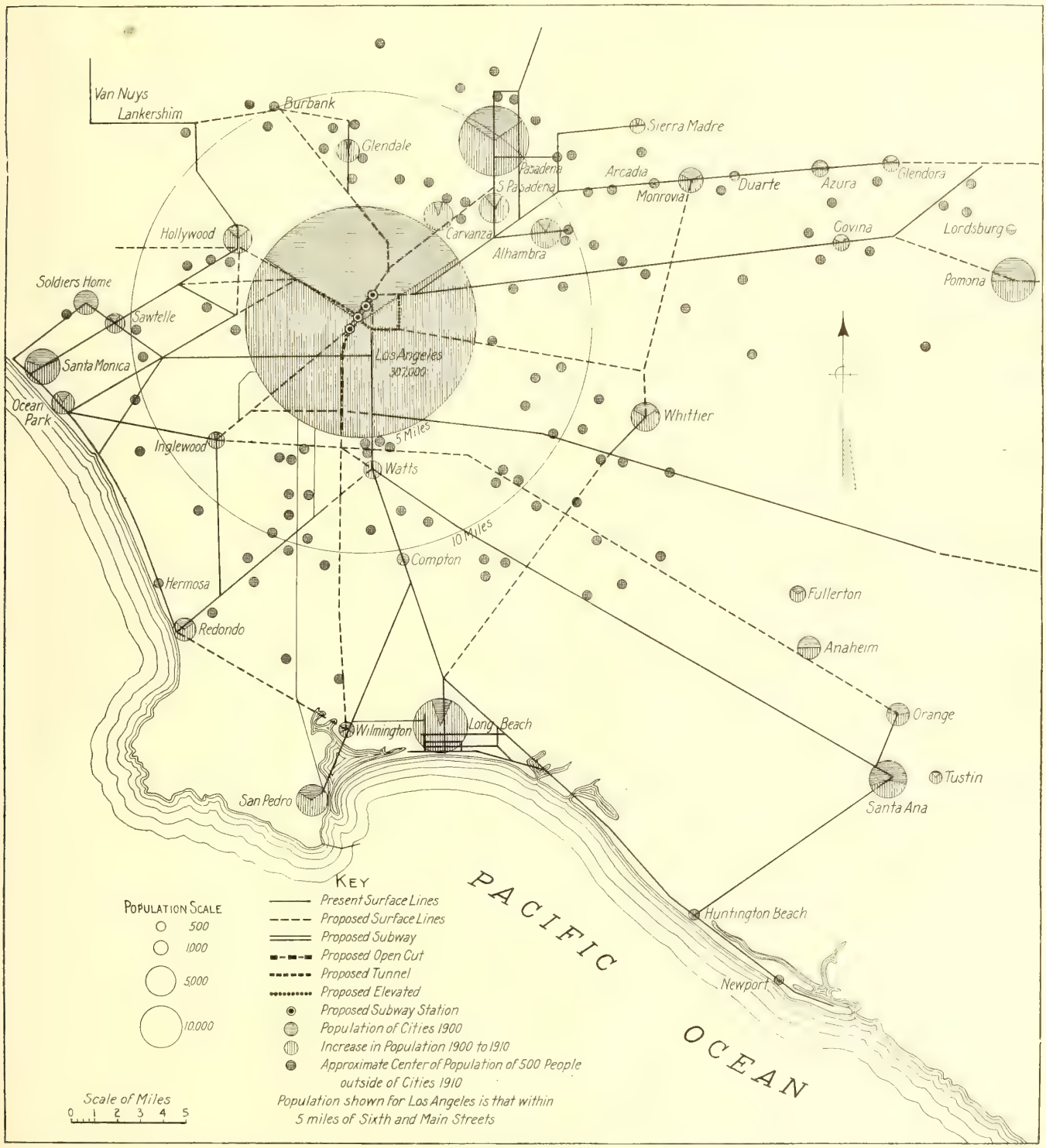
"In planning these circuit routes, two results should be sought. One is to get a route, and eventually more than one route, entirely around the city outside of the down-town congested district. The other result sought is to use parts of these crosstown lines for the connection of certain parts

of radiating lines, thus forming a series of outside loops which will make it possible to increase the service in the short-haul district without running all the cars to the extreme ends of the lines or switching them back and making the passengers take the 'next car.'"

The difficulties in congestion, it is thought, may be solved very largely by working out a scheme of down-town routing, which by connecting the routes on opposite sides of the city so as to form through routes will make it possible to have nearly all of the intersections right-angle crossings with but very few curves or loops.

"First: The business of urban transportation is a natural monopoly. Here is one case where competition is wasteful and ineffective. One city, one fare, through routes and universal transfers are the results of having one company serve the entire community.

"Second: This monopoly should be completely under effective municipal control, both for the protection of the community and also for the safeguarding of the interests of the corporation itself. This control should secure adequate service at the lowest cost, should encourage the operation of the road at a constantly progressing efficiency and should provide extensions and additions in accordance with public necessity and demand. Public control means publicity of all financial and operating records, and to be effec-



Los Angeles Report—Diagram of Rapid Transit Lines Existing and Proposed, with Populations in 1900 and 1910 Shown Diagrammatically

FUNDAMENTAL CONSIDERATIONS AS REGARDS THE CITY SYSTEM

The report sums up the fundamental considerations relating to the city railway system as follows:

tive the public officials charged with the responsibility of exercising this power should be able, honest and beyond the reach of political and particularly of local influence.

"Third: On the other hand, the actual investment in the property, both present and future, should be secure and protected. Before extensions are required or rates reduced, the demands of operating expenses, taxes, maintenance renewals, amortization of intangible values, and a fair profit to capital must be recognized. If there is a surplus, the city and company should be partners and mutually decide whether the surplus is to be used for the extension of the system, for the reduction of the fares or for the betterment of the service.

"Fourth: The length of time of the franchise or permit to use the city streets should be indeterminate. The city should be in effective and continuous control of all its streets, and this result can best be secured by the company surrendering its present series of terminal franchises for a blanket permit securing a 'tenure during good behavior,' and giving the city the right to purchase the entire system at a fair value determined upon an agreed basis.

"Under these restrictions I can see no reason why the community should not continue in comparative harmony with its local public utility transit company, nor why the company should not give adequate service over a constantly growing system. If the investment is protected, the company can proceed to develop the property without fear of loss or confiscation. The advocates of municipal ownership should see in this arrangement the ultimate opportunity for the city to secure the lines at a fair price without working an injustice on the investors who have done so much to bring prosperity to the city.

"A contract ordinance adhering closely to these fundamental principles should prove as effective in Los Angeles as a similar ordinance has proven in Chicago—although it must be understood that the greater density of street car traffic in Chicago creates conditions there which are somewhat different from those in Los Angeles, and therefore it cannot be expected that the Chicago settlement will apply in all of its details to the situation here."

INTERURBAN ELECTRIC RAILWAYS

The report admits that had it not been for the broad constructive policy followed by the present management in producing the network of electric lines which binds together the different communities of the district, the city of Los Angeles itself would be less attractive both for business and pleasure. The electric railway system plays a large part in the prosperity and happiness of the people of the entire section, and it is a fortunate circumstance that the entire system is under one control. Much, however, depends upon the future attitude of the citizens of Los Angeles and the present owners of the system—the Southern Pacific Railroad.

The interurban railways should be encouraged to bring their lines into the city free from grade crossings by either an elevated structure or a subway. This entrance should be fairly independent of any other transportation system. As it will be very expensive, it should be built under a long-time franchise. Moreover the city would hardly care to acquire the right to purchase the facilities only, without acquiring the continuous lines. As regards the passenger service on these lines, the report says:

"If local stops within the city and just outside the city are to be provided in connection with the high speed interurban service, this can be done best by providing four tracks for some distance, using two of the tracks for local and two for express service, then dropping down to three tracks in the more removed districts, using the odd track for one-way rush-hour traffic into the city in the morning and away from the city in the evening of working days and always with the crowd upon holidays and Sundays.

"On account of the length of many of the interurban runs it will be found more economical to store the cars carrying much of this one-way traffic near the central terminal during the middle of the business day, and the design of the complete terminal should include provision for these storage tracks. Transfer stations should be provided between the two high speed terminal systems where they intersect near Sixth and Main, and the subway which will serve the largest number of patrons should be located on the upper level.

"The development of high speed terminals for the interurban systems will have the same effect on the business center of Los Angeles as the moving into the present city limits of a large amount of the surrounding population. With real rapid transit to Pasadena, for instance, the 35,000 people at present living there would be as near the shopping center of Los Angeles as the residents of the city itself now living between the 3-mile and 4-mile circles. There is apparently no way in which Los Angeles can extend its sphere of influence, both for pleasure and business, as easily and as effectively as providing an unobstructed entrance and exit for the interurban electric system. The rides per capita of the people of this district are already very high, but every improvement which will make it still easier to travel from one center to all other centers will further increase the riding habit. The remarkable history of the building up of the towns and cities of this district and the correlation existing between the prosperity of the community and the activity of its people which was made possible by the splendid electric car service can only be an encouragement for still greater improvements and extensions. Of all possible betterments, the building of a comprehensive Los Angeles city terminal for the interurban system will be of the greatest benefit.

"Pending the removal of the interurban cars entirely from the surface of the streets of Los Angeles city, there should be an arrangement which will make it possible to transfer from one system to the other inside the city limits. The Pacific Electric system now operates about 70 miles of track, located upon the streets of the city, not including Wilmington and San Pedro. The carrying out of the comprehensive plan for a high speed terminal will eventually do away with the use of any tracks on the surface of the streets by the interurban cars, and at such time the operation of these street car lines should be turned over to the local company so as to secure one system for the entire city.

"To obtain practically the same result without the delay incident to the carrying out of the terminal plan, it should be possible for the two companies to enter into a local transfer agreement, covering the interchange of passengers inside the city limits only, and I would suggest that at the first opportunity such an agreement be insisted upon."

IMMEDIATE RELIEF FOR MAIN STREET CONGESTION

The report takes up at length the congestion of vehicle and surface car traffic on Main Street and other streets of the city and states that this condition is not a reflection on the designers of the railway systems or of the management but is due to the remarkable growth of the traffic. Permanent relief can be obtained only by a subway, open cut or elevated structure as described, but the congestion can be relieved temporarily by removing some of the cars, such as the interurban cars, to parallel streets. This would not only reduce the congestion but also the noise from cars on Main Street because, as the interurban cars are standard gage and the city cars are narrow gage, the crossings are noisy. The report recommends the use for this purpose of San Pedro Street, which under Mr. Arnold's plan will subsequently be used by the municipal railroad to San Pedro. The report says that these tracks might be built by the city and leased to the Pacific Electric Company, or they might be built by the latter with the understanding that the city should have the right to purchase them at any time.

MAPS

The report is accompanied by ten maps, of which three

are reproduced. That on page 1065 shows the tendency of population in the greater Los Angeles district to crystallize at centers and the growth of these centers during the past ten years. The smaller dots in this map represent 500 persons showing a scattered population throughout the district between the incorporated centers. The diagram also indicates how the present interurban lines can be combined so as to use jointly the more expensive sub-surface facilities throught the heart of the city.

The diagram at the left on page 1064 shows the rapid growth of the city. The Plaza is the exact center of the original Spanish grant in 1781. Successive additions, which have been largely to the west, are shown on the map.

The map at the right on page 1064 shows how transportation distance is rated by time rather than by miles. The circles of the shaded portions show the minutes required to travel from the down-town terminal to the city. The report in referring to this map says:

"On some of the higher speed interurban lines it is now possible to go twice as far from the center of the city in thirty minutes as can be done on the local street cars, and on the interurban tracks running south the rapid transit cars get out into the country 15 miles in the time it takes a city car to reach the 5-mile circle. This latter fact illustrates the advantage of high speed terminals for the interurban lines, for the cars of the southern division of the Pacific Electric lines have the advantage of a private right-of-way and of the use of a surface entrance to their terminal which is not congested until it reaches Main Street. This right-of-way, however, is on grade and will become less an advantage as safety will dictate constantly slower speed, but the diagram serves to show the possibilities of a comprehensive high speed terminal for all the interurban cars. Provide such a terminal and there is no reason why points 20 miles from the city's center should not be reached in thirty minutes. Under these circumstances the radius of the surface systems would naturally be confined to about its present thirty-minute limit. Beyond this limit the development of the territory will be influenced more by the building of the interurban system of transportation than by the extension of the present surface street car city system."

MECHANICAL ENGINEERS DISCUSS WELDING

Several papers on various types of welding were presented at a meeting of the American Society of Mechanical Engineers held in New York on Tuesday evening, Nov. 14.

George B. Pelissier, superintendent Goldschmidt Thermit Company, first gave a brief description of the chemical characteristics of the thermit reaction. He said that two quite distinct methods are followed in applying this reaction. One is to butt-weld for such objects as pipes, tubes and small rods; the other, termed "intermediate welding," requires that a space of ½ in. to 2 in. should be left between the parts to be welded in order to permit a free flow of molten thermit metal between the ends. The latter method, which involves the use of wax matrices, is the one applied for rail welding, engine work, large castings, etc. Mr. Pelissier then exhibited a large number of lantern slides showing the adaptability of the process for such divergent purposes as welding the stern frame and rudder post of a large vessel, flywheel, steel gear, crank shaft, etc. He also presented some figures showing the strength of the welded portions.

W. H. Brown, of the Electric Welding Products Company, described the method of spot welding as applied to sheets of metal up to ⅝-in. thickness.

J. D. Mooney, *American Machinist,* described the autogenous or oxy-acetylene method of welding locomotive and car repair parts as carried out by the Atchison, Topeka & Santa Fé Railway. The oxygen and acetylene are made on the ground. Among the typical jobs illustrated by slides were the building up of a crosshead fit on a piston rod, renewal of worn links, building up of teeth on a reverse lever latch, filling of blowholes in crosshead castings, repair of breaks in main framing and rehabilitation of steel cabs. In conclusion, Mr. Mooney explained how the oxy-acetylene torch had been used to good advantage in cutting up the tangled structural steel of the sunken battleship Maine.

C. B. Auell, Westinghouse Electric & Manufacturing Company, referred to the three processes of electric arc welding known as the Benardos, Slavianoff and Zerener. The Benardos process is now free to all, as the patents on it have expired. It includes a source of direct-current supply, controlling apparatus for the regulation of current and voltage, carbon electrodes, a suitable inclosure for the work, a protective covering for the operator, fireclay or other material for molding purposes, filler and flux. One desirable flux consists of 15 per cent to 25 per cent of red oxide of iron (Fe_2O_3) and 75 per cent to 85 per cent of pulverized borax ($Na_2Bo_4O_7 + 5\,H_2O$). Another flux consists of 5 per cent of oxide of copper (CuO), 15 per cent of oxide of manganese (Mn_2O), 30 per cent of red oxide of iron (Fe_2O_3) and 50 per cent of pulverized borax ($Na_2Bo_4O_7 + 5\,H_2O$). These fluxes may be used either dry or wet.

The Slavianoff process is a modified Benardos method, in which a metal electrode is substituted for the carbon. In the Zerener process, which is apparently not used in this country, the arc is drawn between two inclined carbons and is directed downward into a pencil point by means of an electromagnet. The piece to be welded is brought into the influence of the flame and is thus raised to the desired temperature. In conclusion Mr. Auell said that the oxy-acetylene and oxy-hydrogen processes appeared to have an advantage over the electric arc processes in the matter of average strength of welds and in smoothness of finish, but not as regards cost and speed.

SUIT AGAINST CLASSIFICATION OF ADDITIONS AND BETTERMENTS OF THE INTERSTATE COMMISSION

Suit has been brought in the United States Commerce Court by the Kansas City Southern Railway in reference to the system of accounts prescribed by the Interstate Commerce Commission.

The suit relates particularly to the classification of additions and betterments. In the preparation of plans for reducing grades the company found that the cheapest way of making a proposed improvement would be to secure a new right-of-way in certain places. Bonds aggregating $1,250,000 were allotted to meet the expenses of this work. After the preparation of the engineering plans and other preliminary expenses had been incurred the Interstate Commerce Commission prescribed the classification providing that expenses for grade changes on original rights-of-way should be charged to capital account, but in case of a change of location of line only a portion of the charge should be carried to capital account. The company says that it is unjust as well as misleading to require that more than 60 per cent of the outlay for the more economical method of making the improvement must be written off as a loss and deducted from earnings by charges to operating expenses or through the profit and loss account.

It is also stated that the requirements of the commission amount to a valuation of the railway, resorting in the taking of private property without due process of law and that they exceed the authority either of commissioners or commission and violate the guarantees to the constitution.

A similar condition has arisen as the result of the proposed construction of a new shop at Shreveport, La., and the abandonment of the old facilities. The management elected to charge the net value of the abandoned property against the surplus account, but the commission required that the charge be made to operating expenses.

Changes in the Cleveland Franchise

The Changes Authorized by the Election on Nov. 7 Modify Provisions of the Existing Franchise—The Important Clauses Are Stated and Elucidated

Voters of Cleveland approved on Nov. 7 an ordinance passed by the City Council on July 10, 1911, which amends the franchise ordinance of the Cleveland Railway. One of the changes relates to additions and betterments and provides that the company shall proceed, immediately upon the ordinance taking effect, to expend $2,500,000 in such extensions, betterments or permanent improvements as may be designated by the city. Control of the uses to which this money shall be put therefore rests with the City Council. It is expected, however, that the money will be devoted to the purchase of additional cars and power facilities.

CAPITAL VALUE

Section 16 of the original franchise ordinance is amended in several particulars. This section relates to capital value, and the unchanged paragraphs pertain chiefly to the statements of securities representing the values allowed in the ordinance. The following paragraph, involving a slight change, is substituted for one in the original ordinance:

"The company may, at any time, refund its bonds, or capitalize or issue mortgage bonds for its floating debt as defined in paragraph (b). All bonds hereafter sold by the company shall be sold at the best price obtainable therefor, and shall contain a provision making them payable on ninety days' call, at any interest maturing period, at 105 and accrued interest; and the city shall have thirty days' notice in advance of all such proposed sales of bonds by the company."

The change is in the omission of the words "provided that" after "paragraph (b)."

Following the paragraph quoted is a reference to the allowance of 5 per cent on the bonded debt or, in the event of refunding, of such rate, not exceeding 6 per cent, as the refunding bonds may bear. The latter provision is changed so as to make the rate "that rate per cent which the refunding bonds may bear, and such rate as may be necessary to amortize the discount, if such bonds are sold at a discount, the total, however, of such rate of interest and addition thereto for amortization to be not in excess of 6 per cent per annum on par."

It was provided originally that the company might sell its bonds "for not less than par except with the consent of the city." The new condition is that the company may sell its "bonds on a basis which will not be in excess of 6 per cent on par and will include in such rate provision for amortizing the discount, if such bonds are sold at a discount."

Section 19, concerning the interest fund of $500,000, stipulated originally that this amount should be deposited and draw interest in banks. The option is now added that this fund "may be invested in such securities as may be agreed upon between the company and the city."

Section 21 of the contract stated that any surplus in the hands of the company out of the allowance per car mile for operating expenses remaining unexpended for operating expenses at the end of any period of six months should be placed to the credit of the interest fund. The period is now changed to one year.

The concluding paragraph of this section is amended to read: "No renewal or replacement charged to the maintenance, depreciation and renewal account shall be made by the company until it has been approved by the City Council or by the city street railroad commission when thereunto duly authorized by Council to act."

EXTENSIVE BETTERMENTS OR IMPROVEMENTS

Section 28 is amended so as to give the city a voice in extensions, betterments or improvements. The new first paragraph of this section contains the following provisions:

"Either the company or the city may propose extensions, betterments or permanent improvements. Whenever any extension, betterment or permanent improvement is proposed by the city estimates of the cost thereof and plans and specifications thereof shall be filed with the company by the city, and whenever any extension, betterment or permanent improvement is proposed by the company, otherwise than of the kind and subject to the limitations contained in Section 20 hereof, estimates of the cost thereof and plans and specifications therefor shall be filed with the city by the company; provided, however, that the right of the city to propose extensions, betterments or permanent improvements shall terminate whenever the unexpired term of this franchise, or any renewal hereof, is less than fifteen years."

The reference to Section 20 in this paragraph is to the treatment of small capital expenditures charged to operating expenses.

Important sentences in the ensuing paragraph, as revised, are as follows:

"When such extensions, betterments or permanent improvements proposed by the company have been approved by the Council, or when estimates of the cost and plans and specifications of any extension, betterment or permanent improvement proposed by the city have been filed with the company by the city, such extensions, betterments and permanent improvements shall be made, if the company, acting in good faith and using all usual means, can procure the necessary money, by the sale of stocks or bonds or by an increase of floating debt, unless the company shall claim in any such case that extensions, betterments or permanent improvements proposed by the city will impair the present or future ability of the company to earn the amounts stipulated in Section 16 hereof [This section refers to the return on capital value.—Eds.] or that the company is unable to finance said extensions, betterments or permanent improvements, in either of which cases the claim of the company shall be submitted to arbitration, as provided in Section 11 hereof. Provided, however, that the expenditure of the $2,500,000 hereinafter required shall not be subject to such arbitration." It is then provided that the capital value shall be increased correspondingly. The reference to the return to which the company is entitled on such capital value is amended so as to cover, if bonds are issued to meet the expense, the rate of interest borne by the bonds, including the amortization of the discount, if the bonds are issued at a discount.

In conformity with the intent of this change the city street railroad commissioner, instead of having the right only to employ assistance to check the estimates of the company for proposed work of this character, receives "the right to employ such assistance as he shall deem necessary for the purpose of making the estimates, plans and specifications of any extension, betterment or permanent improvement proposed by the city."

In Section 29 the clause reserving to the company alone the right to propose extensions, betterments or permanent improvements is omitted.

SUBURBAN GRANTS

Section 30, applying to suburban lines and franchises, is amended by the addition of the following:

"Provided that during any unexpired term of this franchise of more than fifteen years' duration, upon demand of the city, the company shall extend to all (or such part as the city may designate) of its existing lines in that portion of the city of Cleveland formerly known as Collinwood

all, any or such parts of the benefits of ordinance No. 16238-A [the original ordinance.—EDS.], as amended, as may be designated by the city, and such terms and conditions of such ordinance, as so amended and as so designated by the city, shall apply thereto; but the company shall not thereby be deemed to have surrendered any franchise existing in such territory."

Section 31 is changed so as to permit the company to give free transportation to motormen, conductors and inspectors, not only when in uniform, as provided originally, but also "upon presentation of badge when going to or from work." There was a provision in this section that the city street railroad commissioner might notify the company and conduct an investigation if, among various things, in his judgment any wastefulness existed in the purchase of material. This is amended to apply to the "use of" material as well.

Section 32, dealing with the reservation by the city of the right to purchase, refers, as amended, to this right "at any time during the life of this grant or any renewal thereof." The amended section makes it clear that the amount to be paid by the city—capital value plus 10 per cent on the net capital value—may be increased as provided in the ordinance or diminished by any reduction of value out of surplus earnings or otherwise, as provided in the ordinance. This clause is also added: "Should the city exercise the option to purchase hereby conferred, upon demand of the city, the company shall convert into cash, at the best price obtainable, the assets or securities then in the sinking fund provided for by Section 40 hereof, and the proceeds shall be deducted from the purchase price to be paid by the city; and in default of the city so demanding such conversion such assets or securities shall become the property of the city, but shall not be deducted from purchase price."

The sinking fund mentioned in this clause is one of the contingencies designed to assist in reduction of the capital value from surplus earnings if the unexpired term of Cleveland franchises becomes less than fifteen years and the company as a result collects the maximum rate of fare.

CITY RIGHT OF PURCHASE

Section 35 is entirely changed and now reads as follows:

"If at the expiration of this grant or any renewal thereof the city shall not have exercised the right reserved to it to purchase the said property as provided in Section 32 hereof, then and in that event the company, by the acceptance of this ordinance, grants to the city, and the city hereby reserves to itself, the rights of purchase following:

"(1) If the city then has legal power so to do, it may purchase said street railroad system with all extensions and additions thereto at the price, in the manner and on the terms set forth in Section 32 of this ordinance, except that 10 per cent shall not be added to any part of the capital value to determine the purchase price to be paid.

"(2) If the city then has legal power to acquire, own and operate street railways within the then city limits, it may purchase said street railroad system with all additions and extensions within the then city limits at the price, in the manner and on the terms provided in Section 32 hereof, except that 10 per cent shall not be added to any part of the capital value to determine the purchase price, and except that there shall be deducted from the total price of the entire system the value of such part of said street railroad, with all extensions and additions, lying outside of the then city limits, such value to be determined by agreement, or in event of a disagreement by arbitration as provided in Section 11 of this ordinance; and, if the city so desires, it may at the same time require the company to sell, assign and convey to such person, firm or corporation as may be designated by the city the part of such railroad system then lying outside the then city limits of the city of Cleveland at the value as so fixed by agreement or arbitration."

Section 36, which stipulated in the original ordinance that the price to be paid by the city in the event of purchase under the conditions named in Section 35 should be the value for street railroad purposes and described the methods to be followed in the determination of value, is repealed.

Section 37 is amended merely to provide that, if no extension or renewal of the franchise is granted by the city and the city does not purchase the property at the expiration of the franchise, any person to whom a franchise is granted over any existing lines shall be under obligation to purchase such lines upon the terms provided for purchase by the city in Section 35.

Section 40 is amended to cover "any renewal" of the unexpired grant. The provisions respecting the exercise by the city of the right to purchase or the designation of a licensee during operation by the company in a period of less than fifteen years' franchise duration, and the terms in the event thereof, are eliminated. An amended clause in this section reads as follows:

"Should the city pass a grant in renewal hereof during a period of less than fifteen years' franchise duration, such renewal grant shall fix as the then capital value of the company, upon which interest shall be paid out of the interest fund, an amount equal to the capital value set forth in Section 6 hereof, increased as in this ordinance provided and diminished by any reduction thereof out of surplus earnings or otherwise as in this ordinance provided, and also diminished by the proceeds of the assets or securities then in the sinking fund provided for by this section, which assets or securities shall be by the company converted into cash at the best price obtainable."

Section 44 concerns the possible purchase by the city on Jan. 1, 1933, of the St. Clair Avenue line upon payment to the company of, there is now specified, the "physical" value. In the event of disagreement between the city and the company as to this value the matter shall be submitted to arbitration in the manner generally provided for other questions which may arise under the ordinance.

The Council reserves the right to repeal the ordinance amending the original contract and thereby to repeal the amendments made if within a reasonable time after passage the Cleveland Railway shall not have provided $2,500,000 for expenditure in such extensions, betterments or permanent improvements as may be designated by the city.

COMMITTEE ON PASSENGER ACCOUNTS OF THE CENTRAL ELECTRIC ACCOUNTING CONFERENCE

President A. F. Elkins of the Central Electric Accounting Conference has anounced the appointment of a standing committee on passenger accounts, the members of which will be as follows : C. M. Witt, auditor Indianapolis, New Castle & Toledo Electric Railway, chairman; C. B. Kleinhans, auditor Toledo & Indiana Railroad, Toledo, Ohio; F. T. Loftus, auditor Indianapolis & Cincinnati Traction Company, Rushville, Ind.; E. O. Reed, auditor Western Ohio Railroad, Lima, Ohio; E. J. Skehan, auditor Muncie & Portland Traction Company, Portland, Ind.

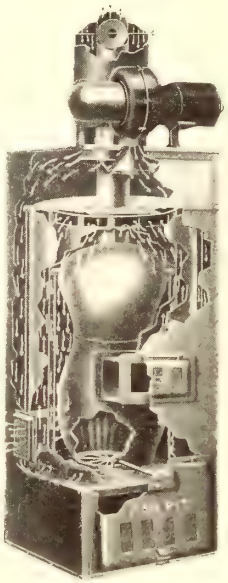
The appointment of this committee was authorized by the conference at its meeting at Indianapolis, Ind., on Sept. 23, 1911. All matters brought before the conference which relate to interline passenger accounting will be referred to this committee for action.

The annual meeting of the Central Electric Accounting Conference will be held at Toledo, Ohio, on Dec. 16, 1911.

The Coney Island & Brooklyn Railroad, Brooklyn, N. Y., is operating a special service during the middle of the day designed especially to accommodate persons who do their holiday shopping at the large department stores on Fulton Street between Flatbush Avenue and Borough Hall.

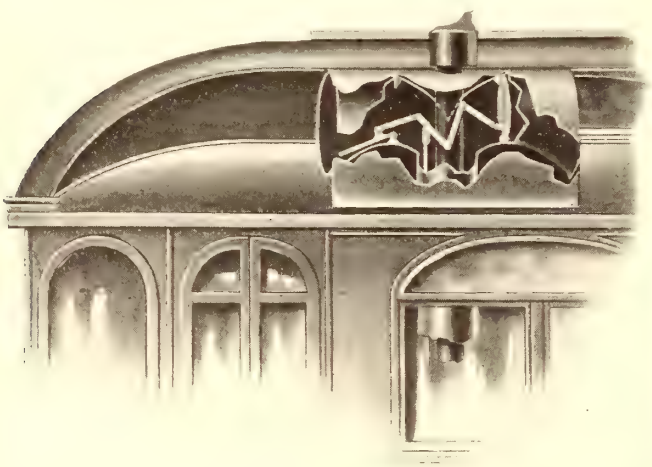
A FORCED-VENTILATION HOT-AIR HEATER

The Cooper Heater Company, Dayton, Ohio, has recently placed on the market a forced-ventilation hot-air heater, which is the invention of its sales manager, W. L. Blackwell, who also invented the Cooper pressed-steel hot-water heater. As shown in the accompanying illustrations, the heater has a blower motor and a funnel-shaped intake, which is placed in the roof of the car. It is considered that air drawn in at the top of the car is much cleaner than air taken through intakes located near the pavement. The roof intake is so designed that a blower motor is unnecessary in a car used in moderate or high-speed service. It is not essential that the air should pass through the motor. It may pass through the air duct which surrounds the smoke pipe to get the benefit of whatever heat is radiated from the pipe before it reaches the heater. At that place the air strikes the funnel-shaped guard which surrounds the stovepipe just inside of the heater and is thereby directly and uniformly distributed to the outer casing of the heater. After passing down the outer casing the air enters the bottom of the second casing, rises up and enters the inner section which holds the stove proper and where the heat is most intense. It enters this section through special ports, after which it passes down around the stove to the outlet duct, which is made either right-handed or left-handed, according to the position in which the heater is to be placed. The flow of air as described is graphically indicated by the arrows in the view above.



Blower Type Heater

The use of a triple by-pass instead of a double by-pass has the advantage of keeping the outer casing cool at all times. Another and even more important feature is the provision which has been made to prevent the possibility of the car burning up through the stove overheating when the motor is not in operation. In case the operator fails to open the upper front door (which is inter-connected with an upper door of the inner casing) to allow the heat to pass out into the car the heat will pass out through the intake at the top of the car instead. This is accomplished by the automatic action of a slide which opens only when the motor is stopped. The smoke pipe has a jack which revolves with the motion of the car, thus discharging the gases to the rear end of the induction draft hood opposite the intake.



Funnel Intake for Heater

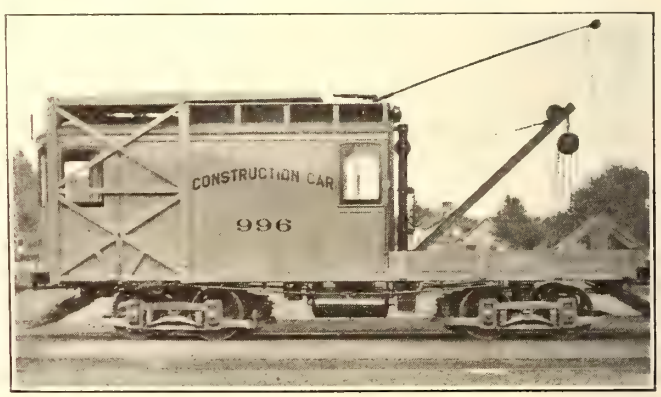
The heater is made of cast iron and steel, the outer casing being of unusually heavy gage steel to withstand rough usage. The doors are top-hinged and are made of soft grade iron. A safety spring catch provides an automatic lock to prevent the doors from being left open through carelessness. The outer casing of the heater is lined with bolted ¼-in. asbestos millboard. The two steel inner casings were welded by the oxy-acetylene process to prevent any possibility of dust or gaseous fumes coming into contact with the fresh air and being discharged into the car. The base and frame of the blower motor are cast in one piece. The head over the commutator end has a hinged opening with concealed automatic lock, but it can be easily removed for inspection of the brushes. The motor is entirely incased to prevent the entrance of dirt and moisture. The blower is also of light and durable design. These heaters are made in three sizes: B-4, 15 in. square and 40 in. high, for cars up to 25 ft. inside length; B-6, 17 in. square and 40 in. high, for 35-ft. bodies, and B-8, 20 in. square and 42 in. high, for bodies up to 65 ft.

TOLEDO LINE CAR

The shops of the Toledo Railways & Light Company have recently constructed the combination work and line car shown in the accompanying illustration. This is a double-end car with a cab 17 ft. x 8 ft. in floor area, built at one end of the underframe. The cab contains two controllers and the tower-raising mechanism and is provided with a workbench, shelves and lockers for the tools and supplies necessary for general repair work. The doors of the body are placed at opposite ends and toward one side, so that long poles may be carried if necessary. The open platform end of the car is 13 ft. x 8 ft. in dimensions and carries a jib crane mounted against the center of the cab end. In erecting the crane care was taken to keep it insulated from any ground connections.

A movable reel jack to carry trolley or feed wire has been mounted at the outer end of the open platform, and ample space is left between it and the derrick so that substation transformers or other heavy equipment may be transported on the line car.

The trolley tower is of the ordinary revolving type mounted on the roof of the cab and so arranged that the standards come just outside of the car-body walls. The tower raises through a distance of 6 ft. and has a floor 5 ft. x 14 ft. in size with a collapsible railing. The tower is motor-operated, with the control placed inside of the cab, and is equipped with two push-button signals for the operator and an automatic cut-out safety device so that the lineman on top of the tower may prevent the movement of the car by the motorman. A hand-operated raising mechanism is provided for emergency use.



Combination Work and Line Car

This new line car is mounted on two Brill trucks and is equiped with two GE-57 motors.

ELECTRIC RAILWAY LEGAL DECISIONS

CHARTERS, ORDINANCES, FRANCHISES

Connecticut.—Location of Road on Highway—Appeal from Commissioners.

The selectmen of a town in approving the route of a street railroad provided that a portion of the road should be laid outside a highway, and on appeal to the railroad commissioners it was found that the petitioner railroad company had a right to a lay-out in the highway, and that it was the commissioners' duty to give the railroad company such lay-out and also to require such changes in the highway as would protect other public uses thereof. Held, that adjoining owners claiming to be injured by such decision were entitled to review such question on appeal to the superior court. (Appeal of Norton et al., 78 At. Rep. 587.)

Georgia.—Ice as Baggage.

The court cannot say as a matter of law that 5 cents' worth of ice, wrapped so as to prevent leaking, is not personal baggage of a passenger attempting to board a street car, and he may not be refused permission to board the car with the ice. (McIntosh v. Augusta & A. Ry. Co., 69 S. E. Rep. 160.)

Illinois.—Drains—Assessment—"Property."

A street railroad's right to occupy a public street, together with ties, rails and rolling stock, is "property" within Const., Art. 4, Sec. 31, provided that the General Assembly may pass laws permitting the owners of land to construct drains by special assessments on the property benefited thereby. (Spring Creek Drainage Dist. v. Elgin, J. & E. Ry. Co. et al., 94 N. E. Rep. 529.)

Indiana.—Eminent Domain—Crossing with Steam Railroads.

Act March 3, 1903, Chap. 59, Sec. 1 (Burns' Ann. St. 1908, Sec. 5666), authorizing electric railways to condemn the right to cross steam roads, does not violate Const., Art. 1, Sec. 23, as granting special privileges and immunities not shared by steam roads, they having substantially the same rights.

Act March 3, 1903, Chap. 59, Sec. 1 (Burns' Ann. St. 1908, Sec. 5666), authorizing electric railroads to condemn the right to cross steam railroads, does not infringe Const. U. S., Amend. 14, as denying to steam roads the equal protection of the law, they being given substantially the same rights. (Vandalia R. Co. v. La Fayette & L. Traction Co., 94 N. E. Rep. 483.)

Kentucky.—Bridges—Defects—Liability.

A contract between a county, a railroad company and a traction company which provided for a change in the location of a county highway crossing the railroad track at grade, required the railroad and traction companies to construct an overhead bridge at their own expense and bound the traction company to keep the bridge in repair, contemplated that the county should be free from the burden of maintaining the bridge, and the traction company only assumed to do for the county what it otherwise would have been compelled to do and was not liable for injuries to a traveler caused by a defect in the bridge.

Though the county authorities or its representatives may be indicted for maintaining a public nuisance, occasioned by maintaining a defective highway or bridge forming a part thereof, yet there is no liability for damages to persons injured thereby. (Blue Grass Traction Co. v. Grover, 123 S. W. Rep., 264.)

Maryland.—Eminent Domain—Streets—Rights of Abutters.

The right of access is the test of an abutter's right of action for occupation of a street by a railroad.

A proper method of ascertaining damage resulting to abutters by obstruction of access to their property through occupation of a street by a railroad is to ascertain what it would cost to restore the means of access by devoting part of the property to that purpose. (Webb et al. v. Baltimore & O. R. Co., 79 At. Rep. 193.)

Michigan.—Rate of Fare—Conditions Imposed by Township.

Where a township, in pursuance of Comp. Laws 1897, Art. 6446, on granting consent to an electric railway company to construct and operate its line along the highways of the township, imposed a condition that the railway company should not charge more than 2 cents per mile for each passenger carried, provided that no single fare should be less than 5 cents, a passenger taking a car in the township was entitled to ride over the entire line at the rate of 2 cents per mile, though it extended beyond the township limits, provided that the total amount paid should not be less than 5 cents. (Ross Tp. v. Michigan United Rys. Co., 130 N. W. Rep., 358.)

New Jersey.—Contribution to Expense of Rebuilding Bridge.

The duty of constructing and maintaining roadbeds and tracks was imposed on a traction company which accepted a franchise, although the statutes did not expressly impose this duty, and as it had the power to construct its road over bridges it was bound to contribute to the expense of rebuilding a public bridge necessitated by the operation of heavier cars propelled by electricity. (Public Service Ry. Co. v. Board of Chosen Freeholders of Hudson County, 78 At. Rep. 235.)

New Jersey.—Construction of Line—Validity of Ordinance.

A street railway company operating under the act of 1893 (3 Gen. St. 1895, p. 3235) obtained in that year from Jersey City by ordinance a consent to the filed location of its route, but without a lawful designation of the location of its tracks in the streets named as constituting such route. In 1910 the city undertook to amend the original ordinance by designating such location of tracks, etc. Held, that the original ordinance conferred no right of construction, and that such right could not be acquired without compliance with the requirements of the later act of 1894 (P. L. p. 374), as modified by the further act of 1896 (P. L. p. 329). (St. Paul's Catholic Church of Greenville v. Mayor and Aldermen of Jersey City et al., 78 At. Rep., 1064.)

New York.—Workmen's Compensation Act—Validity—Deprivation of Property—Police Power.

Workmen's Compensation Act (Laws 1910, Chap. 674), Art. 14a, imposing an absolute liability on employers in certain designated occupations for injuries to a workman not caused in whole or in part by the serious and wilful misconduct of the injured workman, independent of any act of negligence or default on the part of the employer, is unconstitutional, as depriving the employer of his property without due process of law.

Where an industry or calling is per se lawful and open to all, it is beyond the prohibitive power of the legislature, and the right of governmental control is subject to such reasonable enactments as are directly designed to conserve health, safety, comfort, morals, peace and order. (Ives v. South Buffalo Ry. Co., 94 N. E. Rep. 431.)

New York.—Regulation of Fares.

The act of the Public Service Commission in requiring a street railroad company operating a road between two cities and across a bridge of a bridge company to comply with Laws 1905, Chap. 358, and thus to charge 5 cents fare, instead of 6 cents, and paying 1 cent to the bridge company, is not invalid as depriving the company of its property without compensation because reducing its revenue, where a competing company operating fewer cars charges only 5 cents fare. (People ex rel. Cohoes Ry. Co. v. Public Service Commission, Second Dist. (Francis P. Lithgow, Intervener), 128 N. Y. Sup. 384.)

New York.—Injunction to Prevent Moving of House.

Where a street railroad company sues to enjoin interference with its wires and overhead construction by a person moving a building through a city street and alleges irreparable injury, it has no ground for complaint when the order vacating the temporary injunction provides that the work of taking down and replacing its wires shall be done by its own employees and that defendant shall pay the expenses. (Western New York & P. Traction Co. v. Stillman, 128 N. Y. Sup. 363.)

New York.—Regulation—Transfers.

The charters of two street railway companies each contained a section by which each agreed to transport passengers over the entire length of any of its lines of railroad within the village of B. at a fare not over 5 cents for each continuous trip of each passenger and to allow each

passenger one transfer from any one to any other of its said lines and to transfer passengers to and from the intersecting lines of other street surface railways within said village. The terms as to the division of the fare were to be agreed upon. Held, that a refusal to issue transfers at proper points was a violation of their charter obligation and of law, and under Public Service Commissions Law (Laws 1907, Chap. 429, Sec. 57), the Public Service Commission could institute summary proceedings to compel the issuance of such transfers. (Wilcox et al. v. Richmond Light & R. Co. et al., 128 N. Y. Sup. 266.)

Pennsylvania.—Franchise for Leased Cars.

A street railway, having a franchise to operate cars on the streets of a city, may operate not only its own cars but those which are the property of a company which it has leased. (City of Pittsburgh v. Pittssburgh & C. St. Ry. Co. et al., 79 At. Rep. 235.)

Pennsylvania.—County Bridges—Use by Trolley Company —Compensation.

In an action by a county against a trolley company for compensation for the use of county bridges, where there was evidence showing the trolley company's system of trackage, the population of the territory it had to draw upon, cost of the respective bridges to the county and their value in the year for which compensation was sought, the amount paid for the repair of ordinary wear and tear incurred during such year, the general cost of maintenance of the bridges during that year, sizes of the bridges and how they were built, details as to the use made of the bridges by defendant company and some light on the general public use as compared to the precise use of the defendant company, the court properly allowed the jury to determine the proper compensation for the use of the bridges. (Beaver County v. Beaver Valley Traction Co., 79 At. Rep., 161.)

Washington.—Exchange of Transfers.

A street railway company obtaining a franchise providing for the exchange of transfers with any other company operating street railways which shall give and receive transfers to and from the lines of the company, and stipulating for a basis of settlement, must exchange transfers with all companies operating street railways where they give and receive transfers to and from the lines of the company on the basis of settlement specified in the franchise. (State ex rel. Linhoff v. Seattle, R. & S. Ry. Co. et al., 114 Pac. Rep. 431.)

Washington.—Occupation of Street—As Nuisance.

Unlawful occupation of a street by a railroad constitutes a public nuisance, which may be abated by an abutting owner suffering a special injury therefrom.

Rights of public service corporations asserted under eminent domain laws should be strictly construed. (Sylvester et al. v. Superior Court for Benton County, 111 Pac. Rep. 19.)

LIABILITY FOR NEGLIGENCE.

Delaware.—Negligence and Contributory Negligence.

Where the negligence of a street railway was the proximate or immediate cause of the injuries to a traveler, caused by a collision with a car, the company was liable, notwithstanding the negligence of the traveler, not then continuing, and not at the time entering into and contributing to the accident. (McCartney v. People's Ry. Co., 78 At. Rep. 771.)

Indiana.—Notice to Conductor of Destination.

A passenger on an interurban railway who pays his fare and informs the conductor at the time of his destination may assume that the carrier will discharge its duty and stop at that point without further notice to the conductor, and that the carrier will exercise due care in stopping the car at the point of destination.

The burden of proving contributory negligence of a passenger suing for a personal injury received while attempting to alight from a car rests, under the statute, on the carrier. (Indiana Union Traction Co. v. Keiter, 92 N. E. Rep. 982.)

Massachusetts.—Injuries to Passengers from Jerks and Jolts.

Jerks while running and in stopping and starting to let off and take on passengers, jolts in going over frogs or switch points, and lurches in going around curves are among the incidents in electric cars which every passenger must expect, and if a passenger is injured by such a jerk, jolt or lurch the company is not liable. On the other hand, a car can be started and stopped with a jerk so much more abrupt and so much greater than is usual that the motorman can be found to be guilty of negligence. (Work v. Boston Elevated Ry. Co., 93 N. E. Rep. 693.)

Massachusetts.—Care Required to Female Passengers.

A female passenger with a small child in her arms was entitled to protection from being jostled, etc., by other passengers, commensurate with the impairment of her ability to care for herself resulting from carrying the child. (Glennen v. Boston Elevated Ry. Co., 93 N. E. Rep. 700.)

Massachusetts.—Damages for Future Suffering.

The court instructed, in a personal injury action, that if plaintiff's physical condition was such that it "may or may not involve future expense she would be entitled to have that considered"; that if her physical condition did not necessarily involve future expense, "but it might happen in the future, that would be a thing for you to consider as in the future"; and that "plaintiff would have the right to consider the possibility that an operation in the future might be necessary on the question of damage." Held, that the instructions were erroneous, as susceptible of being construed to authorize damages for suffering, etc., which "might" result in the future, instead of for suffering which the preponderance of the evidence showed might be reasonably expected so to result. (Pullen v. Boston Elevated Ry. Co., 94 N. E. Rep. 469.)

Massachusetts.—Collisions—Liability.

A street railway company is not liable for injury to a passenger in a collision between the car and an ice wagon, caused by a sudden movement of the horses attached to the wagon, if the car was not running at an excessive speed, but is liable if the car struck the wagon while it was stationary. (Niland v. Boston Elevated Ry. Co., 94 N. E. Rep. 703.)

Massachusetts.—Injuries on Crowded Elevated Car—Negligence.

When plaintiff entered defendant's elevated street car, it was so crowded that she could not obtain a seat and was compelled to stand in the vestibule, and when the car stopped to permit passengers to alight the conductor told plaintiff that she was blocking the passageway and must stand aside to permit other passengers to alight, and in the jostling which accompanied the efforts of the other passengers to alight plaintiff was pushed off the car. Held, that the company was required to exercise the highest degree of care for plaintiff's safety which was consistent with a similar duty to the other passengers, and it was not negligent under the circumstances, so as to make it liable for plaintiff's injuries. (McCumber v. Boston Elevated Ry. Co., 93 N. E. Rep. 698.)

Michigan.—Injury to Passenger Alighting.

In an action for injuries to a street car passenger while alighting, the issue being whether the car started while plaintiff was getting off or whether she merely caught her foot on something, a charge which stated that it was unnecessary to define negligence in general and that if the car started up after coming to a stop while plaintiff was in a position of danger from which the starting of the car would have a tendency to throw her, it was negligence and plaintiff should recover, but if plaintiff simply slipped in alighting from the car while it was standing still, there was no negligence and plaintiff could not recover, properly submitted the issues. (Cummings v. Detroit United Ry., 128 N. W. Rep. 206.)

Michigan.—Rule Regarding Stops at Railroad Crossings.

In an action against a street railroad for death of a motorman killed in a collision between his car and a railroad engine at a crossing, testimony that it was customary to stop cars so that conductors could alight on a board walk near the crossing was competent to show that decedent in stopping the car was doing what had been repeatedly done, though in violation of a rule requiring him to stop at a greater distance.

In an action against a street railroad for death of a motorman in a collision with a train at a crossing, it was not reversible error to permit an experienced motorman

who had operated the same car to testify as to the effect on the stopping of the car of a brake such as it was equipped with, though decedent after the car was repaired took it out and stated that the brakes were all right. (Rivers v. Bay City Traction & Electric Co., 128 N. W. Rep. 254.)

New Jersey.—Trespass—Third-rail Right-of-way.

The plaintiff, a minor, while passing diagonally from a public byway pursued a footway alongside of the defendant's tracks and upon defendant's right-of-way and was injured by coming in contact with the third rail; held, upon demurrer, that the declaration presented no cause of action. (Tarlucki v. West Jersey & S. R. Co., 78 At. Rep. 149.)

New Jersey.—Injury from Bent Trolley Pole.

Plaintiff sustained personal injuries while a passenger on an open trolley car operated by defendant. Upon the evidence submitted, the jury might have found that he was standing inside the car, leaning against the guard rail, and that while the car was running at very high speed the trolley left the overhead wire, and the pole, striking one or more cross-wires, bounced backward and downward and was bent thereby sufficiently to strike plaintiff, inflicting the injury complained of. Held a question for the jury whether defendant should not, in the exercise of proper care, have anticipated some such accident as the result of the combination of high speed and a displaced trolley and have taken measures to prevent it. (Donohue v. Public Service Ry. Co., 78 At. Rep. 183.)

New Jersey.—Cars Running by Gravity.

It is negligence to turn loose a train of cars on an incline, with knowledge that they will run over a street crossing, without giving warning of their approach. (Hackman v. Lehigh Valley R. Co. of New Jersey, 78 At. Rep. 686.)

New Jersey.—Authority of Conductor—Employment of Physician.

A printed rule of the trolley company required the conductor of a car in case an accident should occur to take the injured person to a physician. The motorman having met with an accident by which his leg was crushed, the conductor telephoned to the plaintiff, a physician, who came and amputated the limb. Held, that the company was liable on contract to the physician for the value of the service thus rendered. (Perkins v. Trenton St. Ry. Co., 78 At. Rep. 666.)

New York.—Ejection of Intoxicated Passenger.

Plaintiff's intestate, on a cold night in winter and when badly intoxicated, boarded an interurban car on defendant's electric line. The conductor collected his fare but afterward ejected him at a point three-quarters of a mile from any shelter and where the snow was 2½ ft. deep, and he was struck and killed by the returning car. Held, in an action to recover for his death, that, whether or not defendant had the abstract legal right to eject him, it was liable if it failed to exercise reasonable care for his safety in doing so, in view of his known condition, which was a question for the jury. (Donovan v. Greenfield & T. F. St. Ry. Co., 183 Fed. Rep. 526.)

New York.—Care Required When Passengers Attempt to Board Moving Car.

Where a person attempts to board a moving train of cars the gates of which are closed, and seizes hold of a part of the car and gets one or both feet on the lower step, the guard is not obliged to do the best that a man of good judgment would do, but it is his duty to do what such a person of ordinary judgment and prudence would do in an effort to save such person from the consequences of his own negligent act. (Sheehan v. Nassau Electric R. Co., 128 N. Y. Sup. 545.)

New York.—Damages for Death of Artist.

In an action for death, it appeared that decedent was forty-six years old and perfectly well save for shortsightedness and a slight deafness in damp weather, that he left a widow and two children, both of whom were under two years of age, that he earned from $75 to $100 a week, from which he gave his wife $72 to $75, and that he was an excellent musician who had earned the reputation of an artist. Held, that a verdict of $30,000 was not excessive. (Zucker v. Whitridge, 128 N. Y. Sup. 233.)

New York.—Time to Alight—Jumping from Moving Train.

Where a carrier either did not stop the train on which decedent was riding at all at the station where he desired to alight or did not stop for a sufficient length of time to enable him to get off while the train was stationary, decedent was not per se negligent in alighting while the train was moving slowly. (Puget Sound Electric Ry. v. Felt et al., 181 Fed Rep. 938.)

North Dakota.—Negligence and Contributory Negligence.

Unless the negligence of the plaintiff proximately contributes to the injury it does not constitute contributory negligence which bars a recovery. The party who last has a clear opportunity of avoiding the accident, notwithstanding the negligence of his opponent, is considered solely responsible for it.

One driving along the street railway track in daylight has the right to suppose that if a car is approaching from the rear a proper lookout is maintained and that ordinary care will be exercised to avoid injuring him. (Acton v. Fargo & Moorhead St. Ry. Co., 129 N. W. Rep. 225.)

Ohio.—To Stone a Street Car an Offense.

A statute may include by inference a case not originally contemplated when it deals with a genus within which a new species is brought. Thus a statute making it unlawful wilfully to throw a stone at a railroad car includes an interurban or traction railway car, although such cars were not known or in use at the time the statute was enacted. (State v. Cleveland, 93 N. E. Rep., 467.)

Pennsylvania.—Collision with Fire Engine.

In an action for injuries to a passenger by collision at an intersecting street crossing with a fire engine, the exclusion of a rule of the company requiring cars to stop while fire engines are passing and of an ordinance requiring cars to stop at the near side of main streets is not reversible error, where the court in its instructions places as high a degree of care on the motorman as that imposed by the rule and the ordinance and there is no evidence that failure to observe either was the cause of the accident. (Fane et al. v. Philadelphia Rapid Transit Co., 77 At. Rep. 806.)

Pennsylvania.—Damages for Future Pain.

In an action for personal injuries, the court should instruct the jury that the verdict should be limited to compensation, and an instruction to allow "the present worth of pain, if any is likely to be suffered in the future," is erroneous. (McLane v. Pittsburgh Rys. Co., 79 At. Rep. 237.)

Texas.—Passengers—Commencement of Relations.

Where a person, without giving any signal, attempts to board a street car at a place where it slows down for a switch but does not stop, the car company's servants owe him no duty as a passenger. (Gildemeister v. San Antonio Traction Co., 135 S. W. Rep. 1097.)

MISCELLANEOUS

Alabama.—"Fellow Servants"—Who Are.

A motorman on one car of a street railroad is a "fellow servant" of a conductor on another car of the same railroad operating cars over the same lines, as both work for the same master over the same lines and for the same purpose.

A street railway may not make a schedule for the car of a motorman and also make a rule which makes the schedule impossible under usual and ordinary conditions and then hold the motorman negligent in doing what is necessary to make the schedule. (Birmingham Ry., Light & Power Co. v. Moseley, 51 So. Rep., 424.)

Iowa.—Duty to Keep Street Safe During Repairs.

A street railway company is bound to construct and maintain its track and roadbed with reference to the surface of the street and in such manner as not to obstruct or render the street unsafe for ordinary travel, so that where its track projects above the surface it cannot insist that travelers keep off that part of the road to avoid injury to the track. (Citizens' Ry. & Light Co. v. Forepaugh & Sells Bros. Shows, 128 N. W. Rep., 357.)

Kentucky.—Master and Servant—Master's Rules.

While the fact that a rule is not in the employees' book of rules is not conclusive that it is not in force, a purported rule of a street car company was properly excluded, where it had been omitted from the latest revision of the rules and there was nothing to show that it was then in force. (Poillon's Administrator v. Louisville Ry. Co., 131 S. W. Rep. 906.)

News of Electric Railways

The Municipal Election in Cleveland

Newton D. Baker has been elected Mayor of Cleveland, Ohio. The election of Mr. Baker is said to have been due to two causes: the personal popularity of the man himself and the failure of the present administration to accomplish as much as was expected of it. Mr. Baker was a close friend of the late Mayor Johnson, and served as city solicitor for several terms under Mr. Johnson. He is in favor of municipal ownership of public utilities and advocated a bond issue of $2,000,000 for municipal electric light plants. This issue he succeeded in having carried at the recent election. During his campaign Mr. Baker announced that he would not reappoint G. M. Dahl as street railway commissioner.

Carl Nau, formerly city treasurer of Cleveland, and at present a member of the firm of Nau, Rusk & Sweringen, accountants, has been mentioned for the office of street railway commissioner. Mr. Nau is quoted as saying that he will not accept an appointment that will require him to sever his connection with the firm of which he is a member. On the other hand, it is stated that the firm may be engaged as accountants for the office. Ernst & Ernst are now the official accountants for the city under a fee of $500 per month. Peter Witt, formerly city clerk, is a candidate for the place now held by Mr. Dahl. Mr. Witt is a radical in his desire to regulate public utilities. Another candidate for the office of street railway commissioner is William Stage, who was connected with the Forest City Railway Company, which was promoted by Mayor Johnson.

The amendments to the Tayler franchise were carried by a large vote. As a result the Cleveland Railway is arranging to expend $2,500,000 for improvements. Additions to the power equipment and the purchase of new cars will probably be considered first.

S. M. Bond, chairman of the wholesale merchants' board of the Cleveland Chamber of Commerce, and Charles E. Adams, president of the chamber, have conferred with Mayor Baehr in regard to establishing freight service on the interurban electric railways which operate into Cleveland. The plan under consideration is to have the Electric Package Agency handle freight as well as express. Trains of from two to five cars would be loaded in the city in the evening and leave at night so as not to interfere with the service of the Cleveland Railway or the service of the interurban lines during the day. The consent of the City Council will have to be secured before a freight service can be started. It is probable that the matter will be placed before the Council soon.

Preparing the Detroit Ordinance

The various civic organizations of Detroit, Mich., are engaged in determining their position with regard to the Thompson plan of settling the street railway question. Many citizens believe the city is not ready for such a radical municipal ownership move as the new ordinance contemplated. On the evening of Nov. 9, 1911, the Detroit Real Estate Board adopted a resolution favoring the Thompson plan. Many of the members of the North Woodward Residents' Association also favor the Thompson plan. Objection is made occasionally to the city assuming the expense of paving between the tracks and to the municipal ownership provision. One objection which is raised is that the ordinance does not provide for the extension of the low fare to the city limits as extended.

Mayor Thompson is of the opinion that $200,000 a year is a very liberal allowance for paving expenses. Even if that amount should be required, he argues that with the taxable valuation of the property of the city $500,000,000 the per capita expense would be insignificant. In 1910 the expense of the company for paving was $239,048 on 15 miles of track. This was very unusual because little paving had been done for several years previous.

Although Mayor Thompson, Corporation Counsel Hally and others have worked earnestly on the preparation of the ordinance it has not yet been completed. A. B. du Pont, Cleveland, was called into conference on Nov. 9.

Attorney Donnelly, representing the company, prepared an ordinance embodying all the points in the tentative agreement. The work now to be done is to reconcile the language of Mr. Donnelly's draft and the one written by Corporation Counsel Hally.

Negotiations in Toledo Interrupted by Election

The plurality of Mayor Whitlock of Toledo at the recent election was more than 3000, a reduction over the votes given him at previous elections. It is not known when negotiations for the settlement of the street railway question will be resumed. Some time ago A. E. Lang, president of the Toledo Railways & Light Company, announced that he was ready to continue the negotiations, but nothing has since been done.

W. W. Miller, attorney for the bondholders of the company, was in Toledo recently. In an interview he is reported to have said that burdens such as improvements between the tracks, repairs to pavements, cleaning and sprinkling parts of the streets, taxes, etc., have to be met with money in the shape of fares secured from the passengers. Mr. Miller has been preparing plans to meet the issue of $5,000,000 of bonds which expires in January, 1912, and $700,000 in February, 1912. He said that no definite plans had been made in regard to improvements to be carried out in 1912.

Transit Matters Before the Council of Pittsburgh

A hearing was held before the Council of Pittsburgh, Pa., on Nov. 9, 1911, at which the subject of subways was considered. Representatives of the Pittsburgh Subway Company, the Rapid Transit Subway Company and the Pittsburgh Railways were present. A fourth subway plan was submitted by a new corporation known as the United Terminal System, incorporated under the title of the Painter's Run Railroad. A. E. Anderson, who represented this company, presented a plan for a downtown loop to connect with all the railroad terminals. Representatives of each of the companies agreed to present in writing a statement of how they expect to finance their respective projects. It was agreed that they should show their financial responsibility and file a bond.

J. D. Callery, president of the Pittsburgh Railways, asked for an extension of at least thirty days for his company to present the plans which the company has in contemplation for improving its system. Mr. Callery said:

"Plans are now well under way for a short subway, including a tunnel through Herron Hill and other connections including a downtown loop. We do not at this time feel that a long subway would justify us for the expenditure, entailing, as it would, an outlay of millions of dollars. We estimate that a subway would cost approximately $2,000,000 per mile, including equipment."

The Council subsequently passed a resolution directing the president of the Council to write to the Pittsburgh Railways to learn when another conference can be held between the officers of that company and the Council to consider the local traction situation and work out plans of improvements and extensions.

Extension of Authority of Chicago Subway Commission Recommended.—Mayor Harrison of Chicago urged the City Council on Nov. 13, 1911, to authorize the present subway engineering commission to draw plans for the proposed harbor improvements at Chicago instead of creating a separate commission for this work. Action on the recommendation was postponed.

Bids Opened for Short Subway in Toronto.—The Board of Control of Toronto, Ont., opened tenders recently for building three miles of underground railway in the city. The tenders ranged from $5,000,000 to $2,600,000. The latter was the tender of M. J. Haney, and this was accepted subject to ratification by the Council. The question will be

submitted to the ratepayers after it has been passed upon by the Council.

Hearing in Regard to Change of Power on Staten Island.—A hearing will be held before Commissioner Cram of the Public Service Commission of the First District of New York, on Nov. 23, 1911, to determine whether an order should be entered by the commission to require the Staten Island Rapid Transit Railway and the Staten Island Railway, both operated by the Baltimore & Ohio Railroad, to change the motive power of their lines from steam to electricity.

Canadian Northern Railway to Build Tunnel at Montreal.—At the forthcoming session of the Dominion Parliament, the Canadian Northern Tunnel & Terminal Company will apply for authority to construct and operate a railway tunnel under Mount Royal at an estimated cost of $25,000,000. The tunnel will give the Canadian Northern Railroad easy access to Montreal and do away with the slow handling of trains around the mountain. The line will be three miles long. Sir William MacKenzie is president of the Canadian Northern Tunnel & Terminal Company.

To Remove Unused Surface Car Tracks in New York.—Justice Pendleton has rendered a decision permitting the city to remove the unused horse car tracks of the Fulton Street Railroad in Fulton Street, New York, N. Y. The bondholders of the Fulton Street Railroad have brought a suit against the receivers of the Metropolitan Street Railway to compel the latter to keep the tracks in repair, but Justice Pendleton decided that the removal of the tracks should not be delayed until this action was settled. He held that the removal would not interfere with any rights of the bondholders.

Accidents on Brooklyn Elevated Railway.—Fifteen persons were injured early on the morning of Nov. 13, 1911, when a West End elevated train on the Brooklyn Rapid Transit Company collided with a Bay Ridge train at the Twenty-fifth Street elevated station. There was a dense fog the morning the accident occurred. The company issued the following statement: "The motorman of the West End-Culver train is wholly at fault, inasmuch as he failed to make a safety stop before going into the Twenty-fifth Street station, as is required by the rules, under such conditions as obtained this morning."

Subway in Seventh Avenue, New York, Considered Again.—Samuel Rea, vice-president of the Pennsylvania Railroad; Mayor Gaynor of New York, Borough President McAneny, Comptroller Prendergast, Chairman Willcox of the Public Service Commission of the First District of New York and ex-Mayor Seth Low of New York conferred recently in regard to increasing the scope of the present subway plans in New York so as to provide for a subway down Seventh Avenue. It is said that Mayor Gaynor favored giving the Interborough Rapid Transit Company another opportunity to make an offer to the city, but Chairman Willcox and President McAneny were not inclined to reopen the subway situation unless there was some chance for a more favorable arrangement with the city.

Appropriation Asked for Grade Crossing Work in New York State.—The Public Service Commission of the Second District of New York in submitting to the comptroller its estimate of amounts necessary to carry on its work for the next fiscal year, has asked for an appropriation of $550,000, to eliminate grade crossings in the State outside of Greater New York. This would provide for grade crossing elimination in the district amounting to $2,200,000, the cost being divided between the railroads one-half, the State and municipalities one-quarter each. In its communication submitting this request, the commission said: "The commission asks this year for $550,000, and feels that the State's proportion of the eliminations which should be ordered during the year 1912 should at least reach this amount. As to the necessity of eliminating grade crossings, it submits no argument and believes that none is necessary. Both of the great political parties in their platforms of 1910 called attention to the necessity for extension of the work of grade crossing elimination and the commission believes there should be no reduction in the amount asked for in this item of the supply estimates."

Financial and Corporate

New York Stock and Money Markets

November 15, 1911.

While mild reaction on the New York Exchange followed the recent announcement of the Government suit against the Steel Corporation, and the volume of trading was curtailed, public interest in both the stock and bond markets is now increasing and prospects seem very good despite the present irregularity. The presidential election, tariff legislation and further suits under the Sherman law continue as topics of interest in financial circles. Rates in the money market are practically unchanged. Quotations to-day were: Call, 2¼@2⅜ per cent; ninety days, 3@3½ per cent.

Other Markets

Traction shares have been the features of the Chicago market the present week and to-day Chicago Elevated Railways preferred sold at 94, a gain of one point. Other shares declined slightly. Trading was in moderate volume.

Nothing significant took place to-day on the Philadelphia Exchange. Yesterday's market was weak. Philadelphia Rapid Transit, Union Traction and Lehigh Valley Transit shares declined slightly.

Prices in Boston have been irregular and trading has been quiet. Copper shares declined to-day in sympathy with the drop in the price of the metal.

Aside from active trading in Seaboard Air Line, the Baltimore market has been very dull this week.

Quotations of traction and manufacturing securities as compared with last week follow:

	Nov. 8.	Nov. 15.
American Light & Traction Company (common)	a296	a295
American Light & Traction Company (preferred)	a107	a107
American Railways Company	a44	a45½
Aurora, Elgin & Chicago Railroad (common)	40	a40
Aurora, Elgin & Chicago Railroad (preferred)	a84½	83½
Boston Elevated Railway	a127½	a128½
Boston Suburban Electric Companies (common)	a15	a15
Boston Suburban Electric Companies (preferred)	a75	a75
Boston & Worcester Electric Companies (common)	a8	a13
Boston & Worcester Electric Companies (preferred)	a58	a58
Brooklyn Rapid Transit Company	77¼	77⅞
Brooklyn Rapid Transit Company, 1st ref. conv. 4s	84⅝	85½
Capital Traction Company, Washington	125	a127
Chicago City Railway	180	a180
Chicago & Oak Park Elevated Railroad (common)	3	3
Chicago & Oak Park Elevated Railroad (preferred)	5	5
Chicago Railways, ptcptg., ctf. 1	a98	a98
Chicago Railways, ptcptg., ctf. 2	a34	a33½
Chicago Railways, ptcptg., ctf. 3	a11	a11½
Chicago Railways, ptcptg., ctf. 4	a6¼	a7
Cincinnati Street Railway	129½	a131
Cleveland Railway	a104½	a103¼
Columbus Railway (common)	83	83
Consolidated Traction of New Jersey	a75½	a75½
Consolidated Traction of N. J., 5 per cent bonds	a104½	a104½
Dayton Street Railway (common)	a25	a25
Dayton Street Railway (preferred)	a101	a101
Detroit United Railway	a79	85
General Electric Company	153¾	152½
Georgia Railway & Electric Company (common)	a160	a159
Georgia Railway & Electric Company (preferred)	a93	a93
Interborough Metropolitan Company (common)	14¾	14¾
Interborough Metropolitan Company (preferred)	46	46
Interborough Metropolitan Company (4½s)	79⅜	79¼
Kansas City Railway & Light Company (common)	*16¼	*16¼
Kansas City Railway & Light Company (preferred)	a44	*44
Manhattan Railway	a140	a138
Massachusetts Electric Companies (common)	a22	a21¹
Massachusetts Electric Companies (preferred)	a94½	a94
Metropolitan West Side, Chicago (common)	*27	*27
Metropolitan West Side, Chicago (preferred)	*75	*75
Metropolitan Street Railway, New York	*8	*8
Milwaukee Electric Railway & Light (preferred)	*110	*110
North American Company	a73	a73
Northern Ohio Light & Traction Company	a57½	a57½
Northwestern Elevated Railroad (common)	*30	*30
Northwestern Elevated Railroad (preferred)	*70	*70
Philadelphia Company, Pittsburgh (common)	a53⅜	a53½
Philadelphia Company, Pittsburgh (preferred)	a43	43
Philadelphia Rapid Transit Company	a23⅜	a23
Philadelphia Traction Company	84¾	a84½
Public Service Corporation, 5% col. notes (1913)	*94	*94
Public Service Corporation, ctfs.	a110	a112
Seattle Electric Company (common)	a108	a108
Seattle Electric Company (preferred)	a101	a101½
South Side Elevated Railroad (Chicago)	*95⅞	a95¼
Third Avenue Railroad, New York	11	11½
Toledo Railway & Light Company	10	a7
Twin City Rapid Transit, Minneapolis (common)	a108	a106
Union Traction Company, Philadelphia	a51⅜	a51½
United Ry. & Electric Company (Baltimore)	18½	18½
United Rys. Inv. Co. (common)	35	35
United Rys. Inv. Co. (preferred)	60½	61½
Washington Ry. & Electric Company (common)	a43⅜	a44
Washington Ry. & Electric Company (preferred)	a90	a89½
West End Street Railway, Boston (common)	a88	a87
West End Street Railway, Boston (preferred)	a102	a103½
Westinghouse Elec. & Mfg. Co.	65	65
Westinghouse Elec. & Mfg. Co. (1st pref.)	a115	a118

a Asked. *Last sale.

ANNUAL REPORTS

Virginia Railway & Power Company

The statement of earnings and expenses of the Virginia Railway & Power Company, Richmond, Va., for the year ended June 30, 1911, as contained in the pamphlet report of the company follows:

Gross earnings		$2,244,589
Income from miscellaneous sources		46,296
		$2,290,885
Operating expenses (including taxes and depreciation)		1,284,980
		$1,005,905
Bond interest	$484,440	
Car trust interest	2,100	
Sinking fund contributions	10,625	
Other interest	490	
		497,655
Net income		$508,249
Less direct charges:		
Dividends on preferred stock	$228,652	
Discount on sale of preferred stock and bonds and premium on bonds purchased by trustees for sinking funds	48,665	
Miscellaneous	2,832	
	$280,149	
Credits:		
Adjustment of sinking fund instalments of underlying companies	$53,974	
Miscellaneous	5	
	$53,979	
		226,170
Surplus		$282,079

William Northrop, president, says in part in the report:

"On Feb. 20, 1911, all of the outstanding certificates of the Virginia Passenger Car Trust Association, aggregating $36,000, a lien upon twenty-two double-truck cars operated by this company, were purchased and the car trust agreement securing the same released of record, and the title to the said cars covered by this agreement passed to the company.

"On April 10, 1911, the company sold $2,600,000 par value of its first and refunding mortgage 5 per cent gold bonds. The proceeds of these bonds were used to reimburse the treasury of the company for expenditures previously made for additions to the property, the payment of liens and valid obligations as provided under the terms of the said mortgage and for the purpose of purchasing and retiring through the sinking funds of the Richmond Traction Company and Virginia Electrical Railway & Development Company mortgages all of the outstanding bonds secured by said mortgages.

"On May 8, 1911, the company purchased 3,291 2-3 shares of the capital stock of the Old Dominion Iron & Nail Works Company, of an issue of 3355 shares, of a par value of $100 each, at a cost of $219,000, for which this company paid $253,512.50 par value of its preferred treasury stock at 85, and the balance in cash. The Old Dominion Iron & Nail Works Company successfully operates extensive iron works upon Belle Isle, located in the James River opposite Richmond, appurtenant to which are very valuable water rights. It was deemed advisable to secure these water rights in order to give your company additional water-power so as to provide for the immediate and growing power requirements and to avoid impending litigation affecting your company's existing water rights. The purchase of the stock with preferred stock of this company was approved by the stockholders.

"On Oct. 3, 1910, Highland Park, Incorporated, a suburb of Richmond, offered for sale at public auction a thirty-year franchise granting to the successful bidder the privilege of conducting an electric light and power business, which franchise was acquired by this company. The business thus far secured is most gratifying, and it is believed will steadily increase.

"In July, 1910, one of the three Cockade Mills, in Petersburg, Va., owned by the company, was partially destroyed by fire. A satisfactory insurance adjustment was made and the property rebuilt. This was the only important fire which occurred during the year.

"The properties of the company have been maintained throughout the year at a high standard of efficiency.

"The wages of motormen and conductors were, on Jan. 1, 1911, increased from 16 2-3 cents minimum and 20 cents maximum to 18 cents minimum and 22 cents maximum per hour. The wages of transportation department employees were increased approximately 10 per cent, and an increase was also made to the light and power department employees.

"Owing to the many improvements to property during the year, the construction of fireproof buildings for housing cars and the remodeling of old buildings, the insurance premiums on the new schedule, which became effective July 1, 1911, decreased the total premium approximately 47 per cent.

"The fire insurance carried as of June 30, 1911, amounted to $1,862,425, and the annual premium thereon to $20,374, an average rate of $1.09 per $100. Under the new schedule the insurance in effect amounts to $1,946,270, and the annual premium thereon to $10,840, an average rate of 56 cents per $100.

"During the year $75,000 was charged against operating expenses for depreciation and cash to that amount set aside as a special deposit, making a total to the credit of this fund in cash as of June 30, 1911, of $125,000. The amount charged to operating expenses and set aside this year is an increase of $25,000 over the previous year. This depreciation fund is carried in the bank as a separate cash account, and charges against the same are made only with the approval of the board of directors or executive committee.

"On May 22, 1911, the board of directors entered into an agreement of merger and consolidation with the board of directors of the Norfolk & Portsmouth Traction Company whereby the Norfolk & Portsmouth Traction Company was merged with and into the Virginia Railway & Power Company, as provided by the laws of Virginia. This agreement was approved by the stockholders of this company at a special meeting held on June 24, 1911, and became effective, in accordance with its terms, on July 1, 1911."

Traffic statistics for the fiscal year ended June 30, 1911, compare as follows with traffic statistics for the year ended June 30, 1910:

	Year Ended June 30, 1910.	Year Ended June 30, 1911.
Revenue passengers	32,298,480	35,027,263
Transfers and passes	12,993,051	14,403,543
Total passengers	45,291,531	49,430,806
Percentage of passengers using transfers	28.22	28.77
Average fare per passenger, including transfers	.032	.031
Car mileage	6,827,159	7,010,151
Car hours	834,996	856,320
Passengers per day	124.086	135,427
Passenger receipts per car mile	21.0	22.2
Passenger receipts per car hour	$1.72	$1.82

Boston & Worcester Electric Companies

The statement of the Boston & Worcester Electric Companies for the year ended June 30, 1911, shows a total income of $20,239, consisting of interest on notes and other miscellaneous income. This compares with a total income of $60,210 in the year ended June 30, 1910, when a dividend payment of $30,375 was received on Boston & Worcester Street Railway shares owned. Disbursements in the fiscal year 1911 were as follows: Interest on $300,000 notes, $15,855; miscellaneous expenses, $1,829; total, $17,684. The disbursements were larger in the preceding year, including $33,936 paid as dividends on the preferred stock. The surplus for 1911 was $2,555. With a surplus of $6,214 carried forward and miscellaneous credits to surplus of $5,121 the total surplus as of July 1, 1911, was $13,890.

William M. Butler, the president, said in part in his statement to the shareholders:

"From the comparative operating statements of the street railway company, it appears that the gross earnings for the year have increased $45,436, a gain of about 8 per cent over the corresponding twelve months of the previous year. In this connection it should also be stated that the earnings per car hour on the main line increased from $7.12 to $8.26, and per car mile from 34 cents to 38½ cents, which results are most gratifying.

"As anticipated in the report of last year, the limited service between Boston and Worcester has continued to stimulate the through business, which has increased to the extent of 47,000 through passengers over the previous year.

"The expenses of transportation for the year were practically the same as the previous year. The expense of maintenance, however, shows an increase of something over $16,-

000. Most careful attention has been given to the maintenance of the property for the past year, and every effort is being made to keep the track and roadway in first-class condition, and the equipment in a high state of efficiency. The block signal system is being rapidly extended to all parts of the railway, thereby improving the service and eliminating the possibility of accidents.

"The street railway company, during the year, has continued the work of double tracking its main line, and during the month of August, 1911, has completed the laying of its double track, so that the company will hereafter obtain the advantages which a through line of double track should afford in operating convenience and economy of time. The work on the highways at Framingham, in connection with the last section of the double tracking, will be completed within the next sixty days. The expenditures incident to the building of this last portion of double track will complete the outlay for new track construction on the company's property.

"The street railway company during the year sold $307,200 of 6 per cent preferred stock to bankers; $297,000 of this preferred stock has been delivered and a major portion of the proceeds used to purchase at par $297,000 of common stock of the street railway company held and owned by the trust, thereby providing the trust with sufficient funds to retire the $300,000 three-year 6 per cent notes issued July 1, 1908, and maturing July 1, 1911, leaving the trust free from liabilities of every kind.

"The balance of $100,200 of preferred stock will be delivered to the bankers some time before Jan. 1, 1912, and the proceeds used to reimburse the treasury for expenditures for additional equipment and for the completion of the double tracking through the center of Framingham.

"The street railway company has no floating debt except $300,000 of notes payable, held by the trust, and has an ample supply of cash on hand for its requirements.

"At the regular June meeting of the trustees no action regarding a dividend was taken. While the surplus earnings had accumulated sufficiently so that a dividend could have been paid, it was the unanimous decision of the trustees that it was for the best interests of the property and of the shareholders to allow a further accumulation of surplus earnings before the resumption of dividends."

A statement of operations of the Boston & Worcester Street Railway for the years ended June 30, 1911, and June 30, 1910, shows the following:

Year ended June 30:	1911.	1910.
Revenue from transportation	$608,034	$563,694
Miscellaneous revenue	7,652	6,451
Total revenue	$615,686	$570,145
Expenses of operation:		
Conducting transportation	$175,637	$175,822
For maintenance	121,906	105,765
For general expense	58,312	51,725
Total expense of operation	$355,855	$333,312
Net revenue above operation	$259,831	$236,833
Interest on funded and floating debt and taxes	165,364	176,123
Net surplus for year	$94,467	$60,710
Dividends paid during year	0	30,375
Surplus for year after dividends	$94,467	$30,335

Action Postponed on Increase in Stock of Columbus Railway

On account of dissatisfaction with the report of the special committee appointed some time ago to investigate the relations between the Columbus Railway & Light Company and the Columbus (Ohio) Railway, action on the proposed increase of the capital stock of the Columbus Railway was postponed from Nov. 11, 1911, to Jan. 11, 1912, the date of the annual meeting of the companies. The committee and the directors of the Columbus Railway & Light Company reached an agreement on the report and recommendations previous to the meeting on Nov 11, but leading stockholders objected when the report and recommendations were read. They objected especially to the proposed assessment of $10 per share upon the stock of the Columbus Railway & Light Company.

Experts who examined the property reported that it was well maintained and operated, while the facilities for transportation were efficient in every way. Ernst & Ernst, accountants, reported that the records were complete and correct. There were differences of opinion, however, as to whether certain charges should have been made against the original or the leasing company.

The committee recommended an independent board of directors for the Columbus Railway to consist of nine members instead of five. Another recommendation provided that all disputes between the two companies should be settled by the boards elected for the companies at the annual meetings, and that the accounts should be audited every year. An auditor-engineer was suggested for the Columbus Railway to aid the directors in caring for its business.

An agreement to adjourn the meeting to Jan. 11, 1912, was reached on the understanding that the call for the meeting for Jan. 11, 1912, would include a statement that, in addition to voting to increase the capital stock of the company $3,000,000, the stockholders will also vote upon an increase of $1,000,000, as recommended by the committee.

Gross Earnings of Ohio Roads

According to the certification of the Ohio State Tax Commission to the state auditor, made on Nov. 11, 1911, the gross earnings of the street and interurban railways of Ohio for the year ended June 30, 1911, were increased $2,595,852 over the preceding year. For 1910 the gross earnings of the companies were $33,143,942, while for 1911 they were $35,739,794. The figures indicate that the people of Columbus were deprived of a reduction in fare as a result of the strike on the lines of the Columbus Railway & Light Company in the summer of 1910. The company is now selling seven tickets for a quarter and would have increased the number to eight had the gross earnings reached $1,750,000 for the year. In 1910 the earnings were $1,725,164. As a result of the strike, however, the earnings were only $1,511,879. The gross earnings of the Cleveland Railway for 1910 were $6,371,656, while in 1911 they were $6,341,963. The gross earnings for the year ended June 30, 1911, and June 30, 1910, of the principal companies in the State as certified to the state auditor by the tax commission follow:

	1910.	1911.
Cincinnati Traction Co.	$4,834,451	$5,045,387
City Railway, Dayton	593,871	650,934
Cleveland, Painesville & Eastern Railway	330,301	365,358
Cleveland, Painesville & Ashtabula Railroad	939,275	1,097,533
Columbus Railway & Light Co. (operating Columbus Traction Co.	232,976	211,083
Columbus Railway & Light Co. (operating Columbus Railway)	1,725,164	1,511,879
Cleveland & Eastern Traction Co.	265,214	184,782
Cleveland & Erie Railway	6,466	704
Cleveland, Youngstown & Eastern Railway	89,121	106,098
Cleveland Railway	6,371,636	6,341,963
Detroit, Monroe & Toledo Short Line Railway	14,376	16,687
Lake Erie, Bowling Green & Napoleon Railway	53,195	52,674
Lake Shore Electric Railway	944,134	1,074,535
Mansfield Railway, Light & Power Co.	204,214	223,360
Maumee Valley Railway & Light Co.	77,352	68,990
Ohio Traction Co.	203,080	1,129,582
Sandusky, Norwalk & Mansfield Electric Railway	75,645	76,362
Springfield & Xenia Railway	66,740	71,378
Springfield Railway	293,096	317,366
Stark Electric Railway	242,705	262,505
Springfield, Troy & Piqua Railway	101,874	109,112
Springfield & Washington Railway	17,729	23,299
Toledo, Fostoria & Findlay Railway	151,669	180,422
Toledo & Indiana Railway	198,986	207,808
Toledo, Ottawa Beach & Northern Railway	15,209	18,377
Toledo Railways & Light Co.	2,867,619	3,113,019
Toledo, Port Clinton & Lakeside Railway	182,112	217,209
Toledo, Bowling Green & Southern Traction Co.	324,808	342,389
Toledo & Western Railroad	58,818	105,323
Youngstown Park & Falls Street Railway	114,390	141,337

Purchase of Control of Green Bay Companies by Clement C. Smith Interests

The following official statement has been issued in regard to the purchase of a controlling interest in the Green Bay Traction Company, Green Bay Gas & Electric Company and the Northern Hydroelectric Power Company, Green Bay, Wis., by Clement C. Smith, president of the Eastern Wisconsin Railway & Light Company, Fond du Lac, Wis., and the Wisconsin Electric Railway, Oshkosh, Wis., and his associates:

"Negotiations which have been carried on between J. H. Emmert, Detroit, Mich., representing A. M. Murphy and Frank Murphy, Green Bay, and William H. Murphy and the Murphy estate, Detroit, Mich., who control the Green Bay Traction Company, the Green Bay Gas & Electric

Company and the Northern Hydroelectric Power Company, and Clement C. Smith, representing himself and Milwaukee capitalists, have resulted in a contract being signed by which the interests represented by Mr. Smith will acquire control of the three properties at Green Bay.

"The Green Bay Traction Company and the Northern Hydroelectric Power Company are to be consolidated under the name of the Wisconsin Public Service Company. Pending the carrying out of the contract providing for the reorganization of the companies and the various financial and legal matters which are involved the management of the properties has been turned over to Mr. Smith and his organization, and he took charge of the properties on Nov. 4, 1911. The general management of the companies will be directed through Mr. Smith's office in Milwaukee in connection with the Eastern Wisconsin Railway & Light Company, the Wisconsin Electric Railway, the Lee County Lighting Company, the Sterling, Dixon & Eastern Electric Railway and the Winona Railway & Light Company and all of the purchasing and accounting will be through this office, but there is no financial connection between the companies at Green Bay and any of the foregoing except through Mr. Smith's interest in the several companies.

"The Green Bay Traction Company operates the street railways in Green Bay, the interurban railway on the east side of the Fox River to Depere and the interurban railway on the west side of the river to Kaukauna, embracing in all about 43 miles of street and interurban railway. At Kaukauna the cars of the Green Bay Traction Company connect with those of the Wisconsin Traction, Light, Heat & Power Company operating to Neenah-Menasha, a distance of 15 miles. At Neenah the cars of the Wisconsin Traction Company connect with those of the Wisconsin Electric Railway and the Eastern Wisconsin Railway & Light Company running through from Neenah to Fond du Lac, a distance of 33 miles. There is at present no plan for through operation from Fond du Lac to Green Bay."

Bristol (Tenn.) Traction Company.—The Bristol Belt Line Railway, which as noted in the Electric Railway Journal of Oct. 7, 1911, page 678, filed with the Secretary of State of Tennessee an amendment to its charter changing the name to the Bristol Traction Company and increasing the capital stock from $100,000 to $300,000, has filed a mortgage to the United States Trust Company, Washington, D. C., as trustee, to secure an issue of $300,000 of 5 per cent bonds, dated Oct. 1, 1911, but callable at 105. The present issue of these bonds is $147,000. The company owns the former Bristol Belt Line and the entire capital stock of the Holston Valley Railway, running from Bristol to Big Creek Park, on the Holston River, and has 17 miles of line in operation and 3 miles of new track under construction.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y.—George Bullock, president of the Susquehanna Railway, Light & Power Company, New York, N. Y., has been appointed receiver of the Jamestown, Chautauqua & Lake Erie Railway, Jamestown & Chautauqua Railway and the Chautauqua Steamboat Company, which are included in the system of the Buffalo & Lake Erie Traction Company.

Carolina Power & Light Company, Raleigh, N. C.—Pingree, McKinney & Company, Boston, Mass., are offering for subscription at 92½ and interest a block of the first mortgage 5 per cent bonds of the Carolina Power & Light Company due on Aug. 1, 1938. The authorized issue of these bonds is $5,000,000 and the amount issued to date is $1,290,500.

Chicago (Ill.) City Railway.—The local transportation committee of the Chicago City Council has recommended that the Council pass the ordinance authorizing the Chicago City Railway to take over the property of the Chicago & Southern Traction Company. As stated in the Electric Railway Journal of July 1, 1911, page 63, the deal will be concluded on the basis of a valuation of the property of the company within the city made by Bion J. Arnold and George Weston.

Chicago & Oak Park Elevated Railroad, Chicago, Ill.—Samuel Insull, chairman of the board of directors of the Chicago Elevated Railways and president of the Commonwealth-Edison Company, Chicago, Ill., has been appointed receiver of the Chicago & Oak Park Elevated Railroad by Judge Kohlsaat, upon application of the Central Trust Company, New York, N. Y.

Elmira Water, Light & Railroad Company, Elmira, N. Y.—The Public Service Commission of the Second District of New York has authorized the Elmira Water, Light & Railroad Company to merge all the property, rights and franchises of the West Side Railroad, Elmira, and transfer all franchises held by the West Side Railroad to the Elmira Water, Light & Railroad Company, which is the owner of all the capital stock of the West Side Railroad and leases all the property of the West Side Railroad.

Grand Valley Railway, Brantford, Ont.—The General Accident, Fire & Light Assurance Company has applied for a receiver for the Grand Valley Railway.

Macon Railway & Light Company, Macon, Ga.—A. B. Leach & Company, New York, N. Y., have concluded negotiations for the purchase of practically all the common stock of the Macon Railway & Light Company and a majority of the stock of the Central Georgia Power Company, and are organizing the Georgia Light, Power & Railways Company as a holding company for the properties previously mentioned and a new gas company which has applied for a franchise in Macon.

Metropolitan Street Railway, New York, N. Y.—The Public Service Commission of the First District of New York has received a letter from Charles F. Mathewson, counsel for the joint committee of bondholders of the Metropolitan Street Railway, asking the commission not to render any decision as yet upon the plan of reorganization of the company. Mr. Mathewson said that the committee contemplates modifying its proposal as to the manner of financing the undertaking when the reorganization is authorized, but did not state the nature of the proposed modification.

Montreal (Que.) Street Railway.—The Public Utilities Commission of the Province of Quebec has granted the application of the Montreal Street Railway and other companies to merge under the title of the Montreal Tramways Company. The terms of this merger were published in the Electric Railway Journal of Oct. 28, 1911, page 964.

Philadelphia Company, Pittsburgh, Pa.—The Philadelphia stock exchange has listed $486,000 additional first mortgage and collateral trust 5 per cent gold bonds of the Philadelphia Company issued in exchange for $477,000 of the $500,000 of 6 per cent bonds of the Allegheny County Light Company, due Aug. 1, 1911, and $9,000 of bonds of the East End Electric Light Company, deposited with the trustee, making the total listed $5,986,000.

Rochester Railway & Light Company, Rochester, N. Y.—The Rochester Railway & Light Company has been authorized by the Public Service Commission of the Second District of New York to issue $1,998,000 of its 5 per cent gold mortgage bonds, dated July 1, 1904, and due July 1, 1954. The bonds are to be issued in exchange, par for par, for the 5 per cent bonds of the Rochester Gas & Electric Company, due Nov. 1, 1912.

Standard Gas & Electric Company, Chicago, Ill.—The Standard Gas & Electric Company, controlled by H. M. Byllesby & Company, has filed in Delaware a certificate of an increase in its authorized capital stock from $24,000,000 to $45,000,000. There was outstanding on April 1, 1911, $7,305,650 of common stock and $4,214,300 of preferred stock. In addition to the above increase in the company's capital stock a new mortgage has been created authorizing an issue of $30,000,000 convertible 6 per cent sinking fund gold bonds. It is dated Dec. 1, 1911, and runs to Dec. 1, 1926. The bonds are secured by bonds, stocks and notes of various public service corporations controlled and operated by H. M. Byllesby & Company. The Standard Gas & Electric Company controls through stock ownership a number of public service corporations. The proceeds of the sales of the first block of bonds, $7,500,000, just sold, are to be used to retire the $1,850,000 of 6 per cent notes and the $3,000,000 convertible 6 per cent bonds; $1,500,000 is to be used to retire purchase money obligations secured by the stock of certain of the company's Colorado properties; about $500,000 will be used to acquire $560,000 bonds

(pledged under this issue) from H. M. Byllesby & Company, leaving about $575,000 for use on extensions of the Colorado properties, of which $425,000 has been advanced and expended. The balance of the authorized issue of $30,000,000 is reserved to provide for 75 per cent of cost of purchases of bonds, stocks and other securities to be pledged in the future. A sinking fund beginning Dec. 1, 1913, provides for the retirement of $1,256,250 of this $7,500,000 issue before maturity; additional issues of bonds call for a proportionate increase in the amount of the sinking fund. The Philadelphia Trust, Safe Deposit & Insurance Company is trustee.

Winnipeg (Man.) Electric Railway.—A press dispatch from Winnipeg dated Nov. 13, 1911, stated that J. P. Morgan & Company, New York, N. Y., had arranged to finance the purchase of the Winnipeg Electric Railway on the basis of $300 a share. At the office of Morgan & Company in New York knowledge of the deal was denied.

Dividends Declared

Georgia Railway & Electric Company, Atlanta, Ga., quarterly, 2 per cent, common.

Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, ¾ of 1 per cent, common.

Pacific Gas & Electric Company, San Francisco, Cal., quarterly, 1½ per cent, preferred.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., quarterly ½ of 1 per cent, common.

MONTHLY ELECTRIC RAILWAY EARNINGS

AMERICAN RAILWAYS.

Period.		Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1 m., Sept.,	'11.....	$417,578	.....	.....	.....	.....
1 " "	'10.....	392,479	.....	.....	.....	.....
3 " "	'11.....	1,288,404	.....	.....	.....	.....
3 " "	'10.....	1,228,813	.....	.....	.....	.....

CLEVELAND, PAINESVILLE & EASTERN RAILROAD.

1 m., Sept.,	'11.....	$34,677	$19,535	$15,143	$8,641	$6,501
1 " "	'10.....	33,647	18,167	15,479	8,116	7,364
9 " "	'11.....	279,593	151,127	128,466	74,375	54,091
9 " "	'10.....	269,381	139,046	130,334	72,607	57,728

CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY.

1 m., Sept.,	'11.....	$107,762	$57,876	$49,886	$30,357	$19,529
1 " "	'10.....	103,188	56,525	46,662	29,794	16,868
9 " "	'11.....	852,136	476,708	375,428	270,793	104,636
9 " "	'10.....	791,460	458,061	333,399	268,145	65,254

DETROIT UNITED RAILWAY.

1 m., Sept.,	'11.....	$929,195	$595,253	$333,943	$177,196	$156,747
1 " "	'10.....	857,442	540,052	317,391	178,802	138,588
9 " "	'11.....	7,758,304	4,887,243	2,871,061	1,588,690	1,282,371
9 " "	'10.....	7,141,186	4,485,425	2,655,761	1,511,120	1,144,640

EAST ST. LOUIS & SUBURBAN RAILWAY.

1 m., Sept.,	'11.....	$197,030	$104,871	$92,159	.....	.....
1 " "	'10.....	211,249	101,989	109,260	.....	.....
9 " "	'11.....	1,677,850	900,994	776,857	.....	.....
9 " "	'10.....	1,756,762	926,751	830,010	.....	.....

ILLINOIS TRACTION SYSTEM.

1 m., Sept.,	'11.....	$598,350	$352,393	$245,957	.....	.....
1 " "	'10.....	529,291	300,989	228,302	.....	.....
9 " "	'11.....	5,019,711	3,083,494	1,936,217	.....	.....
9 " "	'10.....	4,292,662	257,081	1,722,521	.....	.....

LAKE SHORE ELECTRIC RAILWAY.

1 m., Sept.,	'11.....	$124,767	$62,609	$62,159	$34,713	$27,446
1 " "	'10.....	115,009	54,417	60,592	34,928	25,664
9 " "	'11.....	962,236	506,229	456,008	312,401	143,608
9 " "	'10.....	913,664	473,161	440,504	313,008	127,496

NORTHERN OHIO TRACTION & LIGHT COMPANY.

1 m., Sept.,	'11.....	$246,015	$128,812	$117,203	$44,321	$72,882
1 " "	'10.....	224,902	117,557	107,044	43,392	63,653
9 " "	'11.....	2,019,746	1,110,504	909,242	399,069	510,172
9 " "	'10.....	1,837,406	1,009,858	827,548	390,161	437,387

TOLEDO RAILWAYS & LIGHT COMPANY.

1 m., Sept.,	'11.....	$254,243	$152,914	$101,329	$84,173	$17,156
9 " "	'11.....	3,717,072	1,428,301	867,116	717,712	149,403

The Houston Electric Company, the Galveston-Houston Electric Railway and the Galveston Electric Company will issue a monthly magazine upon the opening of the interurban line between Houston and Galveston. This magazine will be devoted to general industrial and development matters in South Texas with the idea of making it a factor in the progress of the territory served by the companies.

Traffic and Transportation

Court Decision in New York Requiring Fare Reduction

As a result of the decision by the Appellate Division, Supreme Court of New York, Third Department, the Westchester Street Railroad, White Plains, N. Y., will be required to reduce its fare between Mamaroneck and White Plains from 10 cents to 5 cents. The decision of the Appellate Division affirmed a decision made by Justice Cochrane on an action by the Public Service Commission of the Second District to require the company to conform to the terms of franchises under which it was operating and to carry passengers for 5 cents.

The mortgage upon the property and franchises of the Tarrytown, White Plains & Mamaroneck Railway was foreclosed and the property sold in parcels. The Westchester Street Railway purchased the parcel extending from White Plains to Mamaroneck and immediately after it acquired possession of the property filed a tariff with the Public Service Commission increasing the fare from 5 cents to 10 cents.

The village of Mamaroneck applied to the commission for an order requiring the company to carry passengers for 5 cents. The commission, deeming itself without authority to make the order directed against the company, authorized its counsel to commence an action in the Supreme Court against the company to require it to conform to the terms of its franchises. Justice Cochrane found against the company, which appealed to the Appellate Division, where the appeal was argued in September last.

The Appellate Division has affirmed the order of the trial court with costs and given leave to the company to withdraw its demurrer upon payment of costs. The decision of the Appellate Division has finally disposed of the controversy unless the company takes the case to the Court of Appeals.

Suit to Prevent Seattle from Enforcing Recent Ticket Ordinance

The Seattle (Wash.) Electric Company has announced that it proposes to institute a suit to enjoin the city of Seattle from enforcing the ordinance passed recently by the City Council which requires the company to sell twenty-five tickets for $1 or six tickets for 25 cents on all its cars. As stated in the ELECTRIC RAILWAY JOURNAL of Nov. 4, 1911, page 1011, Mayor George W. Dilling of Seattle vetoed the original ordinance. The measure was subsequently passed over the veto. In a statement to the public Jacob Furth, president of the company, reviews briefly the history of the franchise under which the company operates. Referring to the negotiations with the City Council in regard to the question of fares when the ordinance under which the company now operates was before the Council, Mr. Furth says:

"Some members of the City Council desired to have a provision inserted in the franchise requiring commutation tickets to be sold on the cars which would entitle a passenger to twenty-five rides for $1. The applicants for the franchise stated that if such a provision were inserted, they would not bid for the franchise and would not accept it. The differences in reference to this matter were compromised by providing that the grantees of the franchise might establish a fare which should not exceed the sum of 5 cents, and should keep for sale for $1 each, at their main office and power stations within the city, commutation tickets entitling a purchaser to twenty-five rides, such commutation tickets not to be transferable or entitle the owner to a transfer. The franchise embodying these provisions was awarded to the highest bidders, and subsequently transferred to the Seattle Electric Company. For more than ten years the company has sold tickets in accordance with the plain language of its franchise. In 1911 a resolution was passed by the City Council designating approximately twelve additional places where the City Council desired tickets to be kept for sale, and requesting the superintendent of public utilities to get the company to establish such places. These places were located in vari-

ous sections of the city. The superintendent of public utilities requested the company to establish these places. The company acceded to the request, and there now exist in the city fifteen places where twenty-five tickets are sold for $1. After the company had established these places, the present ordinance was passed, over the protest of the company that it was a moral and legal violation of its contract with the city. The Mayor vetoed the bill, but the City Council passed it over the veto of the Mayor, and the bill has now become an ordinance, which will take effect on Nov. 29, 1911."

In concluding his statement Mr. Furth says:

"The ordinance if enforced will not only injure the company, but will cause inconvenience and delay to the traveling public. The pay-as-you-enter car is now extensively used in this city. The conductors upon these cars have already sufficient duties to perform. If in addition to their present duties they should be obliged to sell tickets during the rush hours to persons desiring to travel upon these cars, great delay would be caused in the operation of the cars and much inconvenience to the traveling public. On the other hand, persons desiring to purchase tickets can easily procure them at any one of the fifteen places now maintained by the company at various points in the city. The company does not feel that there is any reason for incommoding the public by the enforcement of this ordinance, or depriving the company of its contract rights, and it will therefore ask the judgment of the court in the controversy which has been forced upon it."

Report of Accidents on Electric Railways for Year

The Interstate Commerce Commission has issued Accident Bulletin No. 40, which contains a statement of collisions, derailments and other accidents to trains and casualties to persons from all causes on the railroads of the United States during the months of April, May and June, 1911, with tables for the year ended June 30, 1911, and tables showing the total number of employees in the service of the railroads on June 30, 1911. A summary of the accidents on electric railways engaged in interstate business and therefore reporting to this commission, for the year ended June 30, 1911, follows:

Causes.	Number of Accidents.	Passengers. Killed.	Passengers. Injured.	Employees on Duty. Killed.	Employees on Duty. Injured.	Employees Not on Duty. Killed.	Employees Not on Duty. Injured.	Other Persons Not Trespassing. Killed.	Other Persons Not Trespassing. Injured.	Trespassers. Killed.	Trespassers. Injured.	Total Persons. Killed.	Total Persons. Injured.
Collisions	176	74	984	12	85	..	5	..	1	..	..	86	1,075
Derailments	79	1	179	4	33	..	..	1	4	..	..	6	216
Accidents to trains, cars or engines, except derailments, collisions and boiler explosions	12	..	19	..	2	..	..	..	..	..	..	..	21
Bursting of or defects in locomotive boilers or boiler attachments	1	..	..	..	1	..	..	..	..	..	..	..	1
Total train accidents	268	75	1,182	16	121	..	5	1	5	..	..	92	1,313
Total other than train accidents	...	30	1,101	35	242	4	13	132	476	117	119	318	1,951
Total accidents exclusive of industrial accidents	...	105	2,283	51	363	4	18	133	481	117	119	410	3,264
Industrial accidents to employees[1]	...	...	....	10	399	..	..	..	..	..	..	10	399
Grand total	...	105	2,283	61	762	4	18	133	481	117	119	420	3,663

[1] "Industrial" accidents are those occurring to employees of the railroads on railroad premises in which no moving cars or engines are involved

The number of employees in the service of the reporting electric railways on June 30, 1911, as shown in the report of the commission, was as follows:

	Number of Persons.
1. Trainmen[1] (enginemen, firemen, conductors, brakemen, "trainmen," rear flagmen, train baggagemen)	20,541
2. Other persons employed on trains (dining-car employees, train porters, etc.)	84
3. Yardmen (all employees in yard train work and switching—enginemen, firemen, conductors, brakemen, foremen, droppers, fieldmen, etc)	946
4. Switch tenders, crossing tenders and watchmen	324
5. Bridgemen and trackmen	12,512
6. Others (station and miscellaneous employees, excluding all those officers, clerks, shopmen, indoor employees and others who ordinarily are engaged in work in which they are not liable to railroad accident)	4,727
7. Total	39,134
8. Employees excluded from item No. 6	12,453
9. Total persons employed by electric railways reporting June 30, 1911	51,587

[1] Includes motormen.

Compulsory Owl Service in San Francisco.—A bill has been passed to print by the Board of Supervisors of San Francisco requiring the United Railroads to operate cars on its Castro Street line between 2 a. m. and 6 a. m.

Freight Rights in Boston Desired by Boston Elevated Railway.—The Boston (Mass.) Elevated Railway has petitioned the Railroad Commission of Massachusetts for approval to become a common carrier of newspapers, baggage, express matter and freight in Boston. This petition was acted upon adversely by the City Council of Boston.

Argument Heard in Newark (N. J.) Transfer Case.—Argument was heard by the Supreme Court of New Jersey at Trenton on Nov. 8, 1911, on a writ of certiorari obtained by the Public Service Railway to review the action of the Board of Public Utility Commissioners of New Jersey regarding transfer privileges and rights in Newark.

Basis of Fare Reduction to Suburbs of Birmingham.—A. H. Ford, president of the Birmingham Railway, Light & Power Company, Birmingham, Ala., has submitted a proposal to the City Commissioners of Birmingham, Ala., to reduce the fare to Ensley from 10 cents to 5 cents; to lower the cost of arc lights to the municipality, and to lower the cost of illuminating current to private consumers, provided the city will enter into a contract with the company to furnish power for city lighting for ten years.

Testimony in Connecticut Fare Case.—The testimony has all been presented in the case before the Public Utilities Commission of Connecticut in regard to the application of residents of Manchester, Conn., for a reduction in fare from 15 cents to 10 cents over the line of the Connecticut Company between Hartford and Manchester, and an assignment has been made for Dec. 12, 1911, for presenting the arguments. A summary of the testimony presented before the commission in this case was published in the Electric Railway Journal of Nov. 11, 1911, page 1033.

Reduction in Train Service on the Long Island Railroad.—On Nov. 15, 1911, the Long Island Railroad reduced the train service over its lines. The company states: "The change is made necessary by delay in completing the improvements at Jamaica and the consequent continued operation of steam trains to and from Long Island City, together with the increased cost of operation to and from the Pennsylvania Railroad station and the very general increase of all expenses. The company has endeavored to have the change affect as little as possible the convenience of daily travelers. The deficit for the year is estimated at $630,000."

Report by Commission in Regard to Transfers in St. Louis.—The Public Service Commission of St. Louis, Mo., in its report to the House of Delegates on its investigation of the transfer system of the United Railways, St. Louis, will quote the language of the franchise of the Central Traction Company to show that the United Railways is required to give universal transfers. The report contains no recommendation regarding the enforcement of the law, but quotes the language of Section 5 of the franchise as follows: "Transfers must be given so as to transport passengers on one continuous fare from one point on the system to any other point on the system."

Hearing to Be Held in Regard to Improvements on Elevated Lines in New York.—The Public Service Commission of the First District of New York has decided to hold a

hearing on Nov. 23, 1911, to inquire whether the Interborough Rapid Transit Company should be ordered to equip the cars of the Manhattan Elevated Railway, which it operates, with centre side doors, larger platforms, wider gate openings and improved devices for operating gates and doors, wider end doors, improved couplings and draft rigging and improved braking apparatus. At the hearing the commission will also inquire whether the company should be ordered to change the location of switches and signals, to extend and widen the station platforms, to construct additional stairways, furnish additional station facilities and make such other improvements as may be necessary to increase the capacity and better the service. The hearing will be conducted before Commissioner Eustis.

Suggestion for Experimental Owl Service in Portland, Ore.—B. S. Josselyn, president of the Portland Railway, Light & Power Company, Portland, Ore., has issued a statement in part as follows in regard to the company establishing all-night service: "I am perfectly willing to make a trial of running each present last car one more round trip, which in most instances would extend the time of leaving for the last car to about 1.30, provided we are permitted to charge a 10-cent fare on this extra trip, in order that the small travel may compensate the extra expense. It may be that this addition to our present service would solve the problem, and, if so, the company is not averse to making a fair trial of the matter, say for thirty days, keeping a record of receipts and expenses so as to show the wisdom of giving the extra service."

Washington Suburban Fare Case Before the I. C. C.—Argument was heard by the Interstate Commerce Commission at Washington, D. C., on Nov. 11, 1911, in the case of the citizens of Somerset, Drummond and Friendship Heights, Md., against the Washington & Rockville Railway, the Georgetown & Tenleytown Railway and the Washington Railway & Electric Company, in which it is charged that the fare of 5 cents from Somerset to the district line and conversely is excessive. Counsel for the complainants contended that the jurisdiction of the commission was established by the fact that cars were run by the Washington & Rockville Railway past the district line without change of cars, conductors or motormen. Counsel for the companies contended that interstate commerce was not involved. No through tickets were sold from Washington to Somerset or any point in Maryland and the company had no knowledge of where a passenger was going when he boarded a car. There was a physical connection between the Georgetown line and the Rockville line at the district limits, but this did not establish interstate commerce and no division of charges by the two carriers was in effect. The defendant companies were separate and distinct corporations, notwithstanding that the stock of one was controlled by another.

Answer Filed in Wilmington Ticket Suit.—The Public Utility Commission of Delaware has filed with the United States Circuit Court in Wilmington, Del., the affidavits answering the bill in equity sought by the Wilmington & Philadelphia Traction Company to restrain the commission from enforcing its order directing the company to restore the sale of tickets at the rate of six for a quarter. Henry M. Taylor, of the commission, avers that the company was given full opportunity to put in any evidence it desired, and that at no time while the commission was in session did the company make any objection to the order to restore strip tickets on the ground that the board had not made an investigation to determine whether the rate of fare was a reasonable one. H. B. Bothum, secretary of the commission, filed a statement dealing with the proceedings before the commission. S. S. Hoff, formerly general manager of the Wilmington City Railway, testified in regard to the earnings while he was connected with it, and expressed the opinion that if $250,000 was expended on the property for improvements the sum of $50,000 put aside each year as a reserve fund would be sufficient to maintain the property. The company was given until Nov. 13, 1911, in which to file its answer in rebuttal. A summary of the original affidavits filed by the company in support of its bill was published in the ELECTRIC RAILWAY JOURNAL of Nov. 4, 1911, page 1006.

Personal Mention

Mr. C. E. Moore has resigned as superintendent of transportation of the Springfield (Ill.) Consolidated Railway to become connected with the Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.

Mr. H. C. Bixler, formerly trainmaster of the New York terminal division of the Pennsylvania Railroad, has been appointed assistant superintendent of the Philadelphia terminal division, in charge of the passenger service in and out of Philadelphia.

Mr. Charles D. Kelso has resigned as counsel for the Louisville & Southern Indiana Traction Company and Louisville & Northern Railway & Lighting Company, New Albany, Ind., and as a director of the Louisville & Northern Railway & Lighting Company to engage in private practice.

Mr. B. Collette, who has been trainmaster of the Muncie & Portland Traction Company, Portland, Ind., for more than two years, has resigned, effective on Dec. 1, 1911. Mr. Collette has been in the employ of the Muncie & Portland Traction Company since the road was placed in operation in June, 1906.

Mr. James D. Welch, formerly master mechanic of the Des Moines City Railway and the Inter Urban Railway, Des Moines, Ia., has been appointed master mechanic of the Fort Dodge, Des Moines & Southern Railroad, Boone, Ia., in charge of the passenger and freight equipment of the road, which is now operated by 1200-volt current.

Mr. J. F. Deems has resigned as general superintendent of motive power, rolling stock and machinery of the New York Central lines. In that capacity Mr. Deems has served as a member of the electric traction commission of the New York Central & Hudson River Railroad, advising on the electric locomotive and motor car equipment. He was president of the New York Railroad Club in 1908.

Mr. Henry W. Thornton, assistant general superintendent of the Long Island Railroad, New York, N. Y., and president of the Northwestern Railways, Meadville, Pa., has been appointed superintendent of the Long Island Railroad to succeed Mr. J. A. McCrea, who has been appointed general manager of the company. A biography of Mr. Thornton was published in the ELECTRIC RAILWAY JOURNAL of March 18, 1911.

Mr. C. A. Alderman has resigned as chief engineer of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., to become assistant chief engineer of the Wyandotte Construction Company, Kansas City, Mo., which is building the Kansas City, Clay County & St. Joseph Railway. The new road will consist of 53 miles of line between Kansas City and St. Joseph and 32 miles of line between Kansas City and Excelsior Springs.

Mr. George Kuemmerlein, who has been in charge of the Racine lines of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., as superintendent, has resigned. Before becoming connected with the Racine lines Mr. Kuemmerlein served the company in Milwaukee more than twenty years. Mr. George Kuemmerlein, Jr., one of Mr. Kuemmerlein's sons, is superintendent of transportation of all the lines of the Milwaukee Electric Railway & Light Company.

Gen. George H. Harries, who resigned recently as vice-president and general manager of the Washington Railway & Electric Company, Washington, D. C., to become connected with H. M. Byllesby & Company, Chicago, Ill., was presented on Nov. 11, 1911, with a set of handsomely engrossed resolutions adopted by the board of managers of the Washington Railway Relief Association, and with a traveling bag, containing a silver-mounted toilet set purchased by subscriptions from 1100 members of the organization.

Mr. Thomas K. Bell has resigned as assistant engineer of way of the Philadelphia (Pa.) Rapid Transit Company. With this company Mr. Bell had charge of all the special work. Mr. Bell was chief engineer of William Wharton, Jr., & Company, Inc., Philadelphia, for a long time, but re-

signed from that company in September, 1906, to accept the position of chief engineer of the Interstate Railways, with which he was associated until July, 1910, when he formed his connection with the Philadelphia Rapid Transit Company.

Mr. Wm. E. Thompson has been appointed superintendent of transportation of the Coney Island & Brooklyn Railroad, Brooklyn, N. Y., to succeed Mr. D. W. Sullivan, who has been appointed land agent of the company. Before becoming connected with the Coney Island & Brooklyn Railroad in 1908 as chief inspector Mr. Thompson filled the positions of inspector and later division superintendent of the Virginia Railway & Power Company, Richmond, Va. During the recent labor troubles of the Coney Island & Brooklyn Railroad he was acting superintendent of transportation of the company.

Mr. Morgan Jones was appointed division superintendent of the Indianapolis, Logansport and Peru lines of the Indiana Union Traction Company, with headquarters at Tipton, Ind., on Nov. 10, 1911. Mr. Jones entered the employ of the Indiana Union Traction Company in February, 1905, as night agent at Anderson. In April, 1905, he was promoted to the position of day ticket agent and in September, 1905, he was advanced to train despatcher. On Oct. 1, 1909, Mr. Jones was made chief train despatcher. He held this position until Jan. 23, 1910, when he was promoted to the office of superintendent of the Anderson division. Mr. Jones relinquished the last mentioned position on June 17, 1910, to become chief clerk to Mr. Charles A. Baldwin, superintendent of transportation, which position he held until his recent appointment as superintendent of the Indianapolis, Logansport and Peru lines of the company.

Mr. F. W. Finlayson has been appointed superintendent of power stations of the Worcester (Mass.) Consolidated Street Railway to succeed Mr. George W. Dunlap, whose appointment to the Public Service Commission of the First District of New York was noted in the Electric Railway Journal of Oct. 21, 1911. Mr. Finlayson entered the engineering field as an apprentice machinist with Geo. Lawley & Sons, Inc., operating marine engine shops. Subsequently he became connected with the erecting department of the B. F. Sturtevant Company, Boston, Mass. Later he served successively as engineer with the Newton & Boston Street Railway, the Worcester Consolidated Street Railway, the Western Pennsylvania Railway and the South Terminal Company, Boston. He returned to the employ of the Worcester Consolidated Street Railway as chief engineer of the Fremont Street power plant in 1906, and has remained with the company in that capacity since that time.

Mr. James A. McCrea has been appointed general manager of the Long Island Railroad, a position which Mr. Ralph Peters, president of the Long Island Railroad, has held for a number of years in addition to the office of president. Mr. McCrea entered the service of the Pennsylvania Railroad in November, 1895, as a rodman with the engineering corps of the chief engineer of the Lines West at Pittsburgh, Pa. He was with the maintenance-of-way corps of the Cincinnati and Pittsburgh division from December, 1896, to May, 1897, and the maintenance-of-way corps of the Philadelphia division from May, 1897, to May, 1898. He was assistant engineer of the Eastern division from May, 1898, to August, 1899, and engineer of the Eastern division from August, 1899, to June, 1901. From June 1901, to January, 1906, he was superintendent of the Cincinnati division of the Pennsylvania Railroad. Since January, 1906, he has been general superintendent of the Long Island Railroad. Mr. McCrea is a son of President McCrea of the Pennsylvania Railroad.

Mr. E. M. Haas, superintendent of bridges and buildings of the Illinois Traction System, has become connected with the editorial department of the Electric Railway Journal and will have headquarters at the Chicago office in the Old Colony Building. Mr. Haas has recently been engaged in the construction of the Morris-Joliet extension of the Illinois Valley Railway. He is a graduate of Purdue. Previous to his college course and during vacations Mr. Haas served on the engineering corps of the Baltimore & Ohio Railroad, the Chesapeake & Ohio Railroad and the Cincinnati, Hamilton & Dayton Railroad. After graduation he was resident engineer for the Chicago & Eastern Illinois Railway on the construction of a 6000-car capacity freight classification yard at Dalton, Ill. Mr. Haas was appointed assistant engineer maintenance of way of the Illinois Traction System in 1906, and has since been engaged in maintenance and construction work. In 1907 his title with the Illinois Traction System was changed to superintendent of bridges and buildings.

Mr. Joseph O'Hara, general manager of the Chicago, Aurora & DeKalb Railway, Aurora, Ill., has been appointed superintendent of the railway department of the Springfield (Ill.) Consolidated Railway, effective on Dec. 1, 1911. Before becoming connected with the Chicago, Aurora & DeKalb Railroad, Mr. O'Hara was superintendent of the Illinois Valley Railroad, La Salle, Ill. He served in various capacities with the Grand Rapids (Mich.) Railroad for five years and was previously connected with the Père Marquette Railroad for two years and as superintendent of the Eastern Ohio Traction Company, Cleveland, Ohio, for four years. Mr. O'Hara also was superintendent of transportation of the Aurora, Elgin & Chicago Railroad, Chicago, Ill., from August, 1903, to October, 1907, when he resigned to become superintendent of transportation of the Washington, Baltimore & Annapolis Electric Railway, Washington, D. C. He resigned from the Washington, Baltimore & Annapolis Electric Railway on June 1, 1908, to become connected with the Illinois Valley Railroad.

Mr. George W. Burton, general attorney of the Illinois Traction System, Peoria, Ill., will take up general legal practice on Jan. 1, 1912, and will probably locate at Springfield, Ill. Mr. Burton has been associated with the Illinois Traction System for about seven years. During the first four years he was record and claim attorney and three years ago was made general counsel. No successor to Mr. Burton with the Illinois Traction System has been engaged, but it has been announced that after Jan. 1 personal injury claim work will be in charge of Mr. S. W. Reynolds, Springfield, Ill., who is now freight claim adjuster of the system. Mr. Reynolds will be assisted by Attorney H. C. Dillon of the company's legal department, who is now located at Springfield. The claim record department will be transferred from Peoria to Champaign, where it will be under the direction of Mr. George M. Mattis, vice-president and treasurer of the Illinois Traction System, who also supervises the work of the land department, which has headquarters at Champaign.

Mr. Howard E. Greims has resigned as traveling auditor of the Mohawk Valley Company and the New York State Railways and has opened an office in New York as an independent accountant, making a specialty of examinations of public utilities and audits and investigations of public service properties. Mr. Greims entered business with the United Gas Improvement Company in Philadelphia in 1897 and from 1897 to 1899 he had charge of the records of the money spent on improvements by the United Gas Improvement Company in Philadelphia in accordance with a contract between the company and the city. From May, 1899, to September, 1900, he was connected with the Hawaiian Electric Company. In October, 1900, he returned to the United States and was connected with the Westchester Lighting Company, Mount Vernon, N. Y., until November, 1901, as clerk at its gas works. From November, 1901, to May, 1902, Mr. Greims was storekeeper and assistant foreman at the twenty-fifth ward gas works of the United Gas Improvement Company, Philadelphia. From June, 1902, to June, 1905, he acted as general bookkeeper for the Rhode Island Company, the Rhode Island Suburban Railway and the Interstate Consolidated Street Railway, all controlled by the United Gas Improvement Company. In June, 1905, he became connected with Ford, Bacon & Davis, as traveling auditor and continued in that capacity until June, 1907. From July, 1907, to January, 1908, he represented Brown Brothers & Company, Philadelphia, Pa., at York, and merged the accounts of twenty-two companies into the York Railways and two lighting companies into the Edison Electric Light Company of York. From January, 1908, to March, 1908, Mr. Greims represented Lybrandt, Ross Brothers & Montgomery, New York, N. Y., certified public accountants. He resigned from this company to become associated with the Mohawk Valley Company and the New York State Railways.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***San Francisco Transit Company, San Francisco, Cal.**—Application for a charter has been made in California by this company to build an electric railway in San Francisco. Capital stock, $1,000,000. Incorporators: D. S. Hyde and William McPherson, San Francisco; R. J. Graham, J. Early Craig and L. H. Sage, Oakland.

***Ferdinand (Ind.) Railroad.**—Incorporated in Indiana to build an electric railway from Huntingburg to Ferdinand. Capital stock, $60,000. Directors: Henry Beckman, J. H. Beekman, J. A. Soudermann and Mathias Olinger, Jr.

Laurel Electric Light & Power Company, Laurel, Miss.—Chartered in Mississippi to build an electric railway and power plant in Laurel. Capital stock, $75,000. Incorporators: P. H. Saunders, Herbert Lampe and S. M. Jones. [E. R. J., Nov. 4, '11.]

***Portland & Troutdale Electric Company, Portland, Ore.**—Application for a charter has been made in Oregon by this company to build an electric railway between Portland and Troutdale, via Sandy Road. Capital stock, $25,000. Incorporators: E. L. Thompson, C. C. Craig and Robert Tucker.

Belle Fourche & Spearfish Electric Railway, Belle Fourche, S. D.—Application for a charter has been made in South Dakota by this company to build a 12-mile electric railway from Belle Fourche to Spearfish. Capital stock, $5,000. Incorporators: A. A. Moodie, Bruce Sebastian, Fred E. Harris and F. E. Duba. [E. R. J., Dec. 10, '10.]

***Oregon Southern Railway, Seattle, Wash.**—Application for a charter has been made in Washington by this company to build a 175-mile electric railway from Ashland, Ore., to Port Orchard via Medford, Jacksonville, Grant's Pass and Eugene. Headquarters, Seattle. Capital stock, $2,000,000. Incorporators: J. Arnold Doyle, H. M. Farren, Boise, Idaho, and Charles Radebaugh, Corning, Cal.

FRANCHISES

***Ragland, Ala.**—Frank M. Morris has received an electric railway franchise from the Board of Aldermen in Ragland.

Phoenix, Ariz.—The Salt River Valley Electric Railway has received a 25-year franchise from the City Council in Phoenix. This 60-mile line will connect Phoenix, Scottsdale, Tempe, Mesa, Chandler, Alhambra, Glendale and Peoria. F. M. Winter, Phoenix, president. [E. R. J., Oct. 14, '11.]

Alviso, Cal.—The San José Railway has received a franchise from the Town Trustees over the two principal streets in Alviso. Work will be begun at once by this company on its 12-mile extension from San José to Alviso.

Riverside, Cal.—The City Council has accepted the offer of $25,000 by the Pacific Electric Railway for a franchise to double track Magnolia Avenue between Arlington Avenue and Main Street in Riverside. The company has asked the City Council in Los Angeles for a franchise to construct 1 mile of track on San Pedro Street, Los Angeles, to relieve the congested traffic on Main Street.

Waterbury, Conn.—The Connecticut Company has asked the Board of Public Works for a franchise to build from the plant of the Chase Rolling Mill Company to a connection of the New York, New Haven & Hartford Railroad at Waterville.

Rome, Ga.—The Chattanooga Traction Company has asked the City Council for a franchise in Rome. C. E. James is interested. [E. R. J., Nov. 4, '11.]

Chicago, Ill.—The Chicago City Railway has asked the City Council for a franchise to double track and extend several of its lines in Chicago.

South Bend, Ind.—The Chicago, South Bend & Northern Indiana Railway has asked the City Board of Public Works for a franchise to double track its line along Mishawaka Avenue in South Bend.

Northampton, Mass.—The Northampton Street Railway has received a franchise from the Board of Aldermen to extend its lines in Northampton.

***Austin, Minn.**—L. French and associates have asked the City Council for a 25-year franchise for an electric railway in Austin.

Nashua, N. H.—The Nashua Street Railway has received permission from the Public Service Commission for an extension on Lake Street, in Nashua.

Gates, N. Y.—The New York State Railways has asked the Town Board for a franchise in Gates.

Manheim, N. Y.—The Little Falls & Johnstown Electric Railway, Little Falls, has asked the Town Board for a franchise in Manheim. It will connect Little Falls, St. Johnsville, Ephratah and Johnstown. J. L. Hess, 103 Park Avenue, New York City, president. [E. R. J., Aug. 26, '11.]

Steubenville, Ohio.—The Steubenville & East Liverpool Railway & Light Company has received a one-year extension of time for the construction of additional track on Stanton Boulevard in Steubenville.

Grants Pass, Ore.—The Grants Pass & Rogue River Railroad will ask the City Council for a franchise in Grants Pass. This is part of a plan to build a 30-mile electric railway to connect Grants Pass, Medford and Ashland. Messrs. Doyle and Farren are the promoters. [E. R. J., June 24, '11.]

Saltsburg, Pa.—The West Penn Railways has received a franchise from the City Council in Saltsburg.

South Williamsport, Pa.—The South Side Passenger Railway has received a franchise from the City Council to extend its lines in South Williamsport to the city limits on the west.

Montreal, Que.—The Montreal Street Railway will ask the Council for a franchise on Dorchester Street and on Sherbrooke Street in Montreal.

***Morristown, Tenn.**—John Wooten, Fernwood, has asked the City Council for a franchise in Morristown. This is part of a plan to build an electric railway from Cumberland Street in Morristown to Fernwood, a distance of 4 miles.

Dallas, Tex.—The Texas Traction Company has received permission from the municipal commissioners to double track its lines on Cole Avenue from Haskell to Olive, and on Forest Avenue from Atlanta to Arza in Dallas.

Polytechnic, Tex.—The Northern Texas Traction Company, Ft. Worth, has received a franchise from the Board of Commissioners for an extension of its Polytechnic line for about 1 mile.

Richmond, Va.—The Richmond & Henrico Railway has asked the Council for a franchise to extend its lines into the western part of Richmond.

TRACK AND ROADWAY

Jonesboro & Nettleton Interurban Railroad, Jonesboro, Ark.—This company has awarded a contract to Hemingway & Company to construct its 5-mile line between Jonesboro and Nettleton. J. E. Thompson, Jonesboro, vice-president. [E. R. J., Nov. 11, '11.]

Texarkana Gas & Electric Company, Texarkana, Ark.—A bonus of $5,000 has been secured by this company to build an extension to Westmoreland Heights from its present terminus in Rose Hill on Seventh Street.

San Joaquin Light & Power Company, Bakersfield, Cal.—It is stated that this company will double-track its lines in Bakersfield.

Pacific Electric Railway, Los Angeles, Cal.—This company will build an extension in the northwest section of San Bernardino on F Street to Seventh Street and west on Seventh Street to Mt. Vernon and to the city limits. Work has been begun by this company on its extension from Arlington to a point near the city limits to the southward. This extension is said to be part of a plan to connect Riverside with Los Angeles.

Oakland (Cal.) Traction Company.—Plans have been completed by this company for an extension of its Oakland Avenue line over Forty-first Street westerly to the western waterfront in Oakland.

Los Angeles & Redondo Railway, Redondo Beach, Cal.—This company, now controlled by the Pacific Electric Railway, ceased operation on Nov. 12 as a narrow-gage line.

and will operate by way of the Watts cut-off over the four-track Pacific Electric Railway tracks to the company's station at Sixth and Main Streets in Los Angeles. The work of building the cut-off from Homeward to Watts and the standardization of the narrow-gage line to Redondo Beach have just been completed.

Stockton (Cal.) Electric Railway.—This company is negotating to extend its line from Stockton to Fair Oaks.

Bridgeport & Danbury Electric Railway, Bridgeport, Conn.—Work has been begun by this company on North Main Street in Bridgeport. This line will connect Bridgeport, Trumbull, Monroe, Newton, Bethel, Stepney and Danbury. [E. R. J., July 1, '11.]

Tampa (Fla.) Electric Company.—This company is said to be considering plans to construct a new line to the new Union Station.

Augusta-Aiken Railway & Electric Company, Augusta, Ga.—Work has been begun by this company on its extension from Broad Street out Center Street to Taylor Street and down Taylor to Lincoln Street, where it will connect with the main line tracks in Augusta.

Chicago (Ill.) Railways.—This company has placed in operation its new line from North Avenue to Elston Avenue on Fortieth Street in Chicago.

Peoria (Ill.) Railway Terminal Company.—Work has been begun by this company on its 1-mile section of double track on Adams Street in Averyville.

Anderson, Ind.—Wallace B. Campbell, Anderson, has revived the project to build an interurban railway from Anderson to Lebanon, via Noblesville and thence to Crawfordsville. [E. R. J., Nov. 27, '09.]

***Aurora, Ind.**—Raymond Zeitler, representing Chicago and New York capitalists, plans to construct an electric railway between Aurora and Rising Sun, a distance of 9 miles. The plan is ultimately to build this line to Cincinnati and in the other direction to Louisville.

Evansville, Chrisney & Eastern Railway, Evansville, Ind.—This company has contracted for the final survey for its proposed route between Boonville, Chrisney and Lynnville. [E. R. J., Nov. 4, '11.]

Iowa City (Ia.) Electric Railway.—Work has been begun by this company on its Dodge Street extension to the Prairie du Chien Road.

Kansas City & Ft. Scott Electric Railway, Topeka, Kan.—At a recent meeting plans were considered by this company to secure the right-of-way for its proposed railway to connect Rosedale and Ft. Scott via Stanley, Prescott, Fulton, Louisburg and Pleasanton. The following officers were elected: J. Frank Smith, president; D. A. N. Chase, secretary, and A. M. Kent, treasurer and vice-president. [E. R. J., Nov. 4, '11.]

Brandon, Man.—By a vote of two to one the ratepayers of Brandon have defeated the plan for a municipal street railway and voted to give the franchise to a private company of St. Paul and Chicago capitalists. [E. R. J., April 1, '11.]

Portland (Maine) Railroad.—This company has placed in operation its new Forest Avenue line from Monument Square in Portland to Morrills.

East Taunton (Mass.) Street Railway.—Plans to build an electric railway from Middleboro through Plympton to Kingston, where it will connect with a line from Plymouth to Brockton and Whitman, are being considered by this company.

Eastern New York Railroad, Ballston Spa, N. Y.—During the next four weeks this company will award contracts for the construction of a 24-ft. span bridge.

New York, N. Y.—The Public Service Commission of the First District has ordered that bids be advertised for the construction of section 9 of the Lexington Avenue subway to be opened on Dec. 5, because when bids were opened on Oct. 27, 1910, only one proposal was received, that from the Bradley Contracting Company, for $3,253,072.

Staten Island Midland Railway, New York City, N. Y.—This company has obtained an extension of time for three years within which to complete construction across Richmond Terrace in Richmond, Staten Island.

***Toxaway, N. C.**—E. H. Jennings, it is reported, plans to build an electric railway to connect Toxaway, Fairfield and Sapphire.

Springfield & Xenia Railway, Springfield, Ohio.—This company plans to build an extension from Xenia to Washington C. H., via Jamestown and either through Octa, Edgefield and Milledgeville or paralleling the Jamestown pike from Jamestown.

Toledo & Indiana Traction Company, Toledo, Ohio.—This company plans to extend its line from Bryan, Ohio, to Angola, the eastern terminus of the Bucklen line. With the completion of these lines, it will be possible to establish a through route between Buffalo and Chicago.

Massillon, Wooster & Mansfield Railway, Wooster, Ohio.—W. E. N. Hemperly at a recent meeting of the Board of Trade at Massillon stated that interest has again been revived in the proposed electric railway to connect Massillon, Wooster, Turkeyfoot Lake and Mansfield. Much of the right-of-way has been secured. [E. R. J., Jan. 8, '08.]

El Reno (Okla.) Interurban Railway.—Grading has been completed and two miles of track have been laid by this company on its 12-mile extension between Yukon and El Reno. The work is being done for the Interurban Construction Company, Oklahoma City, by J. G. White & Company, Inc., New York, N. Y.

Sapulpa & Interurban Railway, Sapulpa, Okla.—Extensions are being contemplated by this company east to Tulsa and south to Okmulgee.

***Lindsay, Ont.**—Surveys are being made for an electric railway between Port Hope, Peterboro, Omemee, Lindsay and Orillia. It is proposed to connect the line at Port Hope with a line from Montreal to Toronto. It is planned to obtain power from Niagara Falls. It is reported that the Canadian Northern Railway is back of the project.

Oregon Electric Railway, Portland, Ore.—Plans are being considered by this company to build an extension to McMinnville, via Newberg.

Erie (Pa.) Traction Company.—This company is considering plans to build a more direct line between Meadville, Cambridge Springs and Erie. It is planned to enter Meadville over the tracks of the Northwestern Pennsylvania Railway. The company proposes to begin construction from Siverling's Corners, near Cambridge Springs, thus connecting with the Erie and Edinboro line and cutting off several miles from the present distance by railway between Meadville and Erie.

Southern Cambria Railway, Johnstown, Pa.—As soon as this company completes its extension from Johnstown to Ebensburg it will construct a line to Colver and Carrolltown, a distance of nearly 10 miles. This will be built to connect with the lines of the Northern Cambria Railway at Carrolltown.

Montreal & Southern Counties Railway, Montreal, Que.—Work is progressing rapidly on this company's extension from McGill Street, Montreal, to Richelieu, 14 miles from St. Lambert. Preparations are also being made to construct further lines to Waterloo, 69 miles from St. Lambert, during 1912.

Greenville, Spartanburg & Anderson Railway, Greenville, S. C.—This company has awarded the contract for the concrete work on the main line entering Anderson and on the line between the Riverside-Toxaway and Orr Mills to Nealon & Kline, Middletown, Ohio. The contract to grade the line and lay the ties and rails of these divisions will be awarded soon.

Sioux Falls & Southern Minnesota Traction Company, Pierre, S. D.—Right-of-way is said to have been purchased by this company between Sioux Falls, S. D., and Albert Lea, Minn., a distance of 200 miles. G. P. Peterson, Pierre, S. D., is interested. [E. R. J., Nov. 11, '11.]

Nashville (Tenn.) Interurban Railway.—The extension of this company's Main Street line in Nashville has been completed a distance of 2 miles from the former terminus of the line.

***El Paso, Tex.**—The project of constructing an electric railway from the site of the Elephant Butte dam in New Mexico down the valley of the Rio Grande River, passing through El Paso and terminating about 50 miles from El

Paso, has been revived by a syndicate of Eastern men, represented by J. L. Howard, Boston, Mass. It is reported that formal application will soon be made to the County Commissioners' court and to the City Council of El Paso for the necessary franchises for the proposed line. The Stone & Webster Engineering Corporation, Boston, is said to be back of the project.

Ft. Worth (Tex.) Southern Traction Company.—This company has awarded the contract to the Texas Building Company, Ft. Worth, for the grading work for its line between Ft. Worth and Cleburne. Work has been begun. C. H. Clifford is interested. [E. R. J., Oct. 14, '11.]

***San Antonio, Tex.**—It is reported that Stone & Webster, Boston, Mass., are interested in a plan to build an 81-mile electric interurban railway to connect Austin and San Antonio, via San Marcos, New Braunfels, Kyle, Buda, Hunter and Manchaca.

Southwestern Traction Company, Temple, Tex.—This company has placed in operation its extension in South Temple from Seventh Street and Avenue H to Avenue K south and then west to Twenty-ninth Street.

Tioga (Tex.) Traction Company.—This company has been organized to construct an interurban electric railway between Tioga and Gainesville via McKinney, a distance of about 50 miles. Among those interested are J. P. Mason and Matt Bradley, Tioga. [E. R. J., Sept. 30, '11.]

Charlottesville & Albemarle Railway, Charlottesville, Va.—This company will soon build about ½ mile of new track in Charlottesville.

***Richmond, Va.**—S. W. Burt plans to build an electric railway from Richmond to Norfolk via Surry and Prince George counties.

Virginia Railway & Power Company, Richmond, Va.—Plans are being considered by this company to build an extension out Halifax Street to Hawk Street in Richmond, and the extension of the Sycamore Street line to the new viaduct of the Walnut Hill Corporation. Initial steps have been taken by the company to double-track the entire Port Norfolk & Pinner's Point division.

Parkersburg & Ohio Valley Electric Railway, Parkersburg, W. Va.—This company placed in operation on October 14 its line between Sistersville and Friendly.

Sheridan Railway & Light Company, Sheridan, Wyo.—An extension will be built by this company to the Dietz coal camp, a distance of .4 miles.

SHOPS AND BUILDINGS

Northern Electric Railway, Chico, Cal.—Plans are being made by this company to build a new passenger station at Oreville. The estimated cost is $12,000.

Modesto & Empire Traction Company, Modesto, Cal.—Work has been begun by this company on its new depot in Modesto. The ticket office and waiting room will occupy the north end of the building and the freight department the south end. The structure will be 64 ft. x 32 ft. [E. R. J., Oct. 28, '11.]

Washington Railway & Electric Company, Washington, D. C.—This company has awarded a contract for the reconstruction of its carhouse at Water Street and P Street Southwest to James L. Parsons, Washington.

Tampa (Fla.) Electric Company.—This company has nearly completed its carhouse in Tampa.

Aurora, Elgin & Chicago Railway, Chicago, Ill.—Bids are being asked by this company for the construction of a new station in Wheaton. The building will be 41 ft. x 92 ft. and of brick and steel construction. The cost is estimated to be about $20,000.

Illinois Traction System, Peoria, Ill.—Plans are being considered by this company for a new three-story depot and office building in Champaign. The structure will be located on the site of the old Kennard mill, which is now occupied as a freight depot.

St. Joseph Valley Traction Company, Elkhart, Ind.—It is reported that this company's carhouse and machine shops in Lagrange were destroyed by fire on Nov. 11. The loss is estimated to be about $35,000.

Des Moines (Ia.) City Railway.—New carhouses and repair shops will soon be built by this company at East Twentieth Street and Walnut Street in Des Moines. The general shops will be eventually removed from the present location at the power plant to this East Side site.

Public Service Corporation, Newark, N. J.—Work will soon be begun by this company on its new carhouse and machine shops in Newark.

Syracuse, Lake Shore & Northern Railroad, Syracuse, N. Y.—It is said that this company is considering the purchase of property in East Second Street on which it expects to build a new passenger station and freight depot.

Ohio Electric Railway, Cincinnati, Ohio.—This company has begun the construction of a new carhouse at O'Neil's, near Calvary Cemetery. The structure will be 50 ft. x 200 ft., of brick and concrete construction.

Ephrata & Lebanon Street Railway, Ephrata, Pa.—Property on South State Street in Ephrata has been purchased recently by this company on which it will construct a new carhouse.

POWER HOUSES AND SUBSTATIONS

Illinois Traction System, Peoria, Ill.—This company has ordered for its Bondville station one 750-600-volt rotary converter, three H-25 transformers and a switchboard from the General Electric Company.

Davenport-Muscatine Railway, Davenport, Ia.—Work has been begun by this company on its new substation in Davenport. The company has ordered from the General Electric Company two unit motor generating sets, five 1000-kva water-cooled transformers, one 5-kw, 1800-125-volt generator, one 2000-kva, 2300-volt transformer and a switchboard.

Kentucky Traction & Terminal Company, Lexington, Ky.—This company has ordered from the General Electric Company for its generating stations at Lexington two 2500-kw turbo-generator sets, one turbo-exciter set, one 75-kw motor generating set, two 750-kw motor generating sets, four 33,000-4000 transformers and a switchboard. For the Versailles substation one 1200-600-volt rotary converter, three 33,000-370 air-cooled transformers and switchboard. For the Frankfort substation, two 1200-600-volt rotary converters, six 33,000-370 air-cooled transformers with switchboard. For the Paris substation, one 1200-600-volt rotary converter, three 100-kw transformers. For the Nicholsville substation, one 1200-600-volt rotary converter, three 100-kw transformers. For the Georgetown substation, one 1200-600-volt rotary converter, three 100-kw transformers and a switchboard.

East St. Louis, Columbia & Waterloo Railway, St. Louis, Mo.—This company has ordered four 300-kw, 600-volt rotary converters and fourteen 25-100-kva transformers from the General Electric Company.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—This company has ordered one 75-kw motor-generator set from the General Electric Company.

Western Ohio Railroad, Lima, Ohio.—This company has ordered eight K-21-35,000-volt, 300-amp switches from the General Electric Company.

Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio.—This company is now engaged in enlarging its plant and changing the operating voltage from 13,200 to 22,000. In making this change the company has ordered two 1500-kw and two 50-kw, 6600-volt turbo-generator units from the Westinghouse Machine Company. The previous generating equipment was operated by reciprocating engines.

El Reno (Okla.) Interurban Railway.—This company will build a new substation at Banner in which will be installed one 300-kw rotary converter, three transformers and a switchboard.

Ephrata & Lebanon Street Railway, Ephrata, Pa.—This company has recently purchased a plot on South State Street in Ephrata as a site for a power plant.

Indiana County Street Railway, Indiana, Pa.—This company is enlarging its plant at Two Lick. It has placed an order with the Westinghouse Machine Company for one 625-kva Westinghouse-Parsons turbo-generator unit and one No. 5 Westinghouse Le Blanc condenser. This outfit will be used to supplement its present station which consists of a 1000-kva Allis-Chalmers turbine and Phoenix engine. The turbo unit will feed into the 6600-volt, two-phase, 60-cycle lines which the company is now operating.

Manufactures & Supplies

ROLLING STOCK

Des Moines (Ia.) City Railway expects to purchase ten new cars during 1912.

Boulder Electric Light & Power Company, Boulder, Col., is in the market for two new cars.

Illinois Central Electric Railway, Canton, Ill., expects to purchase one motor and three trail cars.

Merrill Railway & Lighting Company, Merrill, Wis., is considering the purchase of several single trucks.

Otsego & Herkimer Railroad, Oneonta, N. Y., has ordered one long-broom snow sweeper from The J. G. Brill Company.

Auburn & Syracuse Electric Railway, Syracuse, N. Y., has ordered six Sprague-GE control equipments from the General Electric Company.

Virginia Railway & Power Company, Richmond, Va., has ordered nineteen straight-air brake equipments from the General Electric Company.

Belvidere (Ill.) City Railway has ordered two complete equipments of GE-54 motors with type K control from the General Electric Company.

Fostoria & Fremont Railway, Fostoria, Ohio, has ordered four GE-204 railway motors and one K-34 control from the General Electric Company.

Peninsula Railway, San José, Cal., has ordered fourteen Brill 27-MCB-1 trucks through Pierson, Roeding & Company from The J. G. Brill Company.

Kentucky Traction & Terminal Company, Lexington, Ky., has ordered five four-motor equipments with type K control from the General Electric Company.

Metropolitan Street Railway, New York, N. Y., has placed an order with the Westinghouse Traction Brake Company for 640 straight-air brake equipments.

Memphis (Tenn.) Street Railway has ordered ten Brill 21-E trucks without wheels from The J. G. Brill Company for use on the ten cars being built by the St. Louis Car Company.

Ft. Dodge, Des Moines & Southern Railway, Fort Dodge, Ia., has ordered two electric locomotives, four four-motor and one two-motor equipment from the General Electric Company.

East St. Louis, Columbia & Waterloo Railway, St. Louis, Mo., has ordered six GE-203 four-motor car equipments with K-35 controllers, five straight-air brake equipments, one combined straight-air and automatic air brake equipment from the General Electric Company.

TRADE NOTES

International Steam Pump Company, New York, N. Y., has elected William Guggenheim chairman of the finance committee.

Johnson Fare Box Company, New York, N. Y., has received an order from the Seattle (Wash.) Electric Company for 331 Johnson registering fare boxes.

W. H. Schott Company, Chicago, Ill., has removed its general offices from the Steger Building to suite 1813-1816 Harris Trust Building, 111 West Monroe Street, Chicago.

Hale & Kilburn Company, Philadelphia, Pa., has appointed J. G. Bower Western sales manager. Mr. Bower was formerly connected with the Pressed Steel Car Company.

Q M S Co, Plainfield, N. J., reports receipt of an order recently from the Los Angeles Railway for 100 Stanwood car step treads to replace wooden treads on old cars. The new treads are to be attached to wooden hangers.

Macallen Company, Boston, Mass., announces that its address has been changed from Foundry and Division Streets to Macallen and Foundry Streets, as the city has changed the name of Division Street to Macallen Street.

Howard B. Clark, New York, N. Y., consulting engineer, who resigned as member of the firm of Flaherty & Clark on June 1, 1911, is now Eastern representative for the McNaull-Boiler Manufacturing Company, Toledo, Ohio, manufacturers of water-tube boilers.

Canadian Car & Foundry Company, Montreal, Que., has decided to double the capacity of its works at Turcot, near Montreal, which will enable it to build 125 passenger cars per year. The shops for the building of all-steel cars at Dominion, on the outskirts of Montreal, are also to be enlarged, increasing their capacity by about 50 per cent.

Wheeler Condenser & Engineering Company, Carteret, N. J., has appointed George Franklin Pond manager for its Philadelphia territory, with office in the Commonwealth Trust Building, Philadelphia. The company has also appointed Walter G. Stephan manager for the Cleveland territory, with offices at 1325 Citizens Building, Cleveland, Ohio.

Jeffrey Manufacturing Company, Columbus, Ohio, manufacturer of mining, elevating, conveying and power transmission machinery, has recently opened another branch office at 1201 American Bank Building, Seattle, Wash. Percy E. Wright, who has been connected with the home office of the company for the past ten years, will have charge of this branch office and will handle all business in the Northwest territory.

Best Manufacturing Company, Pittsburgh, Pa., has appointed Charles E. Hague as Philadelphia representative with headquarters at 1510 Land Title Building. Mr. Hague is to have charge of Eastern Pennsylvania, Baltimore and Washington territory. The company has also appointed C. L. Stickney & Company as its representative in the States of Washington and Oregon, with headquarters at 108 White Building, Seattle, Wash.

Lindsley Brothers Company, Spokane, Wash., specialist in Idaho poles, has just installed a treating plant at its Priest River (Idaho) yard for the treating of poles with avenarius carbolineum by the open tank process. The plant has a capacity of 300 poles a day, and the company has just completed the shipment of a large order of treated poles from this plant to Colorado points. The other plant operated by the company at Spokane has recently completed the treatment of 40,000 ties for the Washington Water Power Company.

U. S. Metal & Manufacturing Company, New York, N. Y., has recently taken the selling agency for the Southern and Middle Western States of gears and pinions manufactured by the Tool Steel Gear & Pinion Company, Cincinnati, Ohio. The company has also taken over the general sales agency for the United States of Texoderm, manufactured by the Sillcocks-Miller Company, South Orange, N. J. This material is used for railway coach seat upholstering. It has a hard surface and firm body. The base fabric is a heavy duck, strong and firm, possessing great wearing qualities.

ADVERTISING LITERATURE

Allis-Chalmers Company, Milwaukee, Wis., has issued Bulletin No. 1075, which describes its belted alternating current generators.

Railway Equipment Company, Portland, Ore., has issued a booklet which contains a list of equipment which the company carries in stock.

J. A. Fay & Egan Company, Cincinnati, Ohio, has begun the publication of a monthly bulletin entitled "The Lightning Line" for distribution among operators of wood-working machinery.

Ideal Electric & Manufacturing Company, Mansfield, Ohio, has issued Bulletin No. 1011, which contains a complete discussion of the details of construction and operation of its type H direct-current motors and generators. Test curves and characteristics of this type of motor and generator are included, and some of the details of construction are illustrated by special drawings.

Greenlee Brothers & Company, Rockford, Ill., has issued a catalog which fully describes and illustrates the numerous types and sizes of woodworking machines for electric railway shops or light car repairing manufactured by the company. A complete line of tools used for the operation of these machines is also shown. The catalog consists of circulars previously issued by the company and contains 114 pages.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVIII NEW YORK, SATURDAY, NOVEMBER 25, 1911 No. 22

PUBLISHED WEEKLY BY

McGraw Publishing Company

JAMES H. MCGRAW, President; C. E. WHITTLESEY, Sec'y and Treas.

239 WEST THIRTY-NINTH STREET, NEW YORK

TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1021 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Wednesday, 9 a. m., of the week of issue.

Copyright, 1911, by MCGRAW PUBLISHING COMPANY.

Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

The Association of American Advertisers has examined and certified to the circulation of this publication. The figures of circulation contained in the Association's report only are guaranteed.

ASSOCIATION OF AMERICAN ADVERTISERS.
No. A—82. *Whitehall Bldg., N. Y. City.*

NEW YORK, SATURDAY, NOVEMBER 25, 1911.

CONTENTS.

Overhauling Control Equipment..... 1087
Final Decision in Third Avenue Reorganization..... 1087
Overhead Crossing Specifications..... 1088
The Johannesburg Gas Engine Fizzle..... 1088
Consolidation in Chicago..... 1089
Traffic Promotion Work of the Hudson & Manhattan Railroad..... 1090
Right of City to Enforce Old Trackage Agreement Denied in Wisconsin..... 1094
Tests of Current Consumption of Interurban Cars on Detroit United Railway..... 1094
Hearing on Transfers in New York..... 1096
Rehearing on Brakes in New York..... 1096
Meeting of the Committee on Subjects..... 1096
Laying a 60,000-Volt Cable..... 1097
Progress on Power and Other Improvements of Northern Ohio Traction & Light Company..... 1098
Papers at the C. E. R. A. Convention..... 1099
Meeting of Engineering Association Executive Committee..... 1110
Decision in Third Avenue Reorganization Case..... 1112
Operation Under Cleveland Ordinance..... 1113
Increase in Fares by Hudson & Manhattan Railroad..... 1113
Coney Island Fare Hearing..... 1114
The Panama-Pacific International Exposition..... 1114
Going Value of Public Utilities..... 1115
Request for Lower Fares Denied by New Jersey Commission..... 1117
Brake Tests in New York..... 1118
Meeeting of Central Electric Railway Association..... 1119
Automatic Reactance for Track Circuit..... 1120
New Patents on Single-Phase Apparatus..... 1120
Coasting Clock Order in Chicago..... 1120
Electric Railway Legal Decisions..... 1121
News of Electric Railways..... 1122
Financial and Corporate..... 1124
Traffic and Transportation..... 1126
Personal Mention..... 1128
Construction News..... 1129
Manufactures and Supplies..... 1132

Overhauling Control Equipment

The approach of the winter brings to the front the problem of keeping equipment in service under severe conditions in many localities, and now that the heavier class of repair work is either completed or pretty far along in the shop, so far as closed car equipments are concerned, it is desirable to pay particular attention to control and other lighter apparatus. A few adjustments and a little special lubrication and cleaning at this time will do much to prevent trouble when the season of snow, slush and ice arrives. It is true that a chance is seldom given to the elements to attack the auxiliary apparatus on a car directly, but the severity of the traffic conditions in the winter makes it most important to insure the proper working of every detail. In cities where the principal manufacturing companies maintain resident engineers with headquarters at the district offices much good can be accomplished by inviting these experienced men to give short talks upon their equipment and its proper maintenance before assemblies of shop and carhouse employees. Many little practical points can thus be turned to account, such as the fact that the life of contacts may be increased by applying vaseline in small quantities to the tips, the benefits of reverser lubrication, the selection of the proper oil for piston parts in pneumatic control, the cleaning and adjustment of master controllers, the removal of dirt from strainers, the replacement of packing, the draining of reservoirs, and the adjustment of nuts, contacts and bolts in switch groups. It is surprising what can be accomplished in the prevention of trouble by the policy of what might be called "anticipatory maintenance."

Final Decision in Third Avenue Reorganization

The first immediate result of the decision of the Court of Appeals in the Third Avenue Railroad case will be the completion of the plan of reorganization prepared by the committee of bondholders of the company. The findings of the court are published elsewhere in this issue. A long time has been spent in the legal proceedings. It was anticipated so confidently that the plan prepared on behalf of the committee would be acceptable that the formal foreclosure sale of the property of the old company was made on March 1, 1910. Since that date and during the litigation which followed the refusal of the New York Public Service Commission, First District, to approve the plan, the property has been in the control of the committee of bondholders. As a secondary result of the decision it is announced that the representatives of bondholders in the Metropolitan Street Railway will amend their plan of reorganization so as to conform with the interpretation of the law by the Court of Appeals. Unless, therefore, there is unexpected

delay in action on the Metropolitan plan or conditions should undergo some change it may be expected that the reorganization of that property will also be effected after a short time. As we have explained at other stages of the proceedings in the Third Avenue reorganization case, the issue before the court was resolved simply into that of the jurisdiction of the Public Service Commission. Notwithstanding the elaborate preparations made by both the commission and the company to defend their opposing positions in regard to the value subject to capitalization, the question of the value of the property was totally disregarded in the proceedings. The court confined its consideration of the case to a judgment upon the powers of the commission under the law. In so far as the powers which the Public Service Commission assumed to be granted by the law apply to reorganization cases, the authority of that regulating body is greatly restricted by the decision of the Court of Appeals.

Overhead Crossing Specifications

Among other proposed standards of the Engineering Association which will soon be submitted to letter ballot of member companies of the American Association are the specifications for overhead crossings of electric light and power wires above railway tracks. These specifications have already been approved by the National Electric Light Association, the high-tension transmission committee of the American Institute of Electrical Engineers, the Association of Railway Telegraph Superintendents and the engineering departments of the telephone and telegraph companies. They are not perfect, and it is doubtful if they can ever be made to meet exactly the views of all parties at interest. Nevertheless they have been characterized by many competent critics as "the best specifications yet prepared." They protect the crossed company against inadequate and unsafe structures erected over its tracks, and on the other hand they protect the crossing company against unreasonable demands of the crossed company. The wires of electric railways frequently cross foreign tracks, and in turn their tracks are crossed by foreign wires. They are obliged for their own protection to insist on certain standards of construction for wire crossings over their own tracks, and on the other hand they are subject to the whims of the engineers of steam roads over which their transmission lines are carried. Hence a common standard specification would be very desirable for electric railways. The small companies would particularly be benefited by the general adoption of these specifications. Only by a thorough trial in actual practice can the weak points of the specifications be brought to light, and no serious obstacles should stand in the way of revision in the future if such revision is found necessary or desirable. Some of the objections to the specifications in their existing form are valid and should be covered in future revisions. They are not serious enough, however, to warrant the rejection of the specifications as a whole, in view of the imperative need for the specifications by many companies. It is to be hoped that enough votes of member companies in favor of the adoption of the specifications as standard will be secured to assure a trial of them under a wide variety of service conditions.

THE JOHANNESBURG GAS ENGINE FIZZLE

Reports in the English papers mention the final ending of the litigation over the unfortunate producer gas plant which was to furnish power to the Transvaal mines from the neighboring coal fields. The operative qualities of the plant itself did not in fact play an important part in the legal settlement, inasmuch as the action had chiefly to do with the failure to fulfil a contract for operation. As our readers will probably remember, this plant was installed on the advice of thoroughly conservative and skilful English engineers and consisted of fairly large gas engines, not over 2000 hp, directly connected to polyphase generators and fed with producer gas derived from the Transvaal coal mines. There was nothing in the least sensational about the proposition nor any reason to expect failure, for the generating units themselves were of no unusual type and gas producers have certainly been used for many years even on coal as inferior as the South African variety.

The facts, so nearly as we can ascertain them from the reports, are that the contractors failed utterly in getting the plant equipped on time, and ultimately they were put in the ugly dilemma of having to face heavy penalties for delay or of starting without the gas-cleaning apparatus at hand. They took the latter alternative, and uncleaned gas, as it was pretty certain to do, played havoc with the operative qualities of the engines. After a dismal period of tribulation the contractors took over the plant temporarily and undertook to operate it at their own expense until they could make their contract good. For one reason or another they failed to do this; hence the action which has just terminated and the previous abandonment of the gas plant. It is an unpleasant tale of failure and certainly will not encourage the use of producer gas units on a large scale for the delivery of electric power.

Without here entering into the question of the possibilities of economy in the use of gas engines with producer gas, one may unhesitatingly say that the conditions with respect to the relative economy of gas-driven and of steam-driven units have changed radically within the last two or three years. In the first place, in plants large enough to use large turbo-generators designed for high expansion, a thermodynamic efficiency is reached not greatly inferior to that obtainable by gas engines, assuming weight of fuel per unit output as the criterion. The modern high-power and high-expansion turbo-generator will deliver the kilowatt-hour at full load on 12 lb. to 13 lb. of steam, and at partial loads it holds wonderfully near to its full load economy. Efficiency like this is so near to the best that can be obtained by a producer gas outfit that the gain in using the latter becomes insignificant in a comparison of the total costs of operation, in which initial expense, repairs and space required tell somewhat heavily against the gas engine. It is one thing to compete with an old compound Corliss engine taking from 20 lb. to 25 lb. of steam per kw-hour at average load and another thing to compete against a modern turbine requiring only half this quantity of steam. Even if one is dealing with small units it is a grave question whether steam has not to-day the best of the argument. The recent types of self-contained boiler and engine equipments operated at high pressure and high superheating

will actually deliver the brake-horse-power at their rated output on 8 lb. or 9 lb. of steam, or, in other words, when direct-coupled to a generator they will at least equal the best performance of the big turbines. Whether in large or small units, therefore, steam just at present seems to be able to show practically as high fuel economy as even the best internal combustion engines operated on producer gas. The Johannesburg plant, therefore, is one that would be very unlikely to be duplicated even if all its guarantees had been fulfilled.

CONSOLIDATION IN CHICAGO

The tentative plan for consolidation of the surface and elevated railways of Chicago indicates a development of much significance. It appears to be in strong contrast with the changes in Manhattan, where segregation is the feature of the reorganization of surface properties that has been in progress. But transit conditions in these two cities are very different, and like principles need not be applied to both localities.

The long distances in Chicago and the division of the city into three great sections—the North, West and South Sides—make conditions of transportation different from those which exist on the narrow island of Manhattan. Except at a few minor points of contact in the southwestern part of the city, the Chicago surface companies do not enter into competition. They are required by franchise provisions to operate through routes between different sections of the city, and that condition is one that must be met whether or not a combination is made. The recent rehabilitation was conducted on somewhat the same lines, so that these properties are better adapted to consolidated operation than if the construction work of the last few years had been conducted by each company independent of the other.

As the surface properties of Chicago are not competitive with each other, the same condition should not result from the union of companies as if they were engaged in actual competition, as in Manhattan. In the latter case when companies operating on parallel streets in centers of tremendous traffic were consolidated universal transfers were given, with the result that avenues for constant abuse at the expense of the property were opened. The Chicago plan appears to provide for interchange of transfers between surface and elevated properties, with the partial object of diverting the short-haul traffic to the former and the long-haul traffic to the latter.

Furthermore, a logical step toward the larger consolidation has been taken in the unification of Chicago elevated properties. These properties have had one common interest for many years through their dependence on a union elevated loop for their terminal facilities in the congested district. Owing to its ownership or control of this loop one of the strong companies was able to determine questions affecting the operation of this common track. This condition naturally created a relationship of lessee and lessor which was less likely to produce harmony and satisfactory operation than the unified management existing now.

In using the loop for terminal facilities the different elevated lines deal practically with themselves now, and individual preferences are lost in a broad operating policy designed to serve the best interests of the property as a whole. It is to be expected that improved methods of operation will signalize the unification of the elevated properties, but the extent of these will depend in some measure upon the support and co-operation of the city authorities in plans for betterment.

Monopoly in transit facilities in one locality is usually desirable, and consolidated properties are found in most cities. They were created generally by the union of competing lines and have not always received the public recognition of the advantages of consolidation which is now generally given. Monopoly in public utility service in each locality, however, has proceeded because the savings which result from consolidation make it a logical step.

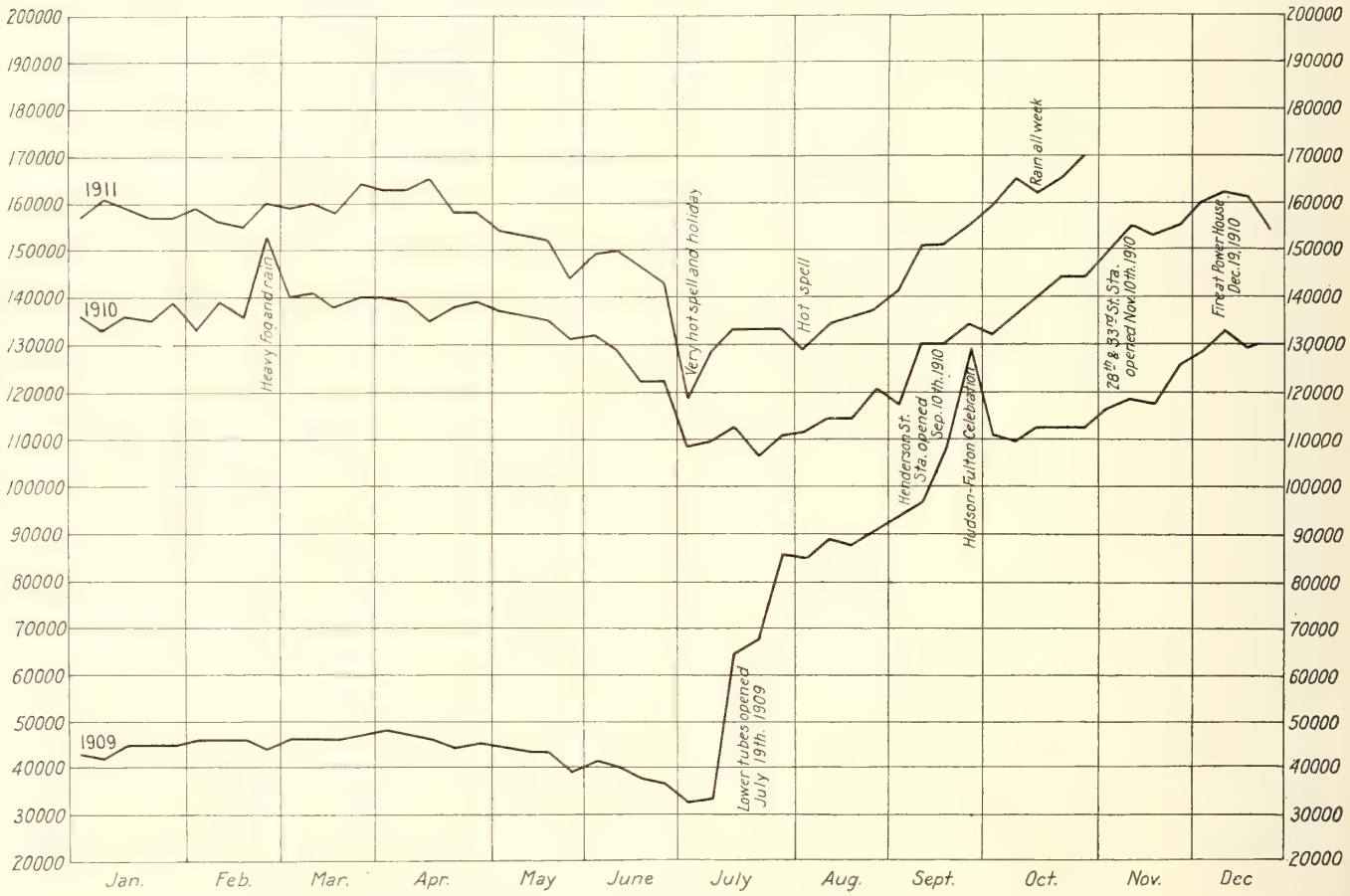
In many other cities consolidations have gone so far as to include already not only the railway facilities, but also the lighting and power organizations. The greater unions create one central market for power and through the production of a large output open an opportunity for reduction of costs. Better service results from consolidation of public utility properties in one city or group of communities. To protect such monopolies some of the regulating commissions have refused to approve the construction of independent competing plants or systems. Such independent enterprises are almost invariably consolidated in time with the existing property, and the duplication of facilities and capital merely increases the investment on which the public must pay a return. One factor that has undoubtedly influenced the proposed Chicago consolidation, if it is not the main operating reason responsible, is the arrangement by which the Commonwealth Edison Company now furnishes power for the surface railways. Under this plan the railways have restricted their investments and the electric company has increased its output at favorable hours. A further consolidation of ownership by unification of the surface railways with the elevated railways and ultimately with the electric lighting and power company would centralize, in one property, the production and consumption of a still larger amount of power with new possibilities of operating advantages and economy.

Of all the factors which seem to make consolidation in Chicago logical none is more prominent than the program for city development which is under consideration. The central feature of the new development is the proposed subway to relieve congestion in the downtown business district. The union loop is inadequate to do its part as the city increases in size. It is so limited in capacity and so hampered by the operating hindrances that arise from its use by four operating companies with connections in four different directions at different places that, as now operated, it will not meet the future requirements of the city. With through operation of elevated trains from one section of the city to another, as proposed under the modified arrangement suggested to the city authorities, there would probably be some relief. Universal transfers and additional through lines from one section of the city to another will increase the possible length of haul, but the other changes in operation rising from the removal of the petty obstacles, such as, for instance, those which the city has placed in the way of extensions of the loop platforms, will tend to overcome the effect of these concessions.

Traffic Promotion Work of the Hudson & Manhattan Railroad

This Company Has Been Successful in Diverting Travel from the Ferries and in Creating Much New Traffic Between New York and New Jersey—It Has Advertised in Newspapers and Has Distributed Folders, Maps and Timetables of Connections with Steam Railroad Suburban Trains—Its New Rapid Transit Line to Newark Is Expected to Develop a Large and Profitable Business

The Hudson & Manhattan Railroad occupies a peculiar position in the rapid transit field in New York City. In reality it is a New Jersey railroad with terminals on Manhattan Island. It provides the resident population of northern New Jersey with a quick and convenient means of transportation under the Hudson River which separates their homes from their places of business. For many years the only transportation facilities between Jersey City and Hoboken and Manhattan Island were the ferry boats operated by the steam railroads whose terminals are on the west side of the river. The large number of commuters on the Pennsylvania, Erie and Lackawanna railroads daily crossed and recrossed the river in ferry boats which also carried many local passengers between Jersey City and Hoboken and New York. When the first tunnels of the Hudson & Manhattan Railroad were opened between the Lackawanna station in Hoboken and Nineteenth Street and Sixth Avenue in New York City, the traffic problem which had to be solved was to induce the public which had always crossed the river on ferry boats to use the tunnel trains and pay an extra fare. It was a problem of diverting existing traffic as well as creating entirely new business.



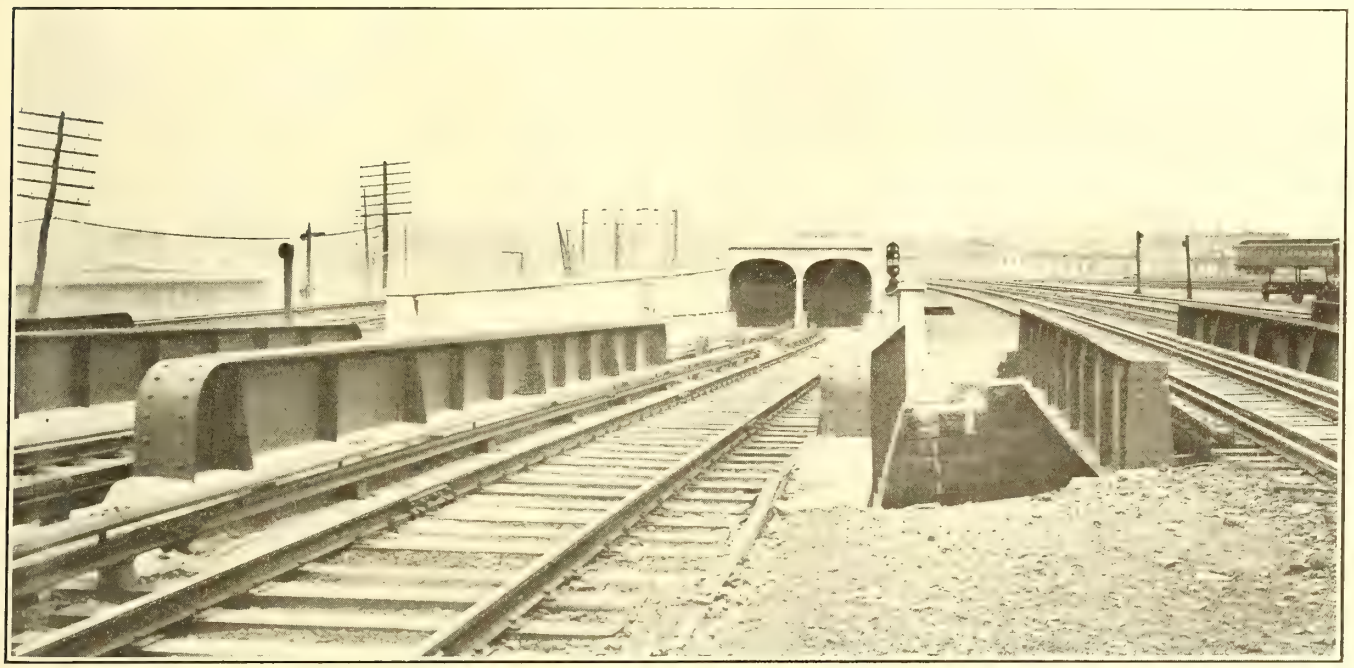
Hudson Tunnel Traffic—Chart of Average Number of Passengers Carried Daily

GROWTH OF TRAFFIC

The uptown tunnels between Hoboken and Nineteenth Street were opened for traffic on Feb. 26, 1908. On June 15 of that year the Twenty-third Street station was opened. During the first week of operation the average daily number of passengers carried was 50,800, many of whom rode out of curiosity. During the month of March, 1908, the number of passengers dropped to a normal daily average of 41,677. A year later the increase had been only about 10 per cent, the daily average for March, 1909, being 45,845. On July 19, 1909, the Terminal Station at Cortlandt and Church Streets was opened and the downtown tunnels to the Pennsylvania Station in Jersey City were put in operation. The Erie Railroad station in Jersey City was completed and a regular service of through trains was run for the first time from Cortlandt Street to Hoboken on Aug. 2, 1909. The effect on the traffic was immediate. From an average of 32,000 passengers daily in the summer of 1909 the traffic grew to 130,000 passengers per day by the end of the year, exceeding the maximum travel which had taken place during the week of the Hudson-Fulton celebration, Sept. 26 to Oct. 2, 1909. On Sept. 6, 1910, the station at Henderson Street, Jersey City, was opened, and on Nov. 10, 1910, the Twenty-ninth and Thirty-third Street stations on the Sixth Avenue line were put in use. The immediate effect of the opening of these new stations on the traffic growth was comparatively small, as the traffic at all other stations continued to increase steadily. By the end of 1910

the average was about 160,000 passengers per day. From present indications the daily average by the end of 1911 will be nearly 190,000 passengers, or an increase of nearly 19 per cent.

The accompanying diagram shows by months the growth of passenger traffic from Jan. 1, 1909, to Nov. 4, 1911. The dates of opening of new lines and stations are indicated on the diagram and the effect on traffic is clearly apparent. The variations up or down by seasons and for short periods are of interest. Thus during the week of July 2 to 8, 1911, the daily average dropped from 140,000 to 118,000 on account of the extremely hot weather which prevailed, and because a holiday was included. A few days of foggy weather, which interferes with the regularity of the ferry-boat schedules, has the opposite effect, that of largely increasing the traffic on those days. The average daily traffic during July, 1911, was about 35,000 passengers less than the average of the spring and fall months. This is accounted for not because the tubes are uncomfortable to travel in during hot weather, for on the contrary the temperature in the tunnels is from 15 deg. to 30 deg. lower than on the streets, but because many business men take week-end holidays during hot weather and because the vacation season reduces the number of persons traveling every day between their homes and offices.



Hudson Tunnel Traffic—Portal of Tunnels on Pennsylvania Railroad Right-of-Way in Jersey City

TRAFFIC PROMOTION

The steady and gratifying increase in traffic on all parts of the system is attributable to the energetic campaign of publicity and promotion which has been carried on since the first tubes were opened and to the policy of giving the patrons of the road good service in the form of frequent trains with plenty of seats, operated on an exact schedule, as reliable if not more so than the schedules of the connecting steam railroads.

The company has a traffic department in charge of Oliver T. Boyd, general passenger agent, from which all traffic promotion work emanates. The general passenger agent prepares and issues all folders, timetables, maps and similar printed matter as well as daily newspaper advertisements and also acts as the publicity agent of the company in giving out information to the newspapers. He reports to William G. McAdoo, president of the Hudson & Manhattan Railroad.

NEWSPAPER ADVERTISING

During 1910 the company carried on a general advertising campaign which included the use of space in several of the morning and evening papers in New York City, Jersey City and Newark as well as advertising cards in the subway and elevated cars in New York City and the surface cars of the Public Service Railway in New Jersey. A large appropriation for this campaign was secured from the directors of the company, and while it is difficult to trace direct results from it the traffic at all stations showed good increases throughout the year. The newspaper advertising consisted for the most part of single-column advertisements 6 in. deep, calling attention to the speed, comfort and reliability of the tunnel train service. Frequent changes of copy were made. These cards were run in German and Jewish papers as well as in those printed in English.

For about ten days prior to the opening of the Thirty-third Street station quarter-page announcements were inserted in most of the morning and evening papers published in New York City. These advertisements attracted much favorable comment on account of their good typographical appearance. In the center of each was a large black-and-white drawing of a tunnel train standing at the platform of the new station, and particular attention was called to the fact that the Lehigh Valley, Erie and New York, Susquehanna & Western railroads would have ticket offices in the station. The only newspaper advertising which has been done during 1911 has been the insertion of announcements regarding the opening of the new rapid transit line to Newark.

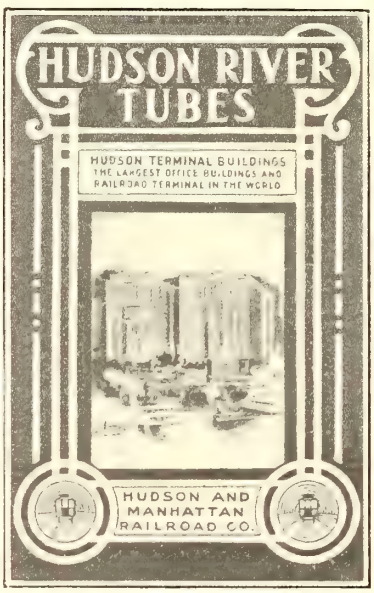
CAR CARD ADVERTISING

The cards carried in the subway and elevated cars called attention to the saving in time from different parts of the city to the railroad stations in Jersey City and Hoboken by using the Hudson Tunnel trains from the uptown or downtown stations. Thus the cards in the Ninth Avenue elevated trains instructed the passengers to change at Christopher Street station and save ten minutes. Similar cards were placed in the Public Service Railway cars to call attention to the convenient location of the Sixth Avenue stations in the center of the theater, hotel and shopping disricts and the Hudson Terminal Station in the heart of the downtown business district.

ADVERTISING STEAM RAILROAD CONNECTIONS

Prior to the opening of the downtown tubes in July, 1909, the Hudson & Manhattan Railroad entered into a traffic agreement with the Pennsylvania Railroad which included arrangements for showing in all Pennsylvania Railroad timetables the leaving and arriving times at the Hudson

Terminal station of connecting tunnel trains. This practice has been continued and has been extended to include the timetables of the Southern Railroad and Seaboard Air Line, which run through trains to New York over the Pennsylvania Railroad from Washington, D. C. The Lehigh Valley Railroad, which uses the Jersey City station of the Pennsylvania Railroad, also advertises tube connections in its timetables. For a time the Erie Railroad showed tube train connections in its timetables, but discontinued the practice some time ago. The Lackawanna has never been willing to assume the responsibility of showing the times of connecting tube trains in its timetables.



Hudson Tunnel Traffic—Cover of Folder

As a large number of suburban passengers on the Erie and Lackawanna railroads use the tubes regularly in preference to the ferry boats operated by the railroads for crossing the river, the traffic department of the Hudson & Manhattan Railroad for some time has been issuing for each suburban station on these roads small pocket time cards giving the leaving and arriving times of trains to and from that station together with the leaving and arriving times of connecting tube trains at the Hudson Terminal and Thirty-third Street stations. These time cards are made up from advance proofs of the steam railroad timetables and the times given allow from three to five minutes to make the connections in the railroad stations. They are revised whenever a new timetable is issued by the steam railroads. Racks containing separate compartments for the folders for each station are placed in the tube stations at the Erie and Lackawanna terminals, and these racks are kept constantly supplied. Passengers are free to take as many of these folders as they choose, as the company is anxious to give them as wide circulation as possible. As many as 60,000 folders of this kind are distributed within a few weeks after a change in the railroad timetables.

As the public depends on the advertised tube train connections shown in the timetables to catch the steam railroad trains leaving Jersey City, special precautions are necessary to insure that these connecting trains are operated on schedule time. At the Hudson Terminal large train-departure signs on the concourse show the leaving time of the next connecting train and the destination of the steam train on the Pennsylvania Railroad with which it connects. Before the connecting train leaves the Hudson Terminal the conductor obtains a clearance card from the train starter showing the number of the train, its leaving time and the name of the conductor. This card is handed to a Pennsylvania Railroad usher when the train arrives in Jersey City and he follows the last passengers and delivers the card to the gateman on the concourse floor. When the gateman has received this card and also similar cards from the captains of connecting ferry boats he knows that the connecting train and boats have arrived and permits the outgoing train to proceed.

FOLDERS FOR GENERAL DISTRIBUTION

For distribution in hotels and railroad and steamship offices the company issues a map folder 9 in. x 11 in., which is folded to vest-pocket size, 2¾ in. x 4½ in. The covers of this folder are printed in light green ink. The front cover is reproduced. The inside of the sheet contains a map of the lower part of Manhattan Island, Jersey City and Hoboken, showing the principal streets, subway and elevated lines, steamship piers and steam railroad stations. The lines and stations of the Hudson & Manhattan Railroad are printed in red ink. The remaining space on the cover side of the sheet is occupied with a summary of the train schedules, running times between stations, connections with surface, elevated and subway lines at all stations, railroad and steamship connections and a few interesting facts about the construction and operation of the tubes. These folders are distributed by a railway timetable distributing company under a contract arrangement.

WALL MAPS

A large-scale lithograph wall map of the tubes and their connections is sent to any one on request and large numbers of these maps have been distributed to hotels, stores and especially to real estate agents in suburban towns.

STEAMSHIP FOLDERS

Arrangements have been made with the pursers of all ships of the North-German-Lloyd and Hamburg-American lines which dock at Hoboken to distribute to the passengers two or three days before landing special folders printed in English and German, which give information about the tube train connections, running times and schedules. These have been the means of acquainting many steamship passengers with the tube service.

DISTRIBUTION OF SERVICE

The traffic handled in the morning and evening rush hours from 7 a. m. to 9 a. m. and 4 p. m. to 6 p. m. constitutes nearly 45 per cent of the daily total. At these times the capacity of the tubes is taxed to handle the crowd. The special effort of the traffic department therefore has been to develop traffic during the middle of the day and at night. The rush-hour travel at present is all in one direction, but when the Sixth Avenue line is extended up to Forty-second Street and east to the Grand Central Station it is expected that a well-balanced rush-hour traffic in both directions will be developed. The steady crosstown travel to and from the Grand Central Station also should improve the off-peak traffic.

PENNSYLVANIA RAILROAD COMPANY
HUDSON DIVISION
FROM HUDSON TERMINAL, NEW YORK

.....191.....

No. of Train.....

Time Leaving New York.....M.

Conductor.....

.....

TRAIN STARTER

To be retained by Superintendent New York Division

Hudson Tunnel Traffic—Train Clearance Card

The company does not keep a record of the tickets collected at different stations, but only of the tickets sold. The ticket sales at different stations, while not a true index of the traffic originating at those stations, afford some interesting comparisons. The largest number of passengers are handled at the Hudson Terminal station, although in volume of ticket sales the Hoboken station exceeds the downtown terminal station. In October the ticket sales at Hoboken were 1,035,000 as compared with 1,023,000 at the Hudson Terminal. About 30 per cent more tickets are sold at the street entrance to the Hoboken station than at the entrance from the Lackawanna station. The passengers entering from the street for the most part ride to and from

the station on the cars of the Public Service Railway, which has a large terminal immediately above the tube station. The two stations in Jersey City at Exchange Place and at Henderson Street and the Erie station contribute the next largest amount of revenue. Practically all the passengers using the Erie station are bound to and from trains of the Erie Railroad. The Hudson & Manhattan Railroad has an arrangement with the Erie Railroad whereby tunnel tickets are sold at the ticket offices of all suburban stations on the Erie Railroad. In October the average daily sales at these stations were 1100 tickets. On the Sixth Avenue line the terminal station at Thirty-third Street sells more tickets than any other station, the next largest sales being made at Twenty-third Street.

SOURCES OF NEW TRAFFIC

The steady growth of traffic during 1911 over the traffic of 1910 has been at the rate of about eighty-five new passengers every day, the average daily traffic having increased nearly 30,000 passengers in a year. Much of this increase is attributed to the development of suburban towns in New Jersey. The new residents who move into these towns do not have to be coaxed away from the ferries, for their decision to settle where they do is based largely on the ease, convenience and rapidity of reaching their offices by tube trains. This growth should continue with the further building up of the suburban territory.

NEWARK RAPID TRANSIT LINE

On Oct. 1, 1911, joint through service was put in operation from the Hudson Terminal to the Manhattan Transfer station of the Pennsylvania Railroad just east of Newark, N. J. By Nov. 26 it is expected that this service will be extended into the center of Newark over a new elevated structure. The Hudson & Manhattan tunnels have been extended west in Jersey City beyond the Henderson Street station to Waldo Avenue, where they emerge on a grade to the right-of-way of the old main line of the Pennsylvania Railroad. From this point west the Pennsylvania Railroad has equipped two tracks with third-rail and suitable signal apparatus as far as Manhattan Transfer, where the electric line to the Thirty-third Street station ends. Beyond Manhattan Transfer a new double-track elevated structure has been built to the Passaic River, which is crossed on a double-deck swing drawbridge. The electric trains use the upper deck, while the lower deck will be used by freight trains moving in and out of the local freight house and yard in Newark. In Newark the elevated structure is built on private right-of-way and extends to the station building at Park Place, about two blocks from the corner of Market and Broad Streets. A station at Summit Avenue, Jersey City, is also being built and will be opened at the same time as the Newark station.

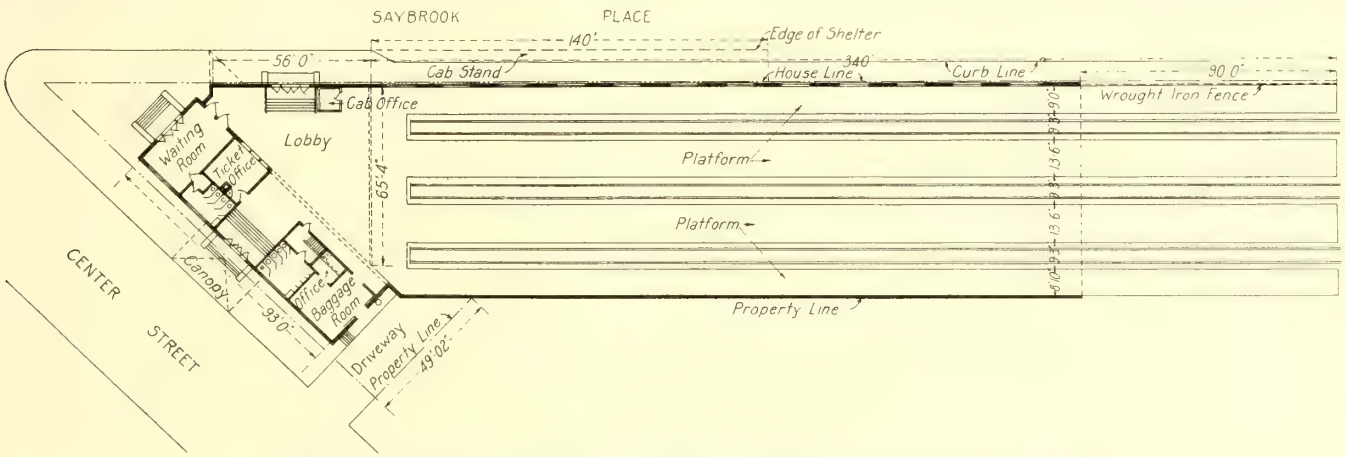
For the operation of this new service the Hudson & Manhattan Railroad purchased thirty-six cars and the Pennsylvania Railroad purchased sixty cars, all of the same design. These cars, which are of all-steel construction, were described in the ELECTRIC RAILWAY JOURNAL for Aug. 12, 1911. The tentative schedule of train service which has been made up provides for a train in each direction at intervals of from six to twelve minutes during the rush hours, twenty minutes during the middle of the day and thirty minutes after 9 p. m. The running time between Newark and Hudson Terminal will be twenty minutes, but this may be reduced later.



Hudson Tunnel Traffic—Elevated Structure in Newark

When electric trains were put in operation as far as Manhattan Transfer the Pennsylvania Railroad discontinued its steam shuttle trains between Manhattan Transfer and Jersey City. As soon as the electric service is extended to Newark the Pennsylvania Railroad will take off eighteen Waverly local trains in each direction. For the present the other suburban steam trains now running into Jersey City will not be changed, although passengers may change to the electric trains at Manhattan Transfer and come under the river without additional charge. The one-way and round-trip fares between Newark and New York will remain the same as at present, 17 cents for a one-way trip and 30 cents for a round trip. Passengers desiring to ride uptown in the tube trains will be obliged to change at Henderson Street or Exchange Place in Jersey City and pay another fare.

The Newark Rapid Transit line is expected to produce a large revenue in the future as it provides the quickest route between New York and Newark. The terminal station in



Hudson Tunnel Traffic—Plan of Terminal Station at Park Place, Newark

Newark is in the center of the business and shopping district and is only a short distance from any surface car line. Some of the rush-hour traffic obtained no doubt will be at the expense of the present tube traffic to and from the Pennsylvania and Lackawanna stations, but on the other



Hudson Tunnel Traffic—Interlocking Tower at Tunnel Portal on Pennsylvania Railroad

hand some traffic may be diverted from the Central Railroad of New Jersey and the trolley lines across the meadows.

INCREASE IN FARES

On Nov. 22 the Hudson & Manhattan Railroad announced an increase of fares effective Dec. 24, 1911. After that date the fare between all stations in Jersey City and Hoboken and stations on the Sixth Avenue line in New York City will be increased from 5 cents to 7 cents, or 1 cent less than the cost of a journey by ferry and street car. The fare between the downtown terminal and all stations in Jersey City and Hoboken will remain at 5 cents, and the present fare of 5 cents between local stations in New York and local stations in New Jersey also will be maintained.

WISCONSIN DECISION ON OLD TRACKAGE AGREEMENT

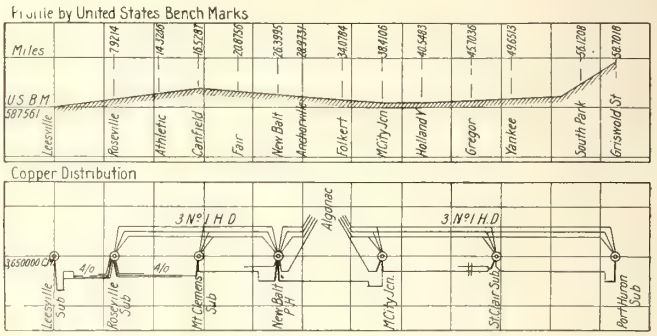
A decision has been rendered by the Railroad Commission of Wisconsin in a case instituted by the city of Green Bay against the Green Bay Traction Company.

This case involves the question of whether or not the city can compel the company to fulfil the agreement of a predecessor company to build and operate additional street railway trackage. The agreement was that such predecessor should remove certain trackage in the west side of the city and within a specified time build and operate an equal amount of trackage in the same section. An application was made to the Common Council for authority to construct a portion of the trackage. No action was taken by the council until several years later, after the expiration of the time specified and after the predecessor company had transferred its property to the present company and had dissolved.

It is held by the commission that the refusal of the Common Council to act within a reasonable time was tantamount to a denial of the application; that the application was for an independent franchise; that at the time the present company acquired the property no right was transferred to construct such line; that the attempted grant by the council was nugatory as the grantee was then no longer in existence; that the present company was not a party, either direct or indirect, to the transaction and is therefore in no wise bound to perform the obligation attempted to be created. The petition of the city was therefore dismissed.

TESTS OF CURRENT CONSUMPTION OF INTERURBAN CARS ON DETROIT UNITED RAILWAY

On Sept. 12, 13 and 14, 1911, an interesting series of tests was made on the Rapid Railway Division of the Detroit United Railway to determine the relative current



Profile of Line and Diagram of Copper Distribution

consumption of a single interurban motor car, a motor car hauling a trailer and a two-car multiple-unit train. The tests were made under the direction of E. J. Burdick, super-

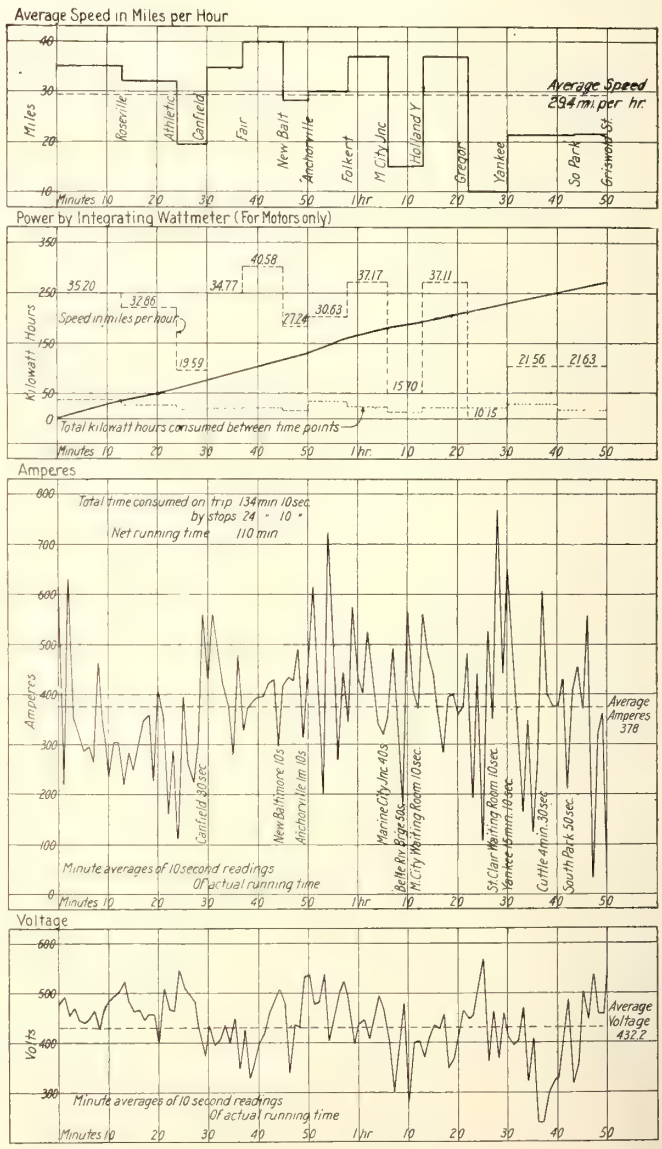


Chart of Test Run of Two-Car Multiple-Unit Train

intendent of power, and Sylvester Potter, master mechanic of the Detroit United Railway.

For the purpose of these tests two of the company's regular interurban cars were taken out of service and

fitted up with the various instruments required. The cars used were of the single-end type with 41-ft. 10½-in. bodies and a seating capacity for fifty-three persons. They were mounted on Baldwin M. C. B. type trucks having a 6-ft. 6-in.

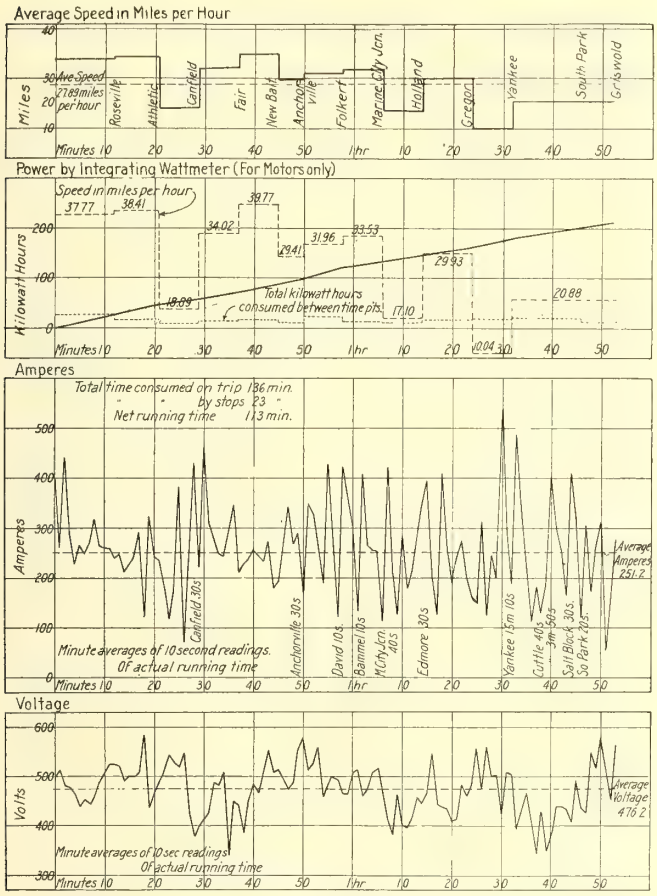


Chart of Test Run with Motor and Trailer Car

was made at practically the same hour, from the Leesville carhouse at the Detroit city limits to the Port Huron carhouse in Port Huron. The cars were run at the same schedule speed and made the same stops as the regular limited cars operating on this division, and as nearly as possible the same length of stops and the same number of

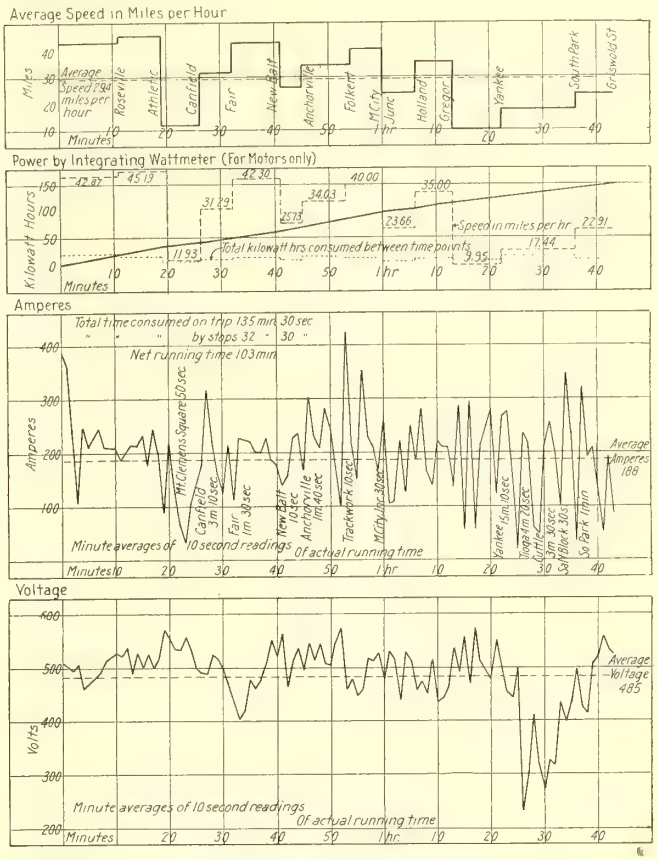


Chart of Test Run with Single Motor Car

wheelbase and 36-in. rolled-steel wheels. They were equipped with four Westinghouse No. 112-B motors of 75 hp each and Westinghouse electro-pneumatic control.

On the first day the two cars, Nos. 7306 and 7307, were connected together and operated with eight motors as a multiple-unit train. For the second day's test the motors were removed from the trucks of car No. 7307, and it was hauled as a trailer by car No. 7306. On the last day car No. 7306 was operated singly. Each day the same run stops were made on the test runs each day. Extreme precautions were taken to have the results of the tests correct. Two ammeters and two wattmeters were used, so that one instrument would check the other. The meters were so wired that the power consumed on both cars was measured, and a separate wattmeter was used to record the energy consumed by the lights and storage batteries. Temperatures of the motors were taken between the armatures and pole pieces at the start and conclusion of each trip.

SUMMARY OF POWER CONSUMPTION TESTS ON RAPID RAILWAY DIVISION, DETROIT UNITED RAILWAY.

Dates	Sept. 12, 1911.		Sept. 13, 1911.		Sept. 14, 1911.
Make-Up of Train.	Two Motor Cars.		Motor Car and Trailer.		One Motor Car.
Cars	No. 7,306	No. 7,307	No. 7,306	No. 7,307	No. 7,306
Motors	4 West. 112	4 West. 112	4 West. 112	None	4 West 112
Gear ratio	30:59	30:59	30:59	None	30:59
Trucks, type	Baldwin	Baldwin	Baldwin	Baldwin	Baldwin
Controller, type	West. Pneumatic	West. Pneumatic	West. Pneumatic	None	West. Pneumatic
Weights, pounds	69,240	65,400	69,240	51,360	69,240
Average volts	432.3		476.2		485.
Average amperes	378.		251.2		188.
Total kw-hours for motors	271.4		212.6		149.4
Total kw-hours for batteries and lights	8.3		5.8		5.
Total kw-hours consumed	279.7		218.4		154.4
Distance, miles	58.7		58.7		58.7
Watt-hours per ton mile for motors	68.66		60.06		73.51
Total watt-hours per ton mile	70.778		61.701		76.
Temperatures, Degrees Fahrenheit.					
Average in motor at start	87.25	75.5	91.5		60
Air temperature at start	64		55		62
Above air in motor at start	23.25	11.5	36.5		−2
Average in motor at end	137.	122.5	145.		130
Air temperature at end	62		62		66
Temperature in motor above air at end	75.	60.5	83.		64
Increase in motor temperature	49.75	47.	53.5		70

The results obtained from the tests are shown in the accompanying table and diagrams.

The profile of the division is approximate only, as it was drawn from the elevations taken from the bench marks of the United States Coast and Geodetic Survey at the different stations along the line. The diagram of copper distribution shows the number and sizes of high-tension and low-tension conductors between the seven substations feeding into the line. The wattmeters, ammeters and voltmeters on the cars were read at ten-second intervals, and readings were also taken from the substation and power station instruments at frequent intervals while the tests were being made. No speedometer was available for taking instantaneous readings of the speed, but the average speed between stations as shown on the curves was computed from the time required to run from one station to the next.

As the principal object in making these tests was to determine the relative current consumption of one-car and two-car trains, the watt-hours for the ton mile shown in the summary are of particular interest. The motor and trailer-car train consumed for the motors alone only 60.06 watt-hours per ton mile as compared with 73.51 watt-hours for the single-car and 68.66 watt-hours for the multiple-unit train. The car hauled as a trailer was much heavier than a specially built trailer of the same seating capacity, so that the possible saving in energy under normal operating conditions should be much larger than appears from the tests. No difficulty was experienced in maintaining the schedule speed with the trailer car, and it is significant that the increase in temperature of the motors on the car hauling the trailer was but little more than the increase of temperature when operating as a multiple-unit train, and was well within safe limits for the insulation. The average line voltage in all tests was maintained above 430 volts.

HEARING ON TRANSFERS IN NEW YORK

At the continued hearing on the question of rates of fare on the connecting or intersecting surface railways in the borough of Manhattan before the Public Service Commission, First District, on Nov. 13, 1911, F. T. Wood, assistant to the general manager of the Metropolitan Street Railway, was recalled as a witness. He introduced a blueprint which indicated by curves the variation in the number of revenue passengers, transfer passengers and total passengers carried during the fiscal years 1898 to 1911, inclusive, by the lines of the Metropolitan Street Railway on Manhattan Island. He explained that in 1899 the total number of revenue and transfer passengers carried by the Twenty-eighth and Twenty-ninth Street Crosstown Railroad and the Thirty-fourth Street Railroad were included in the report of the Metropolitan Street Railway. This tended, therefore to reduce by approximately 10,000,000 the number of revenue passengers for 1899.

Mr. Connette was recalled and cross-examined in detail in regard to sheets which he had prepared since the last hearing, showing the separation of property used for railroad purposes from that which he considered was not used for railroad purposes by the Central Park, North & East River Railroad, Second Avenue Railroad and the Metropolitan Street Railway. It was his opinion that a fairly correct estimate could be made of the increase of passengers that would result from a free transfer system if one were put in force at the 151 points designated in the order of the commission. He thought that the total number of transfer passengers would probably increase in the same relative proportions as the revenue passengers increased. In order to arrive at the probable number of transfers at this time with the transfer system restored as ordered by the commission it would be advisable to take the percentage of transfer passengers to revenue passengers in 1907 and apply the same percentage to the total revenue passengers carried at present. He could not predict the probable increase in transfer passengers if 3 cents or 2 cents was charged for each transfer. He did not know whether more passengers could be taken on between the hours of 10 a. m. and 12 m. without increasing the car mileage. He would not regard as favorable a transfer system under which the ratio of increase of transfer passengers was greater than the ratio of increase of revenue passengers.

The hearing was continued on Nov. 20, 1911, and was given over for the most part to the cross-examination of Mr. Connette by W. D. Guthrie, of counsel for the Third Avenue Railroad. It was hoped to conclude the case on Nov. 24, 1911.

REHEARING ON BRAKES IN NEW YORK

A rehearing was granted by the Public Service Commission of the First District of New York on Nov. 20, 1911, in regard to its recent order directing the surface railways of New York to equip cars of specified weights with power brakes. Commissioner Eustis explained that the proceeding was a rehearing in the interest of the companies that had not accepted the order and that whatever modifications were made after the rehearing would accrue to the benefit of all the companies affected by the order.

George D. Yeomans, counsel for the Brooklyn Rapid Transit Company, said that the officers of that company felt that the order for power brakes had been unnecessarily applied to certain cars. The company desired to make a thorough test of geared brakes and power brakes on the various types of cars included in its equipment, and he suggested that the commission appoint someone to represent it at the tests. Cars had been equipped at some expense for these experiments, but it would be impossible to get all the cars ready so as to complete the tests and compile the results until early in January.

M. E. Burke, representing the receivers of the Metropolitan Street Railway, referred to the section of the order of the commission reading: "After June 1, 1912, all service cars in service other than passenger cars shall be equipped with power brakes and geared hand brakes." He suggested that this should be modified to read: "After June 1, 1912, all double truck service cars in service, other than passenger cars, shall be equipped with power brakes and geared hand brakes."

Mr. Eustis thought that very likely after the rehearing had been completed there would be some modifications. The commission had proceeded with the idea of limiting the power brakes to double truck cars, and as long as the order was not so expressed any modification of it would be so worded.

E. A. Maher, speaking for the Union Railway and the Westchester Electric Railway, said that these companies were opposed to installing power brakes on their cars.

The hearing was adjourned until Jan. 8, 1912.

MEETING OF THE COMMITTEE ON SUBJECTS

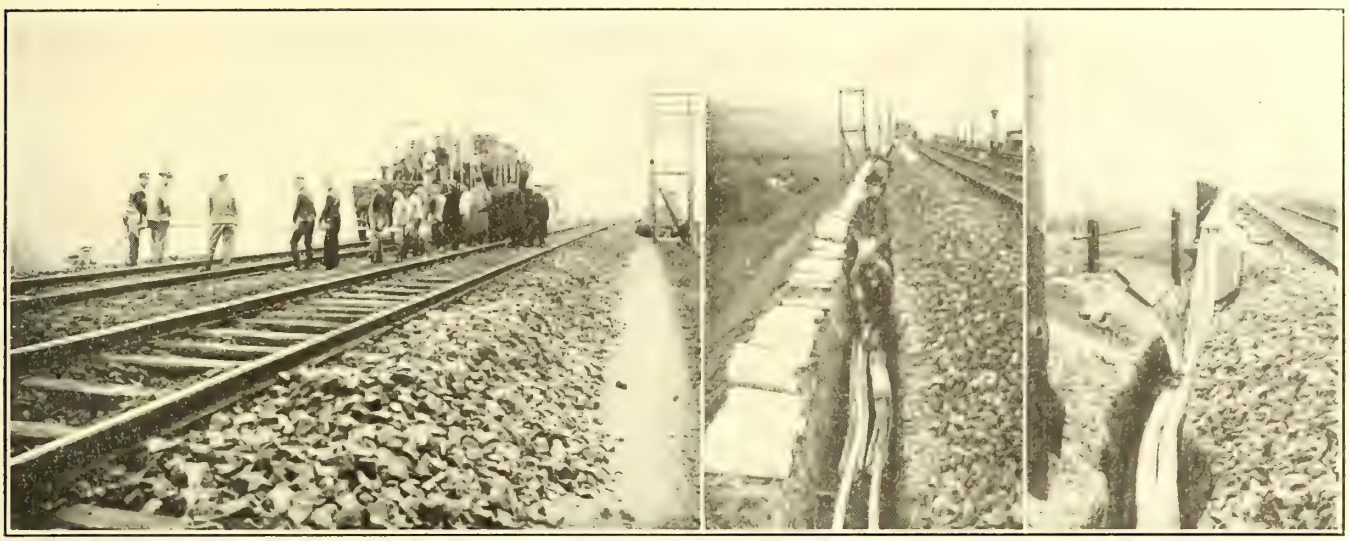
A meeting of the committee on subjects of the American Electric Railway Association was held on Nov. 21 at New York to decide on the topics of the papers to be read at the midyear convention of the association. This meeting will be held during the latter part of January, 1912.

At the meeting were C. Loomis Allen, Utica, N. Y.; James D. Mortimer, Milwaukee, Wis.; E. C. Foster, New York City, and the presidents of the four affiliated associations, P. S. Young, Jersey City, N. J.; E. O. Ackerman, Columbus, Ohio; H. K. Bennett, Fitchburg, Mass., and J. N. Shannahan, New York City. An interesting program was drawn up and will be announced by the secretary before long.

LAYING A 60,000-VOLT CABLE

Since the publication of the article on "Power and Transmission Methods of the Prussian-Hessian State Railways" in the issue for Nov. 4, 1911, particulars have become available of the laying of the 60,000-volt cables furnished by the Siemens-Schuckert company. This voltage is so high that particulars of the work are of interest.

The individual lengths of this cable varied from 2130 ft. to 2700 ft. The cable drums, weighing about 15,000 lb. including cable, were mounted on railroad flat cars equipped with wooden jacks so that the cable could conveniently be taken to the place where it was to be laid and reeled off as needed. The train was then moved slowly along and the cable was reeled off and lowered directly into the cable trench. Each day two lengths were laid side by side, as the trench could not be left open over night. The trench was dug about 26 ft. deep alongside of the outer track.

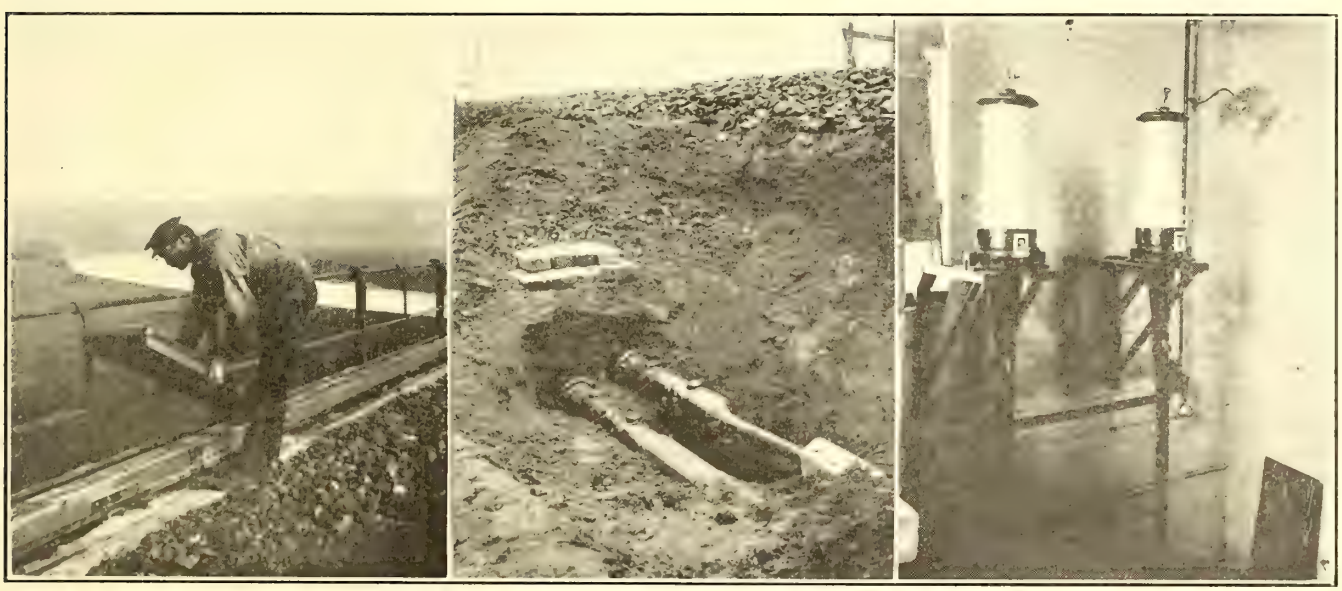


Method of Laying Cable

The cables were laid in sections of two-part conduit clay piping which was filled with sand. This piping was not considered sufficient protection for the cables where installed on the land adjacent to the generating station, and for this reason a layer of thoroughly baked bricks was placed over the clay piping. The cable was carried over the railroad bridges in wooden cases having a packing of tar paper and filled with sand.

Five junction boxes had to be installed in each of the two cables laid in the trench. These boxes were mostly placed in the slope at the side of the roadbed. The junction boxes consist of a cast-iron case with conical ends which were soldered to the lead sheath of the cable. The aluminum conductors were connected by means of clamps which were covered with insulating paper of heavy texture. The junction boxes were then filled with an insulating compound. The joints were made inside of wooden shacks built over the junction places on account of the cold weather, the laying of the cable having taken place in November and December. Two layers of bricks were placed over the junction boxes to protect them from injury.

The places along the roadbed where the boxes were placed are indicated by enameled signs. The position of the cable is shown by indicators along its full length. The indicators consist of inverted cast-iron boxes which are laid almost flush in the ground. On the inside is attached a length of wire cable, and to the other end of this a cast-iron cross, which is laid next to the cable and which acts as an anchor for the box.



Cable Protection, Cable Junction and Potheads

Potheads are installed in the power plant and the substation. They consist of a cast-iron lower part and an upper part of porcelain with a metal cover. The metallic lower part is soldered to the lead sheath of the cable. A brass rod, passing through the cover of the pothead, is

screwed onto the aluminum conductor, and to this are connected the conductors to the busbars. The entire pothead was filled with insulating compound after connections were made.

There were two objects in placing the transmission cir-



A Turn in the High-Tension Cable

cuits underground, the principal one being the immunity from atmospheric disturbances and the other the desire to hide them from the view of any rioters or invading army in case of war.

PROGRESS ON POWER AND OTHER IMPROVEMENTS OF NORTHERN TRACTION & LIGHT COMPANY

The development work now projected by the Northern Ohio Traction & Light Company is one of the largest in the United States. The demands upon this company in railway, lighting and power departments have practically outgrown the capacity of the property.

The business of the rubber companies located in Akron has increased at a phenomenal rate, demanding increased power facilities on the part of the Northern Ohio Traction & Light Company. In addition the general industrial development throughout the territory served has been so great as to require additions to plant and changes in the physical condition of the property to an unprecedented extent.

To meet the conditions that have arisen the Northern Ohio Traction & Light Company through a subsidiary, the Northern Ohio Power Company, is establishing an entirely new power system on its northern division. Brief mention of this project has been made in previous issues of the Electric Railway Journal. A new steam turbine plant of 35,000-hp capacity will be built on the Cuyahoga River between Akron and Cuyahoga Falls. For fourteen years the company has owned water rights on the Cuyahoga River at this point with 105 ft. available head. To supplement the steam plant a hydroelectric plant is being established with a capacity of 3000 kw.

The generating equipment at the steam plant consists of three 60-cycle, three-phase, 1800-r.p.m., 7000-kva turbo-generators; two 150-kw direct-current, 250-volt turbo-generators for exciters; nine 1100-kva, oil-insulated, water-cooled transformers for changing generator voltage to 7625 volts for use with star-connected grounded neutral service, giving 13,200 volts transmission; one 20-kw motor-generator set; three 55-kva transformers, 2300 to 440 volts, and one main switchboard for controlling above apparatus and outgoing lines.

A contract has been placed with the Westinghouse Electric & Manufacturing Company for the entire electrical equipment including substations. One substation will be located within the steam plant and will have 1000-kw capacity in rotary convertors. Another substation, to be located within the city of Akron, will have 4000-kw capacity for the railway lines and 5000-kw capacity for lighting. One substation, to be located at Bedford, will have 1000-kw capacity and will replace an obsolete steam plant at that point. Another substation will be placed at a point midway between Bedford and Cuyahoga Falls and will have 500-kw capacity. A substation with 500-kw capacity will be established at Kent, Ohio. A substation to be located at South Akron will have 3000-kw capacity and will be used for the lighting, power and railway departments. The company is changing from 25 cycles to 60 cycles two 600-kw substations located on the line connecting Canton and Akron and one 800-kw substation at Barberton, which furnish power for light and railway purposes. In the new development 60 cycles will be used throughout.

The power house at Akron now under construction will contain fourteen Babcock & Wilcox boilers of 600 hp each, normal rating. Taylor stokers, Le Blanc condensers and a Custodis stack, 275 ft. high and 16 ft. in diameter, will be provided. A dam 64 ft. high and 450 ft. long, made of Ransome hollow concrete pattern, will serve a double purpose. It will create a lake nearly 2 miles in length and with an average depth of 40 ft., which will be used both for hydroelectric and condensing purposes.

A 90-in. penstock will be carried 3000 ft. below the dam to supply the hydroelectric plant, in which there will be installed water turbines made by the Trump Manufacturing Company, of Springfield, Ohio, and electrical apparatus made by the Westinghouse Electric & Manufacturing Company.

A private right-of-way is being acquired for 13,000-volt, three-phase, high-tension lines, the city of Akron, 3 miles away, being fed by duplicate lines. Steel towers constructed by the Archbold-Brady Company and 45-ft. and 50-ft. Georgia pine creosoted poles, set in concrete, will be used for transmission. Stranded copper wire with hemp core will be used throughout. The steel cross-arms will be of the heaviest character. Ground wires will be installed on the top of all poles for lightning protection. The sizes of copper wire vary, but none will be less than No. 1 B & S. Each transmission line plant to Akron will consist of three 35,000-circ. mil copper wires.

The substation in Akron will be located in a new terminal building, to be constructed within one block of the business center of the city. The terminal building will contain the general offices of the Northern Ohio Traction & Light Company, facilities for the Electric Package Agency, a train shed and general provision for both the interurban and the city lines. All electric wires, both lighting and power, will reach the terminal building under ground. A private right-of-way is being acquired for the use of the company's interurban lines which enter Akron.

The South Akron development includes, besides the substation, a carhouse and shops. Work upon this improvement has already been begun. The carhouse will have capacity for seventy-five interurban cars and shop facilities sufficient to take care of all the requirements of the entire interurban system, comprising more than 200 miles of track.

All buildings will be thoroughly fireproof and attention will be given to architectural effect. The original Akron, Bedford and Cleveland line of the company is now being relocated on private right-of-way and double track is being constructed. When this trackage is completed into Akron and proper improvements are made in Cleveland for a four-track line—including the subway which is now under construction by other interests and will reach the center of Cleveland—trains can be operated between the center of Cleveland and the center of Akron entirely on private right-of-way and in an hour. The running time of the limited interurban cars between these points is now one hour and forty minutes.

Papers at the C. E. R. A. Convention

Abstracts Are Published of the Five Papers Presented at the Convention of the Central Electric Railway Association, Held at Louisville, Ky., Nov. 23

SUBSTATION OPERATION

BY J. E. COCHRAN, SUPERINTENDENT OF LINES AND SUBSTATIONS OHIO ELECTRIC RAILWAY COMPANY

The companies forming this association have in their service about 525 substation operators. The majority of these men receive very little training; many of them are placed in charge of thousands of dollars' worth of equipment as soon as they have learned the sequence of opening and closing the switches, and without any knowledge whatever of the reasons why they do so or what the results of an error might be. How often we hear of a rotary being destroyed because the operator was away from the machine room during a high-tension failure, or of an employee of a power plant or substation being electrocuted because some operator was asleep and a rotary was running inverted. The death toll of linemen has been very great as the result of careless handling of the high-tension switches by operators. The state railroad commissions insist upon the proper training of men employed in the train service, and general managers should insist upon the proper training of substation operators for the reason that an ignorant or careless operator through failure of equipment in his care will make ineffective the entire train schedule no matter how carefully prepared. The successful operation of substations is purely a question of the personality of the substation employees and the head of that department. The fact that there is but a small amount of manual labor required of an operator has set a low rate of wages for this particular service. Wages lower than those received in other occupations necessitate the employment of men who are content to work for small wages because of the fact that there is but little physical effort required of them.

There are but two classes of men to whom substation work appeals who are worth while for a company to employ. One class is composed of men past the prime of life who are physically unable to perform hard labor and who desire positions where they are not exposed to severe weather conditions. It has been my experience that these men, past forty-five years of age, make the most dependable and trustworthy operators, especially for night duty. The other class is composed of young men, graduates from high school, who are desirous of gaining electrical knowledge and experience while earning money enough to pay for their tuition in some university. These young men are usually very industrious and trustworthy during their time of employment, which is usually from one to two years.

Unfortunately from an operating standpoint many substations are located in towns and villages where the operator is required, in addition to his duties as substation attendant, to act as passenger, freight and express agent. The complex freight and passenger tariffs and the very stringent rules of the railway commissions make this position very hard to fill. The operator is not only required to have an electrical and mechanical knowledge, but he must be an accountant and well versed in railway rules, and he must be a diplomat with the courtesy of a Chesterfield if he fills his position to the satisfaction of both the company and the traveling public. There is no position connected with railway operation that is harder to fill and requires more tact and good judgment than that of an agent in the average small town of from 2000 to 10,000 population.

There are very few men who have both clerical and mechanical ability, and the usual result is that when an operator is promoted to a position where there is considerable agency work he soon loses interest in the electrical equipment, and his services as an operator become most unsatisfactory, while he may develop into a good transportation man. In such a case this man should be transferred to a larger agency that has no substation in connection with it. Were there no clerical work connected with any substations the selection of operators would be a very easy task. It is a regrettable fact that a large number of the men who have good mechanical ability have a very limited education.

In my department we have sixteen substations, ten of which have agencies connected with them. We have made it a rule to select all our agents from among the substation operators, promoting them to the more responsible positions on merit and not on seniority. With promotion as a reward there is some incentive for bright young men to enter the service, put forth their best efforts and grow up in the business. This also gives the management an opportunity to study the character of each man and assist him to develop along the line in which he seems to be the strongest. We often find men who are indifferent operators but are very successful in some other department. We have linemen, trainmen, dispatchers and clerks who received their first knowledge of railway work and discipline in a substation.

These men are recruited from all walks of life. Among the thirty-six operators we now have employed, the following list gives an idea of the great difference in their previous occupation: Three locomotive engineers, seven stationary engineers, seven laborers, two farmers, five bookkeepers, three printers, one plumber, three machinists, two linemen, one liveryman, one lumber dealer and one carpenter.

Of this number two were experienced operators, having been in the service of other companies. Four had had some small experience in the operation of motors or generators. The remaining thirty had no electrical knowledge whatever, and at least twenty of them had never been inside of a substation before they applied for positions with this company.

The length of their services in years has been as follows: One has been in the service of the company for seven years, four for six years, two for five years, five for four years, eight for three years, three for two years, five for one year and eight for less than one year.

Very few men seek other employment after they have seen three years' service. Most of the men who have climbed to better positions have done so before the end of their second year. About 50 per cent of the men engaging in this work remain less than six months.

A large part of the failures are due to nervousness. Night work, electrical storms and overloaded rotaries are very trying and not conducive to peace of mind.

We now have men employed in the various offices who were almost nervous wrecks after having "bucked" a rotary a few times. Ex-locomotive and stationary engineers, as a rule, are the most satisfactory operators. In their former occupations they have formed the habits of close observation and strict attention to duty.

Country-bred young men who have received a good education have been our most successful agents. They are usually keen-witted, anxious to learn, honest, amenable to discipline, have formed few vicious habits and are not afraid to work.

School teachers and young men who have been employed in the factories of the larger cities have been failures in nearly every instance. Only in extreme cases do we employ an experienced operator who has been in the service of some other company. The same motive that would

cause such a man to leave his former position would prevent him rendering us good service. It has been my experience that this applies to all departments.

Good, experienced men do not often need to hunt for employment. The vicious and incompetent are always seeking new fields.

Owing to promotions, resignations and dismissals we are compelled to employ about twenty-five new men each year. For this reason it has been necessary for us to adopt some definite method of training, which is as follows:

When an operator is employed he is placed under the care and instruction of one of our best operators for ten or fifteen days. He is instructed in all of the duties of an operator and is taught the names and uses of all of the apparatus. At the end of a week or ten days he reports to my office for examination; he then receives from three to five days' more instruction, is again examined, and if found capable is placed upon the extra list. During his spare time he is sent to each of the other substations so that he may be familiar with their conditions should he be called upon to work in any of them. As soon as there is a vacancy he is assigned to the night "trick" in some station. If there is an agency in connection with it and he takes an interest and develops along that line, when there is an opening he receives an opportunity to show his ability as a day operator and agent. If successful his next promotion will be to an agency at one of the larger stations.

If he does not show any inclination toward clerical work his promotion will be from night operator to day operator in some station that has no agency in connection with it; from there he may be taken to any of the mechanical or electrical departments. All of our operators work straight nights or days; that is, there is no changing time of duty, except by promotion. My experience has been that this method is more satisfactory than alternate weeks of night and day duty.

We have procured from the makers of our apparatus their instruction books on the operation of rotaries. The books contain full instructions for operators, with wiring diagrams and photographs of different installations. On these books is placed an additional manila cover and they are placed in each substation.

Inserted in each instruction book is the following typewritten list of questions:

QUESTIONS FOR SUBSTATION OPERATORS

1. Define volt, potential, emf, tension.
2. Define ampere, coulomb.
3. Define watt.
4. Define kilowatt.
5. Define ohm.
6. What do you mean by direct current and alternating current?
7. What is meant by positive and negative leads?
8. What do you mean by series connections?
9. What do you mean by shunt connections?
10. What do you mean by parallel connection?
11. Define open, grounded and short circuits.
12. Name the different kinds of transformers in a substation; for what are they used?
13. What circuits are taken from the shunt transformers?
14. What circuits from the series transformers?
15. How would you disconnect series transformers in case of trouble?
16. How do you distinguish between primary and secondary circuits?
17. What is the voltage of the primary and secondary circuits of the shunt transformers?
18. What clearance ought high-tension lines to have?
19. Why should a high-tension line be grounded before attempting to work on or near it?
20. What care should be given transformers, oil switches and alternating-current lightning arresters?
21. What is the object of choke coils in primary of station transformers?
22. What is the object of reactive coils in secondary of station transformers?
23. What takes place when oil switches are tripped during a short circuit or ground?
24. Give regular order of closing and opening switches starting with direct current; also for starting with alternating current.
25. Give order of shutting down of rotary.
26. What would be the result if you should start the rotary with direct current and the alternating-current switch was at half voltage?
27. What would be the result if you should close the alternating-current starting switch to half voltage and the shunt field break-up switch was closed?
28. What attention should be given rotary when shut down?
29. How would you start rotary if voltmeter was open-circuited?
30. What is the object of the oscillating device?
31. What is the object of the speed-limit device?
32. What attention should be given to the circuit breakers?
33. What attention should be given to the alternating-current and direct-current brushes?
34. Why should the direct-current rocker arm never be moved from the position where it is marked to stand?
35. If in starting a rotary the voltmeter should show the voltage was reversed, what would you do?
36. How would you start a rotary if you had no synchronizing plug?
37. Describe fully the difference between series and shunt fields.
38. What would be the result if you should try to run two rotaries in parallel with the equalizer switch open?
39. How would you test for ground on trolley as to the direction of ground?
40. What is a section switch? How used?
41. How would you test with a voltmeter or series of lamps for a ground, open circuit or short circuit?
42. What attention should be given direct-current lightning arresters?
43. Why should the direct-current machine breakers and switches be opened each time the high-tension current is off?
44. How do you fuse the high-tension fused switches?
45. If you were requested to open the high-tension line at your station how would you proceed?
46. How would you ground high-tension?
47. What would you do in case someone was seriously shocked in your presence?
48. What would you do in case of fire?

These questions are used as the basis of all examinations. They were compiled several years ago, and we have very few operators who have entered the service since that time who are unable to answer intelligently the most of them. A man may be a fairly successful operator and not be familiar with the subjects inquired about, but he would be a much more valuable employee if he thoroughly understood them.

We have men who have been in the service a long time who are unable to answer them, but in case of trouble they are usually helpless and unable to make the needed repairs, whereas the better-posted operators often make slight repairs to their equipment and save long delays and dollars as well.

After a man has been assigned to a station his instruction does not cease. We hold frequent meetings either at my office or in some substation. Those for the night operators are held during the afternoon and those for the day operators at night. Most of the men take great interest in these meetings and are very anxious to attend. More meetings are held with the night operators than with the day men, because more of the day men have passed the critical stage and so they do not need as much instruction.

At these meetings we discuss the elements of electricity and magnetism. With new men these subjects are usually taken up in the form of a lecture of about two hours. We also discuss all matters pertaining to the care of equipment, the best methods of operation and the making of emergency repairs. We trace all of the wiring circuits and explain the use and construction of all instruments and appliances, and in fact touch upon all matters pertaining to substations. These meetings are very often attended by members of other departments, especially the dispatchers. We have found them to be of great social benefit to all the men, inasmuch as they become acquainted with one another and learn of conditions under which others are working.

LIGHTNING PROTECTION

BY E. J. BURDICK, SUPERINTENDENT OF POWER DETROIT UNITED RAILWAY

This subject is of such vital importance that in a great many cases it has been the one thing that has determined the location of generating stations, transmission lines, etc., as it is well known that lightning troubles are more pronounced in mountainous countries and along lakes and streams than in countries that are more level and farther inland. This is particularly the case in engineering projects in connection with long-distance transmission lines, and although engineers in charge of projects of this character appreciate the fact that there are a great many excellent lightning arresters upon the market, it is their duty to locate their lines in such sections as to eliminate as far as possible those static effects. If due care is exercised in the routes and locations and if modern means and apparatus are intelligently applied and used, the trouble, with the exception of bolt lightning, may be almost entirely eliminated or overcome.

My subject may be subdivided under the following heads:

(1) Power House and Substation Protection.
(2) Distribution Protection.
(3) Car Protection.
(4) Telephone Terminal and Line Protection.

POWER HOUSE AND SUBSTATION PROTECTION

It has been my experience that the best protection on the lines and in the power houses is none too good, and that after this protection is once installed it should have careful inspection, and although these inspections should be made at certain defined intervals, it is also good practice to have the arresters looked over after every heavy lightning storm. Unless a definite system is conscientiously followed the lightning arresters may easily be neglected.

In the direct-current power houses of the Detroit United Railway we protect against lightning in every manner possible. Wherever a feeder circuit enters the power houses it is customary to put a choke coil in circuit with it. This coil is located on the rear of the feeder panel. Back of it, or on the line side, is connected a lead consisting of a No. 4 B. & S. wire which follows in a straight line to a fuse box located on the back of the panel. From this point a connection is made directly to the lightning arresters which are maintained in the basement directly under the feeder circuits. These lightning arresters are connected by large cables to the water-piping system of the plant. Besides these arresters, we protect with the method known as the tank lightning arresters and with the fuse arresters. These tank lightning arresters and fuse arresters are directly connected to the busbars, so that should a static discharge get by the choke coil and arrester on any individual feeder to the busbar we have two further chances to divert it before damage is done to the generators. Even with this extreme precaution and with lightning arresters thoroughly distributed upon the line and each car protected in a manner which I will describe later, we had an experience some ten years ago of having four of our generators put out of commission by one discharge. This, of course, was very serious. We immediately made an investigation, which proved that on our large mass of wires, coming into the power house as they do, some further protection was necessary. At this time protective wires were being discussed and tried in different parts of the country. After investigation my conclusions were that they were well worth trying on these cables and particularly on the leads and cables which run from power house to power house and are located in close proximity and run as one unit. This was immediately done by installing extra iron cross-arms on top of the iron poles upon which were strung six barbed wires that formed a "cradle" or "umbrella." These barbed wires were tied together and grounded by means of No. 0000 cables and coke baskets buried in the earth at several different points. The results were most gratifying, for this installation eliminated further trouble. Formerly our stations used to be thrown from the line once or twice during every severe lightning storm, but since this protection was installed we have had a consecutive run of more than eight years without losing power in our stations from this or any other cause.

In our several suburban power houses and substations from which high-tension distribution emanates we protect with choke coils and lightning arresters in somewhat the same manner as that just described except that all high-tension lightning arresters are cut through disconnecting switches, so that in case of difficulties in the lightning arresters the arresters may be cut free from the circuit. These disconnecting switches should be cut in the circuits leading from the lines to the arresters and not in the wire leading to the ground. If such a switch was cut in the ground wire instead of in the wires leading to the arresters and the difficulty was in the arresters themselves, one or more of the phases might be short-circuited. In cases of this kind we have found that the operator may be confused. He might assume that if this ground switch was open his lightning arresters were free and clear, although that might not be the case. Therefore arrangements should be made to cut the arresters from the line.

In substations or power houses where rotary converters or motor-generator sets are installed the d.c. side is protected as in our direct-current power houses. Rotaries located in power houses and run directly from the station generators should be carefully guarded, because they do not have the interconnecting link of the static transformers. Hence lightning can get directly to the a.c. machines.

The effect of a lightning or static discharge upon the generators in the power house, if the discharge does not break down the insulation and burn out the machines, is quite likely to set up inductive influences in the armatures and field windings to such an extent that either the voltage of the machines falls or the machines become reversed. The consequence is that the other machines which are running in parallel with the machines affected immediately start to "motor" the affected apparatus, with the result of an overload upon themselves. Therefore the whole station is thrown from the line. It is a serious matter in a large system to lift the load, although no particular damage may be done in the station. This is particularly so if the system of distribution is thoroughly and properly equalized. The same result is apparent in substations. Power and substation operators should be thoroughly trained as to what to do in cases of this kind, especially if the polarity is reversed.

It might be well to add that static discharges do not always arise from atmospheric conditions, but that static strains or oscillating currents may be caused from innumerable effects, such as opening of switches, short-circuits, grounding of lines, etc. These different actions, however, may set up oscillating currents which may surge backward and forward to seek relief at the weakest point in the installation. They may become of such high potential

that they will break down at some point in the installation unless proper precautions are taken. In other words, good lightning arresters may not only protect from lightning but may also act as safety valves upon the lines to protect them from any abnormal pressures.

DISTRIBUTION PROTECTION

It has been the custom of the Detroit United Railway in protecting its d.c. distributions not only to make use of many properly installed lightning protectors, but also to establish fuse arresters at certain equalizing stations and at carhouses where there are attendants. This fuse arrester is a home-made affair, but it has been found very effective where it can be used. Besides these two different methods, the overhead guard or protective wire, as previously described, may be installed over the main feeder leads or where these cables come into the equalizing station.

High-tension transmission lines, outside of their choke coils and lightning arrester protection in the power house, should also be protected with the overhead guard or ground wire. This is one of the best methods that can be used unless the lines are of sufficient length to warrant the establishment of transfer or protective houses at different intervals. These overhead wires not only perform the function of guarding these wires but also relieve them of static stresses, and, further, they are not subject to the many weaknesses of the lightning arrester. Therefore I cannot impress upon you too forcibly the fact that overhead protective wires, properly grounded and maintained, will produce results and pay for their installation in any kind of distribution work.

There are several other methods which have recently come to my notice and are proving satisfactory in some cases, but I have never had any personal experience with them. One of these is a system of arc rings installed around each insulator. These rings take the arc when the flashover occurs and prevent it from getting underneath the skirts of the insulator and bursting them. Another method uses the high-tension, horn-type arrester and choke coils. It was formerly considered good practice to install these arresters only at points that were convenient and near the power house. On some of the later transmission lines, however, they have been installed on special platforms, or cross-arms at intermediate points upon the line.

CAR PROTECTION

The method of car protection is comparatively simple. Our practice is to install choke coils of ample capacity in the vestibules with inclosed lightning protection tapped off above the choke coils through a suitable fuse to the ground connection on the truck frame.

It is asserted by competent engineers that the rail should be thoroughly grounded at frequent intervals, particularly where the roadbed is an elevated structure, where stone ballast is used, or in very dry and sandy localities. Their theory is that the rail itself becomes electrostatically charged and that a difference of potential between the rail and the moist earth where the lightning arresters are grounded will cause a backlash from the rail up through the motors to the trolleys and from the trolleys back through the lightning arrester rods, thereby burning out the motor equipment. This may seem to be a very circuitous route for the static charges to take, but it is well for all operators to take this theory into consideration.

TELEPHONE TERMINAL AND LINE PROTECTION

In connection with telephone terminal and line protection we have found that it is good practice to use the regular repeating coil in all of our terminal stations, and at all places where we have attendants the ordinary heat coil connected in the circuits by means of clips and held in place by springs to keep the heat coil under tension. Besides these heat coils, we also take taps from our lines. These taps run directly to two small carbon plates, which carbons are insulated by small pieces of tissue paper. The carbons are held together firmly by springs; one of them is connected to the line and the other to the ground. When a lightning discharge takes place, or the line is subjected to high potential, the small piece of tissue paper used as insulation breaks down and the heat coil opens up. We have found that this simple method gives very good results in practice.

INSTALLATION AND MAINTENANCE OF LIGHTNING PROTECTION

All lightning arresters should be located in a clean, dry place so that they can be easily inspected and repaired. All wires used in connecting arresters should be of ample size and should be carried in as direct a path as possible to the arrester and from the arrester to the earth, because coils and bends in the wire have a tendency to impede lightning discharges.

In most lightning arresters one of the inherent defects lies in the condition that difficulties do not usually come from lightning or static discharges but are more often caused by the following up of the static current by the dynamic curent, which causes considerable trouble or destroys the arrester itself. In a.c. work, particularly, it is very noticeable that such an action occurs at one time and not at another. This action is attributed to the fact that if the discharge comes at such a point in the line wave that the potential is at or near the zero mark the dynamic current does not follow over the lightning arrester gaps, but that it may follow if the potential is at or near the maximum point.

In many cases lightning arrester wires have been installed in iron pipes which were used for mechanical protection. This is very bad practice, because the pipes act exactly like a choke coil and therefore make the arrester ineffective. This effect also takes place in lightning arresters which are mounted in iron boxes. Both classes of construction should be avoided.

The grounding of arresters has received much attention. My own theory, which may be considered as a hobby, is that lightning arresters, particularly those near a power house or substation, should not be grounded directly to the rail if a reasonably practicable ground can be obtained in moist earth. There are two reasons for this: First, the rail itself may not be of as low a potential as the earth from an electrostatic standpoint, unless the rail is grounded at frequent intervals; second, we are certain that the rail is of a lower or greater negative to the generator than the earth from a dynamic standpoint. It is therefore possible for these static discharges not to seek the earth at the point where connection is made to the rail but to follow the rail back to the power house, through the apparatus to the many pipes that are located in the buildings to the earth at this point. Furthermore, if the lightning arrester should hold over—that is, if the dynamic current should follow up the static discharge—the tendency is to short-circuit across the lightning arrester to the rail, thereby destroying the arrester. On the other hand, if the lightning arrester is grounded to the earth, which I think is correct, the dynamic current has to pass through the arrester and its connecting wires through the earth to the rail, where it is seeking the generator negative. It will readily be seen that when some resistance has been thrown in circuit for the dynamic current to follow over there is less liability of the short-circuiting and the destruction of the lightning arrester itself. In other words, I think it is proper construction to ground the rail at frequent intervals but not at the same point at which the lightning arresters are grounded.

Finally, I wish to impress upon you most forcibly the importance of systematic inspection. It is one of the most vital points we have to deal with in protecting all classes of power houses and distribution lines. Make a study of your conditions and above everything else give your lightning arresters a chance. Systematic inspection and proper reports will pay large dividends upon the time and money expended.

ELECTRIC LOCOMOTIVES FOR INTERURBAN FREIGHT HAULAGE

BY F. E. WYNNE, WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY

The purpose of this paper is twofold: First, to call attention to a few facts in connection with the present status of interurban freight haulage, and, second, to outline a method for quick approximate selection of a locomotive for a given service or to determine the approximate performance of a given locomotive.

The report of the Ohio Railroad Commission for 1910 gives some interesting data regarding earnings from freight traffic. In addition to passenger revenue, five other definite classes of revenue from transportation appear in the report, namely, baggage, mail, express, milk and freight. The figures for thirty roads are considered. Only eight reported earnings in all five classes. Five roads reported earnings from express but none from freight, while nine gave revenue from freight but none from express. It is probable, therefore, that there is more or less overlapping in the traffic reported under the several classes.

The revenue from the five classes combined varies between 3 per cent and 39 per cent of the total income from transportation, and the average is 13 per cent. The freight revenue varies from nothing to 31 per cent, and the average is 10.7 per cent. The average of the eight roads reporting all five classes is 18.6 per cent for the five combined and 14.4 per cent for freight alone. Nineteen of the roads show freight revenue less than the average for the entire thirty.

That portion of the freight business which is already best developed consists largely of the transportation of the products of dairies and truck farms to the cities and the distribution of merchandise to the small towns and farms. In general, the trains are made up of a motor car and perhaps one or two trailers, the motor-car equipment being the same as that used for the passenger cars except that it may be geared for lower speed. For this class of freight such operation is essential, and the service may be termed fast freight. As this traffic increases greater motive power will be required in order to maintain the speed and keep down the number of trains. This motive power may be supplied by locomotives or by motor cars with multiple-unit control, the limit to the size of trains being in substation and line capacity.

CARLOAD FREIGHT

The traffic not yet developed is, of course, problematical, but there are several sources of heavy freight, one or all of which may produce revenue for any particular railway. One of these is the handling of coal, stone, gravel and sand in carload lots. Another is raw material for factories and their finished products. Farm machinery and the heavier farm products also come in this class. Another way of increasing freight is through an agreement by which the electric lines will serve as feeders for existing steam railroads with which they connect but do not compete. In some cases it may even be found possible to use the electric line as a connecting link for freight interchange between allied steam roads which at present have no physical connections near the territory served by the electric line.

In any of these cases high speed is not necessary, and an electric railway already equipped for the operation of passenger trains of only one or two cars has ample capacity to operate freight trains of fairly large tonnage at low speed. Such traffic can best be cared for during the hours of light passenger service and at night when no other trains are on the line. Interest on the investment for the power house, substations and distributing system is going on all the time. With the established record of electrical apparatus for reliability an interurban road may operate twenty-four hours a day as well as eighteen hours or twenty hours and move traffic which it cannot at present handle in the shorter time because of lack of track capacity and limitations in the power equipment and distributing system. The extra expense for station attendance, power and wear and tear on the machinery, and, of course, the cost of locomotive crews, would be covered by the receipts from a comparatively small amount of freight.

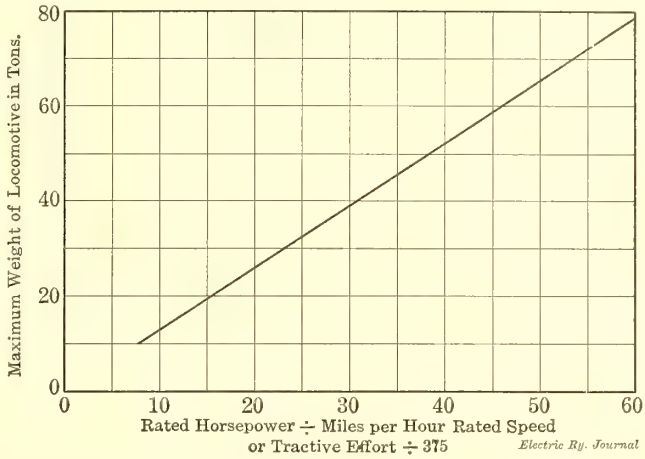


Fig. 1—Electric Locomotives—Curve Showing Maximum Weight of Locomotives for Any Capacity at Any Rated Speed for Any Rated Tractive Power

ENGINEERING CONSIDERATIONS

Granting that a carload freight business is offered or can be built up readily, the railway manager must determine the probable size of trains to be handled, decide upon the speed at which they are to operate and see that the locomotives best adapted to all his conditions are secured. The characteristics of the track, curvature, grades, rail weight, strength of bridges, etc., must be considered. The maxi-

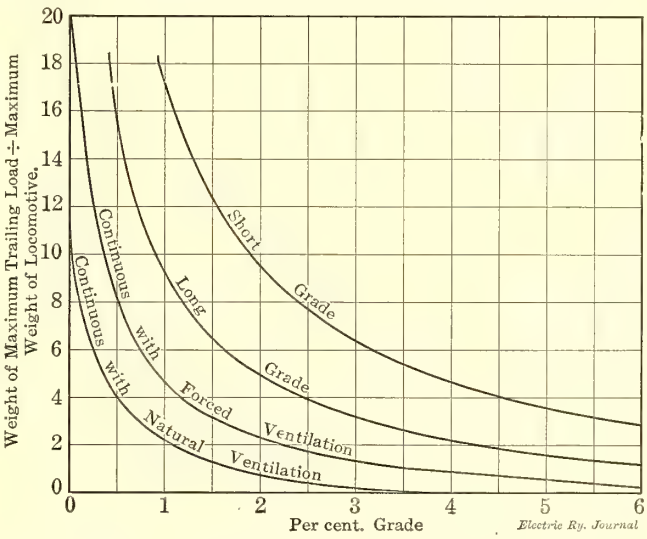


Fig. 2—Electric Locomotives—Curves Showing Number of Times Its Own Weight Which May Be Hauled by Locomotive Under Various Grade Conditions

mum current which the locomotive may safely take from the substations should be known. It is also advisable to know the probable amount of tonnage to be handled daily in each direction and at what points it will originate and be delivered. The locomotive selection may then be made, the basis depending on just what are the limiting features.

The following examples will serve to indicate an approximate method of procedure for several typical cases.

Case I. Assume that a spare equipment of four 60-hp motors is available for locomotive service and that the speed of the equipment at its rated horse-power and volt-

age is 11 m.p.h. What is the maximum weight of locomotive suitable for this equipment? The rating of the locomotive is 240 hp. The rated horse-power divided by the rated speed is 240 ÷ 11 = 21.8. From Fig. 1 it will be seen that when the horse-power divided by the rated miles per hour is 21.8 the maximum weight of the locomotive is 28.5 tons.

The next question is: What can this locomotive haul? To answer this definitely requires an exact knowledge of the profile of the road. Suppose that the road in question is practically level except for some overcrossings where there are grades of 2 per cent for 1500 ft. to 2000 ft. The curve for short grades shown in Fig. 2 is used. At 2 per cent this curve shows that the locomotive can haul 9.6 times its own weight, or the maximum trailing load is 9.6 × 28.5, which equals 273 tons. The average loaded freight car in many sections is from 35 tons to 40 tons gross weight, so it appears that this locomotive can haul seven or eight average loaded cars.

The above determination of tonnage should be checked against the load which the locomotive can handle continuously under average conditions. The assumption was made that the road was practically level. Assume further that the motors are naturally ventilated; that is, that no blowers are used. The curve on Fig. 2 for continuous natural ventilation shows that on a perfectly level grade the locomotive will haul eleven times its own weight, or 313 tons. Hence in this case the short 2 per cent grade is the feature limiting the tonnage. To find the speed running free on the level with the maximum tonnage use Fig. 3. This shows 17 m.p.h.

Case II. Suppose the road is not practically level but is in a rolling country, and that, in addition to the short 2 per cent grades, there are a number of grades of 1.25 per cent, each from 2 miles to 2.5 miles in length. Fig. 2 shows that the maximum trailing load on long grades of 1.25 per cent is 7.7 times the locomotive weight, or 220 tons. If under these conditions the two ends of the road have nearly the same elevation, the equipment will probably haul the load of 220 tons continuously with natural ventilation. If, however, the ends of the line have considerably different elevations, forced ventilation may have to be applied or else the average load must be reduced below 220 tons.

Case III. Suppose a locomotive with a rated speed of 14 m.p.h. is desired, and that the construction of the roadway limits the weight to 47 tons. What is the minimum equipment for such a locomotive? Fig. 4 shows that at 14 m.p.h. the minimum rated horse-power per ton is 10.6. Hence the rating of this 47-ton locomotive should be not less than 500 hp and the equipment not less than four 125-hp motors. The performance of this equipment under the conditions pertaining to the road in question may be determined as previously described. If it is not sufficiently large more powerful motors may be applied up to the point where the dimensions and weight of the equipment would require a locomotive having a minimum weight of 47 tons.

Case IV. Assume long and short grades as in Case II. What weight of locomotive will be required to handle 500 tons trailing load? Further assume that the nature of the road is such as to be equivalent to a continuous pull up a 0.3 per cent grade. What is the minimum equipment for a locomotive if forced ventilation is used and the free running speed on the level is 12 m.p.h.?

The short-grade curve in Fig. 2 shows that a locomotive will handle 9.6 times its weight on the maximum grade. The continuous forced-ventilation curve of Fig. 2 shows that on a 0.3 per cent grade the locomotive will haul 10.7 times its own weight. Hence the short 2 per cent grade fixes the locomotive weight, and this should be not less than 500 ÷ 9.6 = 52 tons. Fig. 4 shows that at 12 m.p.h., with forced ventilation, the minimum equipment should have 7.6 hp per ton. Hence the locomotive should rate 7.6 × 52 = 395 hp. The equipment should be four 100-hp motors, geared for 10 m.p.h. rated speed and provided with forced ventilation.

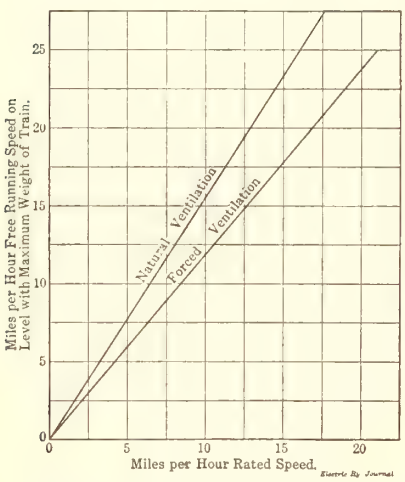


Fig. 3—Curve Showing Relation Between Rated Speed and Free Running Speed on the Level with Maximum Weight of Train

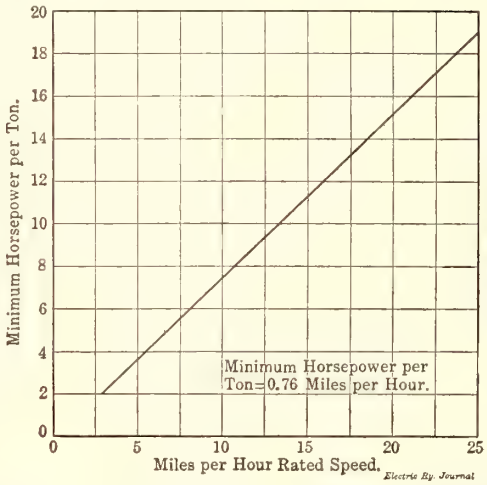


Fig. 4—Curve Showing Minimum Rated Capacity in Horse-Power per Ton of Any Locomotive at Any Rate of Speed

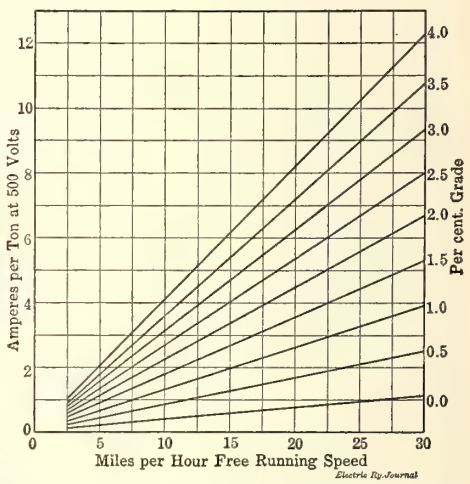


Fig. 5—Curves Showing Current Required by Locomotive for Any Free Running Speed on Various Grades

USE OF CURVES

Numerous other cases varying the known quantities might be assumed, but the foregoing will sufficiently illustrate the method of using the curves. In making use of these curves it should be remembered that the results are only approximate and may be materially altered by other conditions in any particular case.

The current demand for a freight train depends primarily upon the speed, train weight and grades, and secondarily upon the alignment, average weight of car, frequency and duration of stops, etc. The size of locomotive, speed and train weight should be adjusted to the capacity of substations and line in so far as the demands of the traffic will permit.

The curves on Fig. 5 will be found useful in selecting the maximum weight of train to be handled within any fixed current limit. To illustrate its use, suppose the maximum grade on a road is 3 per cent for 1.5 miles, and it is so located that all the power for climbing must be taken from a 500-amp substation. A speed of 8 m.p.h. is desired on this grade. For such a grade the substation may work at 50 per cent overload; that is, it will deliver 750 amp. Fig. 5 shows that at 8 m.p.h. on a 3 per cent grade 2.5 amp per ton are required. Hence the maximum weight of train at this speed is 750 ÷ 2.5 = 300 tons, including locomotive

weight. If 6 m.p.h. were sufficient speed 415-ton trains could be operated. If 12 m.p.h. were desired the train weight would be limited to 200 tons. So the effect of speed on power demand is apparent. On any specific road, therefore, the choice lies between speed and tonnage in a single train.

In making use of these curves it is necessary to remember that the gear ratio must be chosen so that the desired speeds will be obtained. In general, the lowest speed gear which an equipment will take is found most suitable for locomotives. The curves give approximately maximum locomotive weights and minimum capacities which may be used under various conditions. A careful and detailed study of service requirements will often show that the most suitable locomotive varies slightly in weight or capacity from that indicated by these curves.

PUBLICITY AS A FACTOR IN ELECTRIC RAILROADING

BY J. J. ROCKWELL, SPECIAL SERVICE DEPARTMENT M'GRAW PUBLISHING COMPANY

The terms "publicity" and "advertising" are frequently, in fact almost generally, used synonymously. Yet in reality they have very different meanings. The publication of a statement of the earnings of a railway company is publicity, but it is not advertising. Likewise, a printed statement that a certain manufacturer makes certain motors is publicity, but it is not advertising. Here is the same peculiar difference and distinction which exists between taking orders and salesmanship. One is passive, the other is active. One is a follower and supplier of demand, the other is a creator and maker of demand.

I believe that the members of this association and of most other commercial bodies, when they are speaking and thinking of publicity, really mean advertising, because the commercial use of the printed page to-day, generally spoken of as "publicity," is really intended as a means of inducing people to think along certain lines and consequently to take certain action as a result of that line of thought.

No discussion of the term "publicity" can be adequate or instructive without consideration of the meaning of the term "advertising," because really publicity is contained in and is a part of advertising, as advertising is recognized in commerce to-day. To make this perfectly clear, let us refer again to my statement that the publication of a statement of the earnings of a railway company is publicity, not advertising. If the statement of earnings be coupled with certain arguments calling attention to certain points in the statement and showing what the figures indicate, what the success of the road actually and potentially is by reason of the conditions which have developed these figures, showing the effect of these figures on the stockholders' and bondholders' interests, and supplementing the statement by arguments as to the degree of service which is being rendered to the community by the road which is showing these earnings—in short, if the statement is a general argument with a view to making certain people, such as those in the community in which the road operates, think along certain lines and thereby creating a certain attitude toward the railway company which had not previously existed, then this statement becomes advertising.

Here again you see the analogy between publicity and advertising, and taking orders and salesmanship.

If I am a salesman of trolley wheels, and I call at the office of one of you gentlemen, present my card and say that I am selling trolley wheels and nothing more unless at the time of my call you are in the market for trolley wheels and unless you take the initiative and delve into my proposition, thus finding out what I can do for you in the way of quality and price, then I shall neither make a great impression on you nor cause you in any way to change your methods or actions with regard to the purchase of trolley wheels.

You do not hold in high regard the salesman who calls at your office, presents his card and then quietly sits by waiting for you to buy the goods which he has for sale instead of proceeding to sell them to you. Yet that is precisely what a railway company does when it publishes certain dry facts relative to itself without utilizing the potentiality of those facts for argument, for logic, for persuading traffic to come into a given line and for making the community through which the line runs look upon the activities of the road with a favorable, rather than an unfavorable, eye. Yet such a railroad calls these bald and uninteresting statements advertising and charges them to its advertising account.

WHAT ADVERTISING CAN DO FOR A RAILWAY

Let us, then, consider what publicity, or rather advertising, which is the proper term, can do for a railway company. What is an electric railway? Does it differ essentially from a great manufacturing plant, designed and built to manufacture and sell a certain product that will provide a certain service?

Is it not, in fact, a plant built to manufacture a certain kind of service and to sell that service, at a profit, of course, to the community through which it operates?

Where, then, as a manufacturing and selling proposition, is there any fundamental difference between the railway company and the manufacturing company? And why, then, should not electric railways make use of the power of advertising as do other manufacturers? Recognize first, however, this peculiar difference, namely, that the customer of an electric railway, that is, the community which it serves, controls its destiny to a far greater extent than does the customer of a manufacturing establishment. This is only another way of saying that even to a greater extent than in the case of the manufacturing establishment the railway company must enlist and depend upon the goodwill of its customers, and this desired relation can be developed by the proper kind of advertising.

Think of the story which could be told for the electric railway company. The city road has tremendously increased the business efficiency of this country by its service in shortening the time of traveling between the business man's home and his office. It has made shopping for the women an easy, convenient and comfortable undertaking. It has made possible for city workers the comfort, health and delights of suburban residence. It has worked wonders in the development of cities. It has added to the commerce of cities. It has tremendously developed real estate values and has made possible the development of the city beautiful.

The interurban road, more than any other factor, except perhaps the telephone, has brought comfort, sociability and happiness into the life of the farmer. It has increased the value and productive capacity of his business. It has enabled his children regularly to attend better schools. It has made of him a business man instead of a mere digger of the soil. Yet, contrary to the facts in nearly every other development of this kind, the electric railway has accomplished these results at costs to the community so small that they have represented an actual reduction in the cost of living rather than an increase in it. And for all this wonderful improvement in the efficiency and comfort of life of the community the electric railway has asked only the reward of a fair return on its capital and the investment of sufficient capital to enable it to produce this service.

Moreover, the railway company has not rested on its laurels. It has done everything in its power, as human knowledge grew, to improve the conditions of travel by rebuilding its tracks, by providing greater safety, by installing fenders and wheel guards to protect the pedestrian on the streets, by heating and ventilating its cars, by providing

more substantial car construction and by introducing many other features in operation which increase the comfort of the passengers.

Yet, in spite of all these benefits, we find the people questioning the service, the methods and the ideals of the electric railway company. Instead of a sympathetic co-operation and assistance for the railway company, we find the people complaining and assaulting the methods of the company at every possible turn.

Now, why does this condition exist? In the opinion of this speaker it is simply for the same reason that people generally have an idea that in our modern life murders and outlawry of all kinds have increased and domestic happiness has decreased. They have not; but they seem to have increased because the incidents in which such characteristics have been shown have been given wide publicity for the sake of sensationalism, and the general improved condition of the people in these respects has not been given equal publicity.

THE RAILWAY STORY NOT TOLD

In other words, the story of the railway company has never been properly told. And in the few instances where railways have told their story they have not told it often enough and strongly enough to convince the people of the actual conditions as they exist. In other words, the railways have not efficiently and sufficiently used the modern weapon of advertising. A comparatively few cases of bad management, poor service and greedy methods in railway operation have been seized upon, magnified and given prominence in the eyes of the people to such an extent that some people have come to consider these things as typical of the business of electric railroading. To counteract this force, the electric railway fraternity has depended upon circumstances and the development of conditions, instead of making circumstances and developing conditions by interposing against this current of public thought the whole story, forcefully, strongly and efficiently told, of what electric railways mean to the people and of how many of them are being successfully and serviceably operated for the good of the community.

Advertising does not recognize conditions. It is creative. It makes conditions.

Thus, the electric railway is in the position of the manufacturer of a product (and this condition in the manufacturing field is not exceptional by any means) when the manufacturer says, "I have a better product, a better hat, or better socks, or better shoes, or a better motor, or a better trolley wheel, which I am selling at a price which will save the consumer money; yet the consumer does not buy this in quantities sufficient to make me a profit and he looks askance upon my product." When told that he has not properly informed his field of the advantages, economies and service of his product, he is surprised. He says, "Why, I have told people that I am here in this business, that I have this product and that I can serve them to advantage." Yet, in all these cases, analyses will show that he has not told his story strongly enough, efficiently enough, frankly enough, plainly enough or fully enough, and most of all he has not preached it in season and out of season until his public has come to believe.

Have you ever stopped to think that of all the great developments in civilization which have made for a better and higher human life each was, upon its first announcement and its first trial, and possibly for some long time thereafter, derided, ridiculed and scorned? The telegraph, the telephone, the automobile, the running of railway cars by steam and by electricity—all of these things in their inception and for some time thereafter were held as unbelievable and impossible accomplishments, were treated with laughter and derision, and came at last into their own only through the courage of some brave souls who stuck to the ship and forced the logic of the situation upon the community.

The average man is prone to look upon advertising questioningly, because it takes time to accomplish results, but what thing worth while in this world has ever been accomplished that has not taken time?

POWER OF REPETITION

Tell a man something once in the most convincing manner possible. Does he believe? No, he doubts. Tell him again. He still doubts and presents arguments to justify his doubts. Thereby he puts himself in a position of defense of his original opinion, and human nature is obstinate. But after he has been told long enough and forcefully enough and frequently enough, he must believe because, finding that there is no means of controverting the truth of what has been told him, it is a law of mentality that he must believe; for, as Plato says, "No soul is willingly deprived of the truth."

To produce the situation which he desires and which it is necessary for him to produce to sell his product to the best advantage, the seller must be absolutely honest, frank, open and above-board. He must conceal nothing. He must tell not only the truth, but he must tell the whole truth. So long as he evades or conceals or attempts to hide any one point, just so long will the doubt linger in the mind of the prospective buyer that his product is not all that is claimed for it.

Telling the truth, however, vital as it is to the success of any plan or campaign of advertising, is not the whole problem. I can send you two salesmen selling the same product, both of whom will tell you their story and tell you the actual truth. One of these men you will believe, the other you will not believe; yet both have told the truth. But one has done it in a way that has rung with conviction and brought that conviction to your mind, and after having once accepted his statements as truth you will act in accordance with that conviction.

And even telling the truth in a convincing way is not by any means the whole of advertising.

Commercially speaking, advertising, to be effective, must produce action. It must make persons think along the line that the advertiser desires them to think, and yet the appeal of that line of thought must be so powerful as to induce action in accordance with it.

For instance, the timetable of an interurban railway is generally a truthful statement. But there is nothing in it to produce action on the part of a man or woman who has not already thought of using the trains scheduled in that timetable. The thought, the suggestion of using the cars on that road must be brought to his or her mind in a powerful and appealing manner with good reasons why that kind of transportation should be used, and this, then, will lead to action based on the timetable of the road.

Without the influence, suggestion and inspiration of the thought which produces action advertising is merely publicity.

ADVERTISING AN ELECTRIC RAILWAY

Turn now to the practical application of these general truths for advertising an electric railway

First, of course, the advertising should be directed toward increasing the traffic of the road. Second, it should be directed to telling the people of the community the whole story of the road's operation, its methods, policies, ideals and service, as a means for obtaining and holding the good-will of the community, a good-will which, as I have pointed out, is of greater moment to a railway company than is the good-will of customers to a manufacturing organization.

Undoubtedly, the most powerful and valuable mediums for the carrying of this kind of advertising are the newspapers published in the community which the road serves. But it seems to me that if I were personally directing the advertising and publicity policies of a railway company I would change some of the methods which now exist.

I would not pay for advertising carried as a concealed

weapon in the guise of news or editorial matter. I would ask the co-operation of the newspapers in that respect only in so far as they felt it to be to the interest and benefit of the community to give it, and in accordance with the exact and truthful conditions of the situation.

If a newspaper adopted an attitude prejudicial to the operation of my road, publishing discolored and essentially untruthful editorials and news items, I would take the attitude of one of the fathers of our country in another situation; that is, I would provide "millions for defense but not one cent for tribute," and I would then use that very newspaper in strong, forceful display advertising over the name of the general manager of the road to controvert the statements and implied untruths published in the reading and editorial columns of that paper. I would not temporize; I would fight.

If a newspaper published colored or essentially untruthful or distorted statements regarding an accident, for instance, I would come out in the advertising columns in that same paper and make a signed statement of the exact facts in the case and appeal to the fairmindedness and justice and sense of fair play of the people of the community.

If I were asking for a franchise or for the right to make certain changes in service, I would boldly come out and show not only where these things were of advantage to the community, but also where they were of advantage, financial or otherwise, to the road which I was serving. I would take the people of my community literally and fully into my confidence, putting myself in the position of a public servant who was serving them for their benefit, but who expected to be rewarded for his labors.

There are few selling organizations which have so much of news interest to their customers as has the electric railway. Every change in our construction, every change or improvement in track, every change or improvement in power, every change which, in any way, makes for efficiency and betterment of the road, is of interest to somebody who uses or should use the service of that road, and it should accordingly be used in the advertising of that road.

It has also been a matter of considerable astonishment to me, as an observer of electric railway promotion methods, that electric railway men seem to overlook that in their own cars they have one of the finest mediums for the distribution of advertising they can possibly secure. It seems to me that if I were operating an electric railway I would constantly have in a rack or racks in convenient places in the cars a supply of booklets or pamphlets dealing with new developments of the road, news items, arguments, ideas, pamphlets detailing the development of service and the work which the road was doing for the benefit of its patrons. And I would not rest at that. I would utilize the space immediately above this rack for an efficiency display card briefing the information that was contained in these pamphlets or booklets and suggesting that the passenger should take one and read it either on the car or at his home.

ASSOCIATED ADVERTISING

As another suggestion of practical value, I would lay before this association the question of the electric railways of a given district, a state, for instance, getting together and agreeing upon an associated plan of advertising the service and functions and possibilities of electric railways in that district or state; not with a view to promoting traffic for any particular road, but with a view to promoting traffic for all roads, and then each road would be in a position to back this up locally in its own community with its own advertising, availing itself of the thought and sentiment aroused by the general associated campaign.

In my opinion there is no greater problem confronting the electric railway officials of this country to-day than this problem of advertising which will properly tell their story to the people of the communities they serve, not only as a means of securing and holding the good-will of these communities and their sympathetic co-operation with the activities of the road, but also as a means and a very definite means of promoting traffic and increasing the revenues of the road.

With campaigns of this kind properly carried on, with the right kind of thought and care and brains and inspiration put into them; with skilful, logical and efficient advertising methods used, using all of those mediums which have a valuable place in reaching the attention and consideration of the people, and with a sufficient allowance for time in which the thought and sentiment and opinions of the communities could be developed and molded, I am certain that the results would be such as tremendously to increase the revenues and advance the position of the electric railways of this country.

TRAFFIC

BY F. D. NORVIEL, GENERAL PASSENGER AND FREIGHT AGENT INDIANA UNION TRACTION COMPANY

In 1903 when the writer became connected with one of the electric railways entering Indianapolis no electric line in Indiana had a well-defined traffic department; no tickets were sold and no baggage was handled except as freight. No well-defined system was in use for handling freight, although some freight was being carried by the lines entering Indianapolis. Freight traffic was considered more of an evil forced on the electric railways than a business to be solicited. There are some lines to-day that still view it in this light. At about this time the electric lines began to consolidate and construct connecting links. The whole plan for handling traffic then required reconstruction. First came the making of local division tariffs, both passenger and freight; then the combining of these into interdivision tariffs, and finally an interline passenger tariff covering a wide territory.

Nearly all of the early traction lines had no data for computing intelligently the cost of handling passengers, and assumed that a rate of 1 cent per mile would be adequate to pay operating expenses and provide for the upkeep of the lines as they were constructed. This low rate was very early found to be a mistake, and the companies were soon casting about for some means of increasing their revenues. There may have been an unseen wisdom in these low rates of fare, as they quickly promoted new business. The need of more revenue was imperative, and only very few interurban lines are operated to-day with such a low rate of fare. In most cases the increase in passenger rates has been from 75 per cent to 100 per cent, but even a rate of 2 cents is inadequate to maintain an hourly schedule in sparsely settled districts. With few exceptions the lines in what is now known as the Central Electric Traffic Association's territory are on a basis of 2 cents per mile, and the new interline passenger tariff which went into effect on Oct. 1, 1911, naming rates between cities and towns on more than 3000 miles of electric railway is compiled on the basis of 2 cents per mile, short-line mileage.

The mistake made on passenger business was not repeated in formulating freight tariffs. The traction lines have not advanced so far in the handling of freight as they have in the transportation of passengers. No attempt has been made by the traction lines to initiate rates, and for the most part steam road classifications and rates have been adopted. This would seem to be the logical method to follow, but the writer is of the opinion that the rates now in force for the transportation of freight commodities are not commensurate with the service rendered, and that the time is not far distant when the individual electric railways will see the necessity of advancing their rates and placing them on a uniform mileage basis. The rate scale which was submitted late in the fall of 1910 would increase existing freight earnings approximately 15 per cent and would give

a uniform rate as between all points the same as now obtains in passenger traffic. Some of the steam roads operate under what is known as the Ohio scale, which provides very low class rates for short distances. Others make rates apparently without any uniform basis, suiting special traffic conditions regardless of the distance. A uniform mileage basis would remedy these discrepancies, and the plan should be put into effect before the legislatures of the several states pass laws prohibiting an increase in this direction. The better delivery given by electric railways would hold a large part of the business now carried, and the revenue at the higher rates would equal that obtained at present, although the tonnage might be less.

In a general way the handling of traffic on a railroad is a matter of teamwork. The general manager has many fine questions to decide in the demands coming from the different heads. He must decide just how large an expense is justified to bring in the revenues which he has reason to believe will be produced for the ensuing year. Each head of a department must thoroughly understand the conditions under which he has to perform his duties. He must accept the equipment with which the road is supplied. The traffic man who secures the business must make the very best out of what he has to give to the patrons of the road. By teamwork much can be accomplished in keeping the public satisfied with what the company is able to give it.

Cars must be kept clean; this can be done even with poor equipment. They must be kept in as good running order as the condition of the machinery and equipment will permit, to the end that there shall be few delays. Every effort should be toward the maintenance of schedules. Above all else, courtesy, not only to the traveling public, but between individual employees, is one of the best possible means of retaining business once secured.

PASSENGER TRAFFIC

Regular passenger business comprises the approximately regular travel which has been built up between town and town, or between two business centers, or even from country stops to nearby cities. Little can be done to increase this traffic. Where competition exists a trivial cause may drive a greater or less number of these regular patrons away from one road to another. People are inclined to spend their money where they feel they are getting the greatest returns, which include comfort in traveling, promptness in arriving at destination and a feeling of safety while making the trip; and it seems to me that each and all of these weapons are in our hands if we see fit to use them.

The business of the commercial traveler is not wholly transient, but to a certain extent is different from the regular passenger traffic. The commercial traveler, as a rule, is burdened with more or less baggage in the way of samples. This may be hand baggage, sample cases or even large sample trunks. He sets out with the definite purpose of making certain towns or covering certain territory in a day. The possibility of accomplishing this depends largely upon the transportation lines over which he is to travel. There is no question that the interurban lines make it possible for the traveling man to cover a vastly larger field in the same length of time than he could possibly do by using the steam roads, but unless his samples are moved promptly and there is a reasonable promptness in all schedules the traveler's prearranged plans often may be interrupted. Should this be the fault of the electric line and there be a competing steam line on which he can make the longer trips of his journey he is very apt to take away from the electric line the most profitable part of his patronage. There is no more labor involved in the handling of baggage for a journey 100 miles long than there is for a journey of 2 miles, yet the passenger revenue in one case would approximate $2 and in the other case 5 cents. To a certain extent securing long-haul business depends on the way the same passenger is treated for short hauls.

A class of business which has great opportunities for the electric lines is excursion business. Except for extremely long hauls the interurban lines afford ideal facilities for this class of business, the revenue from which may be considered practically all profit. Its volume depends largely on the attraction advertised at the end of the trip, the manner in which it is advertised and the manner in which the people are handled. Nearly all interurban roads have special-car tariffs and cater to a traffic practically unknown to the steam roads. The users of special cars are small parties traveling between two points, such as lodges, Sunday schools, teachers, etc. The rate for this class of travel has increased until few lines handle passengers on special cars for less than 1½ cents per mile, with a guarantee of fifty or more people. The ordinary excursion business is solicited at a low rate open to all and advertised by the interurban line as a means of promoting travel to a large city, an amusement or a summer resort. As these open excursion rates are rarely ever made except during the summer months, weather conditions have much to do with the patronage. It has become the general custom for all steam lines to operate such excursions to some point on their lines every Sunday, and the interurban lines are forced to run similar excursions in order to secure their share of this class of travel on a day when many people take a trip of some kind.

Commuter travel, which is sometimes handled at low rates of fare, may be included in the company's regular business. Another source of passenger revenue which is small in itself is handling school children during the school term. These rides, as a rule, are short and are furnished at a low rate of fare.

Advertising is the first essential in securing any class of traffic. A good railroad map is more highly prized by the traveling public, and will go further toward fixing a road in the minds of travelers, than any other one kind of advertising. Next follows a carefully prepared timetable folder giving all information which may be of value to the public, not only as to the time of trains, but other information in regard to the handling of baggage, stop-over privileges (if any) on tickets, conditions under which certain packages or bundles may be carried, etc. Timetables should show the trains on each division and the times of connecting trains. Special timetables should be prepared giving the running time of through trains as well as condensed timetables of all connecting lines which may in any way assist a traveler in planning routes. Timetables for individual divisions prepared in the form of cards showing the time of trains at country stops and the trains which make these stops are a good form of advertising for country patrons.

For reaching commercial travelers, recognized railroad guides are the best possible advertising medium. The Central Electric Traffic Association recently concluded arrangements with the *Central States Guide* to insert the timetables of all interurban lines in the territory covered by the *Guide*. Nearly every commercial traveler in Central Electric Traffic Association territory carries this guide with him on his trips.

Another source of revenue on passenger trains is package consignments. The interurban service in this respect seems to have fulfilled a long-felt want in the hourly service rendered, which makes possible the forwarding of small package freight between nearby points at any hour of the day. The usual compensation for such service is slightly lower than the old-line express companies charge for their pick-up and delivery service, but is higher than the common freight rates between the same two points. The facilities for handling this business are not the best and yet it is one that is being continually forced on the electric roads in increasing volume.

In the matter of passenger tariffs the interurban lines are as far advanced as their steam road competitors. The passenger tariffs, baggage tariffs, mileage tariffs and joint

interline passenger tariffs of the majority of interurban lines are as comprehensive as it is possible to construct, considering the class of agents employed by these roads. No provisions have as yet been made to meet the tourist, home-coming or home-seeker's rates put in effect by all steam lines, and an effort should be made by the Central Electric Traffic Association to give the interurban lines the same advantage in this respect as the steam roads enjoy.

FREIGHT TRAFFIC

The revenue derived from the freight traffic on interurban lines is only a small fraction of what it is possible to secure from this source. Almost without exception, however, the freight business handled by interurban lines is up to the limit of the equipment and terminal facilities. In many instances the roads are handling more freight than they are warranted in undertaking to handle, if they are to give service which is satisfactory to the consignor and consignee. The freight business requires warehouses, storage tracks and yards for handling teams and cars. Few of the interurban lines have ever provided these accommodations.

The small train units running hither and thither over the network of lines in the Central Electric Traffic Association's territory represent the most expeditious means of handling freight that has ever been conceived. A car is loaded and within thirty minutes after it is loaded it can be on its way to a destination 10, 50 or 100 miles distant. It runs at a high rate of speed, and makes a delivery 100 miles away in less time than it takes a steam road, with its cumbersome billing methods, to get the cars ready for the switching engine. Manufacturers and merchants of all classes are looking for the most rapid delivery of their goods and recognize in the electric railroad the solution of this problem. With adequate yard facilities, freight houses and equipment the interurban lines could increase their freight business to probably ten times the present volume within an inconceivably short period of time.

Most roads have prepared comprehensive local tariffs covering freight rates on their own lines, and probably 30 per cent of the roads have interline freight tariffs in conjunction with nearby connecting lines. Only a small part of the electric roads, however, have interline tariffs covering a wide territory. A few of the interurban lines have limited interchange contracts with the steam roads, on the basis of a switching charge and not a through traffic agreement. There are exceptions, however. The Grand Rapids, Holland & Chicago and the Illinois Traction System lines have consummated arrangements with some of the steam lines and have purchased a number of ordinary freight cars to be used in this class of service. Until the physical characteristics of interurban lines are greatly bettered, a general traffic arrangement would not be advisable with any steam road. As the needs arise the steam roads will be quick to see the advantage of interchange and will extend their service to the electric lines where the latter can be of any real benefit to both.

The same plan of courtesy and fair dealing with the public should be exercised in handling freight traffic as is done with passenger traffic. Never promise anything which cannot be accomplished. All of the attractive points of the service should be presented in attractive literature sent to prospective patrons. The best form of advertising for freight business is a shippers' guide, which may be prepared for each individual station giving the information most desired by the business men at that particular point.

Agents must be educated to treat the public in the same manner that the successful merchant treats the prospective buyer who comes into his store. Proper attention should be given to all claims and there should be no unnecessary delays in the settlement of claims. Nothing so irritates a shipper filing a claim as to have the matter drag along month after month with no apparent effort made toward settling it. A shipper will be better satisfied, if the claim lacks merit, to have it turned down without delay.

Another phase of the freight situation that should receive attention is the safeguarding against underweights and wrong classification, as is done by the steam railroads, which have a well-equipped freight-weighing and inspection bureau. This bureau has authority to look into and correct the evils which are constantly cropping out on consignments offered for shipment in the way of wrong weights and bad inspection. A box of groceries may be sent out as a box of "canned goods," taking a lower classification, and this same shipment may be shown on the shipping instructions as weighing 50 lb., whereas its true weight is 75 lb., representing a further loss of 33⅓ per cent in revenue. While it may not be possible on account of the expense to go as far as the steam lines have done, it does seem that a bureau could be inaugurated through our Central Electric Railway Association, with a few inspectors who could vastly better these conditions.

More attention should be given to exceptions to the official classification. The interurban lines have only a few exceptions, while the steam lines have many. What may be easily handled by one road may in turn be difficult for another road. Interurban lines should get closer together in these matters than the steam railroads. The same argument applies to commodity rates. Conditions come up which sometimes seemingly make it imperative that a lower rate be placed on some commodity between certain points than is applied over the rest of the road. When the time comes for handling grain and grain products in car-load lots the question of seaboard rates, proportionals, percentage points, etc., must be adjusted.

In closing the discussion of freight traffic it will not be amiss to cite a few long freight runs on interurban lines. A freight train leaves Indianapolis six days a week at 6 p. m., making a delivery in Ft. Wayne at 11:30 p. m. and by connections laying down freight in Toledo, Ohio, at 9 a. m. the next day. Another train leaves Indianapolis at 7 p. m., making delivery at South Bend, Ind., at 7 a. m. the next morning, and at St. Joseph, Mich., before noon of the next day. For quick service the steam roads cannot approach this schedule.

Some mention should be made of the work of the Central Electric Traffic Association, which has been in existence for the past three years. To-day the Central Electric Traffic Association stands head and shoulders above all other traffic associations of electric railways in the United States. It is recognized by similar organizations of the steam roads, between which details of proceedings are exchanged, and is doing more than any other one thing to place the electric railways before the people in a proper light. That the managers of the railroads have loyally supported this organization goes without question, or it could not be where it is to-day. They should continue the same earnest co-operation in order that the greatest future good may be secured.

PLANS OF THE COMMITTEE ON EDUCATION

The committee on education of the American Electric Railway Association is planning to conduct an educational course somewhat similar to that conducted experimentally last summer, if it should receive sufficient encouragement financially from member companies. The committee estimates that the maximum expense of conducting such a course is $40 per student per year, and that of this amount $5 should be contributed by the student. It also believes that the maximum number of students which can properly be cared for during 1912, under its present plans, is 100. The committee was to hold a meeting in New York on Nov. 24 to discuss in detail its plans for the coming year.

An electric railway is to be built in Hungary which will operate on direct current at 1650 volts.

Meeting of Engineering Association Executive Committee

Several Questions of General Policy of the Association Were Discussed and Subjects Were Assigned to All the Standing and Special Committees for Investigation During the Coming Year

The executive committee of the American Electric Railway Engineering Association held a meeting at the association office in New York on Nov. 17 and 18, 1911. Those present were E. O. Ackerman, Columbus, Ohio; E. J. Burdick, Detroit, Mich.; B. F. Wood, Altoona, Pa.; L. P. Crecelius, Cleveland, Ohio; John Lindall, Boston, Mass.; J. H. Hanna, Washington, D. C.; Martin Schreiber, Newark, N. J.; H. H. Adams, New York City, and Norman Litchfield, New York City.

Secretary Litchfield read the minutes of the last meeting of the executive committee, which was held in Atlantic City, N. J., Oct. 9, 1911. These were approved. The secretary then read the minutes of the meeting of the committee on standards, held in New York Nov. 6 and 7, 1911. It was decided to consider the recommendations made by that committee to the executive committee when the selection of subjects was taken up.

Discussion on Association Policy

E. O. Ackerman, the new president of the Engineering Association, stated that the meeting of the executive committee had been called to define the policy of the association for the coming year, to select subjects for committee work, to decide on the formation of special committees and to consider nominations for committee appointments.

Secretary Litchfield presented a number of questions of policy on which he requested the committee to take action. The most important question in his opinion was the necessity of having the Engineering Association keep closely in touch with the work of the state and sectional associations, which are obliged to act promptly to meet local conditions and whose work, therefore, is usually done ahead of that of the national association. He referred particularly to the work of the standardization committee of the Central Electric Railway Association, which had already adopted standards for interurban couplers. The action of the Street Railway Association of the State of New York in appointing a committee to draft specifications for the joint use of poles was another example of a step taken by a sectional association to meet an immediate necessity. As one solution of the problem, Mr. Litchfield thought that in making up the committee assignments some arrangement might possibly be made whereby the state and sectional associations would have representation on committees of the Engineering Association which were carrying on lines of work affecting the special conditions in any locality. He pointed out that this subject had been discussed at the meeting of the executive committee held in Atlantic City in October, at which time the consensus of opinion seemed to be that the American Association could bring about the desired co-operation with sectional associations more effectively than the Engineering Association could, as the former was a body of railway companies some of which were members of both the national and the sectional associations.

Mr. Ackerman called attention to the embarrassing position of companies which were members of two associations which had adopted different standards. He strongly urged harmonizing, as far as possible, the standards of all local associations with those of the Engineering Association.

Mr. Burdick said that the interurban roads operating in the territory of the Central Electric Railway Association were rapidly expanding their through routes and joint operation. This made immediate standardization of couplers and train connections imperative.

Mr. Wood suggested that the secretary should keep all other associations and societies which were working along the same or allied lines as the Engineering Association informed of the work which the Engineering Association was doing.

On motion the secretary was instructed to attend, as a representative of the Engineering Association, the meetings of such other associations as the president may designate, and in attending such meetings to endeavor to further the co-operation of the sectional associations in the work of the Engineering Association. The secretary was especially instructed to inform the secretary of the Central Electric Railway Association that he would be present at the annual meeting of that association to be held in January, 1912. The president was authorized to appoint a substitute representative in case the secretary could not attend this meeting.

The second question of policy presented by the secretary was the relations of the Engineering Association with the American Society for Testing Materials and the American Railway Engineering Association, particularly in the matter of representation on joint committees. He thought it was advisable, where a subject of committee investigation had been undertaken jointly with another association, to have the members of the committee continued in office until the work assigned had been completed. In this way it would not be necessary for new committee members to duplicate any part of the work which had already been done by their predecessors. A motion was made that the chairmen of all standing committees be requested to follow as far as practicable the policy of continuing in office a majority of the members of all sub-committees which were working in conjunction with committees of other associations. The motion was carried.

The third question of policy was future action in the adoption of standards. Mr. Litchfield pointed out that the new rules of procedure for the committee on standards had proved very satisfactory, but he thought that extreme caution was necessary in formulating proposed standards and recommended practices. He thought it would be desirable to incorporate in the instructions to chairmen of committees a warning against hasty and ill-advised proposals of standards. In his opinion one year's work by a committee was seldom sufficient to formulate a satisfactory standard or recommended practice. The chairman of each committee should be very sure that its recommendations as to standards are exactly right before presenting them.

Mr. Hanna called attention to the desirability of submitting all proposed standards to the committee on standards at its meeting before the convention, so that the committee would not be prejudiced in any way by the action of the convention in approving or disapproving such standards.

Mr. Ackerman next referred to the increasing volume of convention work. It was impossible to give all of the committee reports the consideration which they deserved owing to the limitations of time in the meetings. Several remedies had been suggested. One was to sectionalize the meetings so that two or more could be carried on simultaneously and those members of the association who were interested in only one or two reports could attend the meetings at which these reports were presented, while other reports in which they were not interested were being presented at an-

other meeting held at the same time. The possibility of holding evening sessions had also been suggested. It was particularly desirable that the report of the committee on standards receive careful consideration by the entire membership of the association present at the convention, and one plan which had been proposed was to have this report presented at an evening session which would be preceded by an informal dinner.

Mr. Schreiber was opposed to holding an evening session and suggested as an alternative the addition of one more afternoon session. He thought the best way to accelerate the work of the convention would be to prevent waste of time in the meetings. To this end he suggested that the committee reports be reduced to definite recommendations accompanied by descriptive appendices and that the discussions be confined to the recommendations.

Mr. Wood pointed out that the time of the convention was worth probably more than $1,000 an hour, and he was strongly in favor of improving the character of the discussions and eliminating all superfluous remarks which were of little value to the members of the association. He thought that the best way to do this would be to invite certain members who were well qualified to discuss reports to prepare written discussions in advance of the meeting. In order to do this it would be necessary for the secretary to have some knowledge of the qualifications and experiences of individual members.

Mr. Litchfield thought that the most effective method of obtaining the names of members best qualified to discuss the committee reports would be to request the chairman of each committee to submit a list of names of members who should be invited to discuss the report. It would be desirable also to send out with the advance papers a letter requesting members to prepare any discussion of the reports in writing and to submit such discussion to the secretary in advance of the meeting at which the report was to be presented.

As it was considered impossible to reach a definite conclusion with regard to afternoon or evening sessions so far in advance of the next convention, no action was taken in this matter, but a motion was passed that the executive committee considered it advisable to set aside one entire session to consider the report of the committee on standards.

Mr. Schreiber proposed that the executive committee appoint sub-committees of subjects, publications and finance. A motion was passed that the president appoint three members of the executive committee as a committee on publications to advise with the secretary when requested by him on any matters relating to reports and other printed matter of the association about which the secretary was in doubt.

A motion was also passed authorizing the president to appoint immediately after the convention a committee of three members of the executive committee to select subjects for committee work during the following year, this committee to make its report at the first meeting of the executive committee following the convention.

The next subject considered was membership in the association. Several of the members of the executive committee stated that there were strong objections to the use of the term "associate member," as in nearly all other engineering societies the term "associate member" referred to an inferior class of membership. Mr. Schreiber pointed out in this connection that the present constitution and by-laws of the Engineering Association were unsatisfactory in many respects, and on motion the president was authorized to appoint three members of the executive committee as a special committee to investigate the present constitution and recommend such changes as were deemed advisable to the American Association. This committee will consider especially the question of classes and qualifications for membership.

SUBJECTS

The selection of subjects to be considered by the standing committees during the coming year was then begun. The following subjects were approved and assigned to the different committees:

Committee on Equipment.—Specifications for high-grade rubber insulating compound; to be considered by joint sub-committees of committees on equipment and power distribution. Heat-treated axles; revision of the specifications approved by the 1911 convention and consideration of the points raised in the discussion by the committee on standards; assigned to same sub-committee as last year. Standard dimensions of steel wheels of other sizes than those already adopted as standard. Specifications for wrought-iron bars. Self-propelled cars; résumé of experience with actual installation up to date. Couplers and end connections for interurban cars; the committee will confer with the committee on heavy electric traction and will also co-operate if possible with committees of the Central Electric Railway Association and the American Railway Association. Causes of squealing of steel wheels. Investigate end wear of journals. Heat-treated pinions and gears. Specifications for cold-rolled and forged carbon steel axles.

Committee on Way Matters.—Continue work on the design of sections for 9-in. grooved girder and guard rail and 7-in. grooved girder and guard rail; also the design of rail joints for these sections. Proper ballast for track and paved streets. Use of titanium, nickel and chromium alloys in steel for rails; referred to sub-committee on steel for rails. Rules for employees of way department; referred back by the committee on standards. (After considerable discussion a motion was passed that the executive committee instruct the committee on standards that rules of a general nature such as the rules for the government of employees of the way department and rules for fire protection will not be adopted as recommended practice or standard of the association, but that these rules be printed in the proceedings and the attention of the American Association called to them, as it is desirable that they be considered as a guide.)

Engineering Accounting.—This joint committee will be continued to carry on its work on the subject of inter-department charges.

Power Generation.—In addition to the topics recommended for further investigation by the 1911 committee on power generation, the 1912 committee will have the following subjects assigned to it for investigation: Chemical laboratory practice in connection with power-plant operation. Peak loads. Boiler settings and furnace design with special reference to power plants built on the common main or unit plan basis.

Committee on Power Distribution.—The following subjects were assigned to this committee for special investigation during the year: Concrete, latticed and tubular steel poles, including setting and iron poles with or without concrete basis. Specifications for joint use of poles. Revision of specifications for overhead crossings with special reference to objections raised to these specifications at the meeting of the committee on standards. Specifications for high-grade, rubber insulating compound; to be considered jointly with committee on equipment. In addition to these subjects the following alternative subjects were assigned: Standardization of overhead line material. Revision of copper wire table. Stranding table for cables. Specifications for crossings of foreign wires over electric railway wires. Specifications for trolley contact wire crossings over steam railroads.

Committee on Buildings and Structures.—General form of contracts and specifications for electric railway structures. Review of modern carhouse construction with recommendations. Waiting stations and shelters for electric railways.

Committee on Heavy Electric Traction.—Permanent way construction lines with reference to third-rail clearances; to be considered in conjunction with committees of the

American Railway Association and the American Railway Engineering Association. Power consumption of trains drawn by electric locomotives.

Joint Committee on Block Signals.—This committee will continue the same subject as last year. The advisability of increasing the size of this committee by appointing not more than two new members from the Engineering and Transportation & Traffic associations will be taken up with the executive committee of the Transportation & Traffic Association, and, if approved, the enlargement of the committee will be left to the discretion of the chairman.

Committee on Education of Engineering Apprentices.—This committee will continue its consideration of the same subject assigned to it last year.

GENERAL BUSINESS

On motion it was decided to print the standards and recommended practices of the asociation in a separate pamphlet to be distributed to the members of the association.

Mr. Litchfield and Mr. Schreiber were appoined a committee of two to draw up a resolution suggesting ways and means of giving more publicity to the work of the Engineering Association and its value to member companies, this resolution to be submitted to the executive committee of the American Association at its next meeting.

There being no further business, the meeting then adjourned.

DECISION IN THIRD AVENUE REORGANIZATION CASE

A decision was rendered on Nov. 21 by the Court of Appeals at Albany in the case in which the New York Public Service Commission, First District, disapproved the plan of reorganization for the Third Avenue Railroad property. The court reverses the decision of the commission.

The committee of holders of bonds of the Third Avenue Railroad announces that it hopes to end the receivership and turn the property over to the new company by Jan. 1. Official notices have been issued by James N. Wallace, chairman of the committee of bondholders, stating that the Central Trust Company, as syndicate manager, has agreed to take the place of non-assenting stockholders and guarantees $7,200,000 for reorganization purposes. Out of the total of $37,560,000 consolidated mortgage bonds $37,258,000 have been deposited. The other bondholders have until Dec. 23 to deposit their holdings under the plan. Stockholders may participate in the plan by depositing their certificates before Dec. 23 and paying in three instalments an assessment of $45 per share.

Chief Judge Cullen, who wrote the opinion for the Court of Appeals, says that the statutory provisions for reorganization of corporations embodied in Sections 9 to 12 of the stock corporation law have not been repealed by implication as to railroad corporations by the provisions of the public service commissions law. The decision says:

"We think these statutes are not inconsistent; that on the one hand the enactment of the public service commissions law did not repeal the provisions of the stock corporation law for the reorganization of the property and franchises of corporations sold under foreclosure, and on the other hand that the provisions of the stock corporation law do not withdraw corporations formed on reorganizations from compliance with Section 55 of the public service commissions law. In other words, the two statutes must be construed together, though parts of the later statute may be inapplicable to cases arising under the earlier."

The court also holds that it is not necessary for the reorganized corporation first to obtain permission and approval of the commission under Section 53 of the public service commissions law before it may exercise and enjoy any of the rights, privileges and franchises of the predecessor railroad sold under foreclosure which at the time of such sale belonged to or were vested in the corporation last owning the property sold, or its receiver. Nor is it necessary for such company first to obtain the approval of the commission under Section 54 of such law to enable lawful transfer to it of the franchises and of any right to or under any franchise to own or operate a railroad or street railroad sold under foreclosure which at the time of such sale belonged to or were vested in the corporation last owning the property or its receivers. Nor must it first obtain such consent to purchase, acquire, take or hold any part of the capital stock of any street railroad corporation organized or existing under or by virtue of the laws of this State, sold under foreclosure, which at the time of such sale belonged to or was duly vested in the corporation last owning the property sold, or its receiver.

It is further held by the court, as to the question arising under Section 55 of the public service commission law, and Sectoins 9 and 10 of the stock corporation law, relative to the reorganization of corporations, that the commission was not justified in refusing the consent applied for because the value of the mortgaged property and the amount of new capital to be invested were less than the amount of securities to be issued by the corporation.

The court adds: "The requirement of the statute is that the issue of the securities shall be necessary for the acquisition of the property, and although as a general rule under this requirement the securities should not be authorized except where the value of the property is equal to the amount of securities issued there may be exceptions to the rule. One is found in the statute itself.

"Thus, in the case of a merger the limit of the amount of stock of a corporation is dependent, not on the value of its property, but on the stock outstanding of the constituent corporations prior to the merger. We think the same rule is applicable to the case of a corporation formed on the reorganization of a foreclosed railroad.

"We do not say that in the reorganization of a railroad the new corporation is authorized to issue securities in excess of those of the company to whose property and franchises it has succeeded and the new money or property that may be put in the enterprise. Such a plan would be plainly inconsistent with the spirit of the public service commissions laws against the issue of 'watered' stock or bonds, but up to the limit we have named the new corporation has the right to issue securities. The determination of the commission to the contrary was therefore erroneous."

STATEMENT OF COMMISSIONER MALTBIE

Commissioner Maltbie made the following statement in reference to the decision:

"If I am correctly informed as to the decision, the Public Service Commission is stripped of all control over new companies growing out of reorganization. Every street railway corporation in Manhattan now in receivers' hands may reorganize and issue securities to the full amount of its present overcapitalization, thus perpetuating the financial conditions which have been the subject of so much consideration and to remedy which the public service commissions law was formulated. It also means that any corporation may waste its capital, may declare dividends out of earnings while allowing its plant to deteriorate, may go into receivers' hands, and after reorganization may issue new stock and new bonds running for a long period and with the par value of the old. Yet the Public Service Commission is helpless to prevent such a result."

MR. WHITRIDGE ON THE DECISION

F. N. Whitridge, receiver of the Third Avenue Railroad, said regarding the decision:

"I still concede to the Public Service Commission as much common sense as a hen. It is an extraordinary body of men. I would not have it inferred that I consider them dishonest. Every one of them is as honest as a man can be who keeps scrapbooks filled with newspaper clippings about himself.

"I consider the commission funny, but it has been a

serious concern to the security holders of the Third Avenue road. It has cost them approximately $400,000, it has held up the reorganization of the company for two years and has put the property owners to a large and useless expenditure.

"As receiver I have been obliged to engage in nine suits with the commission. The commission has lost them all.

"I presume the reorganization plan will now soon be effected. In my opinion it is a conservative plan. It cuts down the fixed charges by $1,000,000 a year, reduces the aggregate capitalization by $6,000,000 and furnishes $7,000,000 new money for working capital, maintenance and equipment.

"The Court of Appeals has not decided that the Public Service Commission should be deprived of any powers, but has prevented it from usurping powers it was not fit to use."

EFFECT ON METROPOLITAN REORGANIZATION

Regarding the effect of the decision Guy E. Tripp, chairman of the joint committee of bondholders of the Metropolitan Street Railway, said: "The Court of Appeals has pointed out a way by which the Metropolitan company can reorganize. Consequently we shall amend our plan to conform with the decision of the court and shall submit the amended reorganization plan to the Public Service Commission for its approval along the lines laid down by the Court of Appeals."

In a subsequent statement Mr. Tripp said that the reorganization committee had no intention of taking advantage of the recent decision in the Third Avenue case to increase its capitalization. He added that the committee intended to adhere strictly to its original plan for the distribution of the securities among bondholders, and that it would make only such changes as might be necessary to obtain new capital on the best terms.

OPERATION UNDER CLEVELAND ORDINANCE

At a recent convention of the League of American Municipalities, held at Atlanta, Ga., Leslie C. Smith, superintendent water department, city of Cleveland, referred to the operation of the Cleveland Railway under the existing franchise ordinance. He spoke of the condition of the ordinance which prevents any possible additional return for increased efficiency of management, saying, in part:

"It is quite evident that since the amount allowed by the city to the company for expenditures in operation is definitely fixed and the items to be included are enumerated, any excess in such operation expense must come from some other source. It is equally apparent that the first expenditure from the interest fund established will be the 6 per cent allowed the stockholders upon their investment. To maintain this latter amount intact it seems thoroughly axiomatic that the interest fund will not be depleted below an amount necessary to secure such dividends. The answer is then settled that if the return for operating expenses allowed is insufficient to guarantee necessary expenditures inferior service must of necessity arise.

"This brings us back to one of the original generalities that the end to be attained must be adequate service commensurate with reasonable cost. Such a condition places the people face to face with the choice between a minimum rate of fare with questionable service or a higher rate of fare with improved service. The investment of this company is entirely in its stockholders' hands. Naturally enough and rightly enough its management's first consideration will be the protection of the stockholders' interests. No one has a right to expect any company so owned to exert itself to meet a public demand in general service at a loss to itself, nor does this imply that the corporation will not act fairly. The ultimate condition of ownership by the city seems rather to be a forced conclusion than an optional one. It is the removal of the speculative possibility and increased returns for ingenuity and achievement which will coerce the company into a willingness to sell. Few investors are willing to assume responsibility and thus face the possibility of loss when there is no commensurate possibility of gain.

"The weakness apparent in the franchise stipulation that the city may purchase the property at the expiration of the franchise upon the appraisement of its physical value rather than its capital value it is now sought to rectify by an amendment subject to popular approval. The capital value was fixed by arbitration and, since this cannot be increased except by the city's consent, it seems only just that at the expiration of the grant the city shall pay an equivalent amount therefor, if it chooses to assume the ownership of the system."

INCREASE IN FARES BY HUDSON & MANHATTAN RAILROAD

Formal notice has been issued by the Hudson & Manhattan Railroad that, beginning on Dec. 24, the rate of fare between points in New Jersey and uptown New York will be increased from 5 cents to 7 cents. The present rate of 5 cents will be continued between New Jersey points and downtown New York and for local trips in New Jersey and for local trips in New York. In his statement to the public W. G. McAdoo, the president, says that with the present uniform fare the company has not earned fixed charges and taxes. Mr. McAdoo says, in part:

"On Feb. 26, 1908, the first tunnels under the Hudson River were opened to public use. Twenty-six years had elapsed since the work was begun in 1882. Two disastrous failures had occurred and many lives had been lost in the attempt to master the extraordinary difficulties involved.

"Before the tunnels were opened the rate of fare was seriously discussed by the company's directors. They believed that at least the same fare as that charged by the ferry and the trolley, namely, 8 cents, should be paid for the superior tunnel service.

"After long consideration, however, it was determined to try a uniform rate of 5 cents (although the company had the right at that time to make it 8 cents) with the hope that sufficient traffic would be developed beween New York and New Jersey to justify it. After almost four years of trial, it has been clearly demonstrated that the tunnel company is not justified in carrying passengers between New Jersey and Sixth Avenue points, or uptown New York, for a 5-cent fare.

"Since the uptown tunnels were opened, the company has extended its service to the Erie and Pennsylvania Railroad stations and to Grove Street, in Jersey City. From all of these points to Sixth Avenue, New York, the rate by ferry and trolley was previously, and is to-day, 8 cents, notwithstanding the tunnel company voluntarily made the rate 5 cents.

"In the near future the tunnel service will be extended to Summit Avenue (the Heights section) in Jersey City. Between this section and Sixth Avenue points the present combined rate by trolleys and ferry is 13 cents. It is the intention of the tunnel company to make the rate 7 cents between these points. The tunnel service has marked advantages over the ferry and trolley service. By ferry and trolley from Hoboken to Thirty-third Street the time is thirty minutes against fourteen minutes by tunnel; from the Erie station to Thirty-third Street it is thirty-nine minutes against thirteen.

"The tunnel system is now practically complete, with the exception of the extension from Thirty-third Street to the Grand Central Station. The entire interest on its bonded debt and all fixed charges must, within the near future, be charged against the earnings from the railroad and the terminal buildings.

"On the business thus far developed, and with a uniform 5-cent fare, the company has not earned interest on its bonds, taxes and other fixed charges.

"The burden of taxation alone (notwithstanding the particularly fair attitude of the New Jersey authorities) is enormous. For the fiscal year ended June 30, 1911, taxes aggregated $414,588. For the present fiscal year, on the basis of assessments already made, they will be increased approximately $478,281. If the company was exempt from taxation (like the New York subway) it could continue to carry passengers for a uniform 5-cent fare.

"The tunnel lines between Jersey City, Hoboken and Sixth Avenue involve an average longer haul and cost decidedly more to construct than the tunnel lines to downtown New York. It seems, therefore, reasonable and logical that, in a readjustment of rates, the fare to uptown New York should be more than the fare to downtown New York.

"For these reasons, it has been decided to increase (beginning Dec. 24, 1911) the rate between Jersey City, Hoboken and Sixth Avenue, or uptown New York, to 7 cents. This is 1 cent less than the existing rate by ferry and trolley. The rate from Summit Avenue station (when opened) to uptown New York will be 7 cents and to downtown New York 5 cents. This is 6 cents less than the existing rate by ferry and trolleys from Summit Avenue to uptown New York, and 3 cents less to downtown New York.

"The present rate of 5 cents between local stations in New Jersey and between local stations in New York will be maintained.

"With this increase in the uptown rate to 7 cents, and with the new service put into operation between Newark and New York, and with a reasonable growth in traffic over the system, the company will earn its fixed charges with a reasonable surplus for equipment, renewals and contingencies.

"It is needless to comment on the fact that the earning of fixed charges is absolutely essential to the company's integrity. The company is certainly entitled to and must have a living rate of fare.

"It should be remembered that the New York City subway, a far less costly and difficult undertaking, was financed terest, and is exempt from taxation. The Hudson tunnels, with the credit of the city of New York, at low rates of in- on the other hand, have been financed by private capital, at higher rates of interest, and with no exemption from taxation. This great system, with all of its hazards and risks, has received no financial aid from the state or municipal governments on either side of the Hudson River.

"We submit the facts with the hope that the justness of the company's position will be recognized, and with the belief that the public is willing to support an enterprise that has been consistently managed, from the beginning, in the public interest.

"The Hudson & Manhattan Railroad is now, and has always been, independent. No railroad company in New Jersey or elsewhere has ever had any financial interest in this company or any voice in its management."

Officials of the company have several plans under consideration for the collection of the increased fares. It is probable that 7-cent, 5-cent and 2-cent tickets will be issued. The 5-cent ticket will be used for trips between downtown New York and New Jersey. For trips between uptown New York and New Jersey 7-cent tickets will be used and will be punched as passengers enter the train platform. When passengers reach their destination, they will deposit the tickets in boxes. The plan for collection of tickets for passengers traveling between local points on the uptown New York line has not yet been arranged. If passengers purchase the 5-cent tickets by mistake for the 7-cent trips, they will purchase 2-cent tickets at special booths before they leave the station platform at their destination.

CONEY ISLAND FARE HEARING

At a hearing on Nov. 16, 1911, before the Public Service Commission, First District, New York, Commissioner McCarroll explained that the hearing was an adjourned session of an inquiry on the part of the commission into certain matters connected with the affairs and operations of the companies of the Brooklyn Rapid Transit System in the Coney Island service. At the previous hearing it was proposed that the company should put into operation at certain hours of the day a 10-cent round-trip fare between Coney Island and Manhattan, and an adjournment was taken to afford the company an opportunity to present to the commission at the end of the summer season the results during the trial period.

C. D. Meneely, vice-president and treasurer of the Brooklyn Rapid Transit System, was the first witness. During August, 1911, between 6 and 9 a. m. on trains going to Coney Island, and between 2 p. m. and 4:30 p. m. on trains returning from Coney Island, there were sold and used 12,895 round-trip tickets. During September, 1911, 1712 round-trip tickets were used on these trains during these hours. The arrangement ended on Oct. 1. The special fare was confined to the elevated lines of the company during the hours previously mentioned. The company could not supply an exact estimate or count of the passengers who went to Coney Island at other times of the day at a round-trip fare of 20 cents. As it did not have a similar record during August and September, 1910, no comparison could be made between 1910 and 1911 for these periods at the hours mentioned. Mr. Meneely felt that all the 10-cent round-trip tickets which were sold represented induced business. The company was willing to continue the fare in force or to restore it next summer if requested to do so by the commission.

The hearing was adjourned until Dec. 1, 1911.

THE PANAMA-PACIFIC INTERNATIONAL EXPOSITION

The organization of the Panama-Pacific International Exposition, which will be held in San Francisco, Cal., in 1915 to celebrate the opening of the Panama Canal, is now well under way. The management of the exposition has been vested in a board of directors composed of thirty representative business and professional men and capitalists of San Francisco. A preliminary bulletin outlining the reasons for holding the exposition and the policy which will govern the selection and installation of exhibits is soon to be distributed broadcast over the United States, with the request that local boards of trade, chambers of commerce and other business and civic organizations take steps immediately to indorse the exposition and urge the support of the enterprise.

San Francisco has the advantage of excellent transit facilities by rail and sea to all parts of the world, and the management is desirous of having unusual and extraordinary exhibits rather than those which have the sole merit of quantity and bulk. It will insist on economy of space, not because of a desire to limit the number and size of the buildings, but because it believes that the public should have an opportunity of seeing all the exhibits without undue expenditure of time and physical effort. The management thus early sounds a warning against procrastination on the part of exhibitors in preparing their exhibits, and promises to have the buildings and grounds in readiness in ample time before the date of opening.

Full information regarding the rules and regulations affecting exhibits, facilities for and cost of transportation, rates for water, gas, electricity, etc., can be obtained from the department of participation and exhibits, whose headquarters are in the Merchants' Exchange Building, San Francisco, Cal.

Going Value of Public Utilities*

A Discussion of the Various Methods Advanced for Determination of This Element of Value of the Property of Public Service Corporations

BY FRANK F. FOWLE, CONSULTING ENGINEER, CHICAGO, ILL.

Going value is important in both its legal and its economic aspects, but particularly the latter, because it is one form of value and is thus property as much as though it had physical existence. We are probably accustomed to think of going value primarily in connection with appraisals of public utilities, but in order to maintain our ideas in proper balance we ought to recognize that going value may exist in a business of any kind, irrespective of tangible or physical property.

THE NATURE OF GOING VALUE

In general going value has been taken to mean that element of value which is created by an active or going business, in addition to the tangible investment for property and working capital. It exists by reason of the fact that there is a live, productive business, and it would cease when the business ceased, even though the property could retain at the same time a value equal to its structural cost. The differences of opinion arise when we come to measure the amount of going value or attempt to formulate a rule for determining it.

Some students of the problem have gone so far as to imply that going value is really inherent in the plant. This view of the matter is difficult to accept because it sets aside the question of earnings.

THE METHODS OF DETERMINING GOING VALUE

Regardless of the kind of business to which they apply, the principal methods may be set down as follows:

1. Capitalizing the net earnings.
2. Finding the cost of reproducing the net earnings.
3. Capitalizing the early losses.
4. Capitalizing the cost of securing business.
5. Over-capitalization of consolidated companies.
6. Miscellaneous.

All of these methods but the first have been proposed mainly in reference to public utilities, where the problem of going value has raised so much discussion. Some of the difficulties surrounding the subject are probably due to the ingenious arguments put forward by those who have sought to maintain values or earnings which were threatened with reduction under the cost of service theory. Perhaps the sanest point of view can be maintained by discussing first the natural method of finding the going value in a private business, from the standpoint of the owner or investor.

THE CAPITALIZED NET EARNINGS METHOD

This method applies to all kinds of private business, and in one sense it applies to public utilities also, but under the cost of service theory it excludes any going value which can be capitalized for the purpose of earning a return.

This is the common-sense definition of going value in general business; it rests absolutely on earnings in excess of the expected or usual return on the tangible property. Where such a return does not exist there can be no going value in the sense here defined, and if the net earnings do not equal the expected rate of return the going value will be negative; that is to say, the investment value will be less than the cost of the tangible property. Value is here established and measured entirely by net earnings, without regard to cost of the tangible property.

The rate of return which is regarded as reasonable depends upon local circumstances, but in the main it covers both the ordinary interest rate on secure investments and a margin of speculative profit; this is necessary to attract capital and stimulate development. The total return generally allowed is 7 per cent to 8 per cent. This makes it possible, with certain forms of financing, to show a margin of going value. Under the rule that a property should not be bonded beyond the point where the interest exceeds one-half of the net earnings, the stock can be made to show more than the rate of return allowed on the whole property.

THE REPRODUCTION OF NET EARNINGS METHOD

The general supposition is that on the date of appraisal the existing plant and all of its business will be suddenly wiped out, and then, under the reproduction theory, work will be commenced at once to reproduce the physical property just as it was before, and the business which the old plant had will be acquired by the new one as fast as possible. The community served, however, is not presumed to change in any way from its present size and character, except through natural growth. Obviously some time will elapse before the revenues of the new plant will catch up with the probable revenues of the old one, and thus the act of reproducing the going business will entail some loss during the first few years. This method aims to determine the probable extent of that loss and then reduces the total amount by discounting it at compound interest to its present value, and calls that the present worth of the going value.

The general procedure is to plot the total revenue, the commercial revenue and the operating expenses from the inception of the business to date, or else far enough into the past to establish a safe guide for the future. The revenues from public service, such as fire hydrants or street lighting, are not taken into consideration, because it is assumed that these can be reproduced as soon as the new plant is ready for operation, thus entailing little or no loss. The commercial revenues and the operating expenses of the present plant are projected into the future, and by means of curves showing the established revenues and the expenses of the new plant the date is found on which the revenues of the two plants will become equal.

This reproduction of net earnings method has never, so far as the author is informed, received the sanction or indorsement of the Wisconsin commission. But the fact that it has been accepted in other cases entitles it to our serious consideration.

It can be said in the first place that it measures no element of direct cost in building up a going business, and it bears no relation to the past profits or the losses; and in fact there may be a going value, under this theory, in an unprofitable business. What the method really does determine seems to be this: It estimates the loss of income which would result if the present service contracts and connections were suddenly wiped out, along with the physical plant, and then re-established as fast as possible after the completion of the duplicate plant, assuming that the public appreciation of and demand for the service proceeds as though there had been no change. But such a loss of income tells us neither the actual outlay or investment for building up the original business or the reproduced business, and hence it seems to be not in keeping with the cost of service theory.

It is always a safe test of any theory of going value to inquire whether a prospective investor would recognize it and put his money into the value thus determined. If an engineer were asked by an investor to make a private report on some utility property it is extremely improbable that he would apply this method of going value and submit it along with the estimated tangible value to his client. The

*Abstract of a paper read before a joint session of the Electrical Section of the Western Society of Engineers and the Chicago Section of the American Institute of Electrical Engineers, at Chicago, Ill., on Nov. 22, 1911.

measure of going value from the investor's viewpoint is earning value, present or future, and nothing else.

The author's conclusion in regard to this method, after much study of it, is that it measures no element of value which can be considered under the cost of service theory of rates. It might be admissible, however, under the value of service theory, where cost is not a primary consideration.

THE CAPITALIZED LOSSES METHOD

It is well known that many public service companies failed to earn a reasonable return during their early existence, particularly those which commenced business many years ago. These companies are now reaching the period when their present and future returns will be regulated in accordance with the cost of service theory. This raises a question of equity, because the pioneers who have failed up to this time to recoup their early losses from later profits are now denied the opportunity to recoup themselves in the future. On the face of it this would seem to be unjust, and consequently there has been a tendency to hold that a public utility is rightly entitled to a fair return on its tangible property from the day it commenced operation down to the present moment. If in fact there were such early losses they would now be capitalized, with interest, under this policy and included in the value upon which reasonable returns ought now to be computed.

This in short is the plan which has been approved by the Wisconsin commission, under the name of going value. The selection of the name for this increment of value is not a particularly happy one, because it is not going value in the usual sense, but rather the capitalized value of deferred profits.

There can be no question that the requital of early losses by later profits is entirely equitable, but in case these profits should be so large as entirely to wipe out the losses and furthermore reduce the earning value to a point below the reproduction cost of the tangible property, the matter of equity needs further consideration. Under the Constitution private property may not be taken for public use without adequate compensation, and the question here is whether previous returns in excess of a reasonable rate may be construed as lawful compensation for now fixing a value which is less than the reproduction cost of the property. It is difficult to see why such a construction would not amount to confiscation and thus be unlawful, especially where the present owners or investors did not realize the extra profits. But, even granting that it is not confiscation, as much care should be exercised to make sure that the present owners were the recipients of unreasonable profits in the past as would be expended in the opposite case in making sure that the present owners sustained the early losses.

Early losses and profits may be wholly disregarded, from a new point of view, on the grounds that former times constituted a speculative period, and those who embarked in public utility enterprises expected no more than the usual fortunes of business, pocketing their losses along with the profits as part of the game. Of course the underlying motive in capitalizing deferred profits at the present time is the desire to do justice to the pioneers who invested their money in public utilities and have never had a reasonable return. This is simply the spirit of the square deal, but we should proceed with caution in order to make sure that justice and equity are truly served.

THE MERGED SECURITIES METHOD

It is sometimes the case that two or more utilities are merged and capitalized for more than the cost of the tangible property. This may be a case of necessity owing to over-capitalization of the merged companies, or it may be deliberately planned by the promoters of the merger.

Under the principle that a public utility ought to be a local monopoly, it is the duty of the public not to force competition unless the company which occupies the field is failing in its public obligations; otherwise the company is entitled to protection. If, nevertheless, a competing and unnecessary franchise is granted and a substantial property is built thereunder there is very likely to be a duplication of property and investment by the two companies. A subsequent merger will then result in all probability in a capitalization in excess of the cost of the tangible property which the consolidated company finds it necessary to retain and operate.

Sooner or later the time will arrive when the consolidated company comes under regulation. Then it becomes necessary to pass on the validity of any intangible capital which came into existence with the merger.

On the ground that the public is responsible for the duplicating of property in mergers of competing utilities, it seems just and equitable to allow a going value to the extent of the unavoidable duplication at the time of consolidation.

THE COST OF DEVELOPMENT METHOD

The development and upbuilding of any business commonly calls for expenditures beyond those which represent tangible property. Thus there is the matter of advertising and display to educate the public. Special inducements to try the service are quite common, such as free house piping, or the installation of piping or wiring at the cost of labor and materials, or less than cost, with a long period in which to pay on the instalment plan; also the sale at less than cost of various household utilities which consume water, gas or electric energy; and sometimes the use of free water, gas or electricity is offered for a limited period. There is also the matter of canvassing to obtain business, and to show consumers how to utilize the service economically and at the same time effectively.

Such costs may have been charged to capital or to operating expense, but in either case it seems necessary to consider them as one of the legitimate elements of cost, under the cost of service theory. The Wisconsin commission has expressed substantially this view of the matter, in connection with discussions of going value.

As regards latter day practices, it may be observed that the cost of getting business is divisible, at least for discussion, into two parts; one covers the expense for holding the present volume of business and the other covers the expense of securing an added volume of business. It has been proposed that the first part should be charged to operating expense and the second part to construction or capital account. Such a division seems to be equitable enough, but there is some doubt as to whether it is altogether conservative. The creation of intangible values, or the addition to physical values of expenditures which do not represent physical property, ought to be restrained rather than encouraged. In other words, it cannot be regarded as conservative to attempt to build up values which do not represent tangible property. Therefore, there is good reason for charging the cost of securing business to operating expense.

Whichever way we conclude in the matter, selling cost, or the cost of building up and holding a going concern, is a legitimate outlay which we must recognize under the cost of service theory. In the case of an adjustment of rates at this time, the form or manner in which we recognize it is not so essential as the fact. Again we may observe that this is not going value in the broad sense, but simply an element of cost which demands recognition.

MISCELLANEOUS METHODS

A variety of miscellaneous methods of arriving at the going value have been proposed from time to time.

A going value was claimed, in one instance, equal to one-half of one year's gross receipts.

Another method proposes to fix the going value arbitrarily at one-third of the value of the physical property. This leaves out of consideration the net earnings and the cost of developing the business.

It has also been proposed to assign a going value on the basis of so much per connected customer.

Another proposal was made to fix the going value at an amount anywhere from one-half up to the full sum of one year's gross receipts, on the ground that utility managers would be willing, ordinarily, to spend as much as that to secure the business.

These several methods can perhaps be classified in a general way by saying that they would be admissible under the value of service theory of rates, but not under the cost of service theory, except in so far as they reveal, if at all, any legitimate elements of cost in building the properties and developing the business.

CONCLUSIONS

1. Under the cost of service theory we seem bound to recognize every element of actual cost, for both tangible and intangible property, which is legitimate, reasonable and necessary.

2. Going value, under the cost of service theory, cannot be supported by capitalized net earnings in excess of a fair return on the cost value of the property.

3. Rigid rules of measuring the legitimate going value, if any, under the cost of service theory, cannot safely be laid down, because the local circumstances in each case are different and each issue should be treated on its merits.

4. The general test for value of any kind, under the cost of service theory, is always the cost, but this may be tempered by the great desirability of distributing justice and equity to both the public and the utility companies, in equal measure.

REQUEST FOR LOWER FARES DENIED BY NEW JERSEY COMMISSION

A decision has been rendered by the Board of Public Utility Commissioners of New Jersey denying a plea for lower fares on certain lines of the Trenton & Mercer County Traction Corporation. It is admitted by the company that longer rides are given for one fare on one line than on other lines. The properties of the company, however, are undergoing physical betterment, and the commission concludes that it is too soon after the installation of the additional facilities and equipment provided recently to determine whether the company is making an undue return upon the actual investment when proper allowance is made for maintenance and depreciation. An abstract of the decision follows:

"Common to both complaints is the fact that two fares are required from points within the city of Trenton to reach the plant or property of the complainants. Both complainants cite the fact that the Trenton & Mercer County Traction Corporation upon some or on all of its other lines carries passengers a considerably longer distance for a single fare than said corporation does upon the line reaching Cochran, Drugan & Company's plant, or upon the line affording access to the property of F. C. Leaming et al. Both complainants cite in particular the fact that from the corner of Broad and State Streets the company, for a single fare, transports passengers upon the Yardville line as far as White Horse. It is alleged that upon this particular line, and upon other lines where corresponding conditions prevail, passengers are carried a much longer distance for a single fare than upon the line to the properties of the complainants.

"The allegation of longer rides for a single fare upon other lines branching out from the corner of Broad and State Streets is not denied by the company.

"This board, before it could properly issue an order such as that desired by the complainants, must be satisfied:

"(1) That there are no circumstances to warrant the disparity in charges complained of; and

"(2) That the loss in revenue to the company will not tend to deprive it of a fair return for its services and upon its investment.

SHORT AND LONG HAULS

"When different lines radiate from a common center and traverse districts differently circumstanced as to population it does not necessarily follow that the same maximum length of trip ought to be afforded for a single fare. In addition to distance, the density of traffic afforded by the various districts must also be taken into consideration. In a populous district, like that of a compact city, the carrier can afford to provide a comparatively long ride for a single fare. The reason is because relatively few in such a district will ordinarily ride the maximum distance and because for every one who does so ride the maximum distance there will be very many more who ride only a few blocks. With relatively little riding over the entire length of the fare zone, and with relatively many riding but a short distance, the average rate per car mile may prove remunerative.

"On the other hand, if the region which a traction company penetrates is one sparsely settled and thinly built up there is no large number of short riders whose patronage can be counted on; and if, in such a district, the ordinary passenger is one who is carried for a considerable distance, the average amount received per car mile will be less than in a compactly built district, unless the average charge per mile is greater than in the district of compact population.

"To a certain degree it is true of the Hamilton Square line and of the Pennington line that the density of traffic is less than on the Yardville line and on most of the other lines. The aveage revenue for the whole system ranges between 20 and 22 cents per car mile. A week's observations, from Sept. 10 to Sept. 16, showed the average receipts per car mile to be as follows:

"Hutchinson's Mills and Pennington Avenue line, 17.8 cents.

"Hamilton Square and Pennington Avenue line, 16.7 cents.

"White Horse and Yardville line, 20.9 cents.

"Despite the longer maximum ride given for a single fare upon the Yardville line, it appears that the revenue per car mile on the Yardville line is greater than on either of the other two lines. So long, therefore, as the present system of a uniform fare per car zone prevails, instead of a mileage charge, it does not appear that the present practice complained of is discriminatory.

"In effect, the complainants are interested in having as low a mileage charge on lines affording comparatively slight revenue as on lines affording comparatively heavier revenue. But it does not appear that they are unjustly discriminated against in not obtaining equally low rates per mile.

"While the comparative charges for distances traveled on the various lines may not be discriminatory when compared with each other, it remains to inquire whether a longer ride upon all of the lines ought to be furnished for a single fare. This raises the question whether the receipts now obtained by the company generally are excessive, as affording more than a fair return upon the cost of services rendered and upon the investment in the property.

COST OF SERVICE AND PROFIT

"To this inquiry the answer is that it cannot, with reasonable certainty, be said that the receipts will prove more than sufficient to cover cost of service and afford a reasonable profit on the investment. Until some further experience is had of the earnings of the lines only recently rehabilitated and still undergoing rehabilitation and of the new cars only recently installed, it will not be possible to answer this query. The fact that various lines of the system have shown a paper profit in past years and that dividends in recent years have been paid on outstanding securities, some of which represent no corresponding assets, is unfortunately no evidence that such profits were really earned or that such dividends were really derived from net profits.

"The board is disposed to think that such dividends were, in large part, paid only by reason of a shortsighted and unjustifiable policy on the part of the company, and that, if the various lines and the property used in connection therewith had been maintained in proper physical condition, the aforesaid dividends, or the greater part thereof, could never have been declared or paid. In reality they were paid, in large part at least, not out of income, but out of what should have been regarded as capital. As the result of this policy the properties ran down; their physical efficiency was impaired, and their capacity to render adequate service to the public was reduced below a tolerable standard. The record of dividend payments, therefore, in our judgment is no evidence that high profits were really earned, but that maintenance and repairs were unduly neglected, that depreciation funds were not properly provided, obsolescence was not guarded against and many of the essentials of judicious and conservative management were long and unreasonably neglected.

LEASE OF PROPERTIES

"In this posture of affairs the Trenton Street Railway, the Trenton, Hamilton & Ewing Traction Company, the Trenton, Pennington & Hopewell Street Railway and the Mercer County Traction Company in the latter part of last year applied for this board's approval of the terms of leases of certain lines now operated by the Trenton & Mercer County Traction Corporation, and the Trenton Street Railway proposed at the same time to issue $500,000 bonds, a great part of which was requisite to provide for rehabilitation, the installation of new apparatus and the acquisition of new rolling stock. At this time the board was not possessed of certain powers since conferred by statute, such as make necessary the board's approval of the purpose for which securities are proposed to be issued. The board was apprised by its chief inspector of utilities that the reproduction value of the physical properties involved was about $2,600,000.

"The chief inspector's valuation of the four constituent concerns follows: Trenton Street Railway, $1,820,320; Trenton, Hamilton & Ewing Traction Company, $180,000; Mercer County Traction Company, $348,500; Trenton, Pennington & Hopewell Street Railway, $255,650; total, $2,504,470.

"Of the principal concern, the Trenton Street Railway proper, the chief inspector remarked that the cost to reproduce it 'is about 61 per cent of the total amount of securities issued against it'; and that 'the actual value of the system ought to be restored to a figure very close to the outstanding bond issue, if such a plan is feasible, which is very doubtful.'

"Under these circumstances, with the public suffering from lack of adequate service, the approval of the lease seemed the 'shortest way through' to secure anything that looked like speedy improvement in transportation facilities. The leases were accordingly approved, not that it was regarded as a normal and typical arrangement, but because nothing else was in reasonable expectation. The Trenton & Mercer County Traction Corporation agreed, however, that 5 per cent of its gross receipts should be set aside annually for depreciation. Even this is a wholly inadequate provision, in the long run, to take care of depreciation, not less than 15 per cent of the gross receipts being necessary, according to the chief inspector, for permanently assuring the integrity of the plant from the standpoint of efficiency. At the same time the 5 per cent provision, while the road-bed, cars and other parts of the plant are new, will be some security against the rapid deterioration of the physical property.

BETTERMENTS TO PROPERTY

"From the proceeds of the bond sale certain essential betterments ordered by the commission have been made, and others are in progress, while still others have been promised by the company. Twenty new cars, we are advised, have been put in commission; others have been ordered, and receipts have shown some considerable tendency to increase in correspondence with the additional facilities and equipment. It is, however, in our judgment, too soon to determine whether even now the net earnings will prove that the company is making an undue return upon the actual investment, when proper allowance is made for maintenance and depreciation.

"The terms of the leases impose upon the lessee a growing annual payment, rising by degrees annually from $157,450 in 1911 to $204,750 in 1930, and it is by no means certain that the earnings will properly provide money sufficient to pay the sums aforesaid. It is true that the company is justly entitled to earn only a fair return upon a fair valuation of the property and not upon the capitalization, which is very considerably in excess of the actual property. But until further experience has demonstrated that the earnings suffice to afford more than the company is fairly entitled to this board regards as premature any decision that the rates, as a whole, are excessive or unjust, or that longer rides, generally, should be given for a single fare.

"The community is as vitally interested in adequate and efficient service as in the matter of rates or in the maximum length of rides, and a reduction in rates, if not justified by experience, would not prove to be in the interest either of the patrons of the company or of the company itself.

"The complaints are dismissed, therefore, but without prejudice to reopening the questions involved should further experience demonstrate that the rates charged are either exorbitant or discriminatory."

COMMUNICATION

BRAKE TESTS IN NEW YORK

Sterling-Meaker Company,
Newark, N. J., Nov. 18, 1911.

To the Editors:

This company has been asked by a customer how its brakes performed in the recent test described in the Electric Railway Journal for Sept. 30, 1911, on page 543. This test was said to have been made at the request of the Public Service Commission of New York, First District, and from this railway officers and the public naturally would infer that the test was a public one and that all geared hand brakes had been given an opportunity to compete therein. We are convinced that no one connected with the Public Service Commission intended to convey this impression. It is proper for this company to state that no invitation or opportunity to compete with its Sterling safety brake or Giant brake was given, and no one connected with this company knew that such a test was to be or had been held until long after the test had been made. This company would have been glad to have entered either or both of its brakes in a competitive trial.

J. A. Stowe, President.

[We are glad to publish the above letter if it will serve to correct a false impression in the minds of any of our readers. We do not see how any one could read into the description of the tests in the issue of Sept. 30 any inference that these tests were of a competitive nature between devices of the same class. They were made by the Third Avenue Railroad at the suggestion of the engineering department of the Public Service Commission and their object was simply to determine the relative efficiency of the type of hand brake and the type of air brake with which the greater number of the cars of the Third Avenue Railroad are equipped. As such the report of the test was considered by the editors of this paper to be of interest to its readers.—Eds.]

Meeting of Central Electric Railway Association

This Is a Telegraphic Report of the Discussions on Standardization of Car Equipment, Publicity, Freight Weighing, Operation of Electric Freight Locomotives, Maintenance of High-Tension Lines, Etc.

The Central Electric Railway Association held a regular bi-monthly meeting at Louisville, Ky., on Nov. 23, 1911. The first session was held in the morning and was called to order by President Peck. There were present about seventy-five delegates. Two special-car parties were brought to the meeting by Alexander Shane, general manager Indianapolis, Columbus & Southern Traction Company, and one special-car party by F. D. Carpenter, general manager Western Ohio Railway.

The first order of business was the report of the standardization committee, which was presented by H. H. Buckman. This report recommended a standard design of anti-climber, using a corrugated section 8 in. high and having four ribs. Blueprints of the proposed design were distributed to the members present. H. A. Nicholl, general manager Indiana Union Traction Company, said that action on the approval of this design should be deferred until the prints had been distributed and carefully considered by all member companies.

Upon motion of C. L. Henry, president Indianapolis & Cincinnati Traction Company, it was moved and carried that the action of the Central Electric Association's standardization committee should be considered in conjunction or conference with the American Electric Railway Engineering Association. In this connection Secretary Neereamer read a letter from Norman Litchfield, secretary of the American Electric Railway Engineering Association, requesting a conference between the officers of the associations in order to take steps to co-operate in engineering matters. Copies of this letter will be sent to all members of the Central Electric Railway Association.

Progress was reported by the committee on lightning arresters. The report of this committee was read by Secretary Neereamer. Eleven railways operating 943 miles of track were of opinion that a satisfactory arrester for trolley wire should have the following features: An air-gap which breaks down on a voltage low enough to protect the apparatus connected on the line; a resistance which is sufficiently high to prevent the grounding of the line, but not high enough to impede free passage of the heavy lightning discharge; positive and automatic means of interrupting a relatively small flow of normal current following a discharge; and a properly installed ground. The committee was of the opinion that half of the responsibility for good results depended upon the manufacturer and half upon the manner in which the arresters were installed and maintained by the railway. Lightning protection for alternating-current circuits appeared to be well standardized. In conclusion, the committee requested that more attention be given to answering the data blanks on the subject of lightning.

Upon motion the members present instructed the standardization committee to report at the next meeting on rules of procedure for the adoption of standards. The secretary then read resolutions authorizing the merger of the Central Electric Accounting Conference with the Central Electric Railway Association. These resolutions were approved.

J. J. Rockwell, McGraw Publishing Company, then read his paper on "Publicity," which is published elsewhere in this issue. President Peck spoke of the increased attention which electric railways were now giving to this subject. Arthur W. Brady, president Indiana Union Traction Company, discussed at length the practical value of publicity and of advertising generally. He said that the most noteworthy point brought out in the discussions during the 1911 convention of the American Electric Railway Association at Atlantic City was that the interurban railways had become good advertisers for the purpose of gaining a share of freight traffic. He hoped to see the advertising campaigns of these companies continued with ever better results. Another phase of the advertising of both street and interurban railways was that of keeping the public informed of the difficulties which are encountered in giving it good service. This kind of advertising was being forced upon the railways and they were obliged to resort to it in self-defense. To-day the interurban railways led in traffic advertising and the street railways led in advertising intended to create favorable public sentiment. In their earlier days the interurban railways were considered great benefactors and had therefore received many corporate favors. The present tendency was to place them on more or less the same basis as steam railroads, so that they too would find it necessary to do more advertising to mold public opinion in their favor. The public was now in a state of unrest on account of the many fallacies which had been spread throughout the country by demagogues and agitators against corporations. Mr. Brady hoped that the electric railways would be broad-minded enough to realize that some of this criticism was well founded, but on the whole it appeared to him that the grounds for such criticisms were largely exaggerated. Publicity would do much to counteract this harassing activity of the agitators. Much attention should be given to publicity because the public did not realize the expenses of operation and the need for earning a net revenue which would permit the maintenance of good service and improvements. In conclusion, Mr. Brady complimented Mr. Rockwell for the many excellent features of his paper.

J. F. Starkey, traffic manager Lake Shore Electric Railway, said that publicity was closely related to such problems as keeping the trains on time and to the cleanliness of cars.

President Peck said that the Central Traffic Association had requested the Central Electric Railway Association to give attention to the subject of freight weighing and inspection. One member stated that he knew of a case where a carload was 13,000 lb. overweight. Mr. Carpenter said that platform and track scales quickly paid for themselves many times over. Upon motion of Mr. Henry a resolution was passed instructing the Central Electric Traffic Association to formulate plans and report the details of operating a weighing and inspection bureau.

F. D. Norviel, general passenger and freight agent Indiana Union Traction Company, read his paper on "Traffic," which is published elsewhere in this issue, and described the distribution of the Indiana Union Traction Company's magazine.

The next order of business was F. E. Wynne's paper on "Electric Locomotives for Interurban Freight Hauling," which is published elsewhere in this issue. There was a general discussion following the reading of this paper on the most desirable speeds for freight trains and whether such trains should be operated at night or in the daytime between passenger trains. G. H. Kelsay, superintendent of power Indiana Union Traction Company, favored night operation of freight trains, when almost all of the power equipment of a road was idle.

E. J. Burdick, superintendent of power Detroit United Railway, then read his paper on "Lightning Protection," which is published elsewhere in this issue. There was no discussion.

President Peck introduced General George H. Harries, who said that all of the topics that had been brought up for discussion at the meeting were of interest and value. The most important question, however, was that of public relations. This was an essential part of the operating existence of a corporation. The official of a public utility company could not rest upon his efficiency as a technical man. If he did he was not the kind of a man that the stockholders of a public service corporation wanted. There was a time when such a man was useful, but that time has passed. He must be endeavoring constantly to bring the public into proper relation with the service. The so-called practical man was not a success when he was merely practical and nothing more. He must be able to deal fairly and squarely with the public, telling it what it wanted to know and maintaining harmonious relations. There were serious problems to be considered in the management of electric railways. The operating costs were increasing as well as taxes, while physical renewals had to be provided for. When a complaint was made about the service the manager should tell the complainants frankly why this or that improvement could or could not be accomplished. In short, it was necessary for the manager of a railway to inject the human element into his business. If the official had the capacity, he could take on this additional burden without particular effort. It also behooved the electric railway officials as a class to see that the public received the same courteous and considerate treatment from every one in their entire organization.

J. E. Cochran, superintendent of lines and substations Ohio Electric Railway, then read his paper on "Substation Operation." This paper is printed in another column in this issue.

G. H. Kelsay, Indiana Union Traction Company, spoke of the need for more definite rules for the guidance of linemen making repairs on high-tension wires. A desirable organization of substation forces and a method of promoting substation operators would be to have three grades of substations classified according to the electrical equipment installed and the amount of business handled if the operator also acted as ticket agent. The men should be paid according to their length of service and should be promoted from the lowest grade substations to higher grade substations. Mr. Carpenter described how the West Penn Railways repaired 33,000-volt transmission lines with the current on. A general discussion followed on the method of instructing substation and power station operators over the telephone to cut power off the line when making repairs and also on the use of chains and ground wires for protecting linemen making repairs to high-tension circuits. Mr. Kelsay said that he had investigated the cost of repairing high-tension lines with the current on and had found that the cost was too high to be practicable for general use.

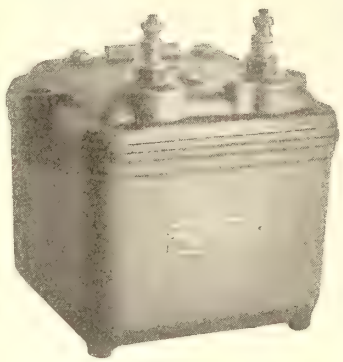
Upon motion of G. K. Jeffries, superintendent Brazil and Danville lines, Terre Haute, Indianapolis & Eastern Traction Company, it was voted that a committee should be appointed to draft standard rules for making repairs on high-tension lines.

In the afternoon the members of the association were the guests of the Louisville Railway. The next meeting, which will be the annual meeting of the association, will be held on Jan. 25, 1912.

The Public Service Commission, of the First District of New York has decided to hold a hearing on an order to require the Interborough Rapid Transit Company, New York, N. Y., to post news of traffic stoppage on bulletin boards at all stations in the subway, the bulletin to be posted after a blockade has continued for ten minutes and to state the cause of the delay. No date has been fixed for the hearing.

AUTOMATIC REACTANCE FOR TRACK CIRCUIT

The General Railway Signal Company, Rochester, N. Y., has recently perfected a device known as an automatic reactance, which is especially adapted to alternating-current signaling. The device has a variety of uses, the most important of which is as a substitute for the fixed resistance or reactance ordinarily inserted between the transformer and the rails to limit the flow of current when a train is in a block. This device when so used offers practically no resistance to the flow of current normally, yet when a train is present it prevents the current from increasing above a predetermined value, thus resulting in minimum energy consumption and permitting the use of minimum sizes of transformers and wires. The device has no contacting parts or moving wires and is simple and rugged in construction. On account of its very low ohmic resistance there is practically no heat developed.



Automatic Reactance Unit

NEW PATENTS ON SINGLE-PHASE APPARATUS

Five patents recently issued to H. Ward Leonard relate to electric-motor control and are notable for the early date of application and the breadth of claims. The principal patent of the group is based on an application filed in 1901. The other applications were filed in 1905 and 1906. There are eighty-eight claims in the patent based on the earliest application, and 62, 30, 88 and 111 claims respectively in the other four.

The patents include broad claims on regenerative methods, especially for alternating currents, on single-phase traction and on multiple locomotive control; also on various systems of voltage speed control. One claim, in patent No. 1,003,923, for which the original application was filed Jan. 24, 1901, reads as follows:

"The method of operating a train, which consists in generating electric energy at a stationary source, transmitting electric energy to the train, leading electric energy upon the train by means of moving contacts, transforming the energy into a plurality of divisions on different locomotive units of the train, supplying said divisions of the energy to at least one element of the motors of the respective locomotive units, and simultaneously controlling the transformed energy to control the train."

COASTING CLOCK ORDER IN CHICAGO.

Announcement was made in Chicago on Nov. 24 that the Chicago Railways Company has just placed an order for 1569 coasting clocks with the Railway Improvement Company of New York. It is well known that the Chicago Railways Company has been conducting quite an elaborate test with coasting clocks and has had on its cars fifty of these coasting clocks which it purchased some time ago. The result of this test has evidently been satisfactory to the company. Before the order is legally binding it must be confirmed by the Board of Supervising Engineers, Chicago Traction. This announcement confirms the advance notice of the order which was mentioned on page 858 in the issue of the Electric Railway Journal for Oct. 14, 1911. Up to that time the company had actually ordered only fifty clocks.

ELECTRIC RAILWAY LEGAL DECISIONS

CHARTERS, ORDINANCES AND FRANCHISES

California.—Railway Right-of-Way Notes—Liability.

If notes given to procure a right-of-way for an electric road required the road to be built by a particular company, the condition was met by construction by a company whose stock was owned by the other company. (First Nat. Bank of Covina et al. v. Ruddock Co. et al., L. A. 2430, 111 Pac. Rep., 86.)

Kentucky.—Transfers—Ejection of Passengers.

A rule of defendant street car company provided that conductor should issue transfer tickets when fares were paid. Plaintiff demanded a transfer without paying his fare, but offered to pay the fare only upon condition that the conductor would simultaneously give him a transfer. After some altercation the conductor ejected him, using no more force than was reasonably necessary. Held, that plaintiff was not entitled to recover for the ejection. (Louisville Ry. Co. v. Hutti, 133 S. W. Rep., 200.)

Texas.—Meaning of the Word "Switch."

An ordinance granting a street railroad company the right to lay its tracks required the single tracks to be laid in the center of the streets and authorized double tracks on a certain street to be laid on either side of the center of the street. The company sought to construct in a certain block of such street two tracks which continued parallel for a short distance on each side of the center line, when they reunited with the single track. Held that the word "switch" has a meaning in addition to its technical meaning, depending upon its character, the word ordinarily meaning a side track constructed to permit the passage of cars from and to the main track, and the track which the company sought to construct was a switch and not a double track within the meaning of the ordinance. (City of Denison v. Denison & S. Ry, Co., 127 S. W. Rep., 804.)

Washington.—Municipal Regulations Regarding Fenders.

Under a municipal ordinance requiring each street car to be equipped with a fender as near to the roadbed as shall be practicable, the question as to the height of a street car fender above the road and as to whether it is carried as near the roadbed as is consistent with the practical operation of the car are for the jury, and the court can only determine that the ordinance is a reasonable exercise of the police power. (Tecker et ux. v. Seattle, R. & S. Ry. Co., 111 Pac. Rep., 791.)

Washington.—Agreement with Municipality—Obligations.

A contract between a city and a street railway operating its lines in the city which binds the company to carry passengers within the city for a single fare not exceeding 5 cents and to issue transfers to all passengers for a continuous trip one way to and from all lines in the city is binding on the company operating a line in territory outside of the city under a county franchise on the territory being subsequently annexed to the city.

A contract between a city and a street railway company granting a franchise must in case of doubt be liberally construed in favor of the public.

The right of a county which grants a franchise to a street railway company to operate a line in certain territory is terminated on the territory being annexed to a city, and the right of the company is after annexation amenable to the proper authorities of the city. (Peterson v. Tacoma Ry. & Power Co., 111 Pac. Rep., 338.)

LIABILITY FOR NEGLIGENCE

Missouri.—Duty in Setting Down Passengers—Sudden Start.

Where a street car on the signal of a passenger slows down at a customary stopping place, and the passenger prepares to alight, it is negligence for those in charge of the car to suddenly start it just before making the stop. (Musick v. United Rys. Co. of St. Louis, 134 S. W. Rep., 32.)

Missouri.—Setting Down Passengers.

Where the conductor and motorman had stopped the car to permit a passenger to alight, and knew or were bound to know that she was in the very act of alighting, they should not only hold the car stationary a reasonable length of time for her to alight, but should exercise a high degree of care to ascertain whether she had reached a place of safety before putting the car in motion. (Jerome v. United Rys. Co. of St. Louis, 134 S. W. Rep., 107.)

Missouri.—Injuries to Passenger Alighting at Point Not a Regular Stop.

Notwithstanding that the usual stopping place of a street car may be on the further side of a street intersection, yet if it stops before crossing the street and a passenger is led to believe that it is in obedience to her signal to give her an opportunity to alight, it would be negligence of the carrier's servants in charge knowingly to allow the car to start while the passenger is alighting so as to throw her to the ground. (Monroe v. United Rys. Co., 133 S. W. Rep., 645.)

Missouri.—Injuries—Excessive Speed.

It was a question for the jury whether it was negligence to operate street cars at the intersection of two avenues which many people were accustomed to use at a speed of 12 m. p. h., even though the maximum speed limit fixed by ordinance was 15 m. p. h. (Brandt v. United Rys. Co. of St. Louis, 93 S. W. Rep., 39.)

Missouri.—Maximum Speed—Negligence.

The operation of a street car in excess of the maximum speed fixed by a municipal ordinance, and thereby injuring a pedestrian attempting to cross the track in front of the approaching car, is negligence per se. (Strauchon v. Metropolitan St. Ry. Co., 135 S. W. Rep., 14.)

Missouri.—Care Required on Streets.

A motorman may presume that an adult will not undertake to cross the track in front of his approaching car where by the exercise of ordinary care he may see the car approaching and must know that if he proceeds there is danger of serious injury, and the motorman need not, under the humanitarian doctrine, stop his car merely because he sees an adult approaching the track and some feet away, but he must make an effort to stop his car when he discovers that the adult is in a perilous position and will not stop and let the car pass. (Semple v. United Rys. Co. of St. Louis, 133 S. W. Rep., 114.)

Missouri.—Railroad Crossings—Care Required.

A motorman operating a car across a railroad crossing must hold his car in a place of safety until the crossing is clear and until it is beyond the action of a train resulting either from its recoil or the reversing of its engine, and for him to run his car in immediately behind a slowly receding string of cars that may stop and return is negligence, notwithstanding any signal from the flagman.

A flagman stationed at a railroad crossing used by a street railway company is the agent of the latter, and it is liable for his negligence in signaling a motorman to cross. (Augustus et al. v. Chicago, R. I. & P. Ry. Co. et al., 134 S. W. Rep., 22.)

Missouri.—Persons Crossing Tracks—Reliance on Speed Ordinance

Where a person alighted from a northbound car and looked north, while still behind the car, to see whether any south-bound car was approaching, being able to see for 40 ft., and then crossed over to the south-bound track, about 5 ft., and did not look again until he was upon the south-bound track and an approaching car was so near that a collision was unavoidable, he was guilty of contributory negligence.

Where the plaintiff in an action for personal injuries did not show that he was familiar with the provisions of a speed ordinance or that he relied on it, it will not be presumed, in excuse of contributory negligence, that the plaintiff relied on its observance. (Paul v. United Rys. Co. of St. Louis, 134 S. W. Rep., 3.)

Wisconsin.—Dogs on Track—Rights of Street Car Company.

A street car company is not required to stop its cars, when running at a legal or reasonable rate of speed, to avoid collision with dogs. A motorman operating a car is entitled to act on the presumption that ordinarily a dog on a street car track will get out of the way. (Smith v. Railroad Co., 79 Minn. 254, 82 N. W. 577, followed and applied. Henry v. St. Paul City Ry. Co., 124 N. W. Rep., 245.)

News of Electric Railways

Progress in Subway Matters in New York

W. R. Willcox, chairman of the Public Service Commission of the First District of New York, said recently regarding the conferences which are now being held with reference to the subway situation:

"We are moving right along in carrying out the program laid down last summer by the unanimous vote of the Board of Estimate and of the commission. I believe that the plan which was approved providing for a dual system so that certain lines should go to the Brooklyn Rapid Transit Company and other lines to the Interborough Rapid Transit Company was the best possible plan. It was a mistake that the extension down Seventh Avenue was not approved, but I believe that the alternative plan, which was finally approved when the Interborough Rapid Transit Company refused to accept the terms offered, was the next best solution."

He is in favor of a west side extension of the Interborough Rapid Transit Company's line if the money needed for construction can be made available. As an alternative, he suggested, however, that a moving platform be built in Thirty-fourth Street which would carry passengers from the Pennsylvania Railroad terminal and make connections with the subways in Broadway and in Lexington Avenue as well as with the present subway in Fourth Avenue.

The commission has approved bonds for two sections of the Broadway and Lexington Avenue subway, and contracts were signed. One of these sections was No. 13, just south of the Harlem River, which was awarded to the Bradley Contracting Company for $4,071,410. The company gave bonds in the sum of $400,000. The other section was No. 15, just north of the Harlem River, which includes the portion where the route divides into two branches, one going to Pelham Bay Park and the other up Jerome Avenue to Woodlawn. This went to the Hagerty-Dumond Company for $3,820,129. The amount of the bond was $500,000.

Opposition to Retrenchment in Lincoln, Neb.

The Lincoln (Neb.) Traction Company as part of a general plan of retrenchment recently modified its schedules and rerouted several lines on the recommendation of J. H. Humpe, general manager, and independent engineers retained to advise the company. An injunction was sought following the announcement of the plans made by the company to restrain it from putting the proposed changes into effect. The conditions in Lincoln are in a way peculiar to that city, and are set forth in part as follows in the affidavit of C. S. Allen, counsel for the company, opposing the application for an injunction:

"The rate of six tickets for 25 cents was imposed by ordinance of the City Council on or about April 1, 1906, at which time the lines of the Citizens' Railway were not constructed and there was no street railway service in Lincoln other than that furnished by the former Lincoln Traction Company. Subsequent to the passage of the ordinance, the lines of the Citizens' Railway were constructed and operated and the lines of the Lincoln Traction Company were extended. At the time of the consolidation the street railway track mileage exceeded the track mileage in any of the cities of the class of Lincoln, and the amount of service greatly exceeded the amount of service given in any other city in its class.

"The problem that confronted the management of the consolidated company was the maintaining of more track and service than any other company in cities of the class of Lincoln for a fare less than usual in such cities, and at the same time to respond to the public demand to build lines and provide cars and equipment equal to the best in cities where the straight 5-cent fare prevails. Finding no solution of this problem, the defendant company requested the Nebraska State Railway Commission to restore the usual and customary fare so as to enable the company to operate under equal conditions with other companies of its class. The commission not only denied the request of the company, but impaired its existing revenues by reducing the fare to Havelock from 10 cents to six tickets for 25 cents. The distance from Havelock to the business center of Lincoln is 7.04 miles.

"Obtaining no relief from the commission, the defendant was forced to economize on service. The changes that had been made were based wholly on operation considerations. The number of cars was reduced and the remaining cars placed where there was the greatest service demand. I was in nowise influenced by real estate or business considerations, or any considerations other than street railway operation. Cars operated around the loop which was built by the Citizens' Railway were reduced in number because the cars in operation on the whole system were reduced and the service demand was less on the lines connected with the Citizens' loop than on the lines connected with the old Traction Company's loop. R. W. Harris, of the engineering staff of the Railroad Commission of Wisconsin, recommended that the Citizens' loop should be enlarged by an extension connecting the track on P Street with the track on Thirteenth and O Streets, permitting the operation of cars from Thirteenth and O Streets around said loop. It is the opinion of the directors that this recommendation is based on substantial grounds and that the connection should be made and the cars operated over the South Fourteenth Street line should connect with this loop in place of the old loop. The proposed change would give the plaintiff the benefit of the College View high line."

Argument in Toledo Rental Suit

The motion of the Toledo Railways & Light Company to strike out of City Solicitor Schreiber's petition all reference to Nov. 11, 1910, was argued before Judge Chittenden on Nov. 13. This suit was brought to enforce the ordinance which provides for the payment of a rental of $50 a day for the use of streets on which the franchises are said to have expired and for the collection of $70,000 for the use of the streets from Nov. 10, 1910, to the time the new ordinance went into effect. Barton Smith, attorney for the company, argued that the ordinance could not fix a rental for the time, prior to its passage. The amount which the company owes the city, if anything, must be fixed by a court and not by ordinance.

City Solicitor Schreiber contended that the city was not praying for a money judgment. The ordinance provided terms under which the tenant might remain. The ordinance requires the company to pay $70,000 cash in back rentals claimed to be due and $250 a day rental from the time the ordinance went into effect. The ordinance stipulates that if the company does not pay these amounts, it shall cease to operate over the streets in question.

The city has announced that its committee is ready to resume the franchise negotiations with the company. It is reported that Frank R. Coates will succeed Albion E. Lang as president of the company, but that Mr. Lang will continue as a director.

Grade Crossing Order on the Long Island Railroad

The Public Service Commission of the First District of New York has served an order on the Long Island Railroad requiring it to erect, maintain and operate during the entire year protecting gates at twenty-one grade crossings on various divisions; to erect, maintain and operate from May 16 to Oct. 16 each year protecting gates at ten other grade crossings on the Rockaway and Far Rockaway divisions, and also requiring visual and audible signals at the Smith Street and Locust Avenue crossing of the Old Southern division. The gates for the first group mentioned are to be installed and ready for operation by Feb. 1, 1912; for the second group by May 16, 1912.

The ordering of these protections finishes the grade-crossing work on the Long Island Railroad which has occupied the attention of the commission for the last three years. After these gates are installed all the most dan-

gerous crossings of that railroad will have been protected by proper devices or eliminated or be in process of elimination. The commission has ordered the elimination of grade crossings to cost $2,000,000, most of which are crossings on the Long Island Railroad. It has now under consideration the issuance of orders for elimination work the cost of which will be about $4,000,000, and most of this work is on the Long Island Railroad. These orders will be issued as soon as the Legislature appropriates the State's one-fourth of elimination expense. The commission has already notified the State Comptroller that it wants an appropriation by the State of $1,000,000 for this work.

Cleveland Street Railway Commissioner Appointed

Mayor-elect Newton D. Baker of Cleveland announced the selection of Peter Witt as street railway commissioner on Nov. 18, 1911, at a salary of $7,500 a year, or $4,500 less than G. M. Dahl, his predecessor, received. Mr. Witt was born in 1868. When he was seventeen years old he left school and became an apprentice in the moulding room of an iron foundry. In 1896 Mr. Witt stumped Minnesota, Wisconsin and Michigan for the Democratic candidate for President. Mr. Witt made the acquaintance of the late Tom L. Johnson in 1901. and was finally placed in charge of the tax school which Mayor Johnson formed to spread his ideas. In 1903 he was elected city clerk, a position which he held continuously for seven years. T. L. Sidio, a senior of the law school of the Western Reserve University, will be Mr. Witt's secretary at a salary of $2,500.

It is believed that Joseph H. Alexander, of the engineering department of the Pittsburgh (Pa.) Railways, will be the engineer in the commissioner's office. He was assistant superintendent of the Municipal Traction Company, Cleveland, which operated the street railways for a short time.

The statement of operation of the Cleveland Railway for October shows a deficit in ordinance allowances of $42,890 and a deficit on actual expenditures of $29,232. The interest fund shows a deficit of $134,000 under the original $500,000. The number of passengers per car mile for the month was 9.68 in comparison with 9.13 a year ago. The detailed statement under ordinance allowances is as follows:

Gross earnings	$534,824
Operating expenses	434,697
Net earnings	100,127
Other income	3,311
Gross income	103,438
Taxes	28,872
Net income	74,566
Interest	117,456
Deficit	$42,890

The ordinance allowance for maintenance was $140,982, while the actual disbursements were $138,267, leaving a surplus of $2,715. Ordinance allowances for operating expenses were $293,714, and the expenditures were $282,771, or a saving of $10,942. The two together amount to $13,658.02 and reduce the actual deficit from $42,890.29 to $29,232.27.

At the meeting of the directors of the Cleveland Railway on Nov. 18, 1911, plans for improvements and financing were discussed. The regular quarterly dividend of 1½ per cent was declared, payable on Jan. 1, 1912.

Electric Zone Extended by New York Central Railroad.—The New York Central & Hudson River Railroad has extended the electric zone on its Hudson River division out of New York City from Hastings to Tarrytown.

Strike in Cleburne.—The employees of the Cleburne (Tex.) Street Railway went on strike on Nov. 17, 1911, to compel the company to comply with certain demands which they had made in regard to the modification of the operating rules. The question of wages is not involved.

Chicago Companies Not Liable for Bridge Reconstruction.—William H. Sexton, corporation counsel of Chicago, has informed the department of public works of that city that in his opinion the city cannot compel the street railways to pay part of the cost of constructing new bridges to replace those over which their cars are now operated.

Fender Test in Montreal.—About a year ago the Public Utilities Commission of the Province of Quebec ordered the Montreal Street Railway to equip its cars with the H.-B. wheel-guards or some other device equally satisfactory. About a dozen fenders were tested recently under the direction of the commission, but the results of this test have not yet been announced.

New Jersey Franchise Tax Assessments.—The State Board of Assessors of New Jersey has completed the assessment against street railway and other public utility companies. The total assessment is $1,112,743.41, an increase of $155,735 over the valuation for 1910. The aggregate assessment is divided as follows: Thirty street railways, $610,199; 113 gas and electric light companies, $333,468; 106 water companies, $63,785.85; thirty-eight telephone and telegraph companies, $100,430.66; four district telegraph messenger companies, $1,223.11; seventeen sewer companies, $3,430.75; one oil or pipe line, $210.18.

One Thousand-Volt D. C. Line for Mexico.—The Mexican house of the Siemens-Schuckertwerke has closed a contract for the construction of a short railway for the city of Pachuca in the State of Hidalgo, Mexico. The first installation will consist of four 34-ton electric locomotives, two substations and overhead equipment. The line will be 17.4 miles long, and operate on 500 volts and 1000 volts d.c. The equipment of the locomotives will be arranged for operation on either voltage. The necessary energy will be transmitted by the Mexican Light & Power Company at 6000 volts, 50 cycles, three phase. The road will be used for city and suburban passenger traffic and for hauling ore from silver mines.

Rights of Stockholders.—Hugh McCloskey, president of the New Orleans (La.) Railway & Light Company, in discussing the rights of stockholders in an interview in the New Orleans *State* recently, said: "A man with money invested in this company is entitled to as much security as if it were his own private business. After he is assured of a reasonable return for his money, I feel that our next duty is toward the public. That it is our intention to fulfill this duty is shown by the fact that we voluntarily reduced the gas rates. Our franchise would allow us to charge $4 per 1000 cu. ft. for gas, but we have reduced the charge to a graduated scale of 75 cents to $1.15 per 1000 cu. ft. according to the amount consumed. The same policy will govern the electric light rates."

Advertising Campaign of the Virginia Railway & Power Company.—The Virginia Railway & Power Company, operating in Richmond, Norfolk, Petersburg, Portsmouth and Suffolk, Va., began the publication of a series of page advertisements in the issue of the *Manufacturers' Record* for Nov. 16, 1911. The advertisements will be published every other week for a year and will outline to business men the advantages of the territory served by the company. In the first advertisement, headed "The Gateway to the South," the company said: "Virginia Railway & Power Company is a firm believer in the territory occupied by these cities. It has expended large sums of money in order to enable it to give to these communities the unexcelled facilities they now enjoy of a cheap and comprehensive transportation system and low rates for lighting and electric power for large and small consumers. Norfolk and Portsmouth with their superb harbor and unlimited water front property for manufacturing and mercantile businesses and rail and water lines in every direction. Richmond and Petersburg, the open highway through which pass all of the large trunk lines between the South and the Northern markets, together make a superb gateway to a section of country abounding in natural resources, of inestimable wealth and overflowing with opportunities for the profitable use of money and energy. This will be a great center of manufacturing and commercial enterprises because the port at Norfolk and Portsmouth is the nearest port to a larger area of the United States than any other port on the Atlantic coast. The harbor is open all the year. An unlimited supply of deep water-front property available for business and manufacturing sites. Water power and cheap electric power. Nearness to the markets of the North and West and the raw materials of the South for manufacturing. Rich agricultural territory insures a source of permanent wealth. The richest coal fields of America are brought in direct touch by three great competing railway systems. Healthy climate and many other reasons combine to make this a territory rich in industrial and commercial opportunities."

Financial and Corporate

New York Stock and Money Markets

Nov. 22, 1911.

Trading on the New York Exchange has been very light the last week. The most encouraging recent sign in the industrial world has been the activity in the railroad equipment field. The decision of the Court of Appeals on Nov. 21 in the reorganization case of the Third Avenue Railroad, although favorable to the bondholders, had a decided effect on the stock of the company, which declined five points in two days. Quotations in the money market to-day were: Call, 2⅜@2½ per cent; thirty days, 3¼@3½ per cent; sixty days, 3½@3¾ per cent.

Other Markets

In Chicago bonds were in demand. Sales were recorded to-day of 15,000 Commonwealth-Edison 4s, 14,000 City Railway 5s, 5000 Chicago Railways 5s, and 6000 Chicago Railways 4s, Series B.

In the Philadelphia market Union Traction has weakened with the last sale recorded at 51⅝. Philadelphia Rapid Transit voting trust certificates hold at 23⅝.

The trading in Boston has been very limited and the changes in prices over a week ago are fractional.

Quotations of traction and manufacturing securities as compared with last week follow:

	Nov. 15.	Nov. 22
American Brake Shoe & Foundry (common)	....	a89
American Brake Shoe & Foundry (preferred)	....	127
American Light & Traction Company (common)	a295	a295
American Light & Traction Company (preferred)	a107	a107
American Railways Company	a45½	a45¾
Aurora, Elgin & Chicago Railroad (common)	a40	a39½
Aurora, Elgin & Chicago Railroad (preferred)	83½	a86¼
Boston Elevated Railway	a128½	a129½
Boston Suburban Electric Companies (common)	a15	a15
Boston Suburban Electric Companies (preferred)	a75	a75
Boston & Worcester Electric Companies (common)	a13	a12
Boston & Worcester Electric Companies (preferred)	a58	a58
Brooklyn Rapid Transit Company	77⅞	77¾
Capital Traction Company, Washington	a127	a127
Chicago City Railway	a180	a180
Chicago Elevated Railways (common)	....	a30
Chicago Elevated Railways (preferred)	....	a94½
Chicago Railways, ptcptg., ctf. 1	a98	a95¾
Chicago Railways, ptcptg., ctf. 2	a33½	a33
Chicago Railways, ptcptg., ctf. 3	a11½	a11
Chicago Railways, ptcptg., ctf 4	a7	a7
Cincinnati Street Railway	a131	a129½
Cleveland Railway	a103¼	a105
Cleveland, Southwestern & Columbus Ry. (common)	...	a4⅞
Cleveland, Southwestern & Columbus Ry. (preferred)	....	a33¾
Columbus Railway & Light Company	....	a37½
Columbus Railway (common)	....	83
Columbus Railway (preferred)	....	90½
Consolidated Traction of New Jersey	a75½	a75½
Consolidated Traction of N. J., 5 per cent bonds	a104½	a105
Dayton Street Railway (common)	a25	a25
Dayton Street Railway (preferred)	a101	a101
Denver & Northwestern Railway	....	145
Detroit United Railway	85	a80
General Electric Company	152½	154¼
Georgia Railway & Electric Company (common)	a159	a159
Georgia Railway & Electric Company (preferred)	a93	a92
Interborough Metropolitan Company (common)	14¾	*14¾
Interborough Metropolitan Company (preferred)	46	47¾
International Traction Company, 4% notes, rcts	...	70
Indiana Union Traction Company	...	12
Kansas City Railway & Light Company (common)	*16¼	a21
Kansas City Railway & Light Company (preferred)	*44	48
Lake Shore Electric Railway (common)	...	a7
Lake Shore Electric Railway (1st preferred)	...	81½
Lake Shore Electric Railway (preferred)	...	a25
Manhattan Railway	a138	134¾
Massachusetts Electric Companies (common)	a21½	a23
Massachusetts Electric Companies (preferred)	a94	a95½
Metropolitan Street Railway, New York	*8	*8
Milwaukee Electric Railway & Light (preferred)	*110	105
North American Company	a73	a74¼
Northern Ohio Light & Traction Company (common)	...	a58
Northern Ohio Light & Traction Company (preferred)	...	a105
Philadelphia Company, Pittsburgh (common)	a53½	a53¼
Philadelphia Company, Pittsburgh (preferred)	43	a43¾
Philadelphia Rapid Transit Company	a23	a23½
Portland Railway, Light & Power Company	...	99½
Public Service Corporation	108	a110
Public Service Corporation, ctfs	a112	a106
Seattle Electric Company (common)	a108	a108
Seattle Electric Company (preferred)	a101½	101½
Third Avenue Railroad, New York	11½	7¾
Toledo Railway & Light Company	a7	a8
Twin City Rapid Transit, Minneapolis (common)	a106	106
United Ry. & Electric Company (Baltimore)	18½	*18½
United Rys. Inv. Co. (common)	35	35
United Rys. Inv. Co. (preferred)	61½	63
Washington Ry. & Electric Company (common)	a44	a46¼
Washington Ry. & Electric Company (preferred)	a89½	a88
West End Street Railway, Boston (common)	a87	a88
West End Street Railway, Boston (preferred)	a103½	a103½
Westinghouse Elec. & Mfg. Co.	65	65⅝
Westinghouse Elec. & Mfg. Co. (1st pref.)	a118	a117

a Asked. *Last sale.

ANNUAL REPORT

Fonda, Johnstown & Gloversville Railroad

The annual report of the Fonda, Johnstown & Gloversville Railroad for the fiscal year ended June 30, 1911, with a comparison with two preceding years, shows the following:

	1911	1910	1909
Railway operating revenue:			
Freight revenue	$261,180	$247,364	$223,752
Passenger revenue, steam division	71,462	68,653	64,165
Passenger revenue, electric division	560,881	534,665	474,720
Mail revenue	3,151	3,149	3,286
Express revenue	17,553	17,950	15,403
All other revenues from transportation	6,540	7,088	5,453
Revenue from operation other than transportation	25,599	25,882	5,880
Total operating revenue	$946,366	$904,751	$792,659
Railway operating expenses:			
Per cent	46.75	46.59	46.86
Maintenance of way and structures	$80,077	$80,991	$63,426
Maintenance of equipment	49,101	49,284	43,931
Traffic expenses	8,099	7,330	5,772
Transportation expenses	246,112	227,926	222,991
General expenses	59,077	55,991	37,197
Total operating expenses	$442,466	$421,522	$373,317
Net operating revenue	$503,900	$483,229	$419,342
Outside operations (Sacandaga Park)—deficit	3,989	6,266	4,716
Total net revenue	$499,911	$476,963	$414,626
Taxes accrued	39,016	36,491	34,341
Operating income	$460,895	$440,472	$380,285
Other income	35,203	30,352	30,526
Gross corporate income	$495,918	$470,824	$410,811
Deductions from gross corporate income	361,614	353,650	369,607
Net income (available for dividends)	$134,304	$117,174	$41,204
Surplus accident fund charged operating expenses during year	7,793	7,904	.....
Total net income earned	$142,097	$125,078	.....
Dividends on preferred stock	$30,000	$30,000	$3,750
Dividends on common stock	50,000	50,000	.....
Total dividends for year	$80,000	$80,000	$3,750
Balance to profit and loss	$54,304	$37,174	$37,454
Miles operated	84.36	84.36	84.36

J. Ledlie Hees, the president, says in the report in part:

"The company's pay rolls for the year amounted to $295,899, equal to 31.27 per cent of its gross revenue from operation and an increase over its pay-roll expense of the previous year of $23,723.

"The popularity of Sacandaga Park, which is owned by the company, is increasing each year, as may be seen from the statement given below, showing number of passengers carried to the resort during the summer season. During the season of 1910, 91,635 persons visited the park, which resulted in a total revenue of $51,773. This was the record season in its history. Ninety-five excursions were run during the season, an increase of twenty-three excursions over the season of 1909. Of these ninety-five excursions, twenty-eight came from the New York Central, carrying 12,202 passengers.

Year.	Passengers Carried.	Revenue.	Year.	Passengers Carried.	Revenue.
1897	17,299	$8,646	1904	61,879	$33,579
1898	25,660	12,199	1905	67,451	39,022
1899	44,345	19,911	1906	73,809	42,039
1900	57,718	27,859	1907	85,003	47,311
1901	55,891	26,543	1908	74,194	43,066
1902	61,666	29,571	1909	86,585	48,147
1903	60,886	32,824	1910	91,635	51,773

"There has been no change in outstanding capital stock during the year.

"For future improvements and additions to the property, the company has available the unissued $500,000 of preferred stock.

"The $463,000 of first consolidated general refunding mortgage bonds, which were held in the treasury, were, with the permission of the Public Service Commission, sold during the year and the proceeds used for the following purposes: Payment of the floating indebtedness incurred for construction; double-tracking East Main Street, Amsterdam; building a single-track extension from the intersection of East Main Street and Vrooman Avenue to Rockton; forming a belt line in the city of Amsterdam; purchase of new cars and electrical equipment for same; installation of a new rotary converter in the substation at Amsterdam, and the building of a shop at Gloversville.

"The new line and the new double track in Amsterdam should result in quite a substantial increase in earnings."

Among the statistical tables submitted by George A. Harris, the general auditor, is the following:

	Per Cent 1911	1910	1911	1910
Maintenance of way and structures	8.46	8.95	$80,077	$80,991
Maintenance of equipment	5.19	5.45	49,101	49,284
Traffic expenses	.85	.81	8,099	7,330
Transportation expenses	26.01	25.19	246,112	227,926
General expenses	6.24	6.19	59,077	55,991
Totals	46.75	46.59	$442,466	$421,527

The number of passengers carried on the electric division in the 1911 fiscal year was 5,827,561, as compared with 5,536,312 in the preceding year and 4,893,647 in 1909. The total mileage in 1911 was 29,137,805, as compared with 27,681,560 in the previous year and 24,468,235 in the year ended June 30, 1909. The total number of passengers carried on the steam division in 1911 was 276,069, as compared with 256,242 in 1910 and 237,142 in 1909. The mileage on this division was 3,846,209 last year, 3,884,238 in 1910 and 3,486,712 in 1909.

The profit and loss account shows that $22,000 was charged off by order of the Public Service Commission "for depreciation to cover original cost of single track taken out of East Main Street, Amsterdam, prior to laying of new double track."

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—The Milwaukee Electric Railway & Light Company has formulated plans to secure not exceeding $90,000,000 of bonds, of which $20,000,000 will be reserved to retire the underlying bonds as they become due and the remainder will be available for additions and improvements made and to be made during a long term of years. The authorized underlying bond issues total $20,000,000, of which $14,228,000 bonds are outstanding. An official statement says: "This issue has no relation to any company other than the Milwaukee Electric Railway & Light Company, and it is not the intention to effect the consolidation of the Milwaukee Electric Railway & Light Company with the other Wisconsin properties in which the North American Company is interested. The issue of bonds under the proposed mortgage is subject to the approval of the Railroad Commission of Wisconsin."

Ohio Electric Railway, Cincinnati, Ohio.—The Ohio Electric Railway, which in 1902 absorbed the Miamisburg & Germantown Traction Company, has arranged with W. E. Hutton & Company, New York and Cincinnati, to purchase the $50,000 of first mortgage ten-year 5 per cent bonds of the Miamisburg & Germantown Traction Company, due Dec. 1, 1911, with coupon of Dec. 1, 1911, attached, at their face value, with interest to date of maturity. An arrangement has been made to extend these bonds for ten years.

Pacific Electric Railway, Los Angeles, Cal.—On Nov. 16, 1911, the stockholders of the Pacific Electric Railway authorized an issue of $100,000,000 of bonds to retire outstanding issues and provide funds to carry out the important extensions and developments which the company has in contemplation.

Pittsburgh, McKeesport & Westmoreland Railway, McKeesport, Pa.—James B. Secrist has been appointed receiver of the Pittsburgh, McKeesport & Westmoreland Railway on the application of the Traction Materials Company. I. I. Robertson, vice-president of the company, joined in the application for a receiver.

Public Service Company of Northern Illinois, Chicago, Ill.—The Public Service Company of Northern Illinois has taken over the properties of the North Shore Electric Company, Chicago Suburban Light & Power Company, Economy Light & Power Company, Illinois Valley Gas & Electric Company and Kankakee Gas & Electric Company, which constitute the group of utility companies near Chicago controlled by Samuel Insull and his associates in the Commonwealth Edison Company, Chicago. The total capital stock of the constituent companies is $15,313,000. The stockholders of the companies entering into the merger receive $763,000 of 6 per cent preferred stock and $9,062,500 of common stock of the Public Service Company of Northern Illinois. In addition $500,000 of preferred stock and $1,000,000 of common stock are retained to finance developments. It is understood that a new first and refunding mortgage to secure an issue of 5 per cent bonds will be placed upon the merged properties to retire $1,250,000 of bonds of the Illinois Valley Gas & Electric Company, $2,000,000 of short-term notes of the Chicago Suburban Light & Power Company and $1,250,000 of the bonds of the North Shore Electric Company. The officers and directors of the Public Service Company follow: Samuel Insull, president; Frank J. Baker and Charles A. Munroe, vice-presidents; John F. Gilchrist, assistant to the president; John H. Gulick, secretary and treasurer; E. D. Alexander, assistant secretary, and assistant treasurer; A. S. Scott, auditor; George H. Lukes, general superintendent; Frank J. Baker, Henry A. Blair, H. M. Byllesby, Louis A. Ferguson, William A. Fox, John F. Gilchrist, Samuel Insull, Frank G. Logan, Charles A. Munroe, John L. Norton, Charles H. Randle, Edward P. Russell, Solomon A. Smith, directors.

San Francisco, Napa & Calistoga Railway, Napa, Cal.—The San Francisco, Napa & Calistoga Railway has been incorporated by Alfred Sutro, T. V. Maxwell, Charles C. Sullivan, Guy C. Earl and W. H. Spaulding with a capital stock of $2,000,000 to succeed the San Francisco, Vallejo & Napa Valley Railway, the sale of which under foreclosure was noted in the ELECTRIC RAILWAY JOURNAL of Nov. 11, 1911, page 1042.

Syracuse (N. Y.) Rapid Transit Railway.—It is reported that the New York State Railways has offered to purchase the preferred stock of the Syracuse Rapid Transit Railway at 110 and accrued dividend at the rate of 6 per cent, and also the common stock at 80 and accrued dividends at the rate of 4 per cent, subject to acceptance by all the stockholders and the approval of the Public Service Commission of the Second District of New York.

ELECTRIC RAILWAY MONTHLY EARNINGS

AURORA, ELGIN & CHICAGO RAILROAD.

Period		Gross Earnings.	Operating Expenses.	Net Earnings.	Fixed Charges.	Net Income
1 m., Sept.,	'11.....	$156,742	$85,489	$71,253	$36,438	$34,815
1 " "	'10.....	154,359	85,783	68,576	33,779	34,797
4 " "	'11.....	699,717	354,182	345,535	145,728	199,808
4 " "	'10.....	677,074	344,049	333,026	132,441	200,585
BROCKTON & PLYMOUTH STREET RAILWAY.						
1 m., Sept.,	'11.....	$12,119	$7,710	$4,410	$1,417	$2,992
1 " "	'10.....	11,976	7,529	4,447	1,359	3,088
12 " "	'11.....	119,204	85,120	34,084	18,553	15,531
12 " "	'10.....	121,012	85,186	35,826	20,756	15,070
EL PASO ELECTRIC COMPANY.						
1 m., Sept.	'11.....	$56,962	$31,514	$25,448	$8,341	$17,108
1 " "	'10.....	54,846	31,384	23,463	8,215	15,247
12 " "	'11.....	673,745	387,223	286,522	98,642	187,881
12 " "	'10.....	634,416	365,320	269,096	101,287	167,809
HOUGHTON COUNTY TRACTION COMPANY.						
1 m., Sept.,	'11.....	$25,675	$12,146	$13,529	$7,756	$5,773
1 " "	'10.....	26,710	12,653	14,057	6,638	7,419
12 " "	'11.....	303,921	159,182	144,739	82,104	5,774
12 " "	'10.....	314,992	166,411	148,582	77,400	7,419
JACKSONVILLE TRACTION COMPANY.						
1 m., Sept.,	'11.....	$45,099	$24,052	$21,047	$12,387	$8,659
1 " "	'10.....	45,995	27,156	18,839	9,451	9,388
12 " "	'11.....	575,456	314,219	261,237	129,257	8,659
12 " "	'10.....	559,603	297,076	262,527	112,401	9,388
PADUCAH TRACTION & LIGHT COMPANY.						
1 m., Sept.,	'11.....	$22,801	$12,133	$10,668	$7,959	$2,709
1 " "	'10.....	21,251	11,264	9,988	7,126	2,862
12 " "	'11.....	259,999	142,613	117,387	93,112	24,275
12 " "	'10.....	243,496	144,300	99,197	83,377	15,820
PENSACOLA ELECTRIC COMPANY.						
1 m., Sept.,	'11.....	$24,667	$14,148	$10,519	$5,863	$4,656
1 " "	'10.....	23,265	13,960	9,305	5,207	4,098
12 " "	'11.....	286,029	167,553	118,476	68,480	49,996
12 " "	'10.....	262,078	154,288	107,790	58,820	48,970
PUGET SOUND ELECTRIC RAILWAY.						
1 m., Sept.,	'11.....	$152,034	$91,218	$60,816	$51,643	$9,173
1 " "	'10.....	160,545	98,608	61,937	51,974	9,964
12 " "	'11.....	1,801,361	1,219,432	581,929	602,223	20,294
12 " "	'10.....	1,903,484	1,258,100	645,384	606,082	39,302
SAVANNAH ELECTRIC COMPANY.						
1 m., Sept.,	'11.....	$58,429	$40,119	$18,310	$18,307	$2
1 " "	'10.....	51,599	32,606	18,993	18,158	835
12 " "	'11.....	675,586	456,287	219,299	218,755	544
12 " "	'10.....	620,179	404,526	215,654	214,652	1,001
SEATTLE ELECTRIC COMPANY.						
1 m., Sept.,	'11.....	$443,640	$241,132	$202,507	$115,627	$86,880
1 " "	'10.....	481,158	274,705	206,453	110,933	95,520
12 " "	'11.....	5,492,194	3,038,399	2,453,795	1,349,865	1,103,930
12 " "	'10.....	5,633,484	3,336,055	2,297,429	1,294,000	1,003,460
TAMPA ELECTRIC COMPANY.						
1 m., Sept.,	'11.....	$56,840	$30,182	$26,659	$6,385	$20,274
1 " "	'10.....	44,969	23,910	21,060	6,019	15,041
9 " "	'11.....	639,043	338,941	300,102	77,838	222,264
9 " "	'10.....	619,255	342,639	276,616	60,077	216,539

Traffic and Transportation

Fare Decision Affecting Portland Railway, Light & Power Company

The Railroad Commission of Oregon has ordered the Portland Railway, Light & Power Company, Portland, Ore., to reduce the rate between its Portland terminals at First and Alder Streets and Oregon City, from 25 cents to 20 cents and has prescribed rates for the sale of commutation tickets between Portland and Oregon City. The commission has also ordered the company to grant a 5-cent fair to passengers from Ardgour and Hendee, stations just outside Portland, to Portland, with transfer privileges. The company is also directed to grant the same transfer privileges to all patrons on the Oregon City and Springwater divisions as are now granted to passengers on the Mount Scott line. The commission says in part:

"For many years one-way commutation rates have been charged by the Portland Railway, Light & Power Company and its predecessors to points on the Springwater division as set out in its tariffs. . . . By reason of the existence of such fare, a large number of persons have been induced to settle upon and along the said Springwater division. Such persons principally work in Portland as clerks, mechanics, artisans or laborers, and they have occasion to travel daily between their homes along the line of the Springwater division and points within Portland, and the fare paid by them for their transportation is an important element in their expenditures. . . .

"The effect of any substantial increase in fare such as proposed . . . will be to compel them to give up their homes and move closer to Portland or into the city itself in order to procure the same or a lower rate of fare than they are now paying. Many such persons are now paying for their homes in instalments. . . . From the evidence, the commission finds that such persons cannot stand, and the traffic will not bear, any substantial increase in the rates of fare charged upon the Springwater division.

"The commission has not considered the testimony to this effect as in any way operating as an estoppel upon the said company, but has considered the same solely with reference to its bearing on the question as to what a reasonable rate would be for the transportation of the passenger traffic . . . and what the passengers can afford to pay and what the service is worth to them.

"The commission finds that the cost to the said company incurred in the transportation of a passenger 1 mile (i. e., per passenger mile), including all operating expenses, movement, maintenance and administration costs, but not including depreciation, interest on the bonds or investments, or taxes, is the sum of 6.15 mills."

Pennsylvania Railroad First Aid Pamphlet

To protect passengers and employees from needless fatalities, the Pennsylvania Railroad instructs its men in the practice of first aid to the injured. Lectures are given by the medical examiner of the relief department with demonstrations of the proper way to treat all common accidents, such as breaks, cuts, burns and electric shock. To supplement these a concise pamphlet covering all the important points has been issued.

The first statement in the pamphlet is that it is always essential that one person should take charge of proceedings in order to avoid confusion. The next thing is to send for a physician. Then comes an explanation of how to use the stretcher, which is always kept where it is readily accessible. Then follows this advice: "Keep the crowd away to insure plenty of fresh air. Examine the injuries carefully before doing anything. Don't touch open wounds with the hands; don't attempt to remove dirt, or apply unclean dressings of any kind, as infection may be introduced by so doing."

Following these precautionary directions comes a description of the contents and use of the various articles in the first aid packet furnished by the Pennsylvania Railroad. After this the specific injuries are taken up separately. Hemorrhage, fracture, burn, shock, unconsciousness, fits, heat exhaustion and sunstroke are discussed and the proper treatment explained. In the system developed by the relief department it is recognized that in many cases there will be very few facilities at hand for caring for the injured and directions are given for making use of such things as are always readily to be had.

At the lectures the men are shown how to make use of a newspaper, a piece of scantling or even a cushion from a car for splints. A safe way to disentangle a man from a live wire by slipping a coat under it is shown. Employees are taught the proper way to lift an injured person to a stretcher; the way to adjust a sling with a triangular bandage from the first aid packet; emergency treatment of injuries to the scalp and methods of bandaging.

Special attention is given to electric shock. The timetables issued to employees of the New York terminal division, where all the equipment is electrical, contain detailed explanations for the treatment for electric shock accompanied by photographs.

Live Stock Transported Successfully.—A car filled with horses was shipped over the electric railways between Indianapolis and South Bend on Nov. 13, 1911.

Seats for Employees in San Francisco.—An ordinance has been passed to print by the Board of Supervisors of San Francisco, Cal., requiring all street railways which operate in San Francisco to provide seats to be used by platform men outside of certain limits.

Indictment for Alleged Violation of Indiana Two-Cent Fare Law.—The Grand Jury of Noble County, Ind., has returned an indictment in eight counts against James D. Mortimer as receiver of the Toledo & Chicago Interurban Railway, Kendallville, Ind., for alleged violation of the 2-cent fare law of Indiana.

Inquiry Into Discontinuance of Interstate Service.—John G. Park, city counselor of Kansas City, Mo., has asked the Interstate Commerce Commission to inquire into the discontinuance by the Metropolitan Street Railway, Kansas City, Mo., of its service over the intercity viaduct which connects Kansas City, Mo., and Kansas City, Kan.

Minneapolis Car Capacity Ordinance Modified.—The City Council of Minneapolis, Minn., has modified the ordinance limiting the capacity of street cars in service in that city by increasing the legal capacity from seventy-two persons to eighty-four persons. The ordinance has been in force several months and has been unpopular with the public ever since it went into effect.

"Shop Early" Signs at Boston.—Through the co-operation of the Boston (Mass.) Elevated Railway "Shop Early" posters have been placed upon the dashboards of all electric cars operating in Boston, the sponsors for the work being the Boston Chamber of Commerce and the Boston Retail Trade Board. The signs are about 12 in. x 18 in. and each displays the above admonition with the traditional holly wreath in red and green.

Service Order in Washington, D. C.—The District Electric Railway Commission, with the consent of the Interstate Commerce Commission, has issued an order requiring more frequent service on the Brightwood line of the Washington Railway & Electric Company, Washington, D. C. This line is 12.5 miles long, and the order of the commission requires the company to maintain a headway of ninety seconds on the line during rush hours.

Steam-Electric Connection in Michigan.—The Supreme Court of Michigan has issued a mandamus compelling the Michigan Central Railroad to make a physical connection at Oxford with the Flint division of the Detroit (Mich.) United Railway. The connection was asked for some months ago by the State Railroad Commission and the Detroit United Railway agreed to make the connection, but objections were raised by the steam roads.

Milwaukee Street Railway Problems.—R. B. Stearns, assistant general manager of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., in charge of the railway department, is contributing to the Milwaukee *Journal* a series of articles entitled "Milwaukee Street Railway Problems." Problems peculiar to Milwaukee are discussed, as are also economic subjects such as the return on the investment, wages, etc. Each article is less than a column in length.

Decision on Car Step Advertisements.—Justice Henry Bischoff, Jr., of the appellate division of the Supreme Court of New York, has ruled that a street car is a wagon under the legal description which covers any vehicle that runs on wheels and that the cars of the Second Avenue Railroad must not carry advertising signs on the outside. For some time the company has been carrying advertising signs on the risers of its car steps. The city has applied to have the agreement between the receiver of the company and the advertising company modified so as to bring it within the law.

Traffic Ordinance in Chattanooga.—J. H. Warner has presented an ordinance to the Chattanooga Board of Commissioners to provide for more stringent traffic rules at street intersections. It is ordained that railroad trains at grade crossings within the city limits shall not stand on street crossings and in switching shall clear the street at each operation and stop long enough to allow traffic to pass. It is further provided that street cars must not pass each other at intersections, and that automobiles, motorcycles and other vehicles must come to a full stop before passing street cars which are unloading or taking on passengers.

Complaint Against New York & Long Island Traction Company.—The Public Service Commission of the Second District of New York has received a complaint against the New York & Long Island Traction Company, alleging that under its franchise the company is not permitted to charge more than 5 cents for a continuous ride of 5 miles or less; that the company is now charging 15 cents to carry a passenger from Rockville Centre to the New York City line, a distance of not more than 5 miles, and 10 cents from Rockville Centre to Valley Stream, a distance of less than 3 miles. The complaint has been served upon the company.

Buffalo Rerouting Results in Complaint.—The Public Service Commission of the Second District of New York has received a complaint against the change in route of the cars of the Elmwood and Hoyt Street lines of the International Railway, Buffalo. The complaint states that prior to August, 1911, operation over the Elmwood and Hoyt Street lines made their property easily accessible to the residents of the Elmwood district, and that the abandonment of this route has resulted in great financial loss and damage to real estate owners in Main Street. The complaint has been formally served upon the company by the commission.

Street Railway Passes Illegal in Kansas.—The attorney for the Public Utilities Commission of Kansas has expressed the opinion that street railways are not permitted to issue passes under the law which created the commission. E. H. Hoqueland, secretary of the commission, says: "The commission is of the opinion that there is no question that the issuance of passes by street railways is in violation of the law. The law provides that it shall be illegal for a public utility to grant free or reduced rates to favored classes except in certain specified cases. The commission does not understand that the passes granted by street railway companies come within the exceptions which are made by the law."

Conference in Indiana on Block Signals.—A. W. Brady, C. D. Emmons, W. G. Irwin and R. I. Todd, members of the committee of officials of the electric railways of Indiana appointed to meet with the members of the Indiana Railroad Commission in regard to the installation of block signals on the electric railways in Indiana, conferred again with the members of the commission on Nov. 14, 1911, but as experiments with signals being carried on in the vicinity of Indianapolis have not been concluded another meeting will be held on Dec. 4, 1911. According to an order of the commission, all of the interurban railways in Indiana were to install block signals before Jan. 1, 1912, but the time has been extended, pending the result of the tests now being conducted.

Increase in Fare on Syracuse, Lake Shore & Northern Railroad Protested.—The Public Service Commission of the Second District of New York has received a complaint from employees of the Halcomb Steel Company protesting against the proposed increase of fare from Syracuse to Stop 4 on the Syracuse, Lake Shore & Northern Railroad, and against the service which is furnished by the railroad to and from such stop. The complaints state that the Halcomb Steel Company is located in Geddes at Stop 4 on the line of this railroad; that the plant employs about 700 men; that the company has for several years issued trip tickets at 5 cents each, and now proposes to increase the rate to 15 cents for a round trip, and that this increase in fare is unreasonable and out of proportion to the rate which is charged by the Syracuse, Lake Shore & Northern Railroad for other distances.

Joint Freight Rate Question in California.—Officials of the Northern Electric Railway, Chico, Cal., and the Western Pacific Railway conferred recently with the members of the Railroad Commission of California in an effort to adjust a joint freight rate from points north of Marysville and beyond Sacramento to San Francisco which would enable the two lines to compete with the Southern Pacific Railroad. H. M. Adams, freight traffic manager of the Western Pacific Railway, and A. D. Schindler, general manager of the Northern Electric Railway, were willing to arrange a rate between the points equal to the rate of the Southern Pacific Railroad, but they differed as to the proportions in which the freight charges should be divided between their respective roads. It is probable that a formal hearing will be ordered by the commission to secure data to enable it to adjust the division of the rates by order.

Presentation of Flag to Trainmen of Public Service Railway.—On the evening of Nov. 17, 1911, the West Hoboken & West New York Social Club, composed of motormen and conductors of the Public Service Railway of New Jersey, was presented with a handsome silk American flag, the gift of Mrs. Viola Bolen Widlake, daughter of N. W. Bolen, superintendent of transportation of the Public Service Railway. This flag was given as a token of appreciation of the many kindnesses of members of the club during a recent illness of Mrs. Widlake. It was presented to the club at its first smoker of the winter season, which was attended by more than 300 members and guests from other divisions of the railway. John F. O'Toole, publicity agent of the Public Service Railway, made a brief presentation speech in which he impressed upon the members of the club the loyalty, purity and courage symbolized in the flag.

I. C. C. Fare Decision Suspended by United States Supreme Court.—The Supreme Court of the United States has suspended, pending appeal, the order of the Interstate Commerce Commission reducing the fare over the line of the Omaha & Council Bluffs Railway & Bridge Company between Council Bluffs, Ia., and Omaha, Neb., from 15 cents to 10 cents. The company has been required to file a bond for $10,000 to compensate passengers in case the order of the commission is upheld. The decision of the Commerce Court at Washington sustaining the ruling of the Interstate Commerce Commission that the commission has authority over electric railways doing an interstate commerce business was referred to in the ELECTRIC RAILWAY JOURNAL of Oct. 11, 1911, page 751. The case in which this decision was rendered was brought to the Commerce Court on appeal from the United States Circuit Court of Appeals by the Omaha & Council Bluffs Railway & Bridge Company.

Three-Cent Fare Ordinance in Portland, Ore.—An ordinance has been prepared for introduction in the Council of Portland, Ore., to require the Portland Railway, Light & Power Company to reduce the fare over its lines from 5 cents to 3 cents. B. S. Josselyn, president of the company, says that the measure if passed would violate the terms of the franchises under which the company now operates. He concluded a recent statement in regard to the matter as follows: "The present franchise of the company expires in 1932, having some twenty years to run, and if the city grows in the next twenty years as it has in the past twenty it will require all the revenue of the company, and more too, to keep abreast with the growth of the city. A reduction in the fare, even if possible, would not only cripple the company, but the city, materially. The proposed ordinance would work serious harm to all parties concerned and cannot be desired by the community at large."

Personal Mention

Mr. Charles P. Garland, master mechanic of the Portland (Maine) Railroad, has retired after thirty years of service with the company.

Mr. Malory McDonald has been appointed city passenger and ticket agent of the Galveston-Houston Electric Railway, with offices in Galveston, Tex.

Mr. Louis F. Reed has been appointed general counsel of the Otsego & Herkimer Railroad, Oneonta, N. Y., to succeed Mr. George H. Taylor.

Mr. H. S. Dickey has been appointed general manager of the electric railways at Boise, Idaho, which are being consolidated. He will take office on Dec. 1, 1911.

Mr. W. P. Ballard, electrical engineer and master mechanic of the Visalia Electric Railroad, Exeter, Cal., has been appointed general manager of the company to succeed James H. Crosett, resigned.

Mr. Albert H. Stanley, managing director and general manager Underground Electric Railways Company, Ltd., London, is on a short visit to this country. He expects to remain about three weeks.

Mr. J. D. Maynes has resigned as auditor of receipts of the Illinois Traction System, Champaign, Ill., to become connected with the American Surety Company, Washington, D. C.

Mr. M. H. Hendee has been appointed manager of the commercial and contract departments of the Augusta-Aiken Railway & Electric Company, Augusta, Ga. Mr. Hendee was formerly chief clerk to Mr. E. C. Deal, general manager of the company.

Mr. F. C. Chambers has resigned as engineer of the power station of the Springfield (Ill.) Consolidated Railway to become connected with the County Traction Company, Chicago, Ill., under Mr. Emil G. Schmidt, president, who was formerly general manager of the Springfield Consolidated Railway.

Mr. S. G. McMeen has been elected president of the Mt. Hood Railway & Power Company, Portland Ore., to succeed Mr. E. P. Clark, Los Angeles, Cal. Mr. McMeen is consulting engineer for the Empire Construction Company, New York, and is connected with the National Board of Fire Underwriters. He was at one time advisory engineer with the Oakland Gas & Electric Company, and also was with the Western Electric Company. More recently he was consulting engineer of the Home Telephone Company, Chicago, Ill.

Mr. H. W. Fuller has resigned as general manager of the Washington Railway & Electric Company, Washington, D. C., to become connected with H. M. Byllesby & Company, Chicago, Ill., with whom Gen. George H. Harries, formerly vice-president of the Washington Railway & Electric Company, is now associated. Mr. Fuller was graduated from Rutgers College in 1891. He worked with the C. J. Field Company on the electrification of the horse car lines of Paterson, N. J., during the fall of 1891 and the year 1892. In January, 1893, he entered the employ of the General Electric Company, with which he continued until September, 1893. A few months later Mr. Fuller became connected with the Consolidated Traction Company, Newark, N. J., and remained with this company and with its successor, the North New Jersey Street Railway, as assistant general manager, until February, 1901. In that year he accepted the position of general manager of the Washington Railway & Electric Company. Mr. Fuller has always taken an active interest in association affairs and for the past two years has been chairman of the committee on city rules of the American Electric Railway Transportation & Traffic Association.



H. W. Fuller

OBITUARY

George W. Hebard, acting vice-president of the Westinghouse Electric & Manufacturing Company, died at his home in New York on Nov. 17, 1911. Mr. Hebard was born in Barre Center, N. Y., in 1845 and was identified in the early history of the manufacture of electrical apparatus as president of the United States Electric Lighting Company, of Newark, in 1882, and was also connected with the early history of the generation and distribution of electricity for lighting in New York City as a director and stockholder of the United States Illuminating Company. Later, as president of the United Electric Light & Power Company, he was affiliated with the introduction of the Westinghouse alternating-current system in New York City. At the time the United States Electric Lighting Company was taken over by the Westinghouse Electric & Manufacturing Company Mr. Hebard was president of the United company, and in the reorganization was made vice-president of the Westinghouse Company. In 1888, when the Westinghouse Company took over the Sawyer-Mann Company, Mr. Hebard was given charge of the newly acquired organization.

Caryl D. Haskins, manager of the lighting department of the General Electric Company, died in Salt Lake City on Nov. 18, 1911, after an attack of pneumonia lasting only two days. Mr. Haskins was born in Waltham, Mass, in 1867, but passed a considerable part of his early life in England, and in 1888 he was foreman of the meter department of S. Z. de Ferranti. Returning to the United States in 1889, Mr. Haskins entered the employ of the Thomson Electric Welding Company, at Lynn, Mass., but was almost immediately transferred to the Thomson-Houston Electric Company. After the General Electric Company was formed Mr. Haskins was appointed to be the head of the meter interests of the consolidated company. In 1893 he was also put in charge of the company's instrument department. In 1900 his responsibilities were again enlarged by including the switchboard department. Later he was appointed manager of the lighting department. While Mr. Haskins is best known professionally as a meter expert, he was an inventor of note. He also found time to do a great deal of literary work as a contributor to the technical press and to the transactions of engineering societies, and even in the realm of fiction. During the Spanish War he raised a battalion of electricians, numbering 160 men, who under his direction took an active part in the work of coast defence. Mr. Haskins was a member of many scientific and social organizations.

The annual banquet of the Railway Business Association was held on the evening of Nov. 22, 1911, at the Waldorf-Astoria, New York. There was an attendance of more than 800. Membership in this association, as is generally known, is made up of companies engaged in the manufacture of apparatus for steam and electric railways, and the purpose of the association is to influence popular opinion in favor of railways and thus promote the interest of the roads. Among those in attendance at the banquet were railroad officials, manufacturers and men prominent in financial and other lines of business. The toastmaster was George A. Post, president of the association. The speakers were: Governor O'Neal, of Alabama; Walker D. Hines, chairman executive committee Atchison, Topeka & Santa Fé Railway; A. C. Rulofson, president California Home Industry League, and H. J. Pettengill, member executive committee Texas Commercial Secretaries' Association. The guests of honor were for the most part presidents of boards of trade in different cities. Of these some twenty-five were present, representing all parts of the country.

The Rochester, Syracuse & Eastern Railroad has issued a traffic folder, "America's Fastest Electric Limiteds," giving facts about the service of the company between the Four Corners, Rochester, and Clinton Square, Syracuse, and a timetable of limited trains between the cities. The company gives reasons why its service is safe, clean, fast, comfortable and convenient.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***San Francisco, Napa & Calistoga Railway, San Francisco, Cal.**—Application for a charter has been made in California by this company as the successor to the San Francisco, Vallejo & Napa Valley Railroad, the property of which was sold under foreclosure recently. Capital stock, $2,000,000. Incorporators: Alfred Sutro, T. V. Maxwell, Charles C. Sullivan, Guy C. Earl and W. H. Spaulding.

***Flathead Interurban Railway, Kalispell, Mont.**—Application for a charter has been made in Montana by this company to build an electric railway from Kalispell to Whitefish, Stillwater and Spring Creek. The line will ultimately be extended southward to Flathead Lake and Big Fork and east of the Flathead River. Capital stock, $50,000. Officers: David R. McGinnis, president; W. H. Griffin, vice-president; R. P. Austin, treasurer, and C. H. Foote, secretary.

***Chattanooga, Rome & Atlanta Railway, Chattanooga, Tenn.**—Application for a charter has been made in Tennessee by this company to build an electric railway from Chattanooga to Ft. Oglethorpe, Rome and other points in Georgia to Atlanta, a distance of about 135 miles. This new company will have the franchise through Chickamauga Park granted several years ago to S. W. Divine, Chattanooga, and two distinct lines are to run to Atlanta. One of these will go through Chickamauga Park to Ft. Oglethorpe. The other will run through Highland Park and Chickamauga Park into Georgia. Capital stock, $100,000. A charter will also have to be obtained in Georgia, the capitalization there to be $2,000,000. Incorporators: John H. Hill, Charles Reif, Michael O'Grady, John O. Hibbets and Samuel W. Divine, all of Chattanooga.

***Beaumont, Waco & Northern Railway, Beaumont, Tex.**—Chartered in Texas to build a 75-mile steam or electric railway between Beaumont and Livingston. Capital stock, $75,000. Incorporators: J. F. Keith, C. S. Vidor, J. G. Reaves, E. S. Woodhead, W. P. Hobby, W. B. Dunlap, B. R. Norvell, John L. Keith and B. Deutser, of Jefferson County, and Kilburn Moore, Galveston.

***Ft. Worth & Southwestern Railway, Ft. Worth, Tex.**—Chartered in Texas to build an 18-mile interurban railway between Glen Rose and Walnut Springs and Ft. Worth. Capital stock, $400,000. Incorporators: W. D. Morton, Glen Rose, W. B. Harrison, Ft. Worth, and D. C. Morris, Walnut Springs.

FRANCHISES

Montgomery, Ala.—The Alabama Traction Company will ask the City Council for a new franchise in Montgomery on the extension of South Decatur Street and along Carter Hill Road to the city limits.

Tuscaloosa, Ala.—F. G. Blair and Henry B. Foster have received a franchise from the City Commissioners to build an electric railway and power plant in Tuscaloosa. [E. R. J., July 8, '11.]

***Phoenix, Ariz.**—Allyn Lewis, Phoenix, has asked the City Council for a franchise in Phoenix. This line is to be operated with storage battery cars.

Los Angeles, Cal.—The Board of Public Utilities has recommended that the Los Angeles Railway be granted permits to install connecting curves at six different locations in Los Angeles.

Long Beach, Cal.—The Pacific Electric Railway has received a twenty-one-year franchise from the City Council in Long Beach. The company has also asked for a thirty-year franchise out Washington Street in Pasadena.

Willows, Cal.—The Sacramento Valley West Side Electric Railway has asked the County Supervisors for a franchise through Glenn County. It will connect Woodland, Colusa, Willows, Orland, Corning, Redding and Red Bluff. C. L. Donohoe, Willows, is the president of the company. [E. R. J., Oct. 14, '11.]

***Caldwell, Idaho.**—O. G. F. Markhus has asked the City Council for a franchise for an electric railway over the Boulevard from the City limits to Tenth Street, thence to Seventh Street in Caldwell.

Long Branch, N. J.—The Jersey Central Traction Company has asked the Board of Trade for permission to build a line from Myrtle Avenue to the tracks of the New Jersey Southern Railroad on South Broadway, Long Branch.

Ridgefield Park, N. J.—The Public Service Railway has received a fifty-year franchise from the Village Trustees to extend its Bergen Turnpike line north from the Little Ferry station through Ridgefield Park to the Queen Anne Road, Bogota. The plan is to extend the line also through Queen Anne Road to connect with the Hudson River Traction Company's line at Bogota.

Trenton, N. J.—The Board of Public Utility Commissioners have approved an ordinance of the City of Trenton granting permission to the Trenton & Mercer County Traction Company to construct a double-track line on Hamilton Avenue in Trenton.

Belle Harbor, N. Y.—The Ocean Electric Railway, New York, has asked the Public Service Commission, First District, to approve its plans for the construction of an extension from Belle Harbor to Neponsit.

New Rochelle, N. Y.—The Public Service Commission of the Second District has received a petition from the Westchester Street Railroad asking for permission to exercise a franchise granted by New Rochelle allowing the construction of tracks in extension of the present Fifth Avenue line to reach the new public park and playgrounds of New Rochelle, and an extension of the present Webster Avenue line through streets near the present line giving a loop or second track for operation at a place where the present single track is said to be somewhat dangerous because of curves.

Rome, N. Y.—The Rome & Oneida Electric Railway has received a three-year extension of its franchise in which to complete its line in Rome. This 13-mile railway will connect Rome and Oneida. [E. R. J., Oct. 1, '10.]

East Youngstown, Ohio.—The Mahoning & Shenango Railway & Light has received a franchise from the Village Council to double track its line through East Youngstown to the village limits.

***Poland, Ohio.**—George E. Rose and John Harrington have asked the Village Council for a franchise to build an electric railway in Poland.

***Sudbury, Ont.**—Louis La Forest has received a franchise to build an electric railway to Copper Cliff.

Portland, Ore.—The Portland Railway, Light & Power Company has received a franchise from the City Council to extend its line on Sandy Boulevard from East Seventy-second Street to the city limits.

Allentown, Pa.—The Lehigh Valley Transit Company has received a franchise from the Council to build a double track line from Eighth Street and Hamilton Street across the Eighth Street Bridge to Ninth Street, thence to the city limits.

Greenville, Tex.—Joseph F. Nichols, Greenville, has asked the City Council for a franchise in Greenville. This proposed line will connect Greenville, Clarksville, Cooper, Deport, Rockwell and Dallas. [E. R. J., Nov. 11, '11.]

Salt Lake City, Utah.—The Utah Light & Railway Company has asked the City Council for a franchise on Main Street and Second North Street to West Capital Street and the Capital grounds. The company has withdrawn its application for a franchise on State Street in Salt Lake City.

Richmond, Va.—The Virginia Railway & Power Company will ask the City Council for a franchise to extend its Halifax Street line and its Sycamore Street line in Richmond.

Bellingham, Wash.—The Nooksack Valley Traction Company has received from the City Council an extension of time on its franchise in which to begin the construction of its line on Grand Avenue in Bellingham. This is part of a plan to build an electric railway to connect Bellingham, Sumas, Ferndale, Lynden and Blaine. [E. R. J., Oct. 7, '11.]

*Edmonds, Wash.—John Appleton and George Walsh, Seattle, have asked the Chamber of Commerce for a franchise to build an electric railway from the center of Edmonds to a station north of Seattle Heights, a distance of 3 miles.

TRACK AND ROADWAY

Mobile (Ala.) West Shore Traction Company.—This company has completed the survey for the first 7 miles of its line south from Mobile. H. Austell, Mobile, president. [E. R. J., Nov. 11, '11.]

*Lethbridge (Alta.) Municipal Tramway.—Contracts will be awarded at once by the City Commissioners for track and overhead material for the completion of this electric railway in Lethbridge.

Bakersfield & Kern Electric Railway, Bakersfield, Cal.—Work has been begun by this company double-tracking its lines in Bakersfield.

Pacific Electric Railway, Los Angeles, Cal.—This company is rebuilding its Sixteenth Street line within the city limits of Los Angeles as far as Rosedale cemetery. All the track has been laid on the Lankershim extension of the Hollywood division and it is expected to have this line in operation by Dec. 15. This extension will then be continued to Van Nuys.

Modesto & Empire Traction Company, Modesto, Cal.—This company has placed in operation its line between Hughson, Denair, Riverbank, Oakdale and Modesto. T. K. Beard is interested. [E. R. J., Oct. 28, '11.]

Sacramento & Woodland Railway, Sacramento, Cal.—Bids are asked by this company to construct a 10,000-ft. trestle to carry rails across the Yolo Tule basin. With the completion of this line work will be begun on a line to Winters, thence through Solano County to Vallejo by way of Vacaville, Elmira, Fairfield, Suisun and Cordelia. Another branch is to be built from Elmira to Dixon and Davis to connect with the line now under construction.

Pacific Coast Railway, San Luis Obispo, Cal.—This company plans to complete its 3-mile extension to Canon Branch within the next two weeks.

Boulder Electric Light & Power Company, Boulder, Col.—This company is building about 2½ miles of new track in Boulder. The company is doing its own work and has ordered all necessary material.

*Pike's Peak Aerial Railway, Manitou, Col.—Preliminary arrangements have been completed and construction will be begun at once on an aerial passenger railway from Manitou to the summit of Pike's Peak. E. A. Norton, First National Bank Building, Manitou; F. R. Coffman and H. A. Lindsey are interested.

Connecticut Company, New Haven, Conn.—This company has completed its double-track line between New Haven and Mount Carmel.

Augusta-Aiken Railway & Electric Company, Augusta, Ga.—Work has been begun by this company on the extension of its tracks in Augusta.

Madison County Interurban Railway, Highland, Ill.—This company, which was incorporated in March, 1909, to build an electric railway in the vicinity of Highland, has just been dissolved. [E. R. J., March 21, '09.]

Pekin (Ill.) City Railway.—Plans are being made by this company to build an extension to Tremont, Delavan, Hopedale, Boynton and Hittle, and to extend its line in Pekin.

Alton, Jacksonville & Peoria Railway, Whitehall, Ill.—Plans are being considered by this company to complete its extension from Godfrey to Jerseyville.

Indianapolis Traction & Terminal Company, Indianapolis, Ind.—An extension of the East Michigan Street line to Emerson Avenue is being constructed by this company.

Vincennes (Ind.) Traction Company.—Plans are being made by this company to make extensive improvements to its lines in Vincennes.

Louisville & Interurban Railway, Louisville, Ky.—T. J. Minary, president of this company, has announced that the directors will consider the construction of an extension to Mt. Washington. B. C. Milner, Louisville, consulting engineer, estimates that the extension could be constructed at a cost of $380,000 for the 10 miles between Mt. Washington and Louisville.

Rockland, South Thomaston & St. George Railway, Rockland, Maine.—This company will award contracts early next spring to build about 3 miles of new track.

Hagerstown & Clear Spring Railway, Hagerstown, Md.—Construction was begun Nov. 16 on Salem Avenue in Hagerstown to build this 25-mile electric railway between Hagerstown and Clear Spring. The line will eventually be extended to Mercersburg, Pa. This company has filed a $250,000 mortgage with the Hagerstown Trust Company as trustee, for the construction and equipment of this line. L. N. Downs, Hagerstown, president. [E. R. J., May 20, '11.]

Omaha, Lincoln & Beatrice Railway, Lincoln, Neb.—During the next four weeks this company will award contracts to the summit of Pike's Peak. E. A. Norton, First Na- for about ½ mile of new track in Lincoln.

Tidewater Power Company, Wilmington, N. C.—This company is now building about 3 miles of new double track to replace the single track in Wilmington.

Cleveland, Barberton, Coshocton & Zanesville Railway, Cleveland, Ohio.—Right-of-way for the entire line has been secured by this company and about 1 mile of track has been built out of Cleveland. This line will connect Cleveland and Zanesville, via Elyria, Barberton, Oreville, Millersburg and Coshocton. J. J. Breitinger, president. [E. R. J., Sept. 2, '11.]

Tri-State Traction Company, Steubenville, Ohio.—This company has placed in operation its Weirton branch between Weirton and Steubenville. It is expected to extend this line to East Liverpool.

*Ridgeway, Ont.—George Pettit, E. W. Near and W. G. Athol are making preliminary arrangements and have raised about $12,000 to carry on the preliminary work looking to the construction of an electric railway from Ridgeway to Crystal Beach.

Oregon Electric Railway, Portland, Ore.—The entire right-of-way has been obtained by this company for the extension between Salem and Albany, a distance of 26 miles.

Southern Pennsylvania Traction Company, Chester, Pa.—This company will pay one-third of the cost of a new $14,000 bridge to be constructed over Seventh Street at Broomall.

Ephrata & Lebanon Street Railway, Lebanon, Pa.—This company has voted to begin the construction on the section between Hopeland and Lebanon. The track on the Ephrata-Hopeland section has been laid from Ephrata to one mile beyond Weidmansville and the grading on the remaining portion is nearly completed.

Scranton & Binghamton Railroad, Scranton, Pa.—During the next three weeks this company will award contracts for the construction of two new bridges, one at Factoryville and the other at Nicholson.

Valley Street Railway, Sharon, Pa.—Arrangements are being made by this company to begin a survey for an extension through the eastern part of Sharon, thence to South Sharon, making a loop.

Titusville (Pa.) Electric Traction Company.—It is reported that this company's extension to Cambridge Springs along Muddy Creek will not be constructed until the spring.

Greenville (S. C.) Traction Company.—This company has completed the double-tracking of its line from the Ottaray Hotel in Greenville through North and South Main Streets and up Pendleton Street to Greene Avenue.

Corpus Christi Street & Interurban Railway, Corpus Christi, Tex.—During the next two weeks this company will award contracts to build 2 miles of new track in Corpus Christi. The company expects to build 1½ miles of track southeast and it will build a cut-off to shorten its principal line between South Bluff and the Union Depot. It will also build a loop in the business section of Corpus Christi.

Dallas (Tex.) Interurban Electric Railway.—This company is in the market for material, including 60 to 70-lb. rails, ties, bridges, culverts, piling for trestling, etc., necessary for the construction of 15 miles of track out from Dallas. J. M. Carter, 9061½ Main Street, Dallas, manager.

*El Paso, Tex.—It is reported that surveys are being made and right-of-way obtained for an electric line between El Paso and Clint. W. E. Anderson and R. L. Dorbant are interested.

Ft. Worth Southern Traction Company, Ft. Worth, Tex.—This company has arranged with the Stone & Webster Engineering Corporation, Boston, Mass., for the engineering and construction of a complete interurban railway between the city limits of Ft. Worth and Cleburne, a distance of about 30 miles. The track will be laid with 70-lb. A. S. C. E. rails. The main pole line will carry, in addition to the trolley wire and the direct-current feeders, about 24 miles of 15,000-volt overhead transmission line connecting the Northern Texas Traction Company's power system with two substations to be built on the new line. [E. R. J., Oct. 14, '11.]

Gainesville, Whitesboro & Sherman Railway, Gainesville, Tex.—This company, which has projected a line between Gainesville and Sherman, has completed 11 miles of grading. Work is to be resumed as soon as the reorganization of the company has been perfected. Thomas M. Bosson, secretary.

Greenville Railway & Light Company, Greenville, Tex.—Work has been begun by this company on an extension from Greenville to Mineral Heights.

Utah Light & Railway Company, Salt Lake City, Utah.—This company will place in operation Dec. 1 two extensions and one new line in Salt Lake City. The new line will extend west on Fourth South to Rio Grande Avenue. The two extensions are from Fifth South and Eleventh East. In addition to these improvements the company will complete work on the new steel bridge over the Jordan River on the Poplar Grove line within the next few weeks.

Brattleboro (Vt.) Street Railway.—This company has awarded a contract for the construction of ½ mile of new track on South Main Street to Crosby & Parker, Brattleboro.

Washington & Old Dominion Railroad, Rosslyn, Va.—Grading has been begun by this company, near Cherrydale, to connect the Great Falls & Old Dominion Railway with the Bluemont branch of the Southern Railway. Charles M. Henckley, 1517 H Street N. W., Washington, president. [E. R. J., Sept. 30, '11.]

Fairmont & Clarksburg Traction Company, Fairmont, W. Va.—Surveys are being made by this company over three different routes for an extension from Clarksburg to Northview.

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—Plans are being made by this company to construct a combined passenger and freight station at Sierra Madre.

Ontario & San Antonio Heights Railroad, Ontario, Cal.—This company has begun the installation of a new machine shop at Claremont.

Geary Street Municipal Railway, San Francisco, Cal.—Work will be begun at once by this company on its new carhouse at Geary Street and Presidio Street in San Francisco.

Macon Railway & Light Company, Macon, Ga.—This company has recently issued a statement outlining its plans for improvements in connection with the refinancing of the company. Among other things, the construction of a new carhouse is contemplated.

Chicago, South Bend & Northern Indiana Railway, South Bend, Ind.—Plans are being considered by this company for a new passenger and freight depot in South Bend.

Tri-City Railway, Davenport, Ia.—Plans are being made by this company and construction will be begun in the spring on a new carhouse and repair shops on Fifth Avenue, in Rock Island. The company's old shops at Second Street and Rock Island Street, in Davenport, will be abandoned entirely as repair shops, and the building will be used for an interurban carhouse, freight house, freight storage and offices.

Des Moines (Ia.) City Railway.—This company will soon build a new carhouse in Des Moines. The cost is estimated to be about $40,000.

Boston (Mass.) Elevated Railway.—This company will build a new elevated terminal at the corner of Main Street and Center Street in Malden.

Worcester (Mass.) Consolidated Street Railway.—This company will place in operation on Dec. 1 the addition to its Gates Lane carhouse in Worcester. [E. R. J., Sept. 30, '11.]

POWER HOUSES AND SUBSTATIONS

Lethbridge (Alta.) Municipal Tramway.—Bids are asked by the City Commissioners for additional equipment for the power house in Lethbridge.

Geary Street Municipal Railroad, San Francisco, Cal.—This company has nearly completed plans for the construction of its new power house on Geary Street and Presidio Street in San Francisco. Work will be begun within the next few months.

Hartford, Manchester & Rockville Tramway, Hartford, Conn.—The operation of this company's power station, just north of West Center Street in Manchester, which with the other equipment of the company was taken over by the Connecticut Company, is to be discontinued.

Connecticut Company, New Haven, Conn.—An addition to cost $25,000 will be made at this company's power station on Grand Avenue in New Haven. Additional equipment will be installed.

Alton, Jacksonville & Peoria Railway, Whitehall, Ill.—Frank L. Butler, receiver for this railway, has filed a report in the Madison County Circuit Court recommending that the line to Jerseyville be finished, the power plant equipment sold and that a contract be made with the Alton Gas & Electric Company to furnish power, a plan which would necessitate the erection of a substation 16 miles north of Alton.

Ft. Wayne & Springfield Railway, Decatur, Ind.—Plans are being considered by this company to build a new power house in Decatur. The structure will be one story and of cement block.

Rockland, South Thomaston & St. George Railway, Rockland, Maine.—This company is considering the purchase of new storage batteries.

Boston (Mass.) Elevated Railway.—This company's new South Boston power station will be placed in operation on Dec. 1. Three of the company's substations, those at Coolidge corner, Kendall Square, Cambridge and Egleston Square, are completed.

Berkshire Street Railway, Pittsfield, Mass.—Extensive additions and improvements are being made by this company at its East Street power station at Pittsfield. The company has placed an order for two 750-kw low-pressure steam turbines driving three-phase, 25-cycle, 575-volt, a.c. generators, with the Westinghouse Machine Company. The turbines operate at a pressure of 15 lb., at full load, and under a vacuum of 28 in. The voltage is stepped up to 33,000, at which potential the current is distributed across the western portion of the States of Massachusetts and Vermont.

Chautauqua Traction Company, Jamestown, N. Y.—This company has completed the remodeling of its power station No. 1 in Jamestown. It has placed orders for four new additional boilers.

Wilkes-Barre (Pa.) Railways.—Work will be begun at once by this company on a new substation to take the place of the storage battery plant located on South Main Street, Wilkes-Barre. The structure will be 36 ft. x 51 ft., and 24 ft. high, of brick construction. Two 500-kw rotary converters will be installed in this new station.

Montreal & Southern Counties Railway, Montreal, Que.—This company plans to build a new substation at St. Lambert.

Ft. Worth (Tex.) Southern Traction Company.—This company will build three brick substations, to be equipped with rotary converters, step-down transformers, a.c. and d.c., switchboards, etc.

Laredo (Tex.) Electric Railway.—This company will purchase a gas engine and direct-connected 400-hp, 2300-volt generator.

Manufactures & Supplies

ROLLING STOCK

Oregon Electric Railway, Portland, Ore., is in the market for four 50-ton electric locomotives.

Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo., is in the market for twenty-two closed cars.

Knoxville Railway & Light Company, Knoxville, Tenn., is remodeling several of its cars for prepayment operation.

Tidewater Power Company, Wilmington, N. C., expects to build three closed 20-ft. 6-in. car bodies in its own shops.

United Railroads, San Francisco, Cal., it is understood, will order 100 new cars through Ford, Bacon & Davis, New York, N. Y.

Geary Street Municipal Railroad, San Francisco, Cal., has ordered forty-three closed cars fom the Jewett Car Company.

Lethbridge (Alta.) Municipal Tramway is said to be asking for bids for ten new cars for use on its line which is nearing completion.

Spokane & Inland Empire Railroad, Spokane, Wash., has ordered one 50-ton electric switching locomotive from the General Electric Company.

Valdosta (Ga.) Street Railway expects to purchase a second-hand eight or ten-bench open car equipped with two West.-12-A 30-hp motors and K-10 controllers.

Shore Line Electric Railway, New Haven, Conn., has ordered three 45-ft. combination interurban cars mounted on Baldwin trucks from the Jewett Car Company.

Isthmian Canal Commission, Washington, D. C., has ordered forty electric locomotives from the General Electric Company. They will be used to tow ships through the locks of the Panama Canal.

Dallas (Tex.) Interurban Railway is considering the purchase of several gasoline motor and trail cars for use on a 15-mile interurban line which is being built out of Dallas. J. M. Carter, Dallas, manager.

Peninsular Railway, San José, Cal., noted in the Electric Railway Journal of Sept. 16, 1911, as having ordered seven California type combination motor cars from the American Car Company, has specified the following details for this equipment:

Bolster centers, length, 21 ft. 6 in.	Underframe .....semi-steel
	Bumpers .....American Car
Length of body....28 ft. 3 in.	Cables .....GE
Over vestibule.....41 ft. 2 in.	Curtain fixtures..Cur. S. Co.
Width over sills....8 ft. 2 in.	Curtain material...pantasote
Over all.....8 ft. 5 in	Headlights ....Crouse-Hinds
Height, rail to sills...33⅛ in.	Journal boxes.....Brill
Sill to trolley base, 8 ft. 11 13/16 in.	Sash fixtures..American Car
	Seats .....Brill
Body .....wood	Step treads.....QMS
Interior trim.....mahogany	Trucks.....Brill 27-G
Headlining .....Agasote	Varnish .....Valentine
Roof .....monitor	Ventilators....American Car

TRADE NOTES

Cambria Steel Company, Johnstown, Pa., has appointed W. Beverly Robinson & Company, Montreal, Que., as its Canadian agents for the sale of rails, billets, cars, wire products, etc.

Perry Ventilator Corporation, New Bedford, Mass., has received an order for ventilators for the six new cars being built by The J. G. Brill Company for the Augusta-Aiken Railway & Electric Company.

Pennsylvania Street Railway Tie Company, Dover, Del., has been chartered to manufacture and distribute iron and steel and metal products. The incorporators are F. R. Hansel, Philadelphia, Pa.; George H. Martin and S. G. Seymour, Camden, N. J.

United States Electric Signal Company, West Newton, Mass., on Nov. 15 conducted a test of the new interurban type signal, which has been installed on the northwestern division of the Terre Haute, Indianapolis & Eastern Traction Company between County Line and Zionsville.

Duplex Metals Company, Chester, Pa., is making several additions and improvements to its plant at Chester. A structural steel, galvanized-sheathed building is being erected to replace the old wooden frame building. A new and larger coating department is now practically finished.

More-Jones Brass & Metal Company, St. Louis, Mo., has elected new officers as follows: Edward A. More, president and treasurer; John B. Strauch, vice-president and general manager; Samuel W. Crawford and Thomas W. Wright, vice-presidents; Thomas L. Hamilton, secretary; Albert Y. Evins, manager electric railway department. This company has recently built an addition 80 ft. x 236 ft. to its foundry, and has more than doubled the capacity of its plant by the installation of new equipment.

Valentine-Clark Company, Minneapolis, Minn., dealer in Northern and Western cedar poles, has opened a sales office at St. Marie's, Idaho, and is now in position to quote prices on Western cedar poles from that office to all points west of the Dakota-Montana line and points in the State of Colorado and west thereof and into Texas. Neil Burrell, formerly identified with this company in the East, has charge of the St. Marie's office in connection with L. H. Clark, son of E. L. Clark, president of the company.

International Pay-As-You-Enter Tramcar Company, Ltd., New York, N. Y., was incorporated under the laws of Canada on Nov. 15, 1911, to exploit the pay-as-you-enter system in Europe. The company has established an office at 6 Broad Street Place, London, E. C., and is already negotiating with several of the leading lines to adopt the prepayment devices. Frank Paul, one of the engineers of the Pay-As-You-Enter Car Corporation, left for London last week to supervise the remodeling of cars for pay-as-you-enter operation on the lines of the British Electric Traction Company.

L. R. Pomeroy, New York, N. Y., has resigned as chief engineer of the railway and industrial division of J. G. White & Company, Inc., New York, to open an office as a consulting engineer in New York. Mr. Pomeroy will make a specialty of the design of railway and industrial plants, the rehabilitation of shops, the analysis of machine-tool operation with relation to electric drive and effective operation, and reports and appraisals of railway and manufacturing properties. In this line of work Mr. Pomeroy has had a long experience and has become an authority. He was assistant general manager of the Schenectady Locomotive Works from 1899 to 1901. From 1901 to 1908 Mr. Pomeroy was special representative of the railway department of the General Electric Company, where he specialized on the electrification of steam roads, railway shop applications, etc. For the two years following he was assistant to the president of the Safety Car Heating & Lighting Company and in 1910 he resigned from that company to join J. G. White & Company, Inc. Mr. Pomeroy will have his office at 50 Church Street, New York.

ADVERTISING LITERATURE

Ingersoll-Rand Company, New York, N. Y., has issued a bulletin which describes and illustrates its "Little Giant" rock drills.

Ohmer Fare Register Company, Dayton, Ohio, has issued a 28-page catalog which describes and illustrates ten types of the company's recording registers and its Ohmergraph.

Greenlee Brothers & Company, Chicago, Ill., have issued a 40-page catalog which treats of the adzing and boring of railway ties and of driving screw pikes by power or hand. The company's various machines and devices used in this work are described and illustrated.

Indianapolis Brass Company, Indianapolis, Ind., is mailing to the trade a blotter calling attent on to its overhead line material and car equipment specialties. A piece of string to be tied to the finger has been attached to the blotter to remind the company's customers of these products.

The J. G. Brill Company, Philadelphia, Pa., prints in the October issue of the *Brill Magazine* a biographical sketch of William Alexander House, president of the United Railways & Electric Company, Baltimore, Md. Lima, Peru, is the subject of the thirty-fourth article of the series describing the conditions which govern the type of car for city service. The magazine also contains other articles on Brill equipment and a description and illustrations of the Brill exhibit at the 1911 convention of the American Electric Railway Association held at Atlantic City.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVIII NEW YORK, SATURDAY, DECEMBER 2, 1911 No. 23

PUBLISHED WEEKLY BY

McGraw Publishing Company

JAMES H. MCGRAW, President; C. E. WHITTLESEY, Sec'y and Treas.

239 WEST THIRTY-NINTH STREET, NEW YORK

TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1021 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Wednesday, 9 a. m., of the week of issue.

Copyright, 1911, by MCGRAW PUBLISHING COMPANY.

Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

The Association of American Advertisers has examined and certified to the circulation of this publication. The figures of circulation contained in the Association's report only are guaranteed.

ASSOCIATION OF AMERICAN ADVERTISERS.
No. A—82. *Whitehall Bldg., N. Y. City.*

NEW YORK, SATURDAY, DECEMBER 2, 1911.

CONTENTS.

Co-operation Between Departments..... 1133
Protection of Linemen Against Shocks..... 1133
Increase of Fare on Hudson & Manhattan Railroad..... 1134
The Proper Basis for Rates and Fares..... 1134
A. C. Versus D. C. at Milwaukee..... 1135
Electric Railroading at the Turin Congress..... 1136
Improving Drawings of Piping Installations..... 1137
Alternating and Direct-Current Interurban Lines of the Milwaukee System..... 1138
Multiple Catenary of Bitterfeld Line..... 1145
Electric Railway Improvements in Sydney..... 1146
Proceedings of the Railway Section of the International Electrical Congress at Turin..... 1147
Report on Electrolysis in Chicago..... 1153
Determination of the Proper Bases for Rates and Fares..... 1154
Hearing on Express Plans of Boston Elevated Railway..... 1163
Chicago Investigation of Smoke Abatement and Electrification of Railway Terminals..... 1164
Progress on Metropolitan and Third Avenue Reorganizations..... 1165
Independent Motor Cars in Germany..... 1166
Executive Committee Meeting of the Transportation & Traffic Association..... 1167
Hearing by Massachusetts Commission on Fenders..... 1168
Transfer Order to Be Issued in New York..... 1168
The Sulzer Steam Turbine..... 1169
Electric Shovel for City Track Trench Excavation..... 1171
London Letter..... 1173
News of Electric Railways..... 1174
Financial and Corporate..... 1176
Traffic and Transportation..... 1179
Personal Mention..... 1180
Construction News..... 1181
Manufactures and Supplies..... 1184

Co-operation Between Departments

A commendable desire to avoid the odious name of fault finder may often prove a hindrance to the effective co-operation which should exist between all departments of an organization. The truth of this was vividly brought to mind by a recent accident at a new carhouse where a car was badly damaged through its inability to clear a wall when passing over a certain wye. The fact was that the engineering department had foreseen every clearance condition except the case where the forward truck of a car was on one branch of the wye while the rear truck was on the other branch. The investigation of the accident showed that the platform men who operated at this location were fully aware that some cars were liable to foul this wall under the condition noted, but no one had thought that the oversight could be remedied by reporting the matter to his superior. This incident clearly indicates how necessary it is that the employees should feel that they are working for the interests of the company at large no matter what their own daily routine may be.

Protection of Linemen Against Shocks

The Central Electric Railway Association at its meeting last week decided to appoint a committee to draft a code of rules for the protection of linemen working on high-tension circuits with the end in view of having such a code adopted as standard by all member companies. The wide diversity of practice in this hazardous work is shown by the reports of twelve railway companies published in the ELECTRIC RAILWAY JOURNAL of June 18, 1910, page 1068. Many companies rely for the safety of their linemen largely on the use of grounding wires or chains thrown over the wires after the lines to be repaired have been killed at the power house or substation on telephone instructions from the linemen or dispatcher. Other companies have an elaborate system of transmitting and confirming line dispatching orders which resembles the system of double-order dispatching of trains in that the line dispatcher is notified after his orders have been carried out. Unless the utmost precautions are taken accidents occasionally will happen either through the carelessness of the linemen or as the result of a mistake or disobedience of a substation operator. The old adage that familiarity breeds contempt applies to nearly all men who are employed in dangerous occupations, especially to linemen. Left to their own devices they often will take chances. But if the substation and power house operators as well are specifically instructed as to the proper steps to take to protect linemen working on the wires a simultaneous combination of mistakes by two or more men is necessary to cause an accident. A carefully prepared code of rules covering the acts

of everyone concerned in making high-tension repairs will no doubt be welcomed by all engineers in charge of line maintenance.

Increase of Fare on Hudson & Manhattan Railroad

The action of the Hudson & Manhattan Railroad in increasing its rate of fare 40 per cent between points in uptown New York and New Jersey follows an experiment with the usual 5-cent unit which was found to be unprofitable. That the service rendered by this company is of a superior nature there can be no question. It not only affords greater convenience but also a material saving of time when compared with the old combined route of ferry and surface railway between these points. The fact that the company needs more money to meet its fixed charges and taxes is a sufficient excuse, after the experimental period has passed, for a new start with a higher rate of fare. Allied with the natural inquiry as to whether the company will retain at the higher rate the full amount of business which it has at the lower rate is the question of the means that will now be taken to demonstrate the unusual value of this highly specialized form of service. This may prove to be a greater problem than the one of adopting satisfactory ways for the collection of revenue under the arrangement by which classes of passengers paying different rates of fare will be carried in one train. The latter problem is an operating question, but the former question is the greater and requires a broad policy that will have the effect not only of retaining most of the present business but of stimulating the greater traffic that is needed for the future.

THE PROPER BASES FOR RATES AND FARES

The full report of the committee of the American Electric Railway Association appointed to consider the "Determination of the Proper Bases for Rates and Fares" covers many aspects of this serious question. It includes, in addition to the brief summary of conclusions made public at the last Atlantic City convention, written personal contributions by most of the members of the committee. The study is, as it needs to be if it is to receive public support, an argument for higher average fares through reasonable and justifiable changes in methods, and a statement of the reasons why greater revenue is required to encourage continued investment in the properties so as to enable them to keep pace with the growth of the communities served.

Although, as stated, the brief report of the full committee was published during the week of the Atlantic City convention, this part is republished in this issue for the convenience of readers, together with a full abstract of the rest of the report. The lowest rate recognized in the list of suggested methods of securing increased average rates is the retention of the present 5-cent flat fare and the elimination of free transfers. This rate alone, if attainable by the railways throughout the country, would solve some problems, but unfortunately many companies are confronted by requirements of franchise ordinances governing transfers which were accepted when costs were lower and prospects brighter. Such contracts provide, in many instances, not only for free transfers, but also for the sale of tickets in lots at an average of less than 5 cents. Railways bound by such requirements, however, might secure supplemental contracts with cities authorizing a charge based more nearly on the cost of service if the companies should make other concessions that might meet general public convenience. We have called attention previously to the plan generally recommended by the committee as the most feasible of the methods that it offers. This is the establishment of a zone system with a 5-cent fare for a large central zone and 3 cents extra fare, making a total rate of 8 cents, for a trip to the outlying zone, and the issue of transfers either free or with some charge.

A modification of this suggestion is advanced by Mr. Sergeant in his memorandum. He mentions the possibility of having a central and outer zone with the condition that a passenger might ride without extra payment from one into the next. If, however, the passenger rode from the outlying zone through the central zone and continued his journey to another point in the outer zone, a second fare should be asked. This practice would tend to restrict the average lengths of rides and possibly bring them within the scope of a single 5-cent fare. Such a method might be available by an amendment of the franchise where there is a plain need of increased revenue as well as of additions and betterments.

Inasmuch as the memoranda presented by members of the committee constitute the new part of the report, it is in these that the principal interest centers. The memorandum by Mr. Ford, the chairman, is written on the assumption that necessity exists for general increase in rates of fare if the continued growth of American electric railways is to be assured. Mr. Ford presents a statement of the factors which govern transportation rates. These factors apply not only to the city street railway, but also to the interurban line, steam railway, taxicab, steamship, etc. This memorandum may be supplemented by a reference to factors in transportation conditions which are most apparent in the larger cities of the country. On Manhattan Island two extremes of public utility transportation service are found in the surface and subway lines. The surface lines provide the maximum convenience for very short journeys. Their cars can be taken or left at every street intersection, or, in the case of long blocks, at midway stopping points. On the principal lines the headway is very close. In the subway the average person, instead of finding stations at every street crossing, is obliged ordinarily to allow for a walk of several blocks at the starting point or destination. But the subway service, notwithstanding the crowded cars, the lack of surface air and the noise of operation, redeems itself in the opinion of the busy individual by the amount of time which its wonderful operation saves. These differences in character of service exist in one city. When we compare two or more cities similar differences as to rapidity of travel, lack of overcrowding and general convenience to the public are found, and these differences are so definite that they should be taken into account in any consideration of remedies which appear to be of general application.

In referring to the longer ride, increasing cost, increasing use of transfers and greater requirements as to service and facilities imposed, Mr. Ford states that in consequence of the insufficiency of margin resulting from these condi-

tions the development of the electric railway is at a standstill. Even now these conditions are becoming more serious in many cities. The desired increase of short-haul business in sufficient volume to overcome the increasing density of long-haul traffic is not always realized. Any curtailment in transfers is difficult to effect without the accompaniment of a public outcry by those who have been enjoying privileges to which they are not legally entitled. Improvement in these matters, however, is facilitated by support from public authorities which can be given in a number of localities by state commissions if the members of those bodies are so inclined.

Mr. Sergeant, in his suggestive memorandum, states that if the general public is to be convinced of the necessity for an increase of rates it must be shown the factors of expenditure, capitalization and other elements which enter into the problem. This is a fundamental requirement, and companies with insufficient revenues should prepare themselves and their properties to demonstrate the losses or the insufficient margins returned by analysis of the operations. All conditions of investment and costs of operation as well as of traffic differ in each city. Some systems are reasonably compact and are fairly well protected against excessive waste of mileage. Cities, however, do not develop in expected ways, and investments of companies, reasonable when made, are not always as remunerative as they promised to be. In such cases either the investments are part of the fair costs of the property or the earnings should be sufficient to enable the companies to retire them by sinking fund payments.

The contribution made by Mr. Bradlee, of Stone & Webster, is important not only because of the large number of companies operated by the interests which he represents, but also because of the study which shows definite calculations of the maximum length of haul permissible for profitable operation with average stated numbers of 5-cent fare passengers. In his summary of London conditions, Mr. Clark mentions the fact, which has relieved the companies in that city, that little objection appears to have been raised to the increase in fares.

A growing interest in the well-known European zone system or some modification thereof is evident by references in the various memoranda to the possibilities of some plan of this nature. Mr. Foster, for instance, in emphasizing the necessity of stopping the decline in net earning power, suggests this as one of the possible means. Of course the companies have bound themselves, unwisely in many cases, to extend the 5-cent fares whenever the limits of cities in which they are located are enlarged. In these days of cost analysis and careful consideration of possibilities for economy blanket conditions that involve unlimited and unforeseen responsibilities appear to be suicidal. It is fortunate for the industry that members of the association who have had long experience have paved the way through this report for a thorough consideration of the entire subject. The discussion planned for the mid-year meeting will be a helpful one. It is to be hoped that the consideration of this subject by the association will not be ended until each company in serious straits can make public proof of its need for relief without having unjust use made of its figures by others.

A. C. VERSUS D. C. AT MILWAUKEE

A contribution of exceptional value has been made to the study of the choice of electric systems for railway operation by Messrs. Rau and Mullett in their article in this issue on the results with single-phase and high-tension direct-current operation on a part of the interurban system of the Milwaukee Light, Heat & Traction Company. As so much has been said and written about the merits of these two systems for railway service, it is fortunate that full particulars are available of the performance of equipments of each type on the same road and for the same traffic. To the management of the company are due the thanks of the industry for the information thus freely made public. A somewhat similar analytical article which described the reasons for the change from alternating current to high-tension direct current on the Washington, Baltimore & Annapolis Railway was published in the ELECTRIC RAILWAY JOURNAL for May 27, 1911, and the attention which that article attracted is evinced by the extent of a discussion on that change at the recent Turin International Electrical Congress.

The experience on the Washington, Baltimore & Annapolis Railway, as well as on the Milwaukee road, shows simply that the high-tension direct-current equipment which was installed later was better adapted than was the original equipment to the special conditions on each property. The conclusion should by no means be drawn from these examples that the single-phase system *per se* might not, under other conditions, have been equally superior to any form of direct-current system now developed. The fact is that one of the most important services which can now be rendered to the railway industry by electrical engineers is to outline still more closely than in the past the respective fields of the high-tension direct-current system, the single-phase system and the three-phase system. This cannot be done by exaggerated claims for any one system or equally exaggerated condemnation of another. It can best be accomplished by the development of a clearer knowledge of what have happily been termed the peremptory factors in the choice of an electric railway system. According to this theory each electrical system has undeniable advantages over all others under certain conditions, and a careful consideration of all the surroundings of each particular case should disclose certain factors which make the choice of one system in many cases so much more desirable than any other as practically to decide the question.

The article of Messrs. Rau and Mullett on the Milwaukee situation presents service and cost statistics which are easy of comparison. Those relating to repair work on the two classes of motors are based on twelve months' service with fifty-two a.c. motors and an equal length of service with sixty 1200-volt d.c. motors. During this time 130 repairs were made to the a.c. motors and only five to the d.c. motors. This comparison has an important bearing on the first reason (frequent road failures) given for the change in Milwaukee. However, it should be noted that the a.c. motors were of 75-hp capacity while the d.c. motors are of 100-hp capacity, and there is a possibility that the requirements of traffic brought about by the rapidly increasing load due to new extensions, and also by

more frequent passenger stops, may have put upon the 75-hp a.c. motors heavier loads than those for which they were designed. The a.c. car complete with four 75-hp motors weighed the same as the 1200-volt d.c. car complete with four 100-hp motors. The car bodies were of the same general proportions, but the seating capacity of the a.c. car exceeded that of the d.c. car by two passengers. The total weight of equipment per horse-power of the a.c. motors per car was 266 lb., while the corresponding weight for the d.c. car is 200 lb. per motor horse-power. Thus, considering running conditions identical and without load, each rated horse-power capacity of the a.c. motor was called upon to propel 66 lb., or 33 per cent, more dead weight than the d.c. motor equipment. This difference in motive power rating, when considered in proportion to the weight of equipment, would have an important bearing on the number of motor repairs and probably accounts largely for the inability of the a.c. equipments to fulfil the service requirements as well as for the way in which the 1200-volt equipments are now doing the work.

With regard to road failures of the two types of equipment, no definite statement is made, but the comparison of motor repairs already mentioned indicates a lower road reliability for the a.c. cars, thus substantiating the reason given at the time the change was announced; namely, a lack of reliability of the a.c. cars. But the authors point out in connection with the 1200-volt cars that the dynamotor which supplies 600-volt current for lighting and control purposes when running on the 1200-volt trolley is a frequent source of road trouble. The air-compressor motor is designed for 1200-volt operation and runs at half-speed on 600 volts.

The authors greatly increase the value of their article by presentation of energy consumption statistics which are to be found in Table XI in the article. These statistics are particularly interesting because they show the energy consumption, stops, running time and other operating factors for both a.c. and d.c. types of equipment of like weight when operating over the same tracks on 600 volts d.c. and on the higher voltages (3300 volts a.c. and 1200 volts d.c.) for which they were particularly designed. It will also be noted that the power consumption per train-mile for an a.c. car while running on the 600-volt sections, with motor car alone, with one trailer, and with two trailers, averages 3.5 kw-hours, 4.42 kw-hours and 5.48 kw-hours respectively.

The single-phase car equipment of the Milwaukee system was at the same disadvantage as that of other roads on which terminal operating arrangements required that a.c. cars be routed for portions of their runs over 600-volt d.c. trolley sections. On the Watertown interurban division the total one-way run is 50.56 miles, and 23.49 miles of this distance was and is operated at 600 volts. This 600-volt section includes nearly 9 miles of city tracks, on which stops are very frequent, and about 14 miles of double-track private right-of-way interurban line on which the stops are less than a mile apart. The a.c. cars thus had to be designed for combination service and when in that service had to make frequent stops. The high-voltage sections admit of fast running, and the traffic between Milwaukee and the many attractive lake resorts near Waukesha and Oconomowoc call for heavy train service. As many as four trailers are attached to one motor car, since it is the practice of the transportation department of this road to handle all possible extra business by adding trailers to regular trains. This plan avoids a disturbance of regular schedules and keeps the number of train orders at a minimum. But in the case of the single-phase equipment this practice could not be satisfactorily followed because the a.c. motor cars did not have sufficient motor capacity to handle as heavy train loads as the transportation department demanded.

ELECTRIC RAILROADING AT THE TURIN CONGRESS

We publish elsewhere a résumé of a very interesting discussion on electric railways which took place at the International Electrical Congress at Turin. It is very pertinent evidence of the intense interest in heavy electric traction on the Continent and the activity of engineers in working out the various problems connected with it. In fact, if one went through the discussion and substituted "direct current" for "three-phase" wherever found, it would read very much like the polemics which have often been delivered at a meeting of the American Institute of Electrical Engineers or the New York Railroad Club at New York. For at the Turin conference direct-current traction received very scant consideration, the comparisons made being almost wholly between single-phase and three-phase equipments. Much interesting information was brought out regarding the alternating-current systems of various kinds in use on the Continent.

One striking fact mentioned was that the regenerative control with single-phase motors is being tried out on the Midi line in France. Another was the testimony of Mr. de Kando as to the practical usefulness of the very successful recuperation to be accomplished with three-phase motors. According to his figures, on the Giovi line there was an actual saving of 16 per cent of fuel consumption due to the adoption of recuperation on the system. Thanks to its effect on braking, it has become feasible to run the electric trains down grade on this line at a speed 50 per cent higher than is thought desirable with steam trains controlled by ordinary brakes. Moreover, Mr. de Kando stated that the constant-speed properties of the three-phase motors were practically very useful, and it was found that on the Valtellina line the electric locomotives generally held their schedule admirably under traffic conditions that caused the steam locomotives to be frequently late. As to the complication of the contact system, he thought practical experience had shown that to be greatly exaggerated.

Mr. Vallauri vigorously defended the single-phase system, stating that the only serious defect originally feared in it—that is, the difficulty of commutation—had been found to be much less serious than was at first supposed and that in fact the commutator was as reliable as any other part of the machine. As for the admitted greater weight of the single-phase motor, it was actually useful to traction, and recuperation, from tests already made, was shown to be possible with this system. Another speaker, taking the opposite view, defended the three-phase system against the charge of over-complication in the overhead

system, mentioning a single yard with 5 miles of electrified tracks on the three-phase system which was regularly in operation without any difficulty in construction or maintenance.

Only toward the end of the discussion did the direct-current system come into consideration. It was brought vigorously into evidence by the distinguished president, Mr. Mailloux, and warmly defended by some of the German, Austrian and Russian delegates, one of whom in particular expressed the opinion that with high voltage on direct-current lines the total economy was quite comparable with that of single-phase operation.

The papers and discussion deserve careful reading from all electric railway engineers, particularly on account of their presenting a totally different viewpoint from that which we Americans are wont to take—a viewpoint the more interesting since it is based on considerable experience with conditions and systems not common here.

Aside from this discussion as to methods, the most interesting result of the congress was the decision to define acceleration in terms of miles (or kilometers) per hour per second, instead of using the smaller linear units and writing feet (or meters) per second per second. This resolution, which was put through the congress unanimously, is an important and logical one, the point being that the acceleration is thus expressed in terms of the same linear unit used to define the speed instead of a submultiple of that unit, a change which considerably simplifies the numerical part of the problems of acceleration. This decision was very largely due to the influence and the clear setting forth of the situation by President Mailloux, who has consistently advocated the simpler method. Altogether the proceedings at Turin were rich in their record of comparative experience, and the results of the meeting are certainly most valuable and instructive.

IMPROVING DRAWINGS OF PIPING INSTALLATIONS

Throughout the entire field of power plant design it is doubtful if there is a more difficult problem from the drafting point of view than the clear and accurate presentation of piping layouts. Even in drawings of large stations it is hard to present plans and elevations of pipe runs which are easily interpreted when examined by persons reasonably familiar with the use of blue prints. There is relatively more space available for piping and auxiliaries in plants of high capacity, but the frequent changes of level encountered produce overlapping on drawings of assembled equipment, and the requirements of drawing to scale leave little opportunity for making complicated details clear on general plans and elevations. These conditions are the cause of no little lost time, mental friction and general inconvenience whenever important piping installations are projected or are under construction, and in the interests of the busy operating man something ought to be done to improve the situation.

There is no good reason why the use of diagrams and sketches of important pipe details should not come into vogue on the mechanical side of the station, just as the application of skeleton diagrams of electric wiring has done so much to simplify the arrangement of equipment on the switchboard end of the establishment. Contractors must have detailed plans in any event; but it is scarcely less important to provide those who are to operate the plant with drawings showing the principles of the arrangement adopted, even if scales and the exact locations of all fittings are omitted. Some excellent work has been done along this line in the preparation of drawings showing the connections of valves in automatic sprinkler systems for car-house and shop service, and if similar diagrammatic sketches could be brought into general use in the power house field, the results would be of real value. Best of all, the preparation of such sketches, by the use, say, of a single line for each pipe instead of the double line, and the employment of convenient symbols such as X, T and U at valves and fittings, with appropriate numbers, takes very little time and trouble if done by the man who designs the piping. It is entirely needless in the majority of cases to attempt to show numerous piping systems on a single drawing. The better plan is to confine the diagram of each system to a separate sheet which can be posted behind glass or filed in a loose-leaf book easily accessible by the power station engineer.

Designers of electrical power stations have too often failed to realize that when the operating engineer, the construction man or the superintendent is running down trouble in the system of compressed-air piping he cares very little about the valves in other systems of auxiliaries, but needs a clear record of manipulating possibilities on a highly specialized assembly of apparatus. The station operator soon finds himself so familiar with the installation that he rarely refers to the diagram, but it is none the less a valuable adjunct to the plant's resources. In too few cases as yet are copies of the final approved drawings of a plant maintained in the office of the chief operating engineer as well as in the files of the consulting or designing engineer. Nothing less than a full set of blue prints should be supplied to every station in cases where drawings are provided for its efficient construction and extension.

There is also room for improvement in the preparation of detailed drawings of piping, notably in the labeling of every run and piece of apparatus shown, the specifying of diameter and material, and the tabulation of lists of fittings and special parts, with space for the index number, number required, size and description. It would be a great help if piping plans showing the termination of a given run, as at the end of a given contract section, were always provided with letters, figures or other identification by which the continuation of the pipe could be picked up and followed on another drawing. This method has been followed of late with great success to show the course of wiring runs in connection with the installation of switchboard panels and apparatus for remote control, and there is no reason why it should not be utilized equally well in piping work. Still another improvement which has lately come into use is the lettering of all piping and auxiliary equipment in the station with the function of each important piece, a plan which extends the benefits of the pipe-coloring schemes, which are so deservedly popular, and promises further application when its conveniences have become fully appreciated.

Alternating and Direct-Current Interurban Lines of the Milwaukee System

Comparative Construction Data and Car Energy Consumption Figures Are Presented for the Interurban Lines of the Milwaukee System Formerly Operated by 3300-Volt Alternating Current and Now by 1200-Volt Direct Current

BY. O. M. RAU, CHIEF ELECTRICIAN OF THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY, AND H. A. MULLETT, SUPERINTENDENT OF ROLLING STOCK

Three divisions of the Milwaukee Light, Heat & Traction Company afford a most excellent basis for comparing the cost and performance of 3300-volt a.c. and 1200-volt d.c. trolley systems. These divisions, or rather the parts of them located away from Milwaukee, terminate at Watertown, East Troy and Burlington, Wis. About 75 miles of track on these divisions was first equipped for 3300-volt single-phase operation, and then after about two years' service the same mileage was re-equipped for 1200-volt d.c. operation. Thus direct comparisons of important features of the installation may be made on one basis, and these, therefore, are more valuable than comparisons of dissimilar operating systems on different roads.

The single-phase equipment was described in the Street Railway Journal for Aug. 3, page 156, and Aug. 10, 1907, page 218. The 1200-volt equipment was described in the Electric Railway Journal for July 16, 1910, page 102.

The interurban cars which run to the Public Service Terminal in Milwaukee had to be designed for 600-volt operation as well as for 3300-volt a.c. or 1200-volt d.c. operation. It may be said that the combination 3300-volt a.c.-600-volt d.c. equipments did not fully meet the requirements so far as continuity of service and trailer-hauling capacity were concerned and that the change to 1200 volts d.c. was made largely for this reason.

The three lines for which data are available have the same 600-volt terminal route for 8.64 miles between the Public Service Building in Milwaukee and West Allis. This is over city track. From West Allis one route extends westward to Waukesha Beach and Watertown and another southward to St. Martins, where it in turn divides, one extension leading to East Troy and the other to Burlington. The total run between the Milwaukee Terminal and Watertown is 50.56 miles, of which 27.07 miles from Waukesha Beach to Watertown formerly was operated at 3300 volts a.c. and now is operated at 1200 volts d.c. On the south branches the routes are the same between Milwaukee and West Allis and between West Allis, and St. Martins, 6.17 miles. The route from West Allis, through St. Martins to East Troy, is 27.42 miles, and to Burlington it is 28.13 miles. These routes, with the exception of the West Allis-St. Martins section, also were operated with single-phase current and now are operated with 1200-volt direct curent.

Table I.—Mileage of 1200-Volt Lines.

Waukesha Beach to Watertown	27.07
West Allis to St. Martins	6.17
St. Martins to East Troy	21.25
St. Martins to Burlington	21.96
Total	76.45

A summary of the mileage, including sidings, of the 1200-volt lines of the Milwaukee Light, Heat & Traction Company is published in Table I.

The service requirements on these lines are heavy during four summer months. The average daily revenue car miles run during the four summer months of the year approximate 2100 and during the other eight months are approximately 1400. Ordinarily single cars are run on the East Troy and Burlington divisions on two-hour headway, but on Saturdays and Sundays as many as four trailers are added to each motor car to meet the demands of the traffic to and from the numerous resorts served by these interurban divisions. The service on the Watertown line has an hourly schedule during the four summer months. The daily motor-car mileage and the Saturday and Sunday trailer-car mileage for summer and winter months are as shown in Table II.

The schedule speeds on the high-voltage portions of the routes average about 24.5 m.p.h. with maximum speeds of 55 m.p.h. The average distance between regular stops is 0.75 mile on the Watertown divisions and 0.83 mile on the other two divisions. These data and those which follow refer only to service on the high-voltage sections of the interurban lines.



Milwaukee Interurban Lines—Interurban Car with Single- Phase Equipment

Table II.—Average Daily Car Mileage on 1200-Volt Line.

	Watertown.	East Troy.	Burlington.
Summer, four months.			
Motor cars	976	377	364
Saturday trailers	90	84	32
Sunday trailers	117	168	40
Fall, winter, spring, eight months.			
Motor cars	448	377	364
Saturday trailers	...	42	24
Sunday trailers	...	84	32

As earlier stated, the high-voltage lines operate to and from the Milwaukee terminal over 600-volt city and connecting lines. Thus the service requires more high-voltage cars than would be necessary to operate only the high-voltage sections. Considering only the high-voltage sections ten motor cars and eighteen trailers would be sufficient to handle the traffic. The disposition of cars on the three lines then would be as shown in Table III.

TABLE III.—DISPOSITION OF CARS ON THE THREE LINES.

	Water-town.	East Troy.	Bur-lington.
Motors	4	4	2
Trailers	6	8	4
Motor cars operating eight months, Sundays	3	1.5	1.5
Trailers operating four months, Sundays	5	3	3



Milwaukee Interurban Lines—Waukesha Beach 1200-Volt Substation Building

SINGLE-PHASE CARS

The original single-phase motor cars, ten in number, had the characteristics given in Table IV.

TABLE IV.—DATA OF SINGLE-PHASE CARS.

Length over all	53 ft. 5 in.
Length over corner posts	40 ft. 0 in.
Width over belt rail	8 ft. 4 in.
Height from rail over roof board	11 ft. 11¾ in.
Truck-center distance	29 ft. 0 in.
Wheel base	6 ft. 1 in.
Wheel diameter	3 ft. 0 in.
Trucks, M. C. B. type, company design.	
Seating capacity	66
Motors, four a. c.-d. c. GE-605	75 hp
Total weight with a. c. motors	80,000 lb.

1200-VOLT CARS

The present 1200-volt passenger rolling stock consists of the ten cars designed for single-phase use, fifteen new passenger cars and five utility cars. The fifteen new steel passenger cars are equipped with GE-207 100-hp motors. The ten older cars and the utility cars were re-equipped with GE-205 75-hp motors. The motor cars equipped with GE-205 motors weigh 72,000 lb. complete with d.c. apparatus, whereas formerly, with the single-phase apparatus, they weighed approximately 80,000 lb. Both types of motors have commutating poles and are designed for operation on both 600 volts and 1200 volts. The gear ratio of the 205 motors is 2.525 and that of the 207 motors is 3.05.

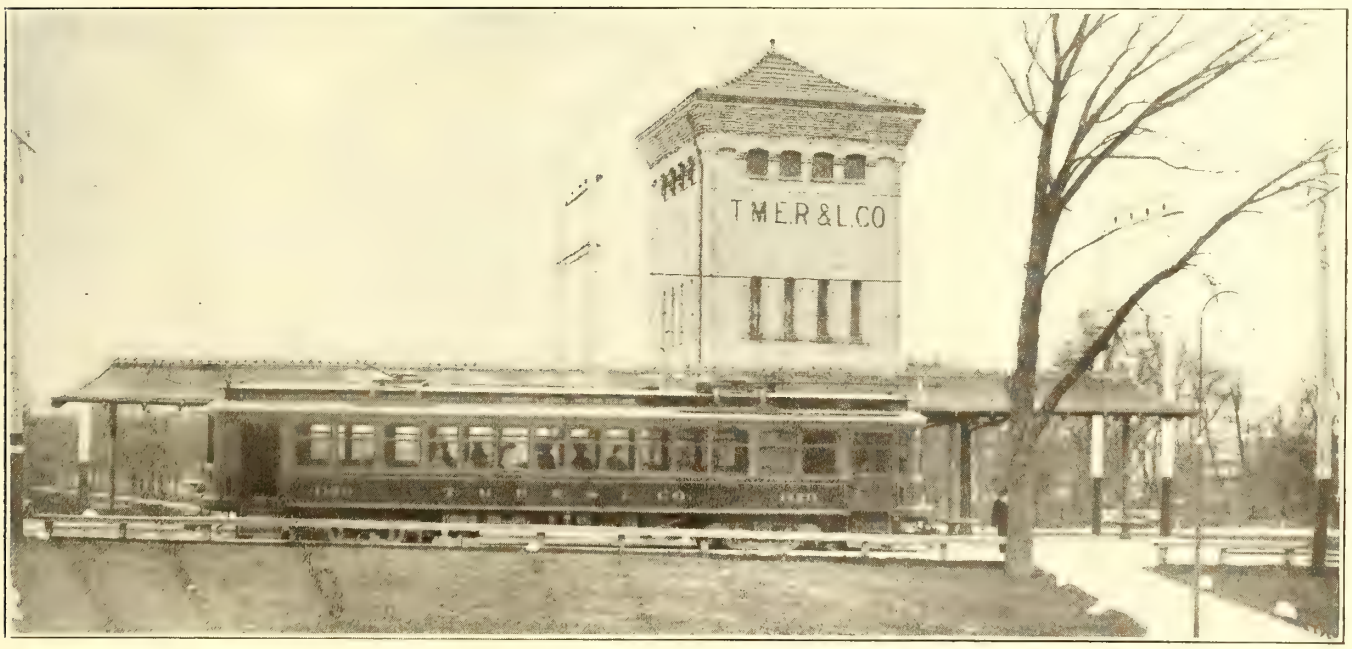


Milwaukee Interurban Lines—Grade Separation on Waukesha Line

The standard interurban trailer cars of the Milwaukee interurban system seat fifty-four passengers and weigh 36,500 lb. The latest type of interurban motor car, that operated by the GE-207 motors, is built largely of steel. These cars were described in the ELECTRIC RAILWAY JOURNAL for July 16, 1910, page 102. The more important data concerning these cars appear in Table V.

TABLE V.—DATA OF 1200-VOLT CARS.

Length over all	53 ft. 5 in.
Length over corner posts	40 ft. 0 in.
Extreme width	8 ft. 7 in.
Height from rail over roof boards	11 ft. 6 in.
Truck-center distance	28 ft. 4 in.
Trucks, Brill M. C. B. type.	
Wheel base	6 ft. 1 in.
Wheel diameter	36 in.
Motors, four GE-207	100 hp.
Weight of car body and trucks	48,000 lb.
Total weight	80,000 lb.
Seating capacity	64



Milwaukee Interurban Lines—Single-Phase Transformer Substation at Waukesha Beach

The new motor cars have the type M non-automatic control with two motors connected in series when running

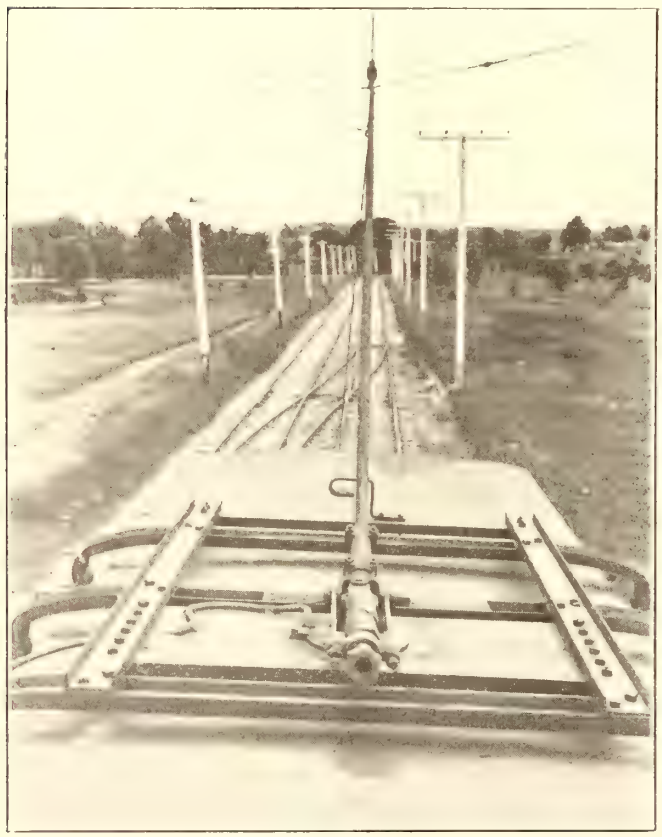
on 1200 volts. A dynamotor supplies current for the control and lighting circuits when the car is on the 1200-volt trolley. The air-compressor motors are insulated for 1200 volts and run at half-speed on the 600-volt trolley section. A commutating switch for changing the motor connections from series to series-parallel during 1200-volt operation and from series-parallel to parallel during 600-volt operation, thereby giving full speed at both voltages, is placed under the car and operated from either end by a lever in the motorman's cab. This switch also transfers the auxiliary circuits, except that for the compressor, from the trolley to the 600-volt tap of the dynamotor when the 1200-volt section is entered. The other parts of the electrical equipment are practically standard 600-volt apparatus with



Milwaukee Interurban Lines—Dead Section Between High and Low Voltage Lines



Milwaukee Interurban Lines—Typical Roadway and Transmission Line Construction on Waukesha Line



Milwaukee Interurban Lines—Method of Supporting Trolley Base on High-Voltage Cars



Milwaukee Interurban Lines—Crossroad Waiting Station and Car Signal

additional insulation designed to provide for 1200-volt conditions.

The dynamotor is the most frequent source of trouble on the 1200-volt equipment. When operating on 1200 volts on the interurban sections it is subject to trouble from lightning and with the dynamotor out of service an individual car is helpless because no 600-volt current is available for the control and light systems. To provide against undue delays and for continuous operation of trains, even though one dynamotor may be inoperative, the light jumpers are made of sufficient capacity so that the control circuit on a car having a damaged dynamotor may obtain 600-volt current through the light jumper from the dynamotor of the next car.

The mechanical department has prepared the following instructions to trainmen for their assistance in preventing or locating and remedying troubles on 1200-volt cars:

NAMES AND LOCATION OF APPARATUS—[600-1200-VOLT D.C. CARS—1111-1125]

"1. Main Switch.—Large knife blade switch in wooden box located under the car between reverser and circuit breaker.

"2. Circuit Breaker.—Automatic overload or safety switch located between commutating switch and main switch.

"3. Commutating or Change-Over Switch.—Iron case located under car between circuit breaker and contactor case.

"4. Contactor Box.—Large iron case under car containing eighteen contactors numbered from 1 to 18, reading from left to right.

"5. Motor Cut-Out Switch.—Iron case located at side of car between triple valve and fuse boxes with handle and dial marked with arrows 1 and 3 out; 2 and 4 out.

"6. Fuse Boxes.—(Four used.) Located under side of car; two placed one above the other and two side by side.

"7. Reverser.—(Two used.) Iron cases located under car next to truck at No. 1 end.

"8. Kicking Coil.—Coil of wire wound on wooden spool, located by No. 1 trolley base on roof.

"9. Lightning Arresters.—(Two used.) Located in wooden box, by No. 1 trolley base on roof.

"10. Dynamotor.—Located underneath car adjacent to No. 2 truck cab side.

"11. Dynamotor Resistance.—Resistance placed in iron box located near the dynamotor.

"12. Controller Switch.—Located overhead in cab.

"13. Controller.—Located in left-hand corner of cab.

"14. Circuit-Breaker Trip and Reset Switch.—Located overhead in cab.

"15. Auxiliary Fuses and Switch.—Located in fuse cabinet, as follows:

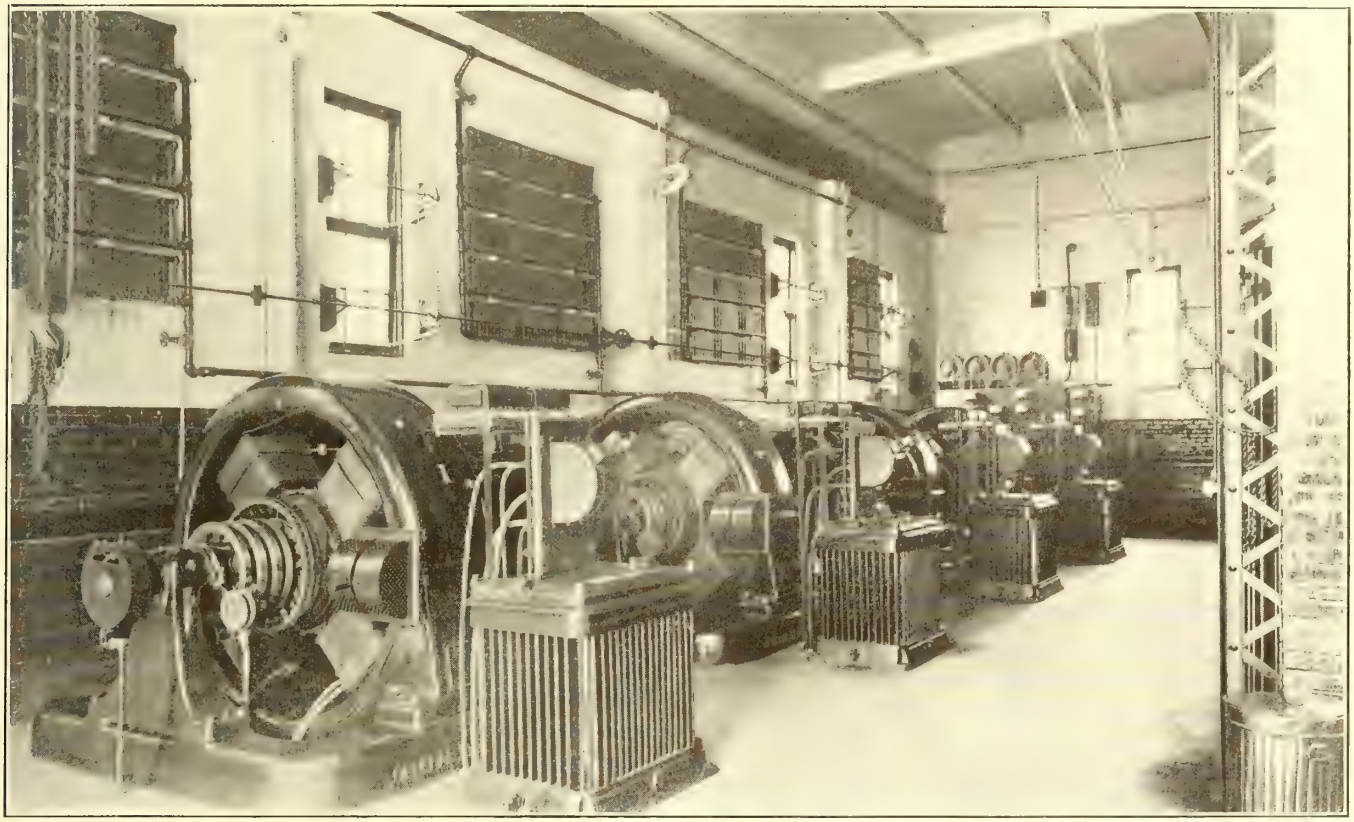
"600-1200-volt switch in small asbestos-lined compartment.

"600-1200-volt dynamotor fuse in small asbestos-lined compartment.

"600-1200-volt air-compressor fuse in small asbestos-lined compartment.

"600-volt headlight fuse.

"600-volt control-circuit fuse.



Milwaukee Interurban Lines—Interior of Burlington 1200-Volt Substation

"16. Resistance Grids.—Located under center of car directly back of contactor box.

"17. Headlight Resistance.—Inclosed in wire casing, directly back of fuse boxes under car.

"18. Air Compressor.—Adjacent to truck, No. 1 end.

"19. Governor for Aair Compressor.—Inclosed in square wooden box under car, located between compressor and fuse boxes.

RULES FOR THE PREVENTION OF TROUBLE ON 600-1200-VOLT D.C. CARS (1111-1125)

"1. As the major portion of the car wiring, control, etc., is at the same voltage as the trolley wire, it is absolutely necessary to have both trolleys off the wire and securely held by the retaining hooks at each end of the car before any of the equipment on the roof, within the car or below the car is inspected or repaired.

"2. When replacing main fuses which are located under car be sure to pull the main switch, and as a second precaution for your safety trip circuit breaker. Do not trust

to others to arrange these precautions. Do so yourself.

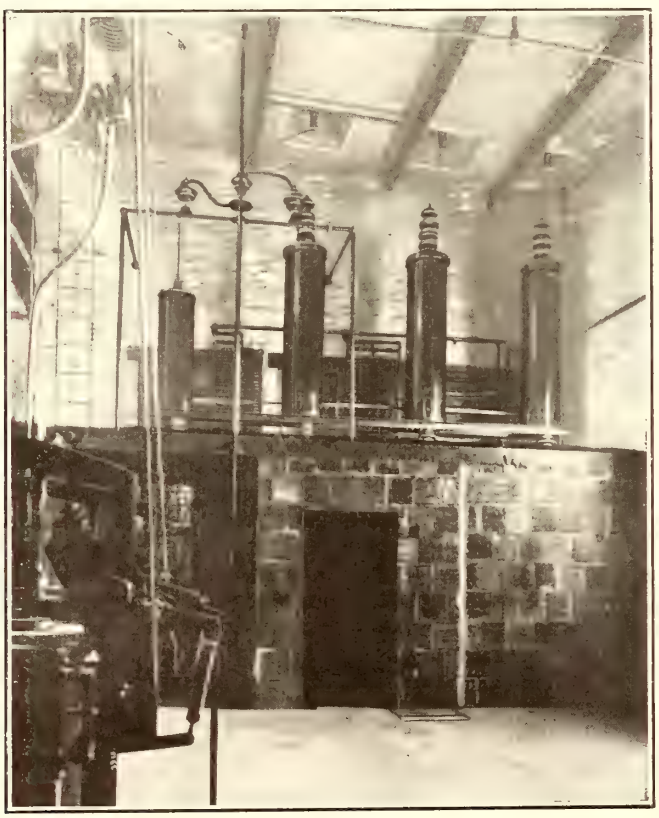
"3. In case the trolley rope breaks near the wheel use the wooden pole provided to pull the trolley down.



Milwaukee Interurban Lines—Watertown Substation and Dam

"4. Don't throw the handle of the controller backward before releasing the trip button.

"5. Don't run over sectional insulators on any portion of the line with power on. To do so will burn up the insulators.



Milwaukee Interurban Lines—Electrolytic Lightning Arresters at Waukesha 1200-Volt Substation

"6. Don't cross over the dead portion of the line between 600-1200 volts at a greater speed than will allow you time enough to throw change-over switch to proper position.

"7. If for any reason the switch cannot be readily thrown bring the car to a stop before the dead section has been overrun; place the switch in the proper position. This can be done by reaching in at the side of the car, if the throwing arrangement has become inoperative, then pull off the dead section, if necessary, by the forward trolley. Under no conditions should this switch be thrown when the trolley is on the wire.

"8. In cases where the reverse handle is thrown to stop the car wait until the car stops before throwing it to forward position again. Not to do so will cause the burning of the reverse fingers.

"9. Always bring the controller handle up slowly, notch by notch, even though the car is going at full speed. The contactors need time to work properly.

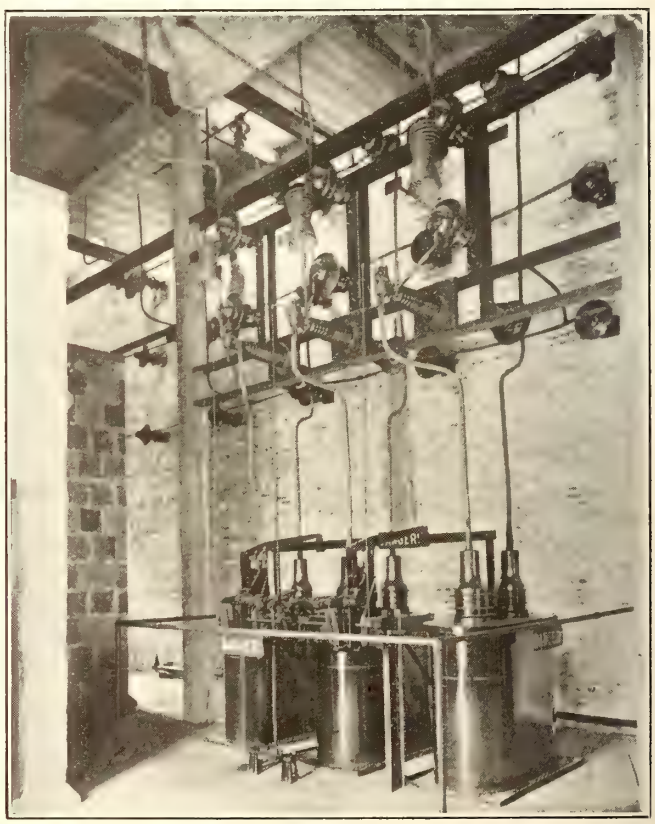
"10. The sixth and tenth points only are running points. Great care should be taken that the intermediate positions are used but momentarily while passing to a running point. This is extremely important and should be closely followed, particularly when trailers are being handled.

"11. If the automatic circuit breaker fails to trip or come up instantly when the trip and reset switch handle is swung to the proper position do not hold it there, but try the switch handle at the other end of the car. If this gives a like result it shows that the trouble is under the car. Provided that nothing can be found out of order, the circuit breaker may be closed by hand.

"12. Motormen must never leave handle of change-over switch from 600 volts to 1200 volts upon rear end of car, but must always see that handle is upon their end in order that passengers cannot meddle with same.

Troubles, Probable Causes and Remedies on 600-1200-Volt D.C. Cars (1111-1125)

"If the car has been operating satisfactorily on 600 volts and is dead when entering 1200 volts, but the air compressor works satisfactorily, this is evidence of control trouble. If



Milwaukee Interurban Lines—High-Tension Switching Equipment in Burlington 1200-Volt Substation

the lights do not burn examine the light fuse and then the dynamotor fuse (be careful to follow precaution given on fuse box cover) or ascertain if dynamotor is running. If so, pull main switch and try contactors; if they do come

up correctly, close main switch and circuit breaker and try contactor slowly up to the third point on the controller, and if car does not move then cut out motor No. 1 and No. 3 and notch up carefully to sixth point, and should car not move then as a second test cut out motor No. 2 and No. 4 and try car.

"If car starts on some point between the first and the sixth it is evidence of a broken grid or poor contact on commutating switch fingers. If, having made these tests, the car does not start, inspect equipment thoroughly for defects, especially main fuses, grids, motor leads, reverse fingers, cut-out fingers, change-over fingers and contactor tips.

"If dynamotor fuse is O. K. and machine refuses to operate move the commutating switch handle back and forth several times to be sure of good contact. (The trolley must be locked down while this is being done.) Provided that this does not clear the trouble examine brushes and lead connections; also small fingers on the commutating switch.

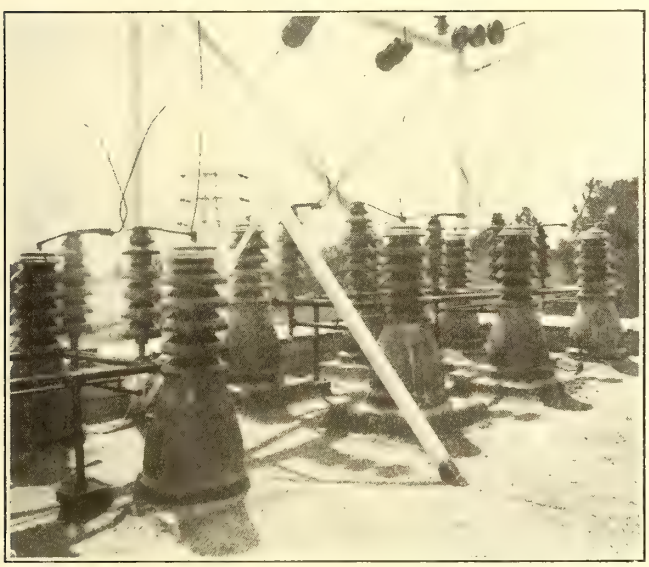
"It is impossible to operate the car on 1200 volts unless the dynamotor is running properly. However, if another motor car is available, the two cars may be coupled together and by plugging in a trailer light connection the disabled car may be operated in the usual manner or the two can be operated simultaneously. It is absolutely necessary, before this is done, to disconnect the dynamotor leads outside of the casing and securely tape the bare ends.

"To replace fuse, open cover of fuse box outward, turn hand screws at end of box and loosen burned fuse and remove same. Insert new fuse and be positively sure that it is properly installed and secured in jaws of clamp, for if not the next time it blows the jaws will be damaged by the arc.

"Should the air governor fail to work properly the only available course to pursue would be to see that the governor is making contact (by the use of wrapping wire, if necessary) and allow the compressor to pump up to normal pressure. Then pull down the trolley pole, open 600-1200-volt switch (following directions on cover) and remove air compressor fuse until pressure has dropped to a point too low for safety, then replace and pump reservoir to pressure again."

TABLE IX.—SUMMARY OF TESTS ON A. C. CARS IN 1908 AND ON D. C. CARS IN 1911.

Run between—	Milwaukee-Waukesha Beach.	Milwaukee-Waukesha Beach	Ratio D.C. Car. to A.C. Car.	Waukesha-Oconomowoc Wye.	Waukesha-Oconomowoc. Beach-	Ratio D.C. Car. to A.C. Car.
Trolley voltage at substation	600 volts d.c.	600 volts d.c.	...	1200 v. d.c.	3300 v. a.c.	...
Type of motor equipment	600 / 100 hp / 1200	600 / 75 hp / 3300		600 / 100 hp / 1200	600 / 75 hp / 3300	
Weight of car complete	80,000 lb.	80,000 lb.	1.	80,000	80,000	1.
Length of run	24. mi	24. mi	1.	13.7	13.35	1.02
Seat miles	1536.	1584.	.97	876.8	881.1	.99
Ton miles	960.	960.	1.	548.	534.	1.02
Running time, total hours	1.262	1.280	.98	.569	.515	1.10
Stop and delay time, hours	.124	.086	1.45	.042	.011	3.90
Running time, net hours	1.138	1.194	.95	.527	.504	1.045
Number of stops	12.5	16.5	.76	7.16	3.	2.38
Average distance between stops, miles	1.92	1.45	1.32	1.93	4.45	.44
Average number passengers	42.	23.	1.83	21.6	10.	2.16
M.p.h., including stop time	19.0	18.75	1.01	24.04	25.95	.93
M.p.h. while running	21.1	20.8	1.01	26.00	26.48	.98
Kw-hours for run	93.15	84.09	1.11	50.8	48.75	1.43
Average kilowatts, including stop time	73.9	65.6	1.13	89.3	94.6	.94
Average kilowatts while running	82.0	70.4	1.16	96.4	96.9	.98
Average horse-power per motor while running	27.5	23.6	1.16	32.3	32.5	.99
Kw-hours per car mile	3.875	3.504	1.11	3.71	3.66	1.02
Watt-hours per ton mile	97.0	87.6	1.11	92.7	91.3	1.04
Kw-hours per seat mile	.061	.053	1.14	.058	.055	1.05



Milwaukee Interurban Lines—Roof Insulators and Discharge Horns at Watertown Substation

COMPARATIVE FIRST COST AND MAINTENANCE OF A.C. AND D.C. CAR EQUIPMENT

The first cost of the cars compares as 100 for a.c., 91.7 for d.c. and 21.5 for trailers.

That the a.c.-d.c. equipment required considerably more maintenance work than does the 1200-600-volt equipment is shown by Table VI, which contains a record of the repair work done on the fifty-two GE-605 single-phase motors from June 1, 1908, to June 1, 1909, and on the sixty GE-207 motors from Jan. 1, 1910, to Jan. 1, 1911. During the latter period only one of the forty GE-205 motors was repaired and that had to be rewound.

TABLE VI.—REPAIR WORK ON A. C. AND D. C. MOTORS.

	A. C. Motors.	D. C. Motors.
Turned commutators	1	1
Burned heads	43	..
New head	..	1
Slotted commutator	7	..
New segments	8	1*
Coils (armature) damaged and replaced	8	..
New bands	13	..
New collars	12	..
Repaired leads	7	1
Hot boxes	2	..
Low bearing	6	..
Turned shafts	10	1
Bent shafts	4	..
Loose pinions	1	..
Neeessary to replace field coils	6	..
Damaged field coils	2	..

*Commutator damaged by foreign body.

OVERHEAD CONSTRUCTION

The catenary trolley construction erected for the single-phase operation is now used for 1200-volt operation with trolley wheels. Part of the trolley wire is No. 00 and part No. 0000. At the time of conversion from 3300-volt a.c. to 1200-volt d.c. aluminum and copper feeders of 250,000-circ. mil and 500,000-circ. mil section were installed to supplement the trolley wire. These feeders tie the substations together electrically. The additional feeder capacity required by the 1200-volt distribution system increased the cost of the overhead system, it is estimated by about 65 per cent.

POWER SUPPLY

The Milwaukee system has a very extensive high-tension network, which is fed from a large steam generating station in Milwaukee and from a hydroelectric station at Kilbourn, 120 miles west from Milwaukee. The steel-tower transmission line from Kilbourn station is on the right-of-way of the Watertown interurban division and supplies the substations of this division.

SUBSTATIONS

The present 1200-volt trolley lines are fed by five rotary-converter substations spaced approximately 25 miles apart, which receive electrical energy at 38,000 volts, three-phase, 25 cycles, and deliver it to the trolley at 1200 volts d.c. All high-tension apparatus is designed for 66,000 volts, to be obtained by changing from star to delta connection. To obtain 1200 volts, two 600-volt rotary converters are operated in series, both being fed by three single-phase transformers. The average load factor for twelve months on these substations is approximately 10 per cent, based on a nineteen-hour operating day, and about 8 per cent based on a twenty-four-hour day, during five hours of which the substations are not operating.

On the different lines the distance between substations averages: Watertown, 26 miles; Burlington, 21 miles, and East Troy, 20.2 miles. The 1200-volt substations have rotary converters as follows: Watertown, four 300-kw; Waukesha Beach, three 500-kw; Burlington, four 300-kw; West Allis, two 500-kw; East Troy, four 300-kw. Thus the total rating of all rotary converters is 6100 kw, which is approximately 33⅓ per cent above the present maximum demand. The third rotary converter at Waukesha Beach substation is used for feeding the adjacent 600-volt line and serves as a spare unit for the 1200-volt set.

The five transformer stations for 3300-volt a.c. operation were equipped each with three 300-kw transformers, except the Waukesha Beach station, which had four 300-kw transformers. The total capacity of the single-phase transformer substations was thus 4800 kw. These stations had a total capacity of approximately 20 per cent more than the average maximum demand.

The single-phase system had considerable advantage over the 1200-volt d.c. system in the cost for substation buildings and equipment. The cost of operating the 1200-volt rotary-converter substations, including labor, supplies and expenses,

Table VII.—Input and Output of Five 1200-Volt Substations, July to December, 1910.

Substation.	Kw-Hour Inpct	Kw-Hour Output.	Efficiency, per Cent.
Watertown	369,352	291,091	78.8
Waukesha Beach	332,452	261,673	78.6
West Allis	402,988	311,606	77.4
East Troy	404,219	238,444	59.0
Burlington	431,254	254,163	59.0

maintenance and equipment and sundries was more than twelve times as much per year as the cost for operating single-phase transformer stations.

Table VII shows the input and output of the five 1200-volt substations during the six months from July, 1910, to December, 1910, inclusive. The figures for input include the line losses.

ENERGY CONSUMPTION OF SINGLE-PHASE CARS WITH TRAILERS

Tests made with the combination a.c.-d.c. cars when operating on 600-volt lines showed the following average results with the 80,000-lb. motor cars and 36,500-lb. trailers earlier described. The results are given in Table VIII.

While operating on the 3300-volt power the a.c.-d.c. type of car and equipment used 3.6 kw-hours per car mile at an average speed of 26 m.p.h. and when hauling one trailer the same motor car consumed 4.8 kw-hours per car mile and ran at an average speed of 21.8 m.p.h. The average energy demand of an a.c. motor car alone was 97 kw and with one trailer the demand was 108 kw. The maximum demand without trailer was 225 kw and with trailer, 257 kw.

Table IX on page 1143 summarizes tests made on a.c. cars in 1908 and on d.c. cars in 1911. The performance of each type of car is shown for the run from the Public Service terminal in Milwaukee to Waukesha Beach on 600-volt d.c. trolley and from Waukesha Beach to Oconomowoc on 3300-volt trolley for the single-phase cars in 1908 and on 1200 volts for the d.c. cars in 1911. This comparison is particularly interesting because the cars were of the same

Table VIII.—Power Consumption and Other Statistics of A. C. Cars on D. C. Circuits.

	Motor Car.	One Motor and One Trailer.	One Motor and Two Trailers
Schedule speed, m. p. h.	18.80	15.86	17.10
Average speed while running	20.00	17.20	18.70
Kw-hours per train mile	3.5	4.42	5.48
Maximum kilowatt	357	362	470
Average kilowatt	66.3	69.8	98.2
Maximum amperes	700	830	820
Average amperes	123	161	216
Minimum volts	175	197	263
Average volts	475	500	492

total weight and operated over the same route. This largely eliminated the effect of grades and curves which might unbalance a comparison made between cars operating on routes with different roadway characteristics. The quantities shown for the 1200-volt d.c. trip between Waukesha Beach and the Oconomowoc wye are the averages of three eastbound and three westbound trips. The other data presented are averages of one eastbound and one westbound trip.

PROPOSED ORDER ON POLES IN NEW YORK

A hearing on the form of a proposed order prepared by the New York Public Service Commission, Second District, requiring all electrical, municipal, telephone, telegraph, railroad and street railroad corporations to stencil and number their poles and structures for carrying overhead wires was held at Albany on Nov. 23. Statements in reference to the proposed order were made by a number of representatives of the various companies. The commission asked those who were present to file suggestions regarding the form of the order by Jan. 1, 1912.

NEW DETROIT ORDINANCE COMPLETED

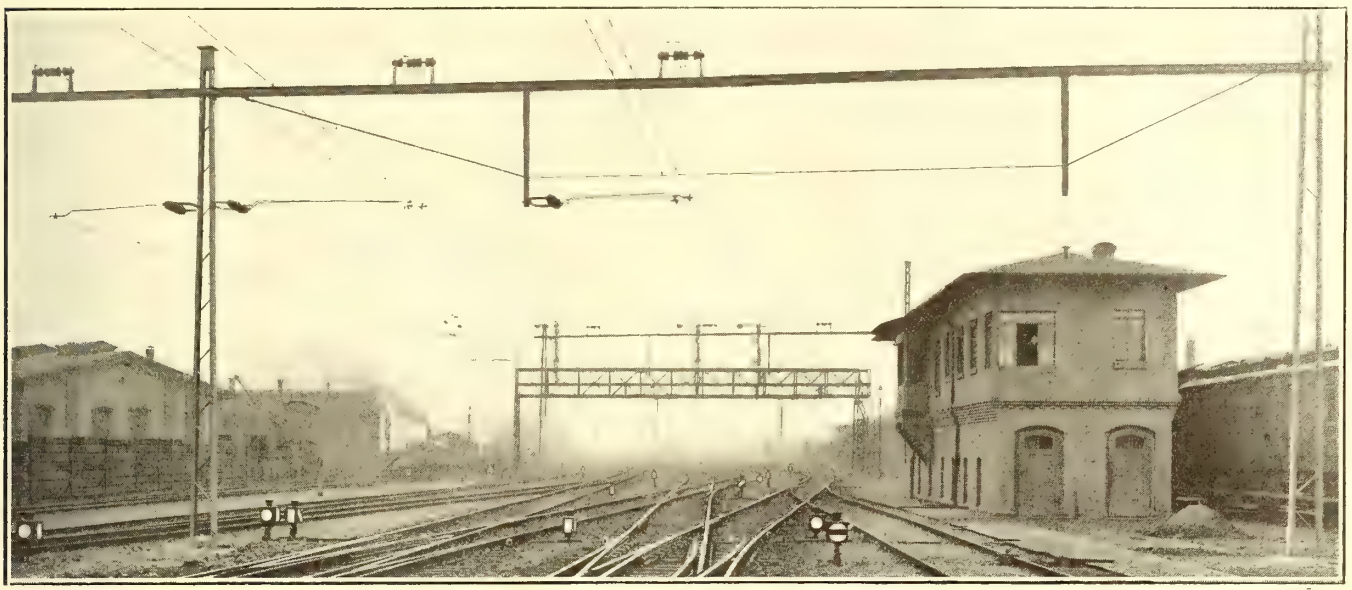
The ordinance based on the preliminary agreement made between officials of the Detroit United Railway and officials of the city of Detroit was presented to the Detroit City Council on the evening of Nov. 28. The ordinance was drafted by Corporation Counsel Hally and places in the form of a franchise contract the features of the agreement described in the issue of the Electric Railway Journal of Oct. 28, 1911, page 950, when the first public announcement of the tentative agreement was made. The ordinance, after action by the City Council, is subject to approval by the voters.

ELECTRIC RAILWAYS IN SWITZERLAND

The following figures have recently been issued by the government of Switzerland showing the number, class and mileage of electric railways in that country, exclusive of electrified trunk lines, for the year ended Dec. 31, 1909. There were thirty 1-meter (39.37-in.) gage, interurban electric lines totaling 330 miles, in addition to a 2-mile line which was operated by steam and electricity. The thirty-two city electric railways were all of 1-meter gage and possessed 241 miles of track, an increase of about 15 miles over the preceding year. Only 1.4 miles were operated by gasoline or horse traction. The city railways carried 111,163,266 passengers and operated 15,695,349 train-miles. Their total earnings, including $27,987 for freight, were $2,736,159 and their total expenses $2,096,541. Electricity was also used to operate six rack railways with 18 miles of track and twenty-four cable railways with 14.26 miles of track.

MULTIPLE CATENARY OF BITTERFELD LINE

In the article on "Power and Transmission Methods of the Prussian-Hessian State Railways," published in the ELECTRIC RAILWAY JOURNAL of Nov. 4, a description was presented of the catenary line installed by the Allgemeine company between Bitterfeld and Raguhn. The accompanying illustrations and following description refer to the multiple catenary construction installed by the Siemens-Schuckert company for the rest of the line, namely, between Raguhn and Dessau. This section is slightly over 9 miles long. The types of the catenary bridges are practically the same as those used for like conditions on the rest of the line, the principal difference being in the design of the brackets or outriggers for the trolley and the auxiliary catenary. The suspension installed comprises a hard-drawn copper trolley wire, a steel auxiliary catenary wire, a main catenary consisting of a seven-strand steel cable and various auxiliary fittings, including means for maintaining constant the tension of the trolley, auxiliary catenary and catenary lines. The auxiliary catenary is attached to the main catenary at intervals of not more than 41 ft. by means of hanger wires which have clamps at each end to permit considerable angular movement. The hangers between the auxiliary catenary and the trolley wire are spaced at distances which do not exceed 20 ft. 6 in. The clamps of these trolley hangers are designed to slide along the auxiliary catenary. The main catenary spans on open track are 246 ft. long, but different spacing is used in the yards according to the conditions. While the several wires of the overhead line are not insulated from each other, the whole system is doubly insulated against ground by carrying the main catenary cable over a spool insulator which is set on a rod having vertically supported insulators at each end. On long bridges this structure for the catenary is carried on the top of the cross girders, but on open track it is carried from the underside of the cross girders. The side sway of the trolley and auxiliary catenary is prevented by outriggers or steady brackets of 1½ insulated tubing, which are attached by yokes to short vertical beams of the catenary bridge. These beams, in turn, are steadied by guy rods. On double track the yokes of these steady brackets are attached back to back below the center of the catenary bridge as illustrated. The trolley wire is

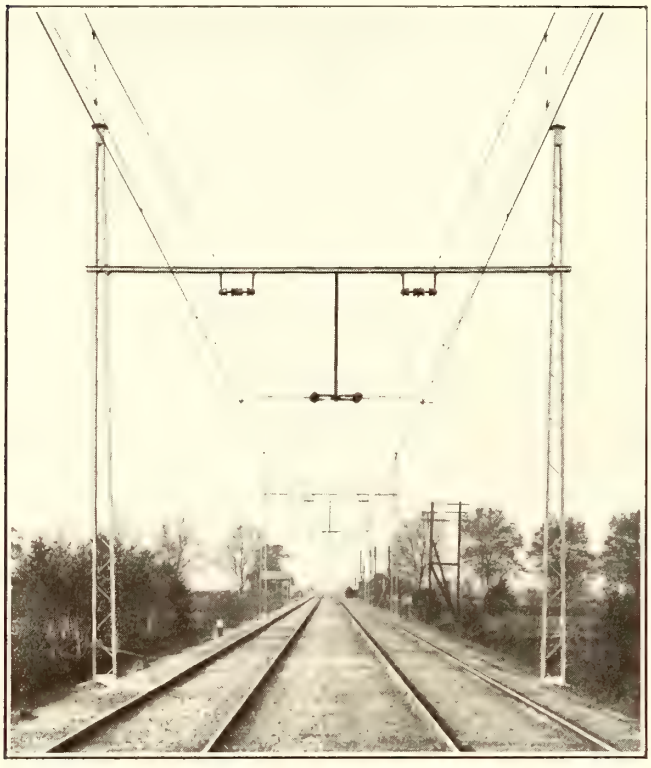


Dessau-Bitterfeld Electric Railway—Catenary Bridge Over a Curve, with Signal Bridge in the Background



Dessau-Bitterfeld Railway—Light Catenary Bridge for Yard Service

staggered throughout. It was necessary to use an extremely wide current collector because at one location the low trolley clearance of 15 ft. above the height of the rails required the trolley wire to be placed 3 ft. 1 in. from the center line of the track. The trolley wire on the other track was also placed offside to the same degree for an equal distance in order to equalize the wear on the collector.



Dessau-Bitterfeld Railway—Two-Track Construction.

The tension take-up devices consist of weights attached to chains which run over sheaves installed on poles or towers about 4600 ft. apart. In addition, the tension of the auxiliary catenary and the main catenary can be separately adjusted at places 984 ft. to 1312 ft. apart. At one place between two tension take-up devices the trolley wire has been rigidly connected to the auxiliary catenary to minimize the tendency of the former to creep in the direction of running. Every track is furnished with horn switches and oil resistances as safety precautions against high-tension and lightning discharges. The main line is divided by section insulators. The siding tracks are dead except when it is necessary to run cars over them, but even then the line is not energized until warning signals have been given to those who are working on the cars and tracks.

ELECTRIC RAILWAY IMPROVEMENTS IN SYDNEY

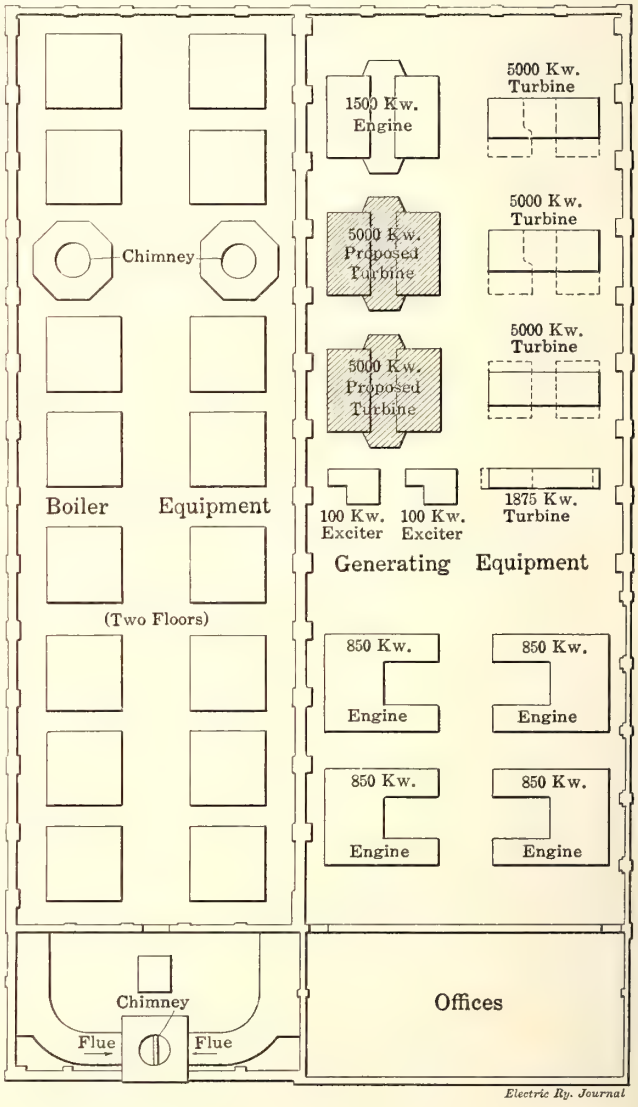
The New South Wales Government Railways and Tramways have recently received bids for the erection of two 5000-kw turbo-alternators to be added to the Ultimo power house at Sydney and three 5000-kw units for the new White Bay power house, also at Sydney, which eventually will contain ten sets of the same size.

The arrangement of the present generating plant at the Ultimo power house is shown in the accompanying drawing. The existing equipment consists of four horizontal condensing engines, direct-connected to generators, having an output of 850 kw each, at 600 volts d.c.; two vertical condensing engines, direct-connected to a 1500-kw alternator; one 1875-kw turbo-alternator; and three 5000-kw turbo-alternators. The a.c. plant furnishes three-phase current at 6600 volts, 25 cycles. There are also two horizontal compound engines, each direct-connected to an exciter, having an output of 100 kw at 125 volts. The boiler house contains forty-eight B. & W. water-tube boilers, of 2842 sq. ft. heating surface each. Twenty-eight of these boilers are fitted with superheaters capable of giving 120 deg. Fahr. superheat. There are also twelve B. & W. boilers, with a heating surface of 3140 sq. ft. each, which are also fitted with superheaters.

The new turbines are intended to operate either at 150-lb. or 200-lb. pressure above atmosphere with 110-deg. superheat. The alternators will be wound for 6600-volt, 25-cycle, three-phase operation. The generating sets will be guaranteed to carry an overload of 25 per cent continuously and an overload of 50 per cent for two hours. The specifications for these turbines were prepared by O. W. Brain, electrical engineer, New South Wales Government Railways and Tramways.

OTHER IMPROVEMENTS

The healthy growth of the tramway system is also indicated by improvements in other departments during the fiscal year ending June 30, 1911. There were added forty-nine eighty-passenger motor cars of the type described in the Electric Railway Journal of July 1, 1911, and two



Ultimo Power Station of the New South Wales Tramways.

ballast trail cars. The track department relaid 9 miles, double-tracked 5 miles and built several loops. The Manly steam tramway was converted to electric traction and work has been commenced on the conversion of another steam line. Two substations, two battery rooms, nineteen waiting rooms and an employees' recreation room have also been provided, besides two new carhouses and enlarged shops.

Proceedings of the Railway Section of the International Electrical Congress at Turin

Among the Subjects Discussed in the Three Days' Session at Turin Were the Relative Merits of Single-Phase, Three-Phase and Direct-Current Traction, Methods of Current Collection and Distribution and a Standard Unit for the Measurement of Acceleration

The International Electrical Congress, held in Turin, Italy, Sept. 10-17 in connection with the international exposition in that city, was divided into eight technical sections as follows: (1) electrical machinery and transformers; (2) construction, central stations, switchboards, distribution; (3) instruments and methods of measurement; (4) electric light and heat; (5) electric traction; (6) telegraphy and telephony; (7) storage batteries, electrochemistry and electro-metallurgy; (8) rates, taxation and legislation.

The United States sent official delegates and this country was well represented at the congress. Dr. Elihu Thomson was president of the International Electrotechnical Commission, which held its meetings the week before the congress. Gano Dunn was one of the honorary vice-presidents of the congress; C. O. Mailloux was president of Section 5; Prof. A. E. Kennelly was president of Section 3, and Dr. C. H. Sharp was vice-president of Section 4. These and other American electrical engineers presented papers either in person or by proxy.

The sessions of the railway section were held on Sept. 12, 13 and 15. The officers of the section, besides the president, C. O. Mailloux, of New York, were: Vice-presidents, L. M. Barnet-Lyon, of The Hague, Holland, and Giuseppe Sartori, of Trieste, Austria; secretaries, Fenzo Fenzi, electrical engineer, Milan, and G. Ponti, Turin.

PROCEEDINGS ON SEPT. 12

The first paper presented was that by Giorgio Calzolari, who is connected with the Italian State Railways. It was entitled "The Application of Single-Phase Traction and Three-Phase Traction on Lines of Heavy Traffic." An abstract follows:

SINGLE-PHASE TRACTION AND THREE-PHASE TRACTION FOR HEAVY ELECTRIC RAILWAYS

By way of introduction Mr. Calzolari summarized expert opinion on this subject, briefly reviewing the conclusions reached by the various commissions that had been appointed to investigate and study it. The preference of the various countries for one system or another, as reflected in their present activities, was then taken up in a brief description of the electric traction systems under construction in different parts of the world. This review placed Germany, Sweden and Austria on one side as favoring single-phase traction for general adoption in heavy railroad work, while Russia, France and Italy were opposed to the standardization of any electric system at the present time, but seemed, if anything, to favor the three-phase system.

In studying the characteristics of the two systems the author divided the problem into two parts, which he stated as follows:

(1) The requirements of railway operation, viz.: (a) Sufficient starting and running torque, (b) ability to maintain schedule time, (c) multiple operation of motor cars or locomotives.

(2) Economy of operation in the following respects: (a) First cost of motive power plant, (b) simplicity and durability of the distribution system, (c) simplicity and durability of the electric equipment, (d) ratio of weight of motor equipment to torque and power, (e) energy consumption at locomotive and at power plant per ton-kilometer, (f) instantaneous power demands, (g) maintenance expense.

Continuing, Mr. Calzolari said that both single-phase and three-phase motors were able to develop sufficient torque and power for heavy railroad work. In regard to schedule speed he looked upon the constant-speed characteristic of the three-phase motor as an advantage, and in comparing the induction motor equipped for either cascade or variable pole operation with the single-phase commutator motor he was of the opinion that because of the variation of power-factor with speed the single-phase motor was more limited in its running speed than was the three-phase motor.

Multiple operation, he said, offered no difficulties with three-phase motors. It had been the general belief that because of their constant speed induction motors could not be operated in multiple on the same train without serious disturbances. However, actual experience had shown that no serious difficulty was experienced when two locomotives were attached to the same train even though one had new and the other worn tires.

The question of first cost depended so extensively upon local conditions that it was difficult to show where either one of the systems had an advantage over the other in this respect. The single-phase distribution system was clearly the simplest, and yet, because of the extremely high tension in the working conductor, the three-phase system with a much lower working emf had a greater factor of safety.

As regards the motor equipment, the induction motor was simpler and more robust than the commutator motor, but both had a very short air gap. Furthermore, the single-phase motor equipment weighed about 40 per cent more than a three-phase equipment for the same service, and because of this difference in weight the energy consumption per ton-kilometer was slightly in favor of the three-phase equipment, and if the three-phase system was operated with regenerative control the energy consumption at the power house was still further reduced. Regenerative control with single-phase motors was now being tried out on the Midi line in the French Pyrenees Mountains.

The three-phase system had an important advantage over the single-phase system in that it permitted the running trains to feed energy back to a starting train, thus relieving the power house of excessive demands. The author estimated that by suitable adjustment of the speed regulators the momentary demands in the power house of a three-phase system could be reduced by more than 30 per cent. On the score of general maintenance, the two systems were considered to be about equal. Summing up, the author thought that the 10,000-volt, 15-cycle to 25-cycle, single-phase system was best adapted to long lines of moderate traffic, especially in cases where hydroelectric energy was developed exclusively for traction purposes, while the 3000-volt, 15-cycle, three-phase system was best adapted to lines carrying heavy traffic, especially where there were heavy grades and long runs.

At the end of the paper the author gave a detailed description of the electrification of the Giovi lines with three-phase equipment.

DISCUSSION ON MR. CALZOLARI'S PAPER

President Mailloux, after expressing his pleasure at seeing so many distinguished specialists and experts in electric

traction present at the meeting, requested Mr. de Kando to give, in French, a brief résumé of the paper, and then to open the discussion. He had selected Mr. de Kando for this purpose on account of his linguistic attainments, and, above all, on account of his high reputation as an authority on the subject, especially as regards three-phase traction, where no one could deny him first place.

Mr. de Kando (Italian Westinghouse Company) referred to the subject of recuperation, which was one of the most important points brought out by Mr. Calzolari in his description of the Giovi line. He had said that there was a saving of 16 per cent secured in fuel consumption by the use of recuperation. This amount was worth saving, especially as the figures showed that the weight of trains ascending the line was about 50 per cent greater than that of the trains descending the line and that a considerable part of the energy recuperated was allowed to be wasted in the safety rheostat at the power station. This latter condition, however, was temporary. Actually, the losses during a run were sufficient to consume the energy recuperated from a standard train (500 metric tons) with two locomotives descending at slow speed. The safety rheostat was necessary only when the train was descending at high speed, that is, at 45 km or 28 miles per hour. The great success of the system of recuperation on the Giovi line had induced the Italian State Railways to permit an increase of speed on trains descending grades, so that now the speed of descending electric trains is about 50 per cent higher than that of steam trains controlled by ordinary braking apparatus. This decision, it should be remembered, was reached by an extremely conservative management.

Another important point, in Mr. de Kando's opinion, was the question of constant speed. Railroad timetables were based on the average maximum speed possible after allowing a sufficient margin between the time of run actually required and the minimum time possible for a given run. Where motors of constant speed were used this margin was always available, independent of the conditions of the track, of the weight of the trains, and of other circumstances which had an effect on a variable speed motor. The result was that steam trains on the Valtellina line operating between Milan and Lecco were frequently late, while the three-phase electric locomotives under equally difficult operating conditions would not only maintain their schedule time but often gain time.

Another point to consider was that of the contact line. He thought that the opponents of the three-phase system exaggerated the objections to a double overhead trolley line system. That on the Giovi Railway had been built by the Italian State Railway Department, whereas those on some other lines, such as the Burgdorf-Thun line, the Valtellina line and the Simplon line, had been built by contractors, and it was obvious that when the overhead line was built by contractors certain desirable features in it might be sacrificed to gain advantages in other parts of the system. On the other hand, the governmental Railway Department had undertaken a class of work which was not at all in its line. Nevertheless, he thought the work had been very well done.

Finally, he spoke about another point mentioned in the report of Mr. Calzolari which he considered important; that was the question of motor capacity in its relation to weight. He thought that Mr. Calzolari, in his report, had unduly favored the single-phase system, because he had compared the most powerful single-phase locomotive with the Giovi three-phase locomotives, which ought not to be considered as a finality as regards weight per horse-power capacity. If the Giovi motors had been supplied with forced ventilation it would have been possible to have increased their capacity considerably. If the weight of an electric locomotive was greater than that absolutely necessary to secure traction it would increase the energy consumption. Thus, if the Giovi locomotives had been only 20 tons heavier the corresponding increased consumption of fuel would have amounted to 1600 tons per year with a ten-minute train service.

Riccardo Vallauri, the next speaker, defended the single-phase system. He said that in those European countries in which railway electrification had actually begun, such as Sweden, Switzerland, Prussia, Austria and on the Midi Railway of France, the decision had been in favor of the single-phase system. The only notable exception was the Italian State Railways, which had commenced electrification at a time when the single-phase system had not been developed, and the Italian State Railways were showing a conservatism toward a change from three-phase which was perhaps only natural in a governmental organization. He thought that the more complicated overhead construction required by the three-phase system was sufficient to condemn it. The motor itself was also less desirable, possessing as it did the characteristics of a shunt machine. It could be used only at three economical speeds, and then only by the use of complicated connections. It had a low power factor and was sensitive to fluctuations in the voltage. It was difficult to connect two locomotives in multiple-unit service. On the other hand, the only objection originally feared in the single-phase system, its use of a commutator, had been found not to be as serious as was at one time thought. Motors of 1000 hp had been in use on the Dessau-Bitterfeld line for some months and had operated at speeds of 120 km (75 miles) per hour without sparking at the commutator. This proved that the commutator was as reliable as any other part of the machine. The single-phase motor was somewhat more expensive to build than the three-phase motor, but this higher cost was more than counterbalanced by the lower cost of distribution in the single-phase system. The greater weight of the single-phase motor was not commercially objectionable because such weight was useful for traction. As regards recuperation, some tests made on the Dessau-Bitterfeld line had shown that single-phase locomotives were capable of recuperation if it should be considered economically desirable. He thought that the conditions on the Giovi line were especially favorable as regards recuperation. Finally, he referred to the plan to equip the Gotthard line with the single-phase system as evidence that it was now accepted by the Swiss commission as more desirable than the three-phase system.

Alfredo Donati, delegate from the Italian State Railways, referred to the fact that Italy had been the pioneer in the use of high voltage. The selection of the three-phase system for the Giovi line was made in 1905, when little had been done with the single-phase system. Moreover, the line seemed particularly adapted for the three-phase system on account of its heavy grades, dense traffic and heavy trains. The government Railway Department was not committed to any one system, and on the Verese line had direct-current locomotives of 1200 kw hauling heavy trains at speeds of 90 km (56 miles) per hour. On the other hand, on the Parma suburban lines it had recommended the single-phase system. He thought that each system had its field. He did not consider the difficulties with two overhead wires, crossings, etc., mentioned by the previous speaker, as a serious objection to the three-phase system when there was sufficient space between the tracks for the erection of supporting structures. As an example of the possibilities of equipping large stations with the three-phase system, he referred to the station at Busalla, which he claimed was the largest electrified station in the world and which had 8 km of electrified tracks. In these yards there were thirty-seven overhead frogs. The station at Pontedecimo was second in size, and also had a great many frogs and crossings on curves and on grade. No difficulties had been experienced in its construction or in its maintenance. It had been installed by the regular rail-

road force within about a month. Many of the seeming difficulties could be eliminated by the use of two collectors on each locomotive. No trouble had been experienced on the Giovi lines with the system of current collection. Whether span construction was used, as on the Valtellina and Giovi lines, or a catenary was employed, as on the Lecco-Calolzio Railway, where a speed is attained with trolleys of 106 km (66 miles) per hour, the service was satisfactory. Unfortunately there was at present no single-phase railroad system that had as difficult a traffic situation as the Giovi Railway, so that it was impossible to establish comparisons or deduce conclusions therefrom.

The traffic on the Giovi line, the speaker said, was practically 500,000 ton-kilometers (340,000 ton-miles) per day and the grades were as high as 3.1 per cent; while the locomotives were as powerful as those on the Lötschberg line, which weighed 27 tons more. With such traffic, the fuel consumption per ton-kilometer, with steam, was 65 grams, whereas with electric traction it was only 29.5 watt-hours measured at the power station. With these figures it was possible to calculate the saving. Mr. Donati did not accept the conclusions of Mr. Vallauri that a wide range of speed for the locomotives was desirable for trunk-line service. He thought that two or three operating speeds were all that were needed to utilize as much as possible the capacity of the line. Neither did the speaker think that a standard electrical system was necessary, as in railway service locomotives would have to be changed at the end of each locomotive run, and it would be desirable to use on each section the type of locomotive best adapted for the special conditions of that section. The demand for a standard electrical system was based upon theoretical rather than upon practical considerations. On the other hand, ability to recuperate power produced a saving not only in the investment and operating expenses of the power station, but also in the wear of rails, tires, brakeshoes, etc. He thought that on the Giovi line the ability to recuperate ought to more than double the life of the rails which, although weighing 50 kg per meter (100 lb. per yard), had not lasted more than three years when steam traction had been used. The saving in brakeshoes and brakes on the locomotives and trains ought to amount to 7000 francs ($1,400) per locomotive per year on the Pontedecimo-Busalla line. In conclusion, the long experience with electric traction of the Italian State Railways had shown the desirability of selecting the electric system for the work to be done rather than blindly to adopt one standard system.

As Mr. Donati had been interrupted a number of times in his talk by advocates of other electrical systems, the president suggested at this point that it would be much better if the discussion should be conducted "in series" and not "in parallel." By this means a better power factor and a higher efficiency would be obtained. He announced that every delegate desiring to speak would have the opportunity, but he should take his turn in doing so. In this connection he urged all speakers to use the French language, if possible, as that language was understood by more of the delegates present than any other language.

Frédéric Koramzay, delegate from Hungary, said that he would like to correct an erroneous statement by Mr. Vallauri, that all of the state railroad managements in the different European countries, with the exception of Italy, had adopted the single-phase system. Hungary has not yet adopted any special system. Personally, he had a very high opinion of the three-phase system for lines of heavy traffic, and in many installations this system would be less expensive in first cost and more economical in operation. In Hungary the first single-phase line at 10,000 volts had recently been put into operation, but he believed that the three-phase system would also be extensively used in that country.

Henry Graftio (Russian State Railways) thought that the section should by no means conclude from the papers which had been read that the single-phase system was the only one to be used for trunk-line service and that the three-phase system and other systems were out of the running. The Western State Railways of France were about to equip all their suburban lines with direct current, and the Russian State Railways intended to select the direct-current, single-phase or three-phase system, according to the conditions, whichever would give the best results. The hope of establishing a single standard electrical system for all of the railways in one country was a mirage. The subject had been discussed at the Berne Congress, and the conclusion had been reached there that electricity could advantageously be substituted for steam traction under two conditions only, viz., first, when the cost of generating current was low (the discussion related principally to the conditions in Bavaria and Austria), and second, when the traffic exceeded a certain density in ton-kilometers per year. These conclusions showed that the installation should be made for reasons of economy, and the claim for a standard system fell to the ground. As a matter of fact, the two instances quoted by the Berne Congress as those in which electric power should be used were those which favored respectively the employment of the three-phase system and of the direct-current system. For these reasons the Berne Congress did not decide in favor of a standard system, nor was such action taken at London at the 1910 meeting of the Institution of Mechanical Engineers, nor in 1911 at the Chicago meeting of the American Institute of Electrical Engineers.

One example of a line in which electric equipment was not justified by economic reasons was the Seebach-Wettingen line in Switzerland, where the electrical equipment had been removed and had been replaced by steam. There were certain conditions in Russia where the introduction of electric traction would be advisable, but there were many other places where the steam locomotive would remain for a long time as the best and most economical form of motive power. With two exceptions, namely, the electric locomotives built for the Kiruna-Richsgreuse Railway by the Siemens Company and for the Lötschberg line by the Oerlikon Company, the ratio of power capacity per ton of weight would be about as follows: Three-phase locomotives from 30 to 33; direct-current locomotives from 20 to 24; single-phase locomotives from 13 to 15. The speaker made the two exceptions mentioned above because figures published in certain technical papers indicated higher values than those given above, amounting to about 20 hp at the periphery of the wheels.

President Mailloux said that the discussion of the relative values of different electrical systems which had taken place at the meeting had interested him greatly and had astonished him a little. In a sense the same sort of discussion had occurred in America, where electrical engineers had carried their arguments along the narrow right-of-way of advocating the superiority of this electrical system or condemning the inferiority of that electrical system rather than keeping to the broad and more advantageous field of discussing the advantages of electricity over steam. He had always believed that these controversies over the relative merits of the different electrical systems had done much to delay the entry of electric traction into its own domain, which still belonged to its one real rival and adversary—steam traction. The battle between systems, it seemed to him, ought to be postponed, and all electrical engineers should unite to convince the advocates and partisans, and often fanatic partisans, of steam power that electric traction was desirable, at least in principle and at least in certain cases. At present the very idea of the introduction of electric traction was scorned by many steam railroads. It was true, as Mr. Graftio had said, that there were many places where the introduction of any system of electric traction could not be justified. On the other hand,

there were a great many places where electric traction would be advantageous and practicable, but unfortunately the fact that specialists in electric traction could not agree as to the system to be used had the effect of discouraging those who were already somewhat incredulous and of making them still more so. The spirit of rivalry had retarded the progress of trunk-line electrification. When the electrical engineers did not agree between themselves railway managers often reached the conclusion that it would be better to wait and not adopt any system.

In Europe the battle of the systems seemed to be between the single-phase system and the three-phase system. Direct-current received scanty if any attention. It seemed practically out of the running. In America, however, the battle of the systems was between the alternating-current and the direct-current system. In fact, the three-phase system and the single-phase system were, so to say, put in the same boat. It ought to be said, however, that the three-phase system was not as well understood in America as in Europe, since there had been but one three-phase installation, that in the Cascade Tunnel of the Great Northern Railroad. When alternating current was mentioned in America in connection with electric traction the words were generally understood to refer to the single-phase system. The speaker did not believe that the direct-current system could be ignored. He himself had recently seen the technical data of the study of a railway system on which high-tension direct current from 1500 volts to 2000 volts was probably to be installed. The line was 1200 km (750 miles) in length, with grades steeper and longer than those of the Giovi line. It had an intense traffic, and conditions which rendered the problem of electrfication extremely difficult. The high-tension direct-current system was far from being dead in America. It had been defended by such distinguished engineers as Potter, Armstrong, Hobart and others, and had an especially valiant champion in Frank J. Sprague, whose name occupied so distinguished a place in the annals of electric traction. More than any other person, perhaps, he deserved the title of the father of the electric railway, and the speaker regretted that Mr. Sprague was not in attendance at the meeting to present the paper which he had been scheduled to read. No one would have been better able than he to discuss the advantages of high-tension direct current. As far as alternating-current traction was concerned, the largest system in America, of course, was that of the New York, New Haven & Hartford Railroad. This line had undeniably been a success and the company was now planning important extensions. The differences in points of view by which the system which had been adopted most extensively and perhaps was held in the highest esteem on one side of the Atlantic—that is, direct-current in America and three-phase in Europe—was the least appreciated on the other side of the Atlantic was undoubtedly to be explained by technical, economical and industrial conditions. For this reason, he believed that the choice of an electric system on any particular line was determined absolutely, in a great many cases, by factors which he calls "peremptory factors," and that in very few cases was there really a choice between two or more systems. He stated that he would discuss this subject more in detail in the paper which he was to present on electrification.

Eugene Eichel, editor *Elektrische Kraftbetriebe und Bahnen*, Berlin, then gave some of the results obtained on German single-phase systems, particularly the Dessau-Bitterfeld line.

Gustave l'Hoest, Belgium Railway Department, said that that country had not adopted any standard system of traction. It was to employ direct current on a suburban section of its line now being equipped on account of the large density of traffic. He asked for information in regard to the indirect economies such as in the wear of brake-shoes, tires, etc., due to recuperation, on the Giovi line.

Dr. Beckmann, Tudor Accumulator Works, Berlin, referred to the system of the Piedmont Traction Company in America, soon to be equipped with the 1500-volt direct-current system. He also said that other lines in America which had originally been equipped with the single-phase system had been changed to the direct-current system, among them the Washington, Baltimore & Annapolis Railway, the Watertown branch of the Milwaukee Electric Railway & Light Company and the Warren & Jamestown Street Railway. He quoted some comparative figures which had been published as to the cost of maintenance and operation of the Washington, Baltimore & Annapolis Railroad before and after the change. These figures were favorable to direct-current traction. He also quoted some comparative figures of cost of operation on the Hamburg-Ohlsdorf Railway, equipped with alternating current, and the Berlin-Grosse-Lichterfelde, equipped with direct current. These figures were also favorable to direct-current traction.

Dr. Behn-Eschenburg, manager of the Oerlikon Company, Switzerland, explained the reason for the discontinuance of electric traction on the Seebach-Wettingen line. It was purely an experimental line and the purpose of its equipment was to determine the merits of the different systems, so that a proper selection could be made for the much longer Berne-Lötschberg-Simplon Railway, and the line had been selected for this test simply because it was near the works of the Oerlikon Company. The purpose of its equipment having passed, the electrical equipment was removed.

Mr. Eichel, Berlin, called attention to the fact that the same plan had been followed in Prussia, where the Spindlersfeld line had been equipped temporarily so that proper decision could be reached for the Altona-Ohlsdorf line. Continuing, the speaker said that local conditions had largely dictated the conversion of the Washington, Baltimore & Annapolis Railroad from alternating current to direct current. At the Washington terminal the cars had to use a 500-volt double-trolley system and also run over an underground conduit system. At the Baltimore terminal the cars had to use a single-trolley system. Moreover, the cars were very heavy for the conduit line in Washington. These were the controlling factors, and the best interests of the section of the line between the termini had to be subordinated to the controlling factors at the termini. The writer then quoted some statistics of the Spokane & Inland Empire single-phase railway and a statement which appeared in the Electric Railway Journal for July 15 from the management of the Chicago, Lake Shore & South Bend Railway favorable to single-phase traction. He also thought that from the announced plans for extension of the New York, New Haven & Hartford Railroad it was well satisfied with its single-phase equipment.

Mr. de Kando said that the successful single-phase roads of America which Mr. Eichel had mentioned had all been constructed by one company, the Westinghouse company, but that this company frankly recognized in its publications that each of the three systems under discussion had its field. It recommended among others the three-phase system for lines with steep grades, and, although the Westinghouse company had done a larger amount of single-phase work than any other manufacturing company, it was not a fanatic in regard to the single-phase system.

In concluding the session the president referred to the importance in the industrial world of railway transportation and said that he did not believe that any sections of the congress were considering more important subjects than the railway section. Railroad transportation had played a large part in the industrial and financial revolution which has taken place in the nineteenth century. The twentieth century had the mission to be better than its predecessor, and electric traction would be to it without doubt as useful in this purpose as steam traction was to the nineteenth century. Therefore, in contributing to the progress of

electric traction members of the congress might feel that they were contributing to the progress of civilization itself. It was for that reason that the president attached such great importance to the work of the railroad section of the Turin congress.

SESSION OF SEPT. 13

At the opening of the session on Sept. 13 the president announced that there would be no meeting on Sept. 14, as that day had been reserved for a visit to Genoa to enable the delegates in attendance at the congress to inspect the Giovi three-phase railway. He urged all to participate in this visit. He then announced that G. l'Hoest, manager electrical department of Railways, Posts & Telegraphs of Belgium, would present a paper on working conductors for electric railways. The president added that the paper would be especially interesting because of the studies which the Belgian govenment had recently been making on the subject of electric traction. An abstract of Mr. l'Hoest's paper follows:

WORKING CONDUCTORS FOR ELECTRIC RAILROADS

The author first described the different types of third-rail construction and said that the under-running third-rail was superior to the over-running third-rail as regards safety and was less susceptible to difficulties from snow and sleet, but it was more objectionable from the standpoint of car clearances and hence could not be used on many of the lines in England. He then described the various types of catenary overhead construction in general use and the double-trolley systems employed by various three-phase lines.

In conclusion the author stated that the third-rail could be advantageously employed for direct-current traction where there were not too many switches and crossings. Its use was especially desirable in and around cities where the unsightliness of the overhead construction was objectionable, and also on account of its non-interference with the clear view of the signals. On the other hand, high-tension systems were limited entirely to overhead distribution. With present-day methods no especial difficulty was encountered in handling emfs as high as could be utilized in the motors, and this with little or no fear of danger due to mechanical failure of any part of the line. However, the author noted a tendency on the part of some constructors to relax and take chances by employing a lower factor of safety.

COMMITTEE ON UNIT OF ACCELERATION

Before proceeding with the discussion on Mr. l'Hoest's paper, the president, with the authority of the delegates, appointed a committee to consider the subject of the proper unit to be used for measuring acceleration, a topic which was on the program of the section. This subject had been referred to the Turin congress from the Marseilles congress in 1908. The committee appointed was Messrs. Barnet-Lyon, chairman; Sartori-Leguez, l'Hoest and de Kando.

The paper on single-phase traction motors by Dr. W. Kummer was then read by Mr. Barnet-Lyon. An abstract of this paper follows:

SINGLE-PHASE TRACTION MOTORS

Beginning with a statement that practically all electrical manufacturers who had earnestly studied the subject had adopted the single-phase system for heavy railroad work, Dr. Kummer said that the motors now in use could be divided into three classes, namely, series, repulsion, and repulsion with armature excitation. He then proceeded to give some of the mechanical characteristics of these motors.

Experience with steam traction had taught railroad engineers to require a driving motor that could develop a variety of torques at a given speed, so as to be able to maintain the operating schedule; also one that could develop large torques at low speeds and low torques at high speeds, so as to secure good economy of energy in starting and in operation over a road having grades. These characteristics were fulfilled to a marked degree by all the single-phase motors. The speaker also said that single-phase motors could be arranged for regenerative control and that an actual installation of this kind was under construction now on one of the lines of the Chemins de fer du Midi, France. However, although regenerative control introduced certain complications in the equipment, it was quite feasible to utilize the motors for transforming the energy of retardation into electric energy which could be dissipated in a rheostat. This system was in use on the Valle-Maggia road.

Following these general characteristics, the author took up in detail the relation between the motor torque and some of the principal dimensions. Using the following symbols, he gave formulas for the interrelations of the various quantities as represented by modern practice:

Normal motor torque in meter-kilograms	$= D$
Rotor diameter	$= D_a$
Gear ratio	$= U$
Drawbar pull per driving axle in kilograms	$= Z$
Diameter of the driving wheel	$= D_r$
Speed in kilometers per hour	$= V$

$D_a = 2.42 \times \sqrt{D}$, for gearless motors

$D_a = 3.30 \times \sqrt{D}$, for geared motors.

Assuming one motor for each driving axle:

$$\left.\begin{aligned} Z &= 82.4 \frac{D_a}{D_r} \sqrt{D} \\ V &= 67.9 \frac{D_r}{D_a} \end{aligned}\right\} \text{for gearless motors.}$$

$$\left.\begin{aligned} Z &= 30.3\, U \sqrt{D} \\ V &= 135.8 \frac{1}{U} \frac{D_a}{D_r} \end{aligned}\right\} \text{for geared motors.}$$

D_r being assumed as 0.5 for geared motors.

With reference to weights and torque, denoting:

Car weight in kilogram	$= G$
Car torque in motor-kilograms	$= D_f$
Adhesion weight in kilograms	$= G_a$
Adhesion coefficient	$= \mu$
Diameter of drives	$= D_r$

Thus

$$\frac{G}{D_f} = \frac{G_a}{\mu} \times \frac{1}{\mu} \times \frac{2}{D_r}$$

which for single-phase motors was about

$$\frac{G}{D_f} = 11 \text{ to } 13$$

DISCUSSION ON PAPERS OF MESSRS. L'HOEST AND KUMMER

Mr. Eichel, Berlin, pointed out that there was a difference in the method of supporting the lower working conductor on the overhead line of the New York, New Haven & Hartford Railroad and in the Siemens system. In the latter the working conductor was attached to the supporting wire by loops so that it might move vertically and longitudinally, and it was held in tension by weights located at convenient points from 1 km to 2 km apart. It was thus very flexible and no difficulty had been experienced in taking current from it by trains at speeds of 130 km (81 miles) per hour on the Dessau-Bitterfeld line. On the New York, New Haven & Hartford Railroad construction the contact wire was of steel and was attached rigidly to the former contact wire by clamps spaced midway between the points of suspension of the old contact wire. The German railway authorities had adopted as standard trolley-wire voltage 15,000 volts at 15 cycles.

In the Cascade Tunnel 6000-volt line trolley wheels were used, as the speed was low, but for high-speed lines the writer thought the bow or pantograph collector more desirable.

President Mailloux then gave a short sketch of the characteristic features of the overhead catenary line of the London, Brighton & South Coast Railway, which he had recently inspected in company with Mr. Dawson, the engineer of that line. He was struck with the flexibility of the construction and the simple and extremely ingenious manner with which Mr. Dawson had secured this result. The double V type of hangers was employed, and the working conductor was supported under an upper parallel conductor by droppers which allowed a flexible movement. These droppers were in two links with an opening between the links of 25 mm (1 in.) so as to permit a vertical movement of 50 mm (2 in.). Such an arrangement also allowed considerable lateral movement in the device. It could be seen to rise and fall with the passage of the pantograph.

C. Palestrino (Italy) believed that better results could be obtained by the induction type of single-phase railway motor like the Winter-Eichberg, Latour, etc., or by a repulsion motor like the Déri, than with the ordinary series type. It had been generally admitted that the single-phase system was more desirable than either the three-phase or the continuous current so far as distribution was concerned, and the critical point in the single-phase series system was the commutator of the motor. Such a motor as he advocated largely overcame commutator troubles. Tests had been made of the Déri type of repulsion motor with rotating brush holders on the Stanstadt-Engelberg line by Brown, Boveri & Company, and also on the Waldegg-Lucerne line of the Seethalbahn, in which a trolley voltage of 5000 was applied directly to the motors. During the past year this motor had also been used on the Martigny-Orsières line and on the city tramways of Parma.

F. Fenzi, consulting engineer, Milan, compared the results on the direct-current Milan-Verese line and on the three-phase Valtellina Railway, both of which had been in operation for about ten years. The power consumption on the former, which was a direct-current line, was 45 watt-hours per ton mile and on the latter, which was a three-phase line, was 40 watt-hours per ton mile, although the grades and speeds on the latter line are much greater. He then entered into a comparison of the relative merits of the different systems and concluded by expressing his opinion that the selection of direct current, with a third-rail at 700 volts, would have been justified for the Simplon and Giovi lines, and that for longer railways he believed that there was a great future for the high-tension direct current. At a voltage of, say, 2500 the substations could be located from 40 km to 50 km (25 to 30 miles) apart.

President Mailloux then, according to the program for that day, presented a paper in French on "The Industrial Definition and Measurement of Train Acceleration." This paper was a résumé of a more extended paper presented under the same name by him at the Marseilles congress in 1908. A condensed and paraphrased English translation of the Marseilles paper was published in the Electric Railway Journal of Feb. 13, 1909, pages 277-279, with an editorial comment on page 270 of the same issue. The Turin paper recapitulates briefly the arguments and the mathematical reasoning and demonstrations which had been previously set forth more fully in the Marseilles paper in favor and in defense of the American practice of measuring and expressing train acceleration in miles per hour per second, and in advocacy of the general adoption of the kilometer (or mile, or verst) per hour per second as an industrial unit of acceleration. The paper shows that such a unit is more rational, logical and scientific, in theory, and especially more intelligible and more convenient, for practical use, than the units used hitherto in Europe, i. e., meters (or feet) per second per second.

This communication and the question of the adoption of the proposed new unit was referred to the special committee already mentioned as appointed for that purpose.

SESSION OF SEPT. 15.

The first order of business on Sept. 15 was the report of the committee on the adoption of an "industrial" unit for train acceleration, as proposed by Mr. Mailloux. The special committee made a unanimous report in favor of the proposed unit, and reported resolutions which were unanimously adopted by the section as a body. The committee was also instructed to submit its report and the resolutions to the entire congress for formal adoption. (This was done at the plenary meeting of the congress, on the following day, when the report and the resolutions were unanimously adopted by the congress as a body.) The resolutions were as follows:

"Whereas it is the universal practice on railways to express the speed of trains in kilometers per hour (or in miles or versts per hour); and

"Whereas it is logical to use this measure of speed in expressing the acceleration per second; and

"Whereas this definition of acceleration of trains is the one employed in America and its use is spreading in other countries; and

"Whereas this proposition has already received favorable action at the International Congress of Electricity held at Marseilles in 1908; now, therefore, be it

"Resolved, (1) That the acceleration of trains ought to be expressed in kilometers per hour per second (or in miles or in versts per hour per second); and,

"Resolved, (2) That the International Electrotechnical Commission be informed of this formal action."

APPLICATION OF ELECTRICITY TO SUBMARINE BOATS

A paper by A. Bezzi on the application of electricity to submarine boats was then presented. In the absence of Mr. Bezzi this paper was read by proxy. As the paper did not relate to railway work, an abstract of the paper and discussion will not be published in this journal.

A paper on the subject of high-voltage direct-current electric traction was then presented by Guglielmo Gyáros. An abstract follows:

HIGH-TENSION DIRECT-CURRENT TRACTION

In this paper Mr. Gyáros claimed that, thanks to the commutating-pole motor, the direct-current system had taken a new lease of life and would in all probability become the standard system for interurban and suburban lines. He said that the commutating pole had greatly increased the possibilities of commutation and experience had shown that high-tension motor brushes had an average life of between 200,000 and 1,500,000 motor kilometers (125,000 and 812,500 miles) and that the motors would stand a momentary overload of 100 per cent without flashing over. He said that the ordinary motor would flash over with an overload of 50 per cent. As an example of the comparative cost of maintenance of single-phase and high-tension direct-current systems the author gave figures taken from the results of the Washington-Baltimore-Annapolis Railway, as published in a recent issue of this paper.

It was the author's opinion that the single-phase system could compete with the high-tension direct-current system only when very high tensions were used in the working conductor. For example, he considered that on the basis of equal economy a 1000-volt direct-current system was equivalent to a 5000-volt or 6000-volt alternating-current system, and that a 2500-volt or 3000-volt direct-current system was equivalent to a 15,000-volt alternating-current system.

There were now either in operation or under construction in Hungary five important high-tension direct-current lines, and the author gave data regarding each one. These systems used the pantograph trolley with an aluminum con-

tact bow. When employed in catenary construction these bows had an average life of about 20,000 car kilometers, but in ordinary trolley construction their life is much shorter. Three of these five lines are owned by one railway company and aggregate in length about 160 km (100 miles). The rolling stock on these three lines will consist of twelve electric locomotives each with two 150-hp motors, eighty-eight passenger cars and eighty-eight trail cars. The voltage to be used is 1000. Of the other two one is 17.5 km (11 miles) in length and will use 1200 volts; the other is a narrow-gage line 58.3 km (36.4 miles) in length.

PEREMPTORY FACTORS IN TRUNK LINE ELECTRIFICATION

Vice-president Barnet-Lyon then took the chair to allow President Mailloux to read a paper on trunk-line electrification. An abstract of this paper will be published in a later issue.

DISCUSSION ON THE PAPERS OF MESSRS. MAILLOUX AND GYÀROS

Dr. Beckman, Berlin, referred to the discussion which had taken place on Wednesday in regard to the conversion of the Washington, Baltimore & Annapolis Railway from single-phase to direct-current. He pointed out that one reason for the change was the excessive weight of the cars, which it had been impossible materially to reduce. Hobart had calculated the weight of single-phase equipment as 40 kg (88 lb.) per horsepower and of direct current as only 20 kg (44 lb.) per horse-power. It was evident that this greater weight would require a higher maintenance charge not only for the rolling stock but also for the track. He maintained that during the past two years there had been a reaction against the single-phase system in America, and that a much greater mileage had been constructed in that country during these years with direct current than with alternating current.

Mr. Eichel did not think such a conclusion should be drawn from statistics which he had received from America.

E. Scheichl, of Vienna, contributed some facts in regard to the three-wire system of the Krizik Company at Prague. This company in 1903 had built a three-wire (2 x 750-volt) electric railway between Tabor and Bechyn and several years later had conducted some tests in Vienna on a three-wire (2 x 1500-volt) system. Although these experiments did not result in the adoption of this system of current distribution for the Vienna system, the speaker believed that the use of a 2500-volt to 3000-volt direct current was practicable and that in many cases it would be more desirable than a 15,000-volt single-phase system.

FINAL CONCLUSIONS

After some further general discussion, Mr. Donati presented the following resolution to summarize the sense of the section:

"As it is desirable in every case to employ that system of electric traction which is best fitted to the financial and technical conditions of the railway to be equipped, this section does not consider it possible to give preference to any single system of electric traction for all railway lines."

Mr. l'Hoest, in seconding this resolution, remarked that it was in accord with the resolution which had been adopted at the International Railway Congress at Berne in 1910.

The resolution was then adopted unanimously by the section. A vote of thanks was then extended to the president, vice-presidents and secretary for their services to the session.

The meeting then adjourned.

Under a new agreement Prussia accords its consent to Hamburg extending its railway to Farmsen, Volksdorf, Wohldorf and Gross Hansdorf. Hamburg gives its assent to the extension by Prussia of the Blankenese-Ohlsdorf single-phase railway, which will open up communication with the towns in the Alster Valley, and, later, an extension to Segeberg will be made.

REPORT ON ELECTROLYSIS IN CHICAGO

In the annual report of the commissioner of public works of Chicago, just issued, is printed a report by Ray Palmer, consulting engineer, on the electrolytic damage to various underground metallic structures in different parts of the city caused by stray return current from the surface and elevated lines. Surveys made during August and September, 1911, showed excessive stray current in the neighborhood of the Illinois Street and Hill Avenue substations of the Chicago Railways Company, the Forty-second Street substation of the Chicago City Railways and at many points along the elevated railway structures. At one point on the Northwestern elevated structure readings of 30 volts negative to 12 volts positive were taken between the rails and a water pipe under the surface of the street. Near the power house of the Metropolitan West Side elevated road the water pipes were positive to the elevated structure and negative to the street-car rails.

The damage is said to include underground water pipes, lead cable sheaths, the metal in structural-steel buildings and the structural steel in bridges used by street railways in crossing the Chicago River. As a remedy for the conditions existing on the elevated structure the report recommends that large negative return cables should be placed on the structure and should be connected to the track rails at intervals of 300 ft. At the present time no return cables are used on any of the elevated structures in the city.

The existing city ordinance relating to the prevention of electrolysis is as follows:

"Ground return wires must be so arranged that the difference of potential between the grounded dynamo terminal and any point on the return circuit will not exceed 25 volts. The positive pole of the dynamo must be connected to the trolley line, and whenever pipes or other underground metal work are found to be electrically positive to the rails or surrounding earth, they must be connected by conductors arranged so as to prevent a flow of current from the pipes into the ground."

The report recommends that the ordinance be amended to read as follows:

"Ground return wire and rail circuits must be of such current-carrying capacity and so arranged that the difference of potential between any two points on the return will not exceed the limit of 12 volts. The railway companies must so equip their return current systems with insulated pilot wire circuits and voltmeters that an indicating reading may be obtained at any time showing the difference of potential between the negative busbars in each station and the extreme limits of the return circuit in the corresponding feeding district.

"The railway companies must protect all metallic work from electrolysis by the proper installation of a system equal to or better than a pipe and cable sheath drainage system consisting of insulated copper wires, pipe straps, ammeters, etc., which limits the maximum amperes drained from this subsurface metallic work to 10 per cent of the total output of the station."

To operate within the limits required by such an amended ordinance the railway companies would be compelled to make one or more of the following improvements:

(a) Reconstruct all defective track work and install additional return feeders.

(b) Install a negative booster system.

(c) Install a return-current drainage system.

(d) Reduce the size of the power plant and substation feeding districts.

(e) Insulate the railway return circuits.

The report states that the most practical and efficient method of reducing electrolytic damage would be the installation of a pipe-drainage system. It recommends that all track bonds should be repaired and maintained in an efficient condition.

Determination of the Proper Bases for Rates and Fares*

A Consideration of This Important Subject by a Committee of Leading Members of the American Electric Railway Association, Collectively and Individually—Increased Fares Will Afford Encouragement to Capital to Provide for Development

BY FRANK R. FORD, CHAIRMAN; C. S. SERGEANT, WM. J. CLARK, H. G. BRADLEE, JAMES F. SHAW AND E. C. FOSTER

REPORT OF THE FULL COMMITTEE

Your committee appointed last winter has given consideration to the subject of determining the proper basis for rates and fares and would beg to report as follows:

First: We believe that there exists a widespread need of increased fares, if adequate service is to be furnished and capital secured to provide for the continued growth of the industry.

Second: Practicable methods of securing increased rates for city systems may be summarized by the following:

(a) Retain present 5-cent flat rate, but eliminate free transfers.

(b) Retain 5-cent rate, but charge 1 cent, 2 cents or 3 cents extra for transfers.

(c) Increase 5-cent rate with (1) free transfer, or (2) without transfers, or (3) with extra charge for transfers.

(d) Establish straight European zone system without transfers.

(e) Establish zone system where a 5-cent fare is charged from outlying districts to central business district, but require a 10-cent fare from outlying district across business district to opposite outlying district, eliminating such transfers as would defeat this object.

(f) Establish zone system with 5-cent fare for a large central zone and 3 cents extra fare, making 8 cents through fare to smaller outlying zone, either with (1) free transfers or (2) a charge for transfers; the local fare in outlying zone being 5 cents.

From analogy with the past history of the industry and from practical considerations, we would in general recommend method (f) as the most feasible of the above plans. Local conditions, topography and customs are, however, different in each city, and would modify any general conclusions on this subject.

Third: Various members of this committee have prepared memoranda on this problem which are hereto appended.

Fourth: We believe that this subject is deserving of the most careful study by the association and we therefore recommend that this report and accompanying memoranda be printed and circulated among the members of the association, and that a full discussion thereof be had at its next winter's meeting.

MEMORANDUM BY FRANK R. FORD, OF FORD, BACON & DAVIS, NEW YORK

To start with it is assumed that necessity exists for a general increase in rates of fare of American electric railways if their continued growth is to be assured. Some railways are obtaining a reasonable return with present rates of fare, others are near the danger line and soon will not earn a reasonable return if the present tendency of increased expenses of operation be continued, while a third class consists of the roads whose present rates are insufficient to pay the entire cost of operation, taxes and a reasonable return to the owners. It is absolutely certain that with the extension of the city limits, with the present 5-cent fare in force, a point will be reached at which the operation at this rate will not be profitable. A proper basis for determining rates and fares should be obtained, even if rates are to be lowered instead of raised.

FACTORS WHICH GOVERN TRANSPORTATION RATES

Apart from the local conditions there are a number of general factors which have governed the fixing of transportation rates which may be summarized in Table I.

Table I.—Factors Which Govern Transformation Rates.

	Basis.	Unit.	Example.
1.	Distance	(a) Passenger mile	Steam railroad, interurban electric railway, etc.
		(b) Passenger zone	European street railway.
		(c) Vehicle mile	Taxicab.
2.	Wholesaling	(a) Round trip	Steam railroad, electric railway, ferry, etc.
		(b) 50-trip	Do.
		(c) Strip tickets	Do.
		(d) Commutation	Do.
3.	Age or size of passenger	(a) Half fare	Steam railroad, street railway, etc.
		(b) Free (infants in arms)	Do.
4	Occupation of passengers	(a) School ticket	Steam railroad, street railway, etc.
		(b) Workmen's ticket	Do.
5.	Class of equipment or accommodation.	(a) 1st class, 2nd class, 3rd class.	European railroad, steamship.
		(b) Parlor car, sleeping car, etc.	Steam railroad, interurban railway, etc.
		(c) Double street car fare.	Auto bus.
6.	Elapsed time	(a) Passenger hour	Cab.
		(b) Chartered car hour	Electric railway.
7.	Time of day	(a) Double fare for owl service.	Street railway.
		(b) Reduced fare for rush hour service.	Do.
8.	Day of week	(a) Reduced rate for holidays, excursions, etc.	Steam railroads, steamboats, etc.
		(b) Double fare for Saturdays, Sundays and holidays.	Street railway (Coney Island fare).
9.	Speed	(a) Limited train (or ship) fare.	Steam railroad, steamship.
		(b) Passenger pool differential.	Do.
10.	Discontinuity of passage	(a) One cent transfer	Street railway.
		(b) Three cent exchange.	Do.
11.	Direction of passage	(a) Reduced rate in light direction.	Street railway (Coney Island fare).
12.	Weight	(a) Ton mile for freight.	Steam railroad.
13.	Space	(a) Cubic foot for freight.	Steamship.
14.	Readiness to serve.	(a) Initial charge	Taxicab.
15.	Expense at service terminals	(a) Present national boundary, weight.	Postal service.
		(b) Message zone	Telephone, telegraph.
		(c) Passenger within present and future city limits.	Street railway.
16.	Free	(a) Transfers	Street railway.
		(b) Dead heads	Steam railroad, street railway, etc.

It will be seen that a large number of factors govern the matter of transportation rates, but practically all of them are disregarded in the standard 5-cent flat rate adopted in most American cities. The simple nature of this standard appealed to the railway managers in the early days of the industry when in many cases, for the short rides involved, the nickel fare apparently represented more than a reasonable return, especially when the cost of maintenance and renewals of the property was overlooked.

If the rate of street railway fares were placed on a measured basis and such measure took into account a number of different factors as above, the rate of fare would become more of the complex problem which it has assumed in the electric lighting industry and would be subject to reasonable analysis for special classes of service.

*An abstract of the report of the committee presented to the American Electric Railway Association, Atlantic City, N. J., Oct. 9 to 13, 1911. The report consists in large part of memoranda furnished by the individual members of the committee, and these constitute the part of the report which has not been available for publication until now. The brief report of the entire committee was published in the issue of the Electric Railway Journal of Oct. 13, 1911, and is republished here for the convenience of readers.

CHANGES OF RATES SUBJECT TO GOVERNMENTAL APPROVAL

Assuming that a raise of rates is necessary in any given situation, our problem is to determine the most reasonable basis as affecting the riding public, the operations of the company and the general growth of the municipality. Generally, the present rates are the result of charter or franchise agreement, so that consent of state or municipality is required, insuring a treatment of the subject that must be fair to the public; consequently, a broad and just solution is the only one admissible. The fact that in many states the amendment of street railway rates is subject to the approval, or in some cases to the initiative, of a public service commission renders the problem certain of careful treatment and much good should result from impartial consideration by these bodies.

In this connection it is of interest to note that the amended public service commission law of New York State provides that "whenever (the) commission shall be of opinion * * * that the maximum rates, fares or charges chargeable by any * * * street railroad corporation are insufficient to yield reasonable compensation for the service rendered, and are unjust and unreasonable, the commission shall with due regard among other things to a reasonable average return upon capital actually expended and to the necessity of making reservation out of income for surplus and contingencies, determine the just and reasonable rates, fares and charges * * *."

FORMER CHANGES OF RATES

One approach to the problem is from the standpoint of the past history of the business in this country and of the methods employed in this and other countries for changing rates.

The position of the electric railways of this country today is somewhat similar to that of the horse car lines during the latter part of the civil war. Congress had imposed an internal revenue tax of one-eighth of a cent per passenger. The price of supplies and labor had increased considerably when measured by the depreciated value of the 5-cent fare and many companies raised their rates from 5 to 6 cents to cover the increased cost. In order to give legal status to the raising of the rates above the 5-cent fare provided in the charter of many of these companies, Congress in March, 1865, enacted a law permitting them to raise the rates 1 cent.

EARLY RATES IN NEW YORK CITY

An examination of the records of some of the horse railroads at the time shows that in New York City before 1860 5 cents was practically the universal fare in the center of the city, although a 6-cent or higher rate was charged where the lines extended beyond the built-up section. By 1886, however, five of the New York lines were charging 6 cents per passenger (some of these, however, having a 5-cent "way" rate) and three charged 5 cents plus the United States tax of one-eighth cent. In 1870, practically all of the lines were running upon the 6-cent basis. By 1874, however, presumably due to a return to normal conditions, practically all of them had reduced the fare to 5 cents except the Fourth Avenue line, which charged 6 cents "way" and 8 cents "through," and the Second and Third Avenue lines, which charged 5 cents "way" and 6 cents "through." By 1880 all of the lines had reduced to 5 cents except the Fourth Avenue line.

EARLY RATES IN BROOKLYN

The Brooklyn City Railroad began operation in 1854, charging a uniform rate of 5 cents within the city limits, which rate was raised in 1865 to 6 cents and continued until 1870; from 1866 to 1875, however, tickets in bundles of twenty were sold for $1. In 1875 the rate was reduced to 5 cents and as the extensions of the various roads beyond the city limits were made, the through rate was placed at 8 and 10 cents inclusive for distances beyond the old city limits. Shortly after electrification in 1895 the universal rate of 5 cents became effective.

EARLY RATES IN BOSTON

In Boston practically all of the city railroads were incorporated on the basis of a 5-cent fare. About 1866 the rate was increased to 6 cents for reasons already given, which remained until the 5-cent fare was restored in the eighties. For the longer rides there also existed rates of 8, 10, 15, 18 and 20 cents for various distances. After the roads were electrified and consolidated, however, the universal rate was fixed at 5 cents.

EARLY RATES IN PHILADELPHIA

In Philadelphia the situation is well stated by R. W. Speirs in his book "The Street Railway System of Philadelphia":

"The railway companies in Philadelphia began in 1858 with a 5-cent fare. The usual omnibus rate had been 6 cents, and the railways promised a reduction, urging this as one reason for establishing the new system of transportation. At first, exchange tickets were sold for 6 cents, but in 1860 the exchange rate was made 7 cents by the Board of Railway Presidents. Although there were many attempts to change the rate, the single fare remained at 5 cents until 1864, when it was increased to 6 cents. The reason given for the increase was the 'high price of horse feed.'

"Shortly after this the single fare was increased to 7 cents, sixteen tickets being offered for $1, and exchange tickets for nine cents each. These rates were maintained for about twelve years, and then, in January, 1877, the fare was reduced to 6 cents, the price of exchange tickets remaining 9 cents. Four years later, in 1881, the general demand for cheaper transportation induced Councils to attach to a grant of extension privileges, requested by the Lombard and South Streets Company, the condition of a 5-cent fare. As other companies applied for privileges Councils took similar action in many cases, and later the General Assembly made the 5-cent fare rate a condition of using cable traction. Thus by means of the pressure brought to bear by the public a uniform 5-cent rate was attained in 1887."

Another statement regarding the rates prior to the civil war, was that in 1857, due to the financial panic, wages for unskilled labor were 60 cents per day, which enabled street railroad companies to make money at the 5-cent fare. War times, however, made men scarce and material higher, which forced the companies to increase the fare to 6 cents.

An interesting fact in connection with the Philadelphia situation at that time was that the board of presidents of the various independent street car lines met periodically at the exchange, Third and Dock Streets, working in combination to control all of the companies for mutual benefit. It is stated that 6 cents was barely enough to cover expenses and they were compelled to raise the rate to 7 and 9 cents including an exchange ticket.

In securing the above information a number of old horse railroad men were consulted and records of the period examined.

FIXED RATES UNREASONABLE FOR LONG PERIODS

The general result of the above situation was that the original 5-cent fare was raised to 6 cents and kept at that point until economic factors reduced the cost of operation, either by change of the financial standard, by consolidation of the companies, or by use of mechanical or electrical traction, and made possible a reduction again to 5 cents. It is apparent that by the nature of things rates depend upon economic factors the same as charges for any other commodity, and no fixed rate can be a reasonable one over a long period, being either too high or too low at practically all times.

PRESENT AMERICAN STREET RAILWAY RATES

In May, 1908, the American Street & Interurban Railway Association published information concerning city fares collected from 117 different city railway companies. With

one exception all companies reported a 5-cent cash fare for adults, the excepted company having a 6-cent fare. Practically all of the companies carried small children free at ages less than from two to five years; for older children of maximum ages from five to fourteen years, a reduced rate of from 2½ to 3 cents was charged. One hundred of these companies reported the use of tickets for adults, as shown in Table II.

Table II.—Rates of City Ticket Fares.

	Average Rate, Cents.
5 companies sold 8 for 25 cents	3.13
2 sold 7 for 25 cents	3.57
22 sold tickets for 4 cents	4.00
36 sold 6 for 25 cents	4.16
4 sold 23 for $1	4.35
9 sold 22 for $1	4.55
4 sold 21 for $1	4.76
33 sold 5-cent tickets.	

Thirty-nine companies sold school tickets ranging from 2.5 cents to 4 cents; seven sold workmen's tickets ranging from 3 cents to 4.16 cents; nine sold postmen's tickets from 2.5 cents to 5 cents, and fifteen sold miscellaneous commutation and school tickets from 2 cents to 4.33 cents.

The mathematical average of the above reduced rates for all tickets, adult, children and school, is 3.53 cents.

One hundred and eight of these companies issue transfers and six do not, seventy-one companies being obligated to issue free transfers by statutory requirement and thirty-three issuing them voluntarily.

Seventy-nine companies gave information showing that their average rates of fare excluding transfers varied from 5 cents to 3.60 cents, and including transfers from 4.81 cents to 2.86 cents. The mathematical average of the rates for these companies is 4.70 cents excluding transfers and 3.89 cents including transfers.

THE CLEVELAND RATE

At the present time the rate of fare of 3 cents of the Cleveland Railway is probably the lowest of any large American city. An additional 1 cent is collected for a transfer on all lines in the city limits, which is returned to the passenger upon presentation of his transfer ticket upon the car of the second line within the time fixed by the company's regulations. Free transfers are issued to and from crosstown lines. A 5-cent fare is charged to various suburbs directly adjoining the city with the same transfer privileges as within the city, although to two of the suburbs eleven tickets are sold for 50 cents and in some cases free transfers are given on these fares.

It is the contention of many that the receipts from these rates of fare are not sufficient to provide Cleveland with good service, to provide adequate maintenance and to leave a sufficient surplus for accruing depreciation and contingencies, nor is the return and surplus sufficiently large to attract capital which should be spent for the extension and development of the property.

SIX-CENT FARES IN MASSACHUSETTS

A number of street railways in smaller cities surrounding Boston have within the past few years raised their rates of fare with the consent of the Board of Railroad Commissioners from 5 cents to 6 cents, in some cases selling tickets at a lower rate.

THE EFFECT OF INSUFFICIENT RATES UPON THE INDUSTRY

A summary of the American situation regarding rates of fare is that, excepting a few minor companies charging 6 cents and one charging 3 cents, the 5-cent cash fare is universal. Due to the reduced rate tickets and to the large use of transfers, the average rate of fare received per passenger, including transfers, is between 3 and 4 cents. With the longer rides, the increasing cost of labor and material, the increasing use of transfers and the enlarged requirements as to service and facilities imposed by public service authorities and by public opinion, the return in the street railway industry at fixed rates of fare, which have been largely reduced in the average, has in general become insufficient to provide the margin necessary for conservative financing. In consequence of this condition the development of the electric railway is practically at a standstill. This effect is also shown in the unfavorable attitude assumed by the banking world to this class of property resulting in the higher rates of interest required in the sale of these securities.

Table III, quoted from the McGraw Electric Railway Manual of 1911, indicates, notwithstanding some discrepancies in the comparisons, the stoppage of development of this industry during the past three or four years, due to the conditions above enumerated.

Table III.—Reports of American Street Railways.

Year	Total Number of Companies.	Miles of Track.	Total Number of Cars.	Total Capitalization Outstanding.
1910	1,279	40,088	89,601	$4,682,106,217
1909	1,253	40,490	91,153	4,652,735,633
1908	1,252	40,247	89,216	4,557,136,143
1907	1,238	38,812	86,204	4,123,834,598
1906	1,164	36,932	84,732	3,765,317,875
1905	1,081	32,517	79,751	3,368,937,062
1904	993	29,548	75,904	3,217,091,971
1903	1,187	29,212	76,186	3,102,390,946
1902	1,110	25,592	70,006	2,794,338,251
1901	1,062	22,063	68,777	2,410,670,135

So much for the flat rate of fare and the early extravagant development of the street railway industry due to its fancied safeguarded profit.

EUROPEAN STREET RAILWAY RATES

On the other hand, the situation of European street railways, where the zone system is largely in force, forms an interesting comparison. A representative discussion of this subject as relating to the English tramways took place in the recent Edinburgh congress of the Tramways & Light Railways Association, from the reports of which the following extracts are given:

"The further demands which are being made by various sections of the public for cheaper fares are becoming one of the most serious problems in connection with management. Demands for preferential treatment to the working classes during certain hours of the day are continually being pressed forward, and when such concessions are granted to laborers and artisans, various other classes of the community, such as shop assistants, clerks, etc., demand similar treatment, and certainly with some show of reason, because, if it be conceded to another class who are equally well paid for their labor, their requests cannot reasonably be refused. In addition, there are agitations for free traveling for certain sections of the community, with the result that about 60 per cent of the traveling public plead for preferential treatment, or free traveling, on many systems where the general rate of fares is already so exceedingly low that if a close examination were made it would be found that they are not in as sound a position as could be desired. It has now been discovered by certain undertakings which have given preferential treatment on a large scale to various sections of the public that a tremendous loss has resulted on that portion of their business, seriously endangering these undertakings."

The statement was made that " * * * tramways and light railways, apart from the preferential treatment referred to, are carrying the general public at very little more than half the fares charged by railway companies. Those responsible should, therefore, consider very carefully the financial result which a haphazard method of charging fares may bring about, especially having regard to the difficulty of some struggling undertakings which are, unfortunately, operated at a loss, and others whose income merely covers operating and other expenses, or yields but very small returns to the proprietors. Railway companies have found it necessary to fix some general basis of charging, with the result that 1 penny per mile third class appears to have been adopted as their standard. If a similar basis could be adopted by tramways and light railway proprietors—not necessarily 1 penny per mile—there is no doubt that good would result, and the public would not, on the whole, suffer, as it is surely beyond cavil that the passenger

should pay for his ride just as he expects to pay for any other service rendered to him."

A further quotation from these reports follows:

"Making every reasonable allowance for the extraordinary difficulty of obtaining authority to construct, and afterwards for the over-regulation which has much increased both the first cost and the working expenses, it still remains a fact that England should be the most eligible country in the world for electric traction schemes, and that many miles of suitable route have only been left unconstructed because of some commercial weakness in the general position which prevents the earning of an adequate profit even in districts that were the first choice of traction engineers when electrical working was originally introduced.

"Judged by the standard of comparable industrial securities, the average return on the many millions invested by municipalities and companies in urban, suburban and interurban transit is painfully, and even dangerously, insufficient—dangerously because sooner or later the public usefulness of the service must suffer in one way or another if the revenue is insufficient to provide amply for efficient upkeep and interest on the investment. The financial health of electric traction in Great Britain is below par, while in every other country such services are steadily prosperous, and additional capital is readily forthcoming for extensions and new schemes. With, on the average, almost unparalleled density of traffic, the British lines are peculiarly unprofitable, as compared with foreign and colonial systems, and after making adjustments in respect to the varying monetary conditions, cost of labor and so forth it will be found that this department of public service is throughout the United Kingdom inadequately remunerated by the average fares obtained.

FARES TOO LOW

"The simple fact is that the price of traveling is too low, and it is solely because of underpayment by the passenger that practically the whole list of electric traction undertakings in this country consists of insufficiently remunerated systems—from tube railways down to small tramways and light railways. There are exceptions, it is true, but these are to be found in densely populated cities where the exceptionally heavy traffic obscures the inadequate profit per passenger. Apart from the London County Council, which has not been able to obtain satisfactory financial results, tramways in the very largest towns earn a substantial balance over the interest on loan capital. Depreciation is seldom adequately allowed, but it may nevertheless be admitted that these few undertakings are genuinely prosperous for the time being. Unfortunately, such towns, with their volume of traffic so enormous that the chief difficulty is to find accommodation for the swarm of passengers, have been allowed to set up a false and uneconomical standard, both as regards fares and as regards wages. Out of their overwhelming revenues they have made repeated concessions to the passengers and the employees, with results immediately costly to themselves and with threatening future consequences, but with an effect almost at once disastrous to the greater number of less favorably situated undertakings, which have been driven by local agitation or municipal ambition to accept the most prosperous systems as their model in regard to the fares, wages, hours of work, holidays and other like matters. There are thus large numbers of municipal tramways, started in the expectation of relief of rates, which are engaged in a constant struggle against insolvency. The lot of the company systems with no ratepayers to fall back upon is naturally harder still. When joint stock companies have gained a footing in the larger towns, as in Bristol, Dublin, Birmingham, and the metropolitan districts of Middlesex, they have undoubtedly demonstrated that there is no failing in respect of good commercial management to explain the poor results which characterize public service companies in this country. But, for the most part, it is the places with the thinner traffic that have been left to companies; and here, after accepting troublesome and expensive conditions, which might still have been supported without the sacrifice of a moderate dividend, they have been subjected to further pressure from municipal authorities, trade unions and public opinion, so that there has been a general encroachment upon those figures of fares and working expenses which formed the basis of the estimates when the service was undertaken. On the one hand, it has become a popular craze to demand so many miles for a penny; and, on the other hand, tramways' employees are granted privileged conditions, much better than are justified by the nature of the work and by the treatment of similar men employed in other occupations of at least equal responsibility.

CAPITAL DISCOURAGED

"The total effect therefore is that electric traction does not pay, and that no further development is likely to occur. Remedial legislation will not overcome this economic obstacle. Nothing but the establishment of a fair price for the service will unloose the purse-strings of the investor, who sees that so many millions already sunk are left without an adequate dividend by this fatal policy of cost price traction.

"In the period of horse tramways—about 1878—the average receipts per tramway passenger were 1.84 pence; in 1898, when there were numerous steam lines, they were 1.23 pence; in 1910, with almost universal electric working, they were only 1.09 pence. Meanwhile, there has been continuous agitation, largely successful, tending to more expensive labor conditions; and constructional maintenance and renewals are also more costly."

These and other summaries of the situation abroad point out the fact that, with the increasing cost of service, rates for privately operated companies are generally insufficient. In many cases of municipal operation, flat rates of fare have been adopted which, under pressure of public opinion, bid fair to wreck these enterprises.

On the other hand, under the new franchises recently granted to the various tramways in Paris, the former flat fares with transfers have been superseded by a zone system of fares and the abolition of transfers, which are said to have improved the average rate.

RATE BASED ON THE PASSENGER MILE UNIT

Disregarding all except the most important factors bearing upon the problem of transportation rates, street railway rates are dependent primarily upon the length of passenger ride, or the average length of ride of all passengers times the total number of passengers, which equals the number of passenger miles carried. The rate is also dependent largely upon the time of service, whether at rush hours or not, as this most largely affects the amount of investment required for equipment.

TABLE IV.—AMERICAN STEAM RAILROAD PASSENGER STATISTICS.

Year.	Journey per Average Passenger. (Miles).	Revenue per Passenger Mile. (Cents).	Revenue per Passenger (Cents).
1909	32.85	1.928	63.053
1908	32.86	1.937	63.394
1907	31.72	2.014	64.600
1906	31.54	2.003	63.895
1905	32.21	1.962	63.985
1904	30.64	2.006	61.746
1903	30.10	2.006	60.720
1902	30.30	1.986	60.494
1901	28.58	2.013	57.941
1900	27.80	2.003	56.459
1899	27.89	1.978	55.816
1898	26.70	1.973	53.237
1897	25.04	2.022	51.163
1896	25.50	2.019	52.078

The passenger mile unit is one used by the steam railroads of this country and is practically the basis upon which passenger rates are fixed. Table IV, showing the average rate of fare of all the steam railroads of the United States, from the Interstate Commerce Commission reports, indicates that, despite fluctuations, this rate has been kept at practically 2 cents per passenger mile, resulting with the increasing length of ride in increased receipts per passenger.

As to American street railways, it has already been pointed out that, with the diminishing rate of fare and with the increasing length of ride per passenger at the flat rate, the rates per passenger mile, which vary directly as the fare and inversely as the length of ride, are rapidly diminishing.

METHODS OF DETERMINING STREET RAILWAY PASSENGER MILEAGE

On the steam railroad, due to the use of tickets, an accurate count can be kept of the passenger mileage. With street railways, however, no record is kept of the length of ride of each passenger, and, consequently, the average length of ride and number of passenger miles carried can only be approximated.

STREET COUNTS

The first comprehensive approximation of street railway passenger mileage of a large city of which I am aware was made by my firm on the lines of the Chicago City Railway in 1905. At that time, with the use of a large force of observers placed at all important traffic points and generally over the system at points of from one-half to one mile apart, a sufficient record was obtained for twenty-four hours of passengers on all cars to permit, by the use of certain formulas and with a separation of the transfers collected, a close approximation of the average length of ride, number of passenger miles carried, the average rate of fare per passenger mile and the approximate point of origin and destination of each portion of the traffic. A similar count with observers stationed on the street was made on the lines of the Pittsburgh Railways in 1906.

RIDING COUNTS

From the results of these two counts of passengers we determined that a sufficiently accurate result could be obtained at less expense by stationing observers on the cars instead of on the street. By this method one or two checkers were placed on an average of every tenth car, and an exact record was made of the number of passengers on and off at each stop. This gave the exact passenger mileage for the cars counted and by applying the average figures obtained to the total passengers riding for the period a very close approximation could be obtained. Counts of this character were made on certain of the lines of New York City by my firm and a plan devised by which similar results could be periodically obtained for the entire city system. We later in 1908 made such a count of the lines of the Toledo Railways & Light Company. These counts showed average lengths of ride varying from 2.5 to 4 miles per revenue passenger and average receipts of from 1.26 cents to 1.84 cents per passenger mile.

A similar count made upon the lines of the Philadelphia Rapid Transit Company by my firm in 1910 showed that the average length of ride for the surface system was 2.71 miles per revenue passenger with equivalent receipts of 1.75 cents per passenger mile. On the subway-elevated system the ride was 3.96 miles per revenue passenger with receipts of 1.27 cents per passenger mile.

TRAFFIC DATA OBTAINABLE FOR EACH LINE

From observations of passengers on and off at each stop in connection with an analysis of the transfers there may be determined for each line and for the system the following:

(a) Average length of ride per passenger.
(b) Number of passenger miles carried.
(c) Average rate of fare per passenger mile.
(d) Proportion of passengers originating and delivered in each section.
(e) Approximate destination and routes of passengers.
(f) True average of number of passengers per car for a given period. (Indicating density of traffic.)

The results of such a count differentiate sharply the profitable and unprofitable lines of the system. While the receipts per passenger mile on any line may be comparatively small the density of traffic may be such that the operating expenses per passenger mile are correspondingly small and the operation of the line may be profitable even with a large average haul. From the results of these observations it is possible to calculate the distance on any line for which a 5-cent ride may be furnished at a profit, or the distance equivalent to the cost of service per passenger represented by operating expenses and a fair return upon the investment. If the average ride per passenger is within this distance the line can be operated profitably. If the average ride upon such a line is greater than this distance it is possible to calculate from the observations the distance it would be necessary to shorten the fare limit on the line to produce an average ride that would be profitable.

In other words, this method renders it possible to determine the length of profitable 5-cent fare limit on each line within a close approximation. The operating expenses per passenger mile for each line are obtained by dividing the operating expenses per car mile of the system by the true average number of passengers per car of that line, which is one of the results obtained from the count, thus correcting the expenses for density of travel. Such a division of operating expenses, while not strictly accurate as between the lines on account of variation of speed, weight and type of cars, furnishes within limits an accurate comparison, and, if desired, allowance can be made for these factors. A similar calculation can be made for fixed charges or return on investment. Division of the cash receipts per passenger for each line by the summation of the operating expenses per passenger mile plus the fixed charges or return on investment per passenger mile for the same line gives the length of ride for which the cost of service equals the receipts.

Many other instructive results may be obtained from these passenger counts. With the increasing use of platform doors and prepayment of fares, periodical checks of traffic can be made in this manner at a moderate expense, resulting in valuable information for the scientific treatment of the rate question.

TIME OF SERVICE

As an instructive comment on the unreasonableness of reducing fares at rush hours by the sale of workmen's and other reduced tickets, the estimate which we have made of the annual income account of the extra motor car operated only at rush hours on the Philadelphia surface system, shown in Table V, will be of interest:

Table V.—Estimated Annual Income of the Extra Rush-Hour Motor Car.

Receipts	$2,664
Operating expenses	1,884
Net earnings	$780
Interest, taxes and depreciation (10 per cent on cars, power plant, car houses and shops)	1,500
Loss (exclusive of fixed charges on track and line)	$720

It should be noted that in this case the receipts are the result of 5-cent cash fares with 3-cent exchange tickets and a limited number of free transfers. This estimate indicates that the greater the number of passengers carried at the 5-cent fare rate by these extra cars the larger would be the loss of the operating company. A reduced rate during the rush hours would enlarge this loss by the amount of such reduction. While it is probably not possible to improve this condition by increasing the rates during rush hours, the large cost of this extra service should be kept in view in the fixing of rates.

SUMMARY OF RECOMMENDATIONS

From a study of the methods used in the past history of this industry and from observation of traffic conditions and rates upon city electric railways, the following method would seem to be a practical solution of the problem:

1. Determine for each line the distance for which the cost of service per passenger mile on that line (including a reasonable return on investment) equals the receipts per passenger mile at 5 cents per passenger, or the base rate of fare.

2. For each line fix the limit of a central 5-cent fare zone

which will result in an average length of ride equal to this distance.

3. Adjust the limits of this central zone to correspond with a practicable point for each line. In order to work out a practical system some lines will, of course, show a loss in operation which must be balanced by an excess profit on others.

4. For the portions of lines outside of this central zone, construct outlying 3-cent fare zones, calculating the distance on each line for which such additional fare would equal the total cost of service. It is believed that the rate of fare for outlying zones, as a matter of expediency, should be less than 5 cents and also that 1 cent or 2 cents additional fare for such zones would not usually be desirable on account of the inconvenience of the additional payment for the short ride involved. The local ride in such outlying zones would cost 5 cents.

5. With regard to transfers both in the central and outlying zones, either free transfers or transfers at a charge equal to the outlying zone fare could be used, dependent on the area to which it was found desirable to extend the zone limits. In other words, a charge of 3 cents for a transfer would permit of considerably larger zone areas than with free transfers, and in many cases the charge for transfers would eliminate the necessity of establishing the outlying zone. On the other hand, the use of free transfers has tended to stimulate traffic and with a high enough rate of fare has some desirable features. If 3-cent tickets for outlying zone fares and 3-cent transfers were used, the same ticket might be interchangeable.

The comprehensive nature of this problem and the difficulties in the way of working out a schedule of rates for any electric railway system will be appreciated when it is considered that there are required the following determinations:

1. The amount of investment or value of the property upon which a return must be earned unless the amount of outstanding securities be used.

2. The reasonable rate of return on this capital value unless the interest and dividend rates of outstanding securities be used.

3. Division between lines on the passenger mile basis of operating expenses and return on investment, with corrections where desirable for speed and weight of cars and for segregation of physical property.

4. For each line the length of average ride which will yield a reasonable profit at 5 cents or other base rate of fare, fixing zone limits for each line corresponding with the maximum ride allowable for these fares.

MEMORANDUM BY C. S. SERGEANT, VICE-PRESIDENT BOSTON ELEVATED RAILWAY

In reply to your favors of Aug. 5 and Sept. 18 upon the subject of rates and fares for transportation of passengers, it seems to me that your schedule of the factors which govern transportation rates, or should govern them, is a very complete outline of the elements which should be taken into account. I can only give a few general views on the subject.

I am quite sure that street railway managers in general do not need to be convinced that existing rates for transportation of passengers, both in this country and abroad, are much too low to give a revenue sufficient to perform a suitable service, properly to maintain the property and provide for depreciation and for reasonable rates of interest upon the investment.

The practical question seems to be whether or not existing charter limitations or public opinion will prevent, and will continue to prevent, raising the fares to meet this situation. No general answer can be given because in some instances it may be possible to raise fares and in others not.

Again, it is by no means certain that an increase in the rates would in all cases yield more gross or net revenue. If the general public is to be convinced of the necessity for an increase of rates it must be shown the factors of expenditure, capitalization and other elements which enter into the problem. To do this would be difficult, perhaps not always feasible. But in view of the tendency to publicity accounting as required by laws governing public service corporations, increasingly prevalent, may we not expect that it will be more easy in the future than it has been in the past to demonstrate that a business is being done at a loss or a margin too small adequately to provide for depreciation and maintenance?

RESULTS OF THE COMPANY CONCERNED

Assuming an instance in which this is possible, will it not then depend upon the particular case and the showing of net income and maintenance which can be made by the company concerned rather than on the general principles which ought to govern the transportation rates, irrespective of the ultimate net results to the company?

It is frequently stated that in city passenger business, even in a dense population, a rate of at least 1½ cents per passenger mile should be received to provide proper compensation. Steam railroads, which make suburban season tickets or commutation rates frequently not exceeding 7½ mills to 9 mills per passenger mile, are prone to state that there is no profit in the business, and there is little doubt that this statement can be substantiated. They do, however, often make lower season ticket rates for the longer distances, which is precisely contrary to the principle we would seek to establish of obtaining additions to our rates for the longer rides. In their case the theory underlying this rate is presumably that of inducing, by a special rate to the bread-winner of the family, a family to settle at a point where they will contribute materially in the course of a year by the local fares which the family other than bread-winner pay to the revenue of the railroad.

OVERLAPPING ZONES

This principle is not capable of application to street railway fares, and changes, it would seem, ought to be made rather in the direction of providing overlapping zones than by disturbing the unit of fare.

Obviously the first and simplest method of increasing fares would be to secure the abandonment of free transfers, which, where the fare is universal, have no logical basis for existence. Straight zone limits, however, always create a feeling of hardship in persons living near the boundary line of the zone who may have to pay two fares for a very short ride.

It has occurred to me that in many cities, if there could be a central zone surrounded by an outer zone, so far as riding across the central zone is concerned, two fares might be properly demanded; that is to say, the suburban rider by such an increase would pay no more than he now does for his daily ride, but if he wished to ride from one outer zone across the central zone into another outer zone he would have to pay another fare. Such a system would tend to restrict the length of the rides and perhaps to bring them within the scope of a 5-cent fare.

MEMORANDUM BY WM. J. CLARK, MANAGER OF TRACTION DEPARTMENT, GENERAL ELECTRIC COMPANY

So far as I can ascertain, no successful application has ever been made to Parliament by a tramway or local transportation company in the United Kingdom to increase its passenger rates above those fixed in its charter.

During recent years there have been some changes in passenger fares on certain of the London Underground or similar railways, which, in a few cases, have resulted in obtaining increased rates on certain classes of traffic, but these have all been within the maximum prescribed by the charters of these companies.

If I recollect aright, the District Underground—so called—whose Parliamentary grants provided for three classes of passenger traffic with fares charged according to distance,

has, since its electrification, succeeded in securing a slight advance in fares for certain classes of its traffic. At any rate, this was done by the Metropolitan Railway Company in 1907, I think dating from July 1 of that year. The Metropolitan is the system which operates the Inner Circle —so called—in conjunction with the District Underground. The chairman of this company, at its annual meeting held about Feb. 1, 1908, remarked thereon as follows:

"The effect of the small advance in fares made in co-operation with the other London companies has increased the average receipts per passenger from 1.377 pence to 1.407 pence; that is, for the total number carried."

The Central London Railway commenced its operations in 1900 with a flat fare for ordinary passengers of 2 pence. Dating from July 1, 1907, this rate was increased on long-haul passengers to 3 pence. It should perhaps be explained that the average rate received per passenger on this system is affected by the issuing of workmen's tickets, etc. In the semi-annual report of the Board of the Central London Company of June 30, 1907, the following statement appears:

"After careful observation and inquiry the directors decided, though with much regret, to abandon the system of charging a uniform fare and to adopt the increased charge of 3 pence for passengers traveling beyond seven or eight stations, adhering to the fare of 2 pence for all lesser distances."

The chairman of the company, at the shareholders' meeting when this report was presented, remarked "that in the face of the new competition (electric buses) they (the board) saw that it was impossible to charge 2 pence for short distances as well as for longer routes, and therefore they had found it necessary to alter the fares. As a result of the extra charge of 1 penny, there was a difference of £60 to £70 a day in the receipts, which they (the board) considered satisfactory."

At the next semi-annual meeting of the company, held Feb. 5, 1908, no particular reference was made to the results secured from the increase in fare, but a long discussion occurred over the fact that there had been a large decrease in passenger traffic. Strange to say, however, a goodly portion of this decrease had occurred in workmen's travel upon which no increase in fare had been made, this being only 1 penny over the entire length of the line—approximately six miles. This rate is also equivalent to that charged for the shortest ride on the competing buses.

The remainder of the decrease was plainly attributable to the competition from motor buses.

At the next semi-annual meeting of the company, held Feb. 4, 1909, at which the report for the half year ending Dec. 31, 1908, was submitted, it was stated that there had been an increase of 5,350,003 in the number of passengers carried during the half year, the average receipts per passenger being 2.03 pence, as compared with 2.01 pence in the half year ending December, 1907, the cost per passenger being 1.02 pence, as compared with 1.28 pence in the corresponding period.

It is regretted that the semi-annual reports of this company from this period up to Jan. 30, 1911, throw but little light upon the actual result secured through advancing rates of fare. This is for the following reason: The competition from motor buses has had a more important effect on the traffic of all local London railway companies than has anything else, and since its first appearance in 1905 and 1906 there have been wide differences in its severity.

At the outset, and for a few years thereafter, a wild craze for their introduction existed and the number which were put in service was astounding. Then it was discovered that the operation of these vehicles was far from profitable; principally because of poor construction and design. This resulted in nearly all of those originally installed being taken out of service and a return to the use of horse vehicles.

More recently better designed and constructed motor buses have been put into service and their use is increasing rapidly.

It should perhaps be stated that so far as I can ascertain there was little objection raised by press or public to the increase in fares being made by the companies above mentioned.

MEMORANDUM BY H. G. BRADLEE, PRESIDENT STONE & WEBSTER MANAGEMENT ASSOCIATION

Sooner or later the street railway companies throughout the country will have to modify their present system of charges. They may possibly adopt a zone system similar to that used abroad, or some entirely different basis may be worked out, but it is perfectly clear that some change must be made eventually if the lines are to be extended further and further from the center of the city, which seems inevitable. Such a change in the basis of charge can only be brought about after the public have been educated to the fact that there is a limit to the distance which a passenger can be carried for 5 cents, and after they have been given, in a general way, some information to show what this limit is.

I think it is possible to show definitely in figures the distance which passengers may be carried for 5 cents with a reasonable profit, and I should be glad to see our committee report to the convention that we have been far enough into the matter to believe that this is a possibility and to recommend that a new committee be appointed which will endeavor during the next year—first, to determine a basis by which such calculations may be made, and second, to obtain, as far as possible, from a number of companies information which may be useful to show either the distance to which passengers may be carried in each of the prominent cities of the country, or at least enough information to throw some light on the average distance in such cities.

With regard to the particular method which I have suggested, this is, of course, only one way of going at the problem, and I have no doubt that there are other ways of arriving at the desired results, and very likely something simpler and clearer might be worked out. I do think that it would be very helpful to the entire street railway industry if we could place in the hands of every street railway man in the country definite information which would enable him to figure out how far his road could afford to carry passengers for 5 cents, and it would be still more helpful if we could furnish him with similar information with reference to other cities which he might use in public discussion and in educating the particular community which he serves. Moreover, if all of the companies were working along the same line I think we should very shortly see a decided improvement in the public sentiment on this question.

SUPPLEMENTARY MEMORANDUM BY MR. BRADLEE WITH REFERENCE TO DISTANCE WHICH URBAN ELECTRIC CARS MAY BE OPERATED WITH PROFIT FOR 5-CENT FARE

If four factors with reference to a company's business are known, it is possible to figure accurately the distance which cars may be operated with profit for a 5-cent fare. The four items to be known are as follows:

First—The total cost per car mile of operating expenses, taxes, depreciation and obsolescence;

Second—The average number of 5-cent fare passengers carried per half round trip;

Third—The investment made in the company's property for each $1 of gross business;

Fourth—The percentage return on the company's investment which must be earned to attract capital freely to the business.

The first three of these items can be obtained with reasonable accuracy for any property; the fourth item is more indefinite, but may usually be determined within comparatively narrow limits.

Herewith are published two sets of curves, for one of which I have assumed that an average investment of $4 is necessary for each $1 of gross earnings, and in the other that an average investment of $5 is necessary for each $1 of gross earnings. In both I have assumed that 8 per cent must be earned on the company's investment freely to attract capital.

Considering the first of these sets of curves, namely, that based on $4 investment per $1 of gross earnings, the average distance which cars may be operated profitably may be figured as follows:

Eight per cent on $4 is 32 cents; therefore, 32 cents must be set aside out of each $1 of gross earnings to provide 8 per cent on the investment.

The receipts per half trip equal the average number of 5-cent passengers per one-half trip times 5 cents, as shown in Table VI.

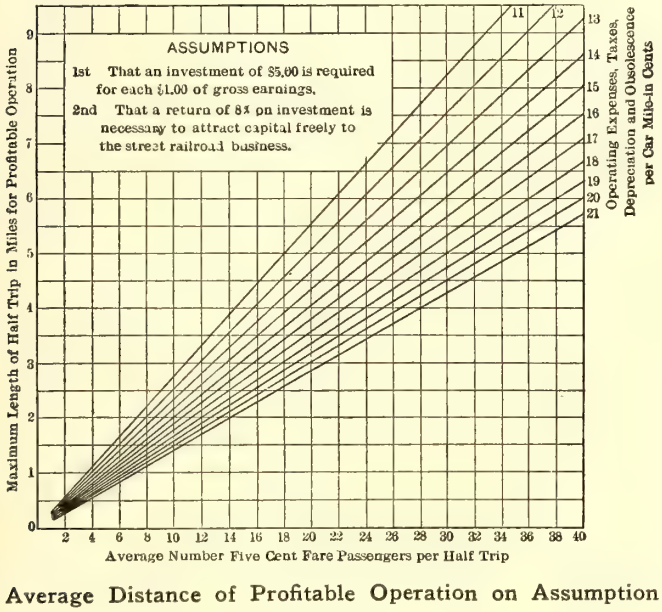
TABLE VI.—RECEIPTS PER HALF TRIP WITH DIFFERENT TOTALS OF PASSENGERS.

Five-cent passengers per one-half trip	Receipts per one-half trip	Five-cent passengers per one-half trip	Receipts per one-half trip
10	$0.50	21	$1.05
11	.55	22	1.10
12	.60	23	1.15
13	.65	24	1.20
14	.70	25	1.25
15	.75	26	1.30
16	.80	27	1.35
17	.85	28	1.40
18	.90	29	1.45
19	.95	30	1.50
20	1.00		

TABLE VII.—AMOUNT AVAILABLE FOR OPERATING EXPENSES AND TAXES WITH OPERATING RATIO OF 68 PER CENT.

Five-cent passengers per one-half trip	Amt. available for operating expenses per one-half trip	Five-cent passengers per one-half trip	Amt. available for operating expenses per one-half trip
10	$0.34	21	$0.71
11	.37	22	.75
12	.41	23	.78
13	.44	24	.82
14	.48	25	.85
15	.51	26	.88
16	.54	27	.92
17	.58	28	.95
18	.61	29	.99
19	.65	30	1.02
20	.68		

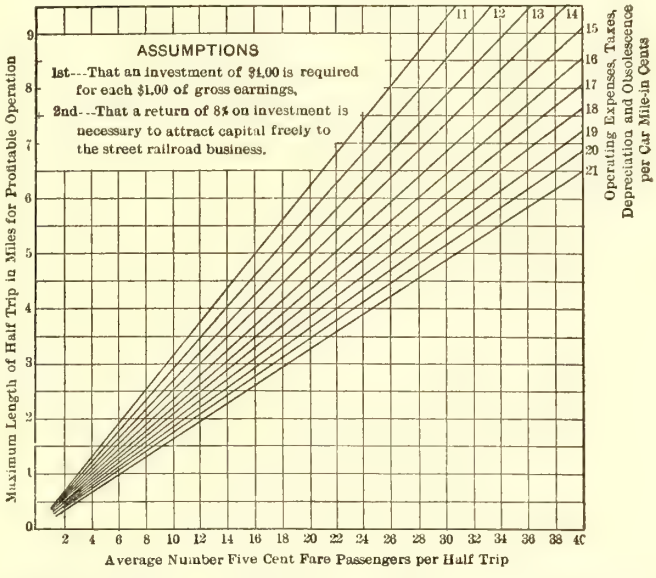
If 32 cents is required per $1 of gross earnings to provide 8 per cent on the investment, 68 cents will remain for



Average Distance of Profitable Operation on Assumption that Investment of $4 Is Required for Each $1 of Gross Earnings

operating expenses, taxes, depreciation and obsolescence. In other words, 68 per cent of the company's receipts will be available for these items. Table VII may, therefore, be easily derived from the preceding by taking 68 per cent of the receipts per half trip as the amount available for operating expenses, taxes, depreciation and obsolescence per half trip.

The maximum length of a half trip in miles which can



Average Distance of Profitable Operation on Assumption that Investment of $5 Is Required for Each $1 of Gross Earnings

be operated profitably may now be obtained by dividing the amount available for operating expenses, taxes, depreciation and obsolescence per half trip by the operating expenses, taxes, depreciation and obsolescence per car mile.

TABLE VIII.—BASED ON AN INVESTMENT OF $4 IN THE PROPERTY FOR EACH $1 OF GROSS EARNINGS

Operating expenses, taxes, depreciation and obsolescence in cents per car mile	Maximum length in miles of half trip with average of— 10 5-cent passengers per one-half trip	20 5-cent passengers per one-half trip	30 5-cent passengers per one-half trip
11	3.08	6.16	9.24
12	2.83	5.66	8.50
13	2.62	5.24	7.85
14	2.43	4.86	7.28
15	2.26	4.52	6.80
16	2.12	4.24	6.37
17	2.00	4.00	6.00
18	1.89	3.78	5.68
19	1.79	3.58	5.37
20	1.70	3.40	5.10
21	1.62	3.24	4.85

TABLE IX.—BASED ON AN INVESTMENT OF $5 IN THE PROPERTY FOR EACH $1 OF GROSS EARNINGS.

Operating expenses, taxes, depreciation and obsolescence in cents per car mile	Maximum length in miles of half trip with average of— 10 5-cent passengers per one-half trip	20 5-cent passengers per one-half trip	30 5-cent passengers per one-half trip
11	2.72	5.44	8.17
12	2.50	5.00	7.50
13	2.31	4.62	6.93
14	2.15	4.30	6.44
15	2.00	4.00	6.00
16	1.88	3.76	5.63
17	1.76	3.52	5.29
18	1.67	3.34	5.00
19	1.58	3.16	4.74
20	1.50	3.00	4.50
21	1.43	2.86	4.29

A similar calculation would give the maximum length of a half trip on the assumption that $5 of investment is required for each $1 of gross earnings.

The results of these calculations would be as shown in Tables VIII and IX.

MEMORANDUM BY E. C. FOSTER, NEW YORK

Obviously, the solution of this matter of fares means as well the solving of perhaps the most vital problem confronting our business, that of a return upon required investment commensurate with the direct service afforded, the risk involved and the substantial indirect value to the communities served. Certainly there seems to be every reason why an industry involving such an immense invest-

ment, which acts as a convenience to so many of our people every day and during all hours of every day in each year and yields to its employees a much higher rate of wages than the average in many other lines, should be entitled to earn at least as great a return upon its capital as other and far less important enterprises. Our association has heretofore been favored with valuable papers on this subject, equally helpful discussions have resulted, and the fact that, so far as I know, no definite action has anywhere been taken to put into effect any of the remedial measures suggested impresses one as indicating the magnitude of the difficulties to be met with in the application of the suggested plans.

To bring about such an end, the first thought is the matter of reducing operating expenses, but there appears to be little opportunity to accomplish much in this direction. It is conceded that labor should not suffer and the best we can hope for in other operating items is that they will remain stationary. It would seem, therefore, that the practical thing to consider is the rate of fare and the length of ride provided for a single fare. In order to plead our case successfully, it is necessary to refer to the early development of transportation lines, the evolution from stage coach to horse car, to cable car and finally to the electric car of to-day. When doing so we should not fail to point out the insidious way in which the rides have lengthened and the errors of judgment which have been made in calculating operating costs and expected returns.

EARLY CONSTRUCTION

Early track construction consisted of rails laid and affixed permanently to a stringer running parallel with the street, resting on cross ties. The rails were light in weight and in size about 1¼ in. by 2½ in., spiked directly to the wooden stringer. The ballast used was that which had been excavated to permit of placing cross ties and stringers, no attempt being made to create a more substantial structure by use of gravel, as is the case to-day. Paving, except in the center of a few of the larger cities, was almost unknown, and in many of the Eastern cities, where used at all, consisted of common field stone, costing about 75 cents to $1 per yard, and stone from the ocean beach at a slightly higher price. Equipment can hardly be compared, the cars and horses used in the early days representing but a small fraction of the cost of the modern electric car. Yet even in those days the rate of fare established was a 6-cent cash or a 5-cent ticket for a ride which averaged not more than 1½ miles, while passengers traveling distances of from 8 to 12 miles were required to pay from 12 to 20 cents, and even on that basis many of the pioneer roads were dismal financial failures.

What is commonly known as the horse railroad did not receive a great deal of attention nor acquire much prominence until about the year 1870. Between that and 1890, however, these roads were operated by men of ability, and in the larger cities seemingly became moderate dividend earners. In reality, however, they were not even the financial successes they appeared to be, because of the failure of the owners to lay aside funds out of the earnings to provide for replacements of worn-out property. During this period 5 cents had become almost universally adopted as the rate of fare, but, as already stated, this was done without provision being made for replacement costs. Up to this time comparatively few burdens had been imposed upon the railways through franchise grants. Beginning with the year 1884 and continuing through 1888, the adoption of electricity as a motive power for street railway cars was discussed and its installation begun, the road at Appleton, Wis., constructed in 1886, being practically the first commercial venture with the new method of locomotion.

Once begun, however, the evolution of the horse railroad into the electric railroad was extremely rapid, and the necessary equipment was soon installed on many lines at great expense, much of this expense being due to the fact that the new motive force was in the experimental stage, and the cost of much experimental work necessarily was naturally borne by the railway companies in the rebuilding of their lines. Despite the incipient state of the art at this time, those in charge of the transportation companies did not hestitate to risk the expenditures of enormous sums of money, to say nothing of possible loss of reputations for this early adoption of electricity, in the discarding of the old for the new traction force, and it is probably not too much to say that, had it not been for these pioneers and the incentive thus given to the development of electrical motive power, its application to city and interurban transportation lines would still be an accomplishment of the future or, at best, have been many years delayed. It is easy to realize how greatly this would have retarded the growth and prosperity of American cities, to say nothing of the rural districts so splendidly served by the interurban railroads of to-day. The great sums required to rebuild the roads could not usually be raised through local subscriptions, or provided from earnings, as it has been possible to do with the comparatively small amounts required for horse railroads, and, as a result, the properties, in many instances, were acquired by new owners who were in a position to command large amounts of capital.

As was to be expected, many of these new owners were inexperienced in transportation matters. There were others among them who viewed the new venture much as a child does a new toy, and it was this combination of inexperience and enthusiasm which, to my mind, was largely responsible for the effort to obtain increased earnings by the wholesale adoption of the free transfer system. However, this is not the only condition that these conditions created, for by means of glowing prospectuses the idea was soon instilled in the public mind that street railways were veritable gold mines in earning power. Then commenced the placing of municipal and other burdens upon these supposedly prosperous railway corporations; taxes were increased, demands for better service began to pour in, higher rates of wages had to be paid and, with the rate of fare remaining unchanged, profits began to disappear.

ARREST DECLINE IN NET EARNINGS

The problem now confronting us is to arrest the decline in net earning power and give to our railway companies sufficient return to enable them to maintain their properties in first-class condition, provide for replacement of worn-out or obsolescent equipment or apparatus and give to those interested an opportunity to realize a reasonably substantial remuneration for capital risked and time, physical and mental effort expended. All these conditions must be adequately cared for in order that the public may be satisfactorily served. It would seem to be necessary, in order to bring such a condition about, that free transfers be materially curtailed, that exchange tickets at an additional cost be substituted therefor, that no further extension of rides for one fare be granted, that a fractional amount of the basic rate be charged for these longer rides provided, or the zone system adopted, that no burdens for maintaining public highways be imposed upon electric railways and that the whole method of taxation be revised and placed on a more logical and equitable basis.

One of the questions which will naturally arise in any campaign having for its object the realization of an honest return on the investment is as to what really constitutes a satisfactory profit. It would seem that this is a question that must more or less depend upon the individual case, but in every case there should be substantial recognition of the creative force responsible for the unit, of the burdens assumed, the risks taken and the years of early development when profits were unknown. In too many cases is the tendency displayed to ignore the rights of the man with the courage to blaze the way to that financial profit for which he takes the risk and without which incentive enterprise

would cease. Perhaps in no other industry is this tendency to grant the right to only limited return, when viewed and discussed from the outside, more marked than in our own line of work.

As justification of the necessity for a satisfactory earning power, we may well point to the many lines of business which net anywhere from 15 to 30 per cent in each year, and in demanding our permit to work for a good return our critics should realize that an electric railway to-day is not in any sense comparable with the street railways of two or three or four decades ago. The extensions, rehabilitation and maintenance are fully 100 per cent more costly, and the reasons for this are readily seen in the following comparisons:

Rails to-day weigh from 70 to 120 lb. per yard, are laid upon a concrete substructure or upon ties 6 in. by 8 ft., spaced 24 in. apart, rock and gravel ballasted. Rails in the early days weighed from 30 to 40 lb. per yard on light stringers and ties with no ballast other than the previously excavated dirt. The paving requirements to-day usually mean granite blocks of specified dimensions, vitrified brick or wooden blocks, and in many cases necessitate the laying of concrete on top of the ballast to provide a base for the pavement. Pavement in the early years was hardly in evidence. The cost of track construction to-day is from $5 to $6 per running foot of single track, while in the early years $1.50 to $2 was ample.

The differences in equipment are still more marked, the early installation consisting of a one-horse car seating twelve people and a two-horse car seating twenty-two people, while to-day the cars in most general use seat anywhere from forty-two to sixty people; the cost of the horse car and horses was about $2,400 for the operation of one car, while that of the electric car and equipment of the type referred to is from $5,000 to $12,000 per car. Again, consider the buildings for housing cars and horses, usually light frame structures costing certainly less than 50 per cent of those of the present day, to say nothing of the expenditures now required for the installation of power stations, overhead lines and electrical equipment.

One mile and a half was perhaps a good average horse car ride with the 6-cent cash and 5-cent ticket charge, as heretofore stated, and an additional charge for transfers and for longer rides, the latter of which ran the cost as high as 12 cents. To-day a 20-mile ride for 5 cents is not uncommon, a situation which has been brought about through the increased area of municipalities, some of which have been increased by more than 100 per cent, and by the installation of the free transfer system by municipal requirement or voluntarily by the companies themselves.

ADVANTAGES TO THE PUBLIC

It is hardly necessary to call attention to the advantages which have accrued to the public aside from the quick, ready and comfortable means of transportation provided. The construction of these railroads has been a powerful aid to the relief of congested districts by enabling the population to obtain cheap homes in outlying districts, thus promoting sanitary and healthful conditions and, from a material point of view, enhancing the prosperity of municipalities enormously through increased taxable values and adding to the efficiency of the individual by affording him the opportunity for speedy movement in the pursuit of his daily toil.

If it were possible to develop a study of the value of the electric railways in this last regard, it would establish a powerful argument why the individual should be willing to approve plans such as are herein suggested. Distances that are now traversed in from ten to twelve minutes required forty-five to sixty minutes in the past. This saving in time reduced to a dollar and cents basis would produce an impressive total.

Personally I have evidence that desirable changes could be brought about if the public could be fully informed and would carefully analyze the evidences we are ready to submit, and the railways would thus be enabled to put into effect plans such as have been heretofore suggested and which contemplate the material curtailment of the free transfer:

The substitution of exchange tickets at a fractional cost;

That no extension of one-fare rides beyond those at present in effect be granted;

That a proportional cost of the unit fare be charged as extensions of existing lines are constructed, or the zone system adopted;

That burdens upon the railways for the maintenance of public highways be eliminated; and

That the present methods of taxation be revised and placed on a more logical and equitable foundation.

HEARING ON EXPRESS PLANS OF BOSTON ELEVATED RAILWAY

The Massachusetts Railroad Commission opened at Boston on Nov. 24, 1911, the hearing in connection with an appeal of the Boston Elevated Railway for the right to carry freight and express in Boston, against the previous adverse action of the Boston City Council. More than 500 persons appeared at the offices of the commission in behalf of the company's petition, and the hearing had to be adjourned to the State House. Special cars were run from Worcester and other points to Boston to enable the residents of the cities affected to be present on behalf of the proposed service. The arrangements for the presentation of the company's case were made by Matthew C. Brush, assistant to the vice-president of the Boston Elevated Railway, counsel being represented by Arthur A. Ballantine.

Mr. Ballantine opened the hearing by stating that the company had brought its petition under Chapter 402, Acts of 1907, after two fruitless efforts to secure from the Boston City Council the privileges of a common carrier of freight and express. The company operated a metropolitan system which was the key to the transportation service on the streets of the Boston district. The system was not fully taxed at all hours and places, and outside communities were demanding the economic benefits of modern express facilities. The rights desired by the company would, if granted, be subject at all times to the regulation of the local authorities and the commission. He then called upon Mr. Brush, who, in stating the company's plans and desires, said in part:

"Our company anticipates conducting this business in a manner similar to that in which freight and express service is conducted in the 823 other cities and towns. One or more terminals will be established as near the center of the metropolitan district of the city as conditions will permit. From this terminal cars will be operated to terminals in the outlying districts, over such routes and in such manner as will not interfere with the passenger business. The company will receive and deliver baggage, express and freight at the various terminals, occupying a position in that respect similar to that occupied by the steam railroads in their freight business, without discrimination or favor to any person or corporation. All freight or express so received will be transported over the rails of the company to outlying terminals or to connecting routes in cars very similar in design to the large passenger cars. The company will transport in these cars articles in accordance with the schedule on file with the commission, such schedule including freight similar to that transported by express companies, and restricted to exclude, besides explosives, all articles and commodities the transportation of which may hereafter be prohibited by the Railroad Commission.

"The company intends if the petition is granted to establish first a terminal at Mott Street, Boston. This we believe to be a proper point at which to receive and ship goods,

and add other terminals in accordance with the traffic demands. All goods will be transported at a regular tariff, such tariff to be published and subject to inspection by the shipper and the public.

"It is impossible to state specifically at the present time the exact rates to be charged, but this, we believe, will automatically regulate itself. The Railroad Commission has jurisdiction in the regulation of rates, and we should assume, of course, that we would be governed by the regulations of the board at any future time in this connection.

"We appreciate that our primary duty is in the proper conduct of our passenger business, but we also believe that there is opportunity for us to act as common carrier without interfering with the passenger service.

"In other cities and towns where this service is in effect there has been no difficulty as a result of interference with the passenger traffic. Moreover, the Railroad Commission has distinctly stated in previous orders that the exercise of authority to operate freight and express cars shall in no way alter or abridge the duty and obligation of the company relative to the transportation of passengers, nor in any way interfere with the conduct of passenger service.

"We do not anticipate stopping freight and express cars on tracks in the highway used for passenger service for the purpose of unloading or loading. A map filed with the board shows that in Massachusetts there are thirty-seven electric railways with freight and express rights in 180 towns, and we believe that Boston furnishes a proper terminal for most of these companies to assemble and distribute merchandise susceptible to proper transportation by this means."

Bentley W. Warren, counsel for the Bay State Street Railway, appeared for residents of the company's territory, representing about 1000 miles of electric railway in Eastern New England. The Bay State Street Railway operated an electric express service in twenty-eight municipalities in Massachusetts, and had acquired rights to conduct this business in seventy-nine cities and towns of Massachusetts, Rhode Island and New Hampshire. All these communities were closely connected with Boston, and needed the service which the Boston Elevated Railway could give. He filed a map of electric express service and grants in Massachusetts which showed that Worcester and Boston were the only large cities which broke the chain of complete service across the State in both directions. He filed with the board petitions from sixty-five boards of aldermen and selectmen urging the commission to grant the petition, and presented letters from twenty-two municipal officials testifying to the benefits of the existing service.

Several hours were then devoted to the presentation of cumulative testimony on behalf of the petition by municipal authorities, officers of boards of trade, trustees of public institutions, state legislators and prominent citizens. A. E. Paddock, Rhode Island Company, Providence, outlined the character of service performed by the trolley electric organization in his district, and C. V. Wood, traffic manager of the street railways centering at Springfield, spoke briefly of the feasibility of handling trolley express business without interfering with passenger traffic, the advantages of locating terminals in side streets, and the policy of letting others perform the work of collecting and delivering merchandise.

W. M. Butler, president of the Boston & Worcester Street Railway, said that his company would be unable to give a satisfactory and profitable service so long as the Boston Elevated Railway could not co-operate in the handling of freight and express traffic over its own system.

Answering several questions, Mr. Brush said that about seven cars would be required to start the business.

HEARING ON NOV. 27

At the hearing on Nov. 27 the principal opposition was voiced by the Boston Expressmen's League. In rebuttal, A. A. Ballantine, for the company, analyzed the opposition as coming almost entirely from existing express interests. He emphasized the point that petitions in favor of the company's project had been filed by no less than seventy-five municipalities. He reiterated the point that the company was determined to preserve the quality of its passenger service at all hazards, and stated that he failed to see the force of the argument that the establishment of the service would create a monopoly, as the facilities were to be placed at the disposal of everybody, including the expressmen themselves. It had been clearly shown that the people of Boston want this service. The Cost of Living Commission reported in favor of trolley express as a means of improving the conditions of living around Boston. Bentley W. Warren, counsel for the Bay State Street Railway Company, emphasized the absence of any opposition from officials of the Boston city government. He contended that the creation of an express monopoly by the use of electric railways for such service was a practical impossibility. Closing, he alluded to the strict control placed in the hands of the board, and said that if the scheme did not work well the commission could terminate its operation.

CHICAGO INVESTIGATION OF SMOKE ABATEMENT AND ELECTRIFICATION OF RAILWAY TERMINALS

At the municipal dinner given by the Chicago Association of Commerce on the evening of Nov. 28, the first official progress report of the Chicago Association of Commerce committee of investigation on smoke abatement and electrification of railway terminals was made public. This report, prepared under the supervision of the chief engineer for the committee, sketched the origin and progress of the investigation of the subjects assigned to the committee. A brief history of attempts at smoke abatement in Chicago was given, which concluded with the 1910 report of the smoke inspector of Chicago, in which the statement was made that there was need of a radical change in existing conditions of smoke abatement, so far as the railways were concerned. The electrification of railway terminals within the city was recommended in explicit form by the smoke inspector.

The recent history of the agitation for railway terminal electrification in Chicago was taken up by the city authorities and by the Chicago Association of Commerce in October, 1909. A committee of experts appointed by the Association of Commerce had reported favorably on electrification as a mechanical problem, but the experts were less confident as to the financial feasibility of the plan. About that time co-operation between the city administration and the Association of Commerce was suggested, and the formation of a joint committee of investigation was proposed. It was understood that the railways would provide the funds for the promotion of the investigation. At a meeting of the association held in September, 1910, the leading representatives of several railways declared that the electrification of the railway terminals in Chicago would involve a great expense which would have to be borne by the commerce of the city and that immediate electrification was premature. Smoke abatement, it was added, need not depend wholly upon electrification. At a meeting of the Chicago Association of Commerce held on March 18, 1911, a general committee of eighteen was appointed to investigate the whole subject. This committee consisted of representatives of the city, steam railway executives and other citizens. Jesse Holdom was appointed chairman and Frederick H. Rawson secretary. It is this committee which has charge of the elaborate investigation which is being conducted.

The engineering staff organized by this committee is as follows: Chief engineer, Horace G. Burt; electrical engineer, Hugh Pattison; terminal engineer, Louis H. Evans;

mechanical engineer, Theodore H. Curtis; consulting electrical engineers, Gibbs & Hill, New York; consulting mechanical engineer, George R. Henderson, Philadelphia; assistant engineer, James Walker; editor for the engineers' staff, Benjamin C. Burt. Headquarters are maintained in the People's Gas Building, Chicago.

The scope of the investigation includes: (1) A determination as to the necessity of changing the motive power of steam railways to electric or other power; (2) the mechanical or technical feasibility of such a change; (3) the financial practicability of such a change. In the scope of the investigation as to the necessity of changing the motive power of steam roads to electric or other power are embraced the following heads: (1) safety, (2) health, (3) comfort and convenience, (4) loss and damage. Under each of these heads are included the subdivisions "passengers," "employees," and "the public." Each of these subdivisions is in turn subdivided.

One feature of the investigation is the collection of information on yard locomotives, freight trains, freight transfer trains, passenger transfer trains and passenger trains operating within the city and in and out of the city. Much of the attention of the engineering staff so far has been devoted to the smoke-abatement portion of the problem, and much information has been collected on the subject. A definite conclusion has been reached in relation to the use of coke as locomotive fuel, and it has been decided to eliminate coke entirely from further consideration.

Such subjects as brick arches and stack blowers in locomotives, as well as down-draft furnaces, steam jets and under-feed stokers, have received attention. Various printed documents have been issued by the committee and a memorandum of maps has been prepared for the study of the territory or territories covered by the investigation. Various advisory committees to the general committee have been formed. One of these consists of motive power and mechanical representatives of railways operating in Chicago. Another consists of representatives of railway transportation departments who are discussing the subject of the proper forms to be used in providing reports of terminal train movements.

In concluding its progress report, the Chicago Association of Commerce committee of investigation on smoke abatement and electrification of railway terminals says that the investigation up to Nov. 24, 1911, has been chiefly occupied with the subject of locomotive smoke abatement. Nevertheless, the subject of the electrification of terminals has been kept constantly in view, and a beginning has been made in the consideration of it. Much time and attention have been given to developing the means of collecting data and information as to present physical and operating conditions. It is expected that in the course of the next few months progress will be made in the study of electrification. The report concludes:

"In proportion as it has progressed, the problems presenting themselves for solution have rather increased than diminished in number, and it is sufficiently clear, even at the present stage, that for the accomplishment of definite and valuable results much labor and considerable time will be required. The task imposed upon the committee proves to be one that is rather special, even unique, in scope and character, and while much may be learned from what has already been accomplished in various lines, yet very much will have to be done for the first time. And it is confidently hoped, and even believed, that if that which has to be done is well done the results will be of interest and value not only for the present time and place but for other times and places as well."

Belgrade is the only town in Servia which has tramways. All the lines, aggregating 19 miles, are operated by electricity. The tramways are owned by a Belgian company, which has a concession for forty-nine years.

PROGRESS IN METROPOLITAN AND THIRD AVENUE REORGANIZATIONS

A statement was issued on Nov. 28 by Guy E. Tripp, chairman of the joint committee of bondholders of the Metropolitan Street Railway of New York, giving a summary of the final plan of reorganization. The Interborough-Metropolitan Company, owner of a majority of the stock, has decided to accept the plan, which provides for an assessment of $12.90 per share. The original plan provided for an assessment of $17.67 per share.

An abstract of Mr. Tripp's statement follows:

"The final plan of reorganization provides for an assessment of $12.90 per share on the $52,000,000 stock of the Metropolitan Street Railway and the $600,000 of stock of the Central Crosstown Railway; the $4,000,000 of improvement notes of the Metropolitan Street Railway not in the hands of the receivers of the New York City Railway are also given the opportunity to participate on the payment of $129 for each $1,000 face value of notes. For this payment the stockholders and noteholders will receive for each share of old stock at $100 par value and each $100 face value of notes the following securities: $8.83 in new 4 per cent mortgage bonds, $5.30 in new adjustment bonds, $30.91 in new stock.

"There has been no change in the character or amount of securities offered to depositing bondholders. The total amount of securities that will be outstanding against the new company is $97,655,500, a reduction of nearly $42,000,000.

"The 5 per cent bonds will receive, as under the original plan, 50 per cent in new 4 per cent bonds and par in adjustment bonds. This includes accrued interest.

"The 4 per cent bonds receive as formerly 75 per cent in new adjustment bonds and 25 per cent in new 4 per cent bonds. This also covers accrued interest.

"The tort claimants are still given 100 per cent of their claims in new adjustment bonds and 50 per cent in 4 per cent bonds, thus giving them the same allotment of securities that is offered the 5 per cent bonds.

"The amount of money to be raised is substantially $7,300,000.

"I believe the committees have succeeded in working out a plan which does justice to the property itself as well as to the public interests. It keeps down capitalization and fixed charges to the minimum and at the same time gives the utmost consideration consistent with conservatism and due regard for the lessons of the past to the bondholders."

THIRD AVENUE RAILROAD

James N. Wallace, chairman of the bondholders' committee of the Third Avenue Railroad of New York, has published a statement of "facts as to capitalization and valuation of property." The existing capitalization of the old company to be readjusted is as follows: Capital stock issued at par for cash, $15,995,800; consolidated mortgage 4 per cent bonds "issued for fully 99 per cent of face value in 1900-03 in connection with electrification of road and subsidiary lines," $37,560,000; receiver's certificates issued at par, $2,500,000; total, $56,055,800. The underlying issue of $500,000 of first mortgage 5 per cent bonds outstanding is not affected by the reorganization.

In addition most of the net earnings since the appointment of the receiver in January, 1908, have been expended on the property. To the above there are added accrued interest on the 4 per cent bonds to Jan. 1, 1910, $4,324,680; and new cash, to be added by stockholders after deduction of receiver's certificates, $4,700,000; making a total of $65,080,480. The plan of reorganization provides for the issue of the following: Refunding 4 per cent bonds, $15,790,000; adjustment income bonds, $22,536,000; stock, $16,590,000; total, $54,916,000. The statement then adds:

"The dividends on the stock since 1864 have averaged

only 5.2 per cent and during the past twenty years have averaged less than 2 per cent. Most of the capital ($8,995,800) has been contributed in cash since 1895, and the dividends thereon from 1895 to 1907 averaged 3.18 per cent and have been nothing since 1907. The consolidated bondholders have received no interest since the July 1, 1907, coupon.

"The capital expenditures made by the Third Avenue Railroad, as shown by its unimpeached books of account and sworn reports, including expenditures by the receiver and current assets and cash in his hands Feb. 28, 1910, were proved to have been $68,954,593, or more than $9,000,000 in excess of the proposed new capitalization and outstanding first mortgage bonds. To the figures of Feb. 28, 1910, should be added accumulated net earnings for nearly two years.

"The cost of reproducing or duplicating the properties of the Third Avenue Railroad System was shown by competent evidence to be over $58,000,000, without any allowance whatever for the value of the franchises (which could not be now duplicated on as favorable terms) or for the value of the property as a completed system and going concern.

"The uncontradicted proof in the proceedings before the commission showed that the actual depreciation did not exceed $2,500,000 (the greater part of which has already been made up by the receiver), but the commission allowed for theoretical depreciation the sum of $11,807,691.

"The net earnings of the Third Avenue system since July 1, 1908, after deducting interest on underlying securities and taxes, have been as follows: Year ending June 30, 1909, $1,353,928; year ending June 30, 1910, $1,871,385; year ending June 30, 1911, $2,123,670."

The committee of bondholders of the Third Avenue Railroad has instructed its counsel, William D. Guthrie, to carry out the reorganization plan in accordance with the decree of the Court of Appeals, and, if possible, to make the plan effective before Jan. 1, 1912.

It is understood that, in view of the decision of the Court of Appeals and the interpretation of the public service commissions law which this involves, the New York Public Service Commission, First District, will ask for an amendment of the law at the forthcoming session of the Legislature.

INDEPENDENT MOTOR CARS IN GERMANY

The following information in regard to the use of storage battery and gasoline-electric motor cars for trunk line service in Germany is taken from a chapter on that subject in "Das Deutsche Eisenbahnwesen der Gegenwart," a two-volume book just published in Berlin.

Tests with storage battery passenger cars for trunk line service have been conducted in Germany since 1894. In the earlier cars the batteries were carried under the seats, where they were hard to get at, where they required a rather inconvenient form of seat and where they interfered with the heating. There was also some trouble from gas from the batteries. In later cars the batteries are carried in a low cab which projects beyond each end of the car. Most cars have series motors, but shunt motors were put in service in 1907 on the Limburg line and gave such satisfactory service that five cars of similar equipment were placed in operation early in 1911. The purpose of using shunt motors, of course, is to avoid resistance losses and to return energy to the batteries on down grades.

The Prussian Railways have built ninety-seven accumulator cars since 1907 and plan to have thirty-three more in service by the end of 1911. These cars are of the twin-unit or articulated type. Each half has three axles and the entire unit is 84 ft. long over all, including the buffers. Each half-car body, not inclusive of the battery cab which is at the end of the car, is 25.4 ft. long. Two of the three axles are placed under the storage battery cab about 5 ft. apart and the driving axle of each half is 25 ft. from the nearest front axle. The entire car has seats for eighty-two passengers and standing room for twenty-four others. The cars are lighted electrically and are heated by means of briquette stoves placed under the seats.

The metal framework of the battery chamber is lead-covered to prevent corrosion from fumes. Each chamber contains eighty-four cells, making a total of 168 cells per twin-motor car. Each battery has a capacity of 368 amp-hours when discharging 180 amp. This capacity is equivalent to a run of 62 miles on level track at a speed of 37.2 m.p.h. The current consumption is about 28.8 watt-hours to 32 watt-hours per ton mile. The greatest permissible current may vary from 160 to 200 amp. About 400 amp-hours are required to recharge the battery after it has been fully discharged.

The series equipments consist of two 85-hp motors, whereas two 115-hp motors are required for the shunt equipment. The controller has a deadman's handle whereby the circuit is broken and the emergency brakes applied in two seconds. The lamps are of the 80-volt tantalum type and of 25 cp each. All circuits are carried in asbestos cables.

The total weight of a twin car is 60 metric tons, and its cost is $20,000. During 1909 the average performance of each battery on these lines was 24,346 miles, and in one district an average of 31,760 miles was obtained. The expenses for operation and maintenance including interest on the investment were about 19 cents per motor car mile, 3.6 cents per mile being allowed for the maintenance and renewal of batteries. The battery manufacturer guarantees to have experts at all installations to show the employees how to maintain and charge the batteries in the best manner. An expert takes charge of no more than ten cars and four charging plants. The compensation of the battery company is on a mileage basis. It receives 3.6 cents for every mile made by the twin cars under their own power and 1.2 cents per mile for the mileage of trail cars. These figures are based on an average mileage of 18,600 miles per car per annum. If this figure is not attained, the user pays 0.6 cent for every missing motor car mile. The manufacturer agrees to deliver all materials for replacement, including acid and distilled water, etc., and owns all scrap. The railway company makes no charge to the battery company for hauling these materials to their point of use. This contract has proved very satisfactory to both parties. The batteries of the twin car run on the average about 43,400 miles before they require to be cleaned for good results.

Experiments with gasoline and gasoline-electric cars have also been undertaken in Germany because the economical employment of storage battery cars is thought to be limited largely to lines which radiate from large cities where cheap electrical energy is available. The maximum economical distance from the charging station is placed at 31 miles. The Württemburg State Railways now have four Daimler cars in service, while the Prussian-Hessian State Railways will have in service by the end of this year twenty gasoline-electric cars. These cars are 68 ft. in length with a cab at one end for the gasoline-electric machinery. The car accommodates ninety-five seated and standing passengers. The gasoline engine has six cylinders and is started by compressed air. The electrical equipment included a d.c. 90-kw, 650-volt generator and exciter, the latter being used also for lighting. The total hourly capacity of the series motors is 82 hp. At a 100-hp load the gasoline engine requires about 0.8 gal. of gasoline per hour. About two-thirds of this quantity is used in average operation. The cooling water of the engine is used for heating the car. The total weight of a complete car is 54 tons and its cost is about $14,600.

EXECUTIVE COMMITTEE MEETING OF TRANSPORTATION & TRAFFIC ASSOCIATION

A meeting of the executive committee of the American Electric Railway Transportation & Traffic Association was held at the headquarters of the association in New York on Monday, Nov. 27. Those present were: President, J. N. Shannahan, New York; W. O. Wood, New York; J. Stanley Moore, Syracuse, N. Y.; C. B. Buchanan, Richmond, Va.; Dana Stevens, Cincinnati, Ohio; H. E. Reynolds, Boston, Mass.; H. W. Fuller, Chicago, Ill.; A. Gaboury, Montreal, and H. A. Nicholl, Anderson, Ind.

The first order of business was a discussion of the resolution to dispense with the reading of papers in open meeting as presented at the last convention by W. B. Rockwell, manager Eastern Pennsylvania Railways, Pottsville, Pa. In accordance with a motion made by Mr. Stevens, the committee decided to adopt this plan so far as long reports are concerned. At future meetings the chairman of each committee which has a long report will be instructed to prepare and read at the convention an abstract of his report instead of the full report. The committee also decided that the secretary will call the attention of city and interurban roads to those papers and reports which are of particular interest to each class.

COMMITTEE ASSIGNMENTS

The execuive committee then proceeded to indicate the lines which should be followed by the various committees appointed by the president. The first subject was "City Rules." It was suggested that a further elaboration of the prepayment car rules would be advisable. Upon motion of Mr. Buchanan, it was decided to arrange for a joint meeting of the committees on city and interurban rules, preferably before the annual meeting in January, to harmonize inconsistencies in the present city and interurban codes. The chairmen of both committees will also be asked to make a joint inquiry into all laws and public utility commission rulings to learn whether any of them conflict with regulations in the two codes.

Upon motion of Mr. Nicholl, the interurban rules committee will be asked to systematize terms and to endeavor to work together with the American Railway Association in the contemplated revision of that portion of the steam association's code which is applicable to joint steam and electric operation. This committee will also be asked to prepare rules on block signal operation, conferring, if necessary, with the block signal committee of the Engineering Association. President McCarter, of the American Association, will be asked to sign a letter prepared by the city and interurban rules committees, inquiring of member companies whether they have adopted the codes, and, if not, the reasons therefor.

Upon motion by Mr. Nicholl, a resolution was adopted that it would be desirable to have not less than 50 per cent of the members of the committees on city and interurban rules reappointed from year to year. It was felt that this practice would eliminate a great deal of the preliminary work which now has to be done by new members because of their unfamiliarity with the reasons which led to the conclusions of earlier committees.

The committee on the training of transportation employees will be asked to consider methods of engaging employees between the periods of their application and their acceptance, the training of interurban employees, forms for permanent records of employees, minimum breaking-in period for both city and interurban men, uniform records for use during the breaking-in period, regulations affecting the employment of trainmen, and merit and demerit systems. This committee will also be requested to arrange a meeting with representatives of the Claim Agents' Association to discuss problems of mutual interest.

In outlining the work for the committee on express and freight traffic, Mr. Reynolds suggested that it could do much good in compiling information on rates, hours of service, the desirability of adding pick-up and wagon delivery service, the design of terminal lay-outs, the laws relating to the handling of express and freight traffic by electric railways, and, in fact, any information that would be of value to companies which contemplated entering the express and freight field. The data so secured should be on file for reference in the secretary's office. The secretary will also ask the member companies what line of inquiry would be of most value to them.

It was suggested that the principal work of the joint committee on express and freight accounting should be a study of the ton-mile basis.

In discussing the work of the committee on passenger traffic, Mr. Moore said that previous committees had thoroughly covered the promotion of summer traffic through parks and the like. There was still much to do, however, in other lines, such as chartered-car rates, parlor cars, chair cars, winter resorts, the handling of foreign cars and interline tourist business.

Mr. Nicholl said that recently some travelers from San Francisco had purchased in their home city a combination ticket which included transportation over electric lines in Indiana.

Mr. Reynolds referred to the exhibit which his company had made at the New England Products Exposition as described in the ELECTRIC RAILWAY JOURNAL of Oct. 21, 1911, page 906. This display of the products along the lines of his company and the listing of land available for factory and other purposes had brought more than 2000 inquiries.

Mr. Buchanan had found it a good thing to sell mileage books which were not restricted to one person.

The suggestion was made that more through business might be obtained by increasing the number of "limited" cars. Mr. Moore said that it was desirable to educate the public to the advantage of these cars having but one or at most a very few stopping points in every town along the route instead of making many stops.

Mr. Fuller alluded briefly to the burden which many street railways must carry in cities where the working hours of almost all of the factories are alike. In Washington, for instance, he had been asked for a rush-hour service which would have given many of the cars only one load a day. It was desirable, therefore, that large employers of labor should be prevailed upon to change their labor schedule so that the traffic load would be spread over a longer period.

Mr. Fuller also suggested that the committee prepare standard definitions of such terms as dispatcher, car starter, day car, trip card, etc. Upon motion of Mr. Buchanan, it was decided to have the president appoint a committee of three to standardize the terms used by the transportation department.

The committee on schedules and timetables will be asked to consider such question as rules as to misses, carhouse records boards showing seniority and working lists, methods of keeping the time of trainmen, forms of detention reports, meal time and layover time, desirability of showing trippers and extras on the regular schedule and the operation of trains according to classification.

It was also the sense of the committee that a working timetable should include the speed limits permitted in the various municipalities, a list of surgeons and a list of stop numbers and the distances between them. It was pointed out by Mr. Wood, however, that it would be dangerous to include extracts from the rule book, as this might create the impression among the trainmen that the other rules were of less importance.

Upon motion of Mr. Nicholl, the president was requested to appoint a committee of three to work with a like committee of three from the Engineering Association to report on multiple-unit train operation.

There were no additional instructions for the committee on block signals.

The final business was the adoption of a motion made by Mr. Stevens that a committee of three be appointed to study the merits and demerits of the car mile, car hour, seat mile and other traffic units and determine their value as units of comparison of operating results on different properities.

The meeting was then adjourned.

HEARING BY MASSACHUSETTS COMMISSION ON FENDERS

The Massachusetts Railroad Commission gave a public hearing at Boston on Nov. 28 in accordance with Chap. 74 of the Acts of 1911, which requires the board to investigate the equipment of street cars with fenders and wheel guards and to report upon the subject to the next Legislature. The hearing followed various tests of the working of typical fenders on a track at Newtonville, Mass., as described on page 919 of the issue of this paper for Oct. 21, 1911. Many officers of the larger street railway systems in eastern Massachusetts were present, and the consensus of opinion as presented to the commission was that the modern fender and wheel guard cannot attain the maximum usefulness until the paving and street conditions at the top of the rail are much improved.

President W. A. Bancroft, of the Boston Elevated Railway Company, said that his attention had been attracted to the fender question about seven years ago by a cablegram received by him when on a European trip, requesting him to visit Liverpool, Eng., at the suggestion of the commission, to investigate the use of protective devices in that city. He became convinced that for Liverpool conditions the problem had been as nearly solved as possible, although it appeared that no fender could completely prevent the results of accidental contact with a moving car. The majority of injuries seemed to occur at the side of the car rather than at the ends. The good results at Liverpool were in large measure due to the smooth pavement, which permitted the carrying of the wheel guard within about 2½ in. of the rail. Liverpool had never had a human being pinned beneath a car since the present type of wheel guards was adopted. In Boston it was not feasible to carry any fender close to the rail, on account of the irregularity of the pavement. Gen. Bancroft said that 291 surface cars would soon be fully equipped with fenders designed by H. L. Libby, of the company. These cars were of the prepayment type, and were also equipped with two wheel guards surrounding the trucks. In the Newtonville tests the dummy was in no case pinned beneath the car but was pushed along or deflected by the guard, the protective equipment being lower than was possible in Boston on account of the smooth roadway upon which the track was laid. The Boston Elevated company had invested nearly $5,000,000 in streets and paving between and adjacent to tracks, and intended to improve this construction so that the guards and fenders might be carried lower. This work could not be done all at once, however. Temporary crossovers and carhouse transfer tables militated against carrying fenders as low as was desirable from the protective point of view. The company was keenly interested in the fender problem, but the result of its studies and experiments indicated that the best which could be done was to prevent human beings from being pinned under the equipment of a car. On a smooth track, using both fenders and wheel guards, the company could generally be sure of pushing the individual off the track, but the weight and speed of modern rolling stock made the momentum of the blow inevitably dangerous.

R. S. Goff, general manager of the Bay State Street Railway Company, concurred with Gen. Bancroft. On the lines of this company, which include many miles of suburban and country trackage, life guards must be carried from 4 to 4½ in. above the rail, on account of the uneven roadway. Mr. Goff cited the bad effects of frost on track surface, and stated that in his opinion no fender fully met the conditions of service now existing.

President C. Q. Richmond, of the Berkshire Street Railway, Pittsfield, cited the difficulties of maintaining satisfactory fender heights in western Massachusetts, where the weather conditions were even more severe than around Boston. E. P. Shaw, Jr., general superintendent Boston & Worcester Street Railway, stated that his company used the Pfingst fender, the elevation being about 10 to 12 in. above the rail. He was opposed to the drop type of fender. Gen. Bancroft called attention to the fact that the wheel guard facilitated plowing snow. Replying to an inquiry, he stated that while the use of a guard might slightly delay getting at trucks and equipment in case of trouble, the benefits outweighed the disadvantages. E. S. Wilde, general manager Union Street Railway Company, New Bedford, said that a minimum height of 4½ in. was necessitated in fender practice on his road, on account of plank crossings. John H. Carter, Boston, also spoke in criticism of the drop type of fender. The board took the subject under advisement.

TRANSFER ORDER TO BE ISSUED IN NEW YORK

The Public Service Commission of the First District of New York has instructed the counsel of the commission to draw up a formal order directing the street railways in Manhattan and the Bronx to restore free transfers at 151 points in addition to about 160 points in the two boroughs at which transfers are now exchanged between different routes under the same management. The additional points to be established under the order will include points at which the routes of companies under separate managements intersect. It is expected that the companies will appeal to the courts in case this order is issued. Douglas Robinson, receiver of the Metropolitan Street Railway, and F. W. Whitridge, receiver of the Third Avenue Railroad, when interviewed, are said to have refused to comment on the proposed action of the commission, saying that the subject was a matter to be considered by the reorganization committees. Guy E. Tripp, chairman of the committee of bondholders of the Metropolitan Street Railway, is, however, reported to have said that the Metropolitan Street Railway will probably contest the proposed order. George W. Linch, receiver of the Second Avenue Railroad and the Central Park, North & East River Railroad, refused to be quoted.

The hearings before the commission were long drawn out and have been reported in the Electric Railway Journal. It is quite possible that the commission anticipated that the case would go to the courts if in favor of transfers, because it exercised great care in rulings on the testimony which was submitted and in the admission of evidence, realizing that the courts might hold that it had prejudiced the case.

The extension of the Central London Railway, London, Eng., from the Bank to Broad Street and Liverpool Street is expected to be ready for traffic in June, 1912. Five hundred trains a day will use the new station, which will be provided with an escalator platform between the two stations. Twenty-six minutes will be allowed for the full journey between Wood Lane and the new eastern terminus. The half mile of double tunneling will cost $564,000, this sum also including the purchase of certain property which will enable a widening of the street to be effected by the civic authorities. About 180,000 persons leave Liverpool Street Station in a day and 70,000 depart from Broad Street.

THE SULZER STEAM TURBINE

The result of balancing the advantages and disadvantages of impulse and reaction turbines has been the so-called "combination turbine" which was first successfully introduced in 1904 by Sulzer Brothers, Winterthur, Switzerland. In this system the high-pressure part of a reaction turbine is replaced by a single impulse wheel, in which the greater part of the drop of temperature is converted into kinetic energy, so that only slight drops and low temperatures fall to the share of the low-pressure stages. The intermediate diaphragms, with their packings, which are most troublesome in working, are dispensed with, the over-all length is rendered short, the weight is greatly reduced, the shaft is very rigid and the axial thrust is small. The design is intended to insure great economy of steam, absence of any risk in applying high degrees of superheating, little axial thrust and high efficiency. In brief, this turbine consists of an impulse turbine with partial admission as the high-pressure stage and a reaction turbine with full admission as the low-pressure stage. The following is a detailed description of the latest type of Sulzer turbine:

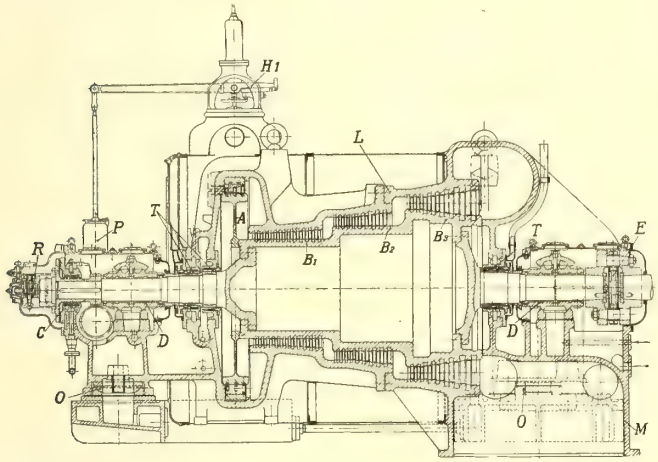


Fig. 1—Cross-Section of 10,000-hp Combination Turbine

Fig. 1 is a longitudinal section and Fig. 2 shows a 10,000-hp turbo-generator. Fig. 3 shows the construction and the connection of the various regulating organs of the turbine, wherein the parts seen from the front of the turbine are cut in a vertical plane. The letters in Figs. 1 and 3 refer to the table on page 1171.

DETAILS

The sections of the cast-iron casing *L* (Fig. 1), constituting the upper end and the lower half respectively, are permanently joined by screws at the vertical flanges so that to open the turbine it is only necessary to unscrew the horizontal flanges. The casing is supported on the base-plate at three points; that is, by one pedestal *O* (Fig. 1), at the high-pressure end, and two at the sides of the exhaust neck, arranged to slide in special guides so as to follow the expansion of the casing by heat. In view of the high temperatures the nozzle chamber *K* (Fig. 3) is made independent as a separate steel casting screwed on to the turbine casing. The nozzle segments are machine-cut out of solid metal.

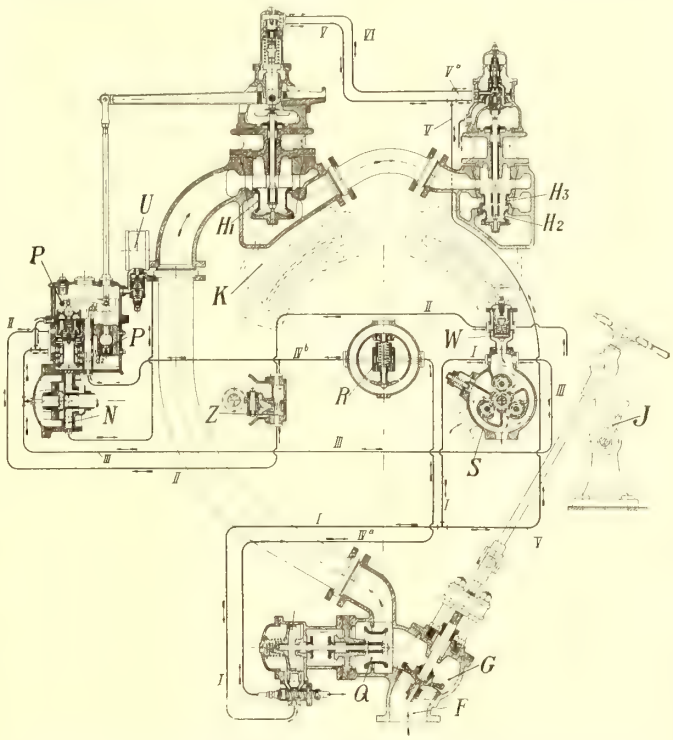


Fig. 3—End Cross-Section of 10,000-hp Turbine, Showing Oil-Pressure System

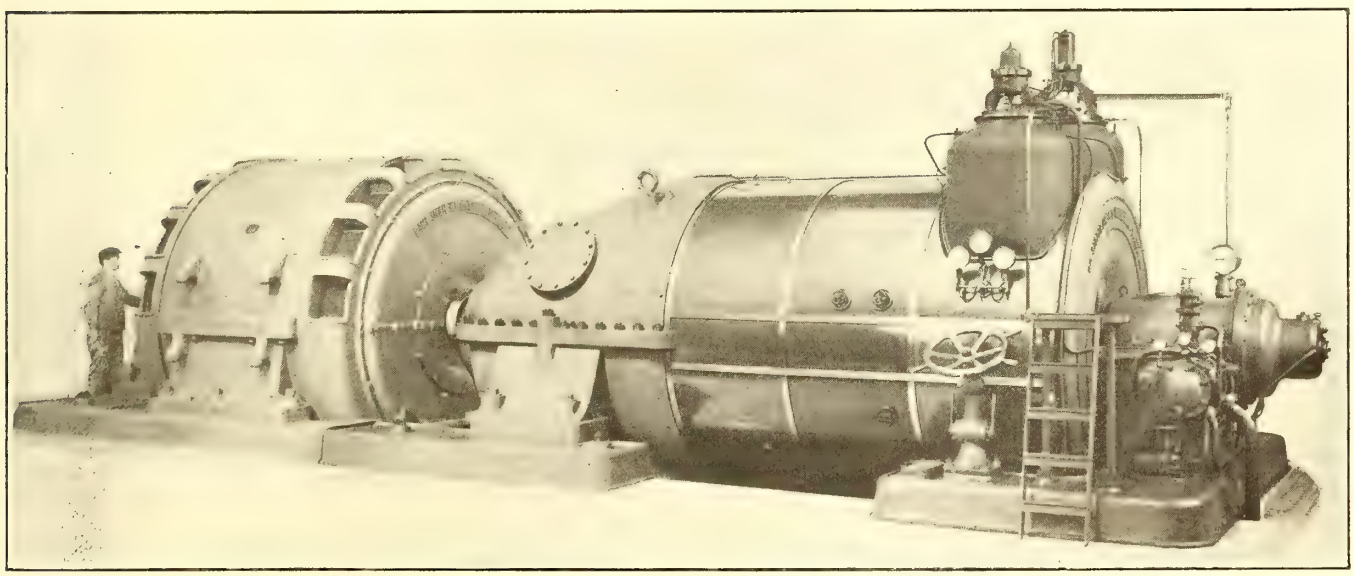
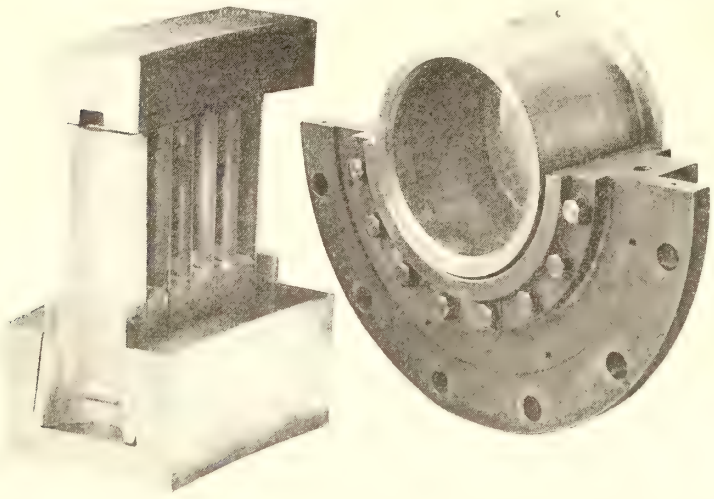
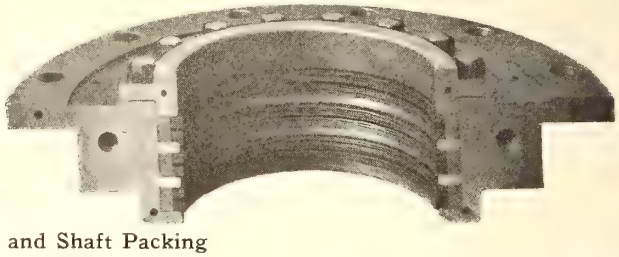


Fig. 2—Turbo-Generator Set of 10,000-hp Capacity

The shaft or rotor *B* (Fig. 1) consists of a hollow steel drum, machined inside and out, with solid, polished shaft-ends joined to the rotor by flanges.

The fastening of the blades (Fig. 4) is done without riveting or calking and therefore does not call for skilled workmen. A ridge on the concave side of the drop-forged distance block corresponding to a notch in the back of the blade firmly secures the latter. The high-temperature blades are made of special steel and the low-temperature blades of special bronze.





Figs. 4 and 5—Blade Fastening and Shaft Packing

Seamless rolled shroud rings are shrunk on around the blades of the impulse wheel *A* (Fig. 1), thus closing the steam passage on the circumference (Fig. 4). The cast-steel bearings *D* (Fig. 1) are arranged to adjust themselves automatically in true alignment with the shaft. Lubrication is effected by cooled oil circulated under pressure. The shaft packings (Fig. 5) are frictionless; they are not affected by longitudinal displacement of the shaft and require neither lubrication nor readjustment. They consist of a large number of thin brass segments, ground to the diameter of the shaft and tightened up into firm packets with interposed segments of wider bore. A specially designed coupling *E* (Fig. 1) is employed to join the shaft of the turbine to that of the generator. This coupling is arranged to compensate differences in the position of the two shafts. The slight axial thrust which arises from the low-pressure side is taken up in the smaller sizes by a simple collar thrust bearing and in the larger sizes by an oil-balancing disk *C* (Fig. 1). The oil is delivered by a special pump into the space between the thrust-balancing disk and the thrust-block. Thence it escapes through the annular slot at the periphery of the disk, which is narrowed in proportion as the axial thrust increases, thus automatically regulating the oil pressure.

THE OIL-PRESSURE SYSTEM

The most characteristic feature of the turbine is the oil-pressure system (Fig. 3). Oil is used not only for the lubrication of the bearings, but part of it serves to operate all the controlling and safety mechanism of the turbine, namely, governor *N*, servo-motor *P*, speed-changing device *W*, overload valves H_2, H_3, emergency governor *R*, thrust-balancing disk, emergency stop-valve *Q* and change-over valve to work "non-condensing." The oil pump *S*, worked by the worm-driven transversal shaft, keeps the pressure of the oil system constant at about 22 lb. per square inch. After circulation all oil is collected and conducted into coolers and filters upon which it is drawn up by the pump for use over and over again.

The governor *N* consists of a centrifugal pump-impeller keyed on the same transversal shaft as the oil pump. The additional pressure generated by the impeller acts upon a spring-loaded piston valve and upon the servo-motor piston which controls the steam admission valve. Any change of oil pressure, that is, speed of the turbine, causes a displacement of the spring-loaded piston valve, thus admitting oil to the servo-motor or relieving the same. The difference of speed between full load and no load depends upon the law according to which the force of the spring varies.

Rough regulation is effected by opening or closing whole groups of nozzles, but fine regulation is obtained by throt-

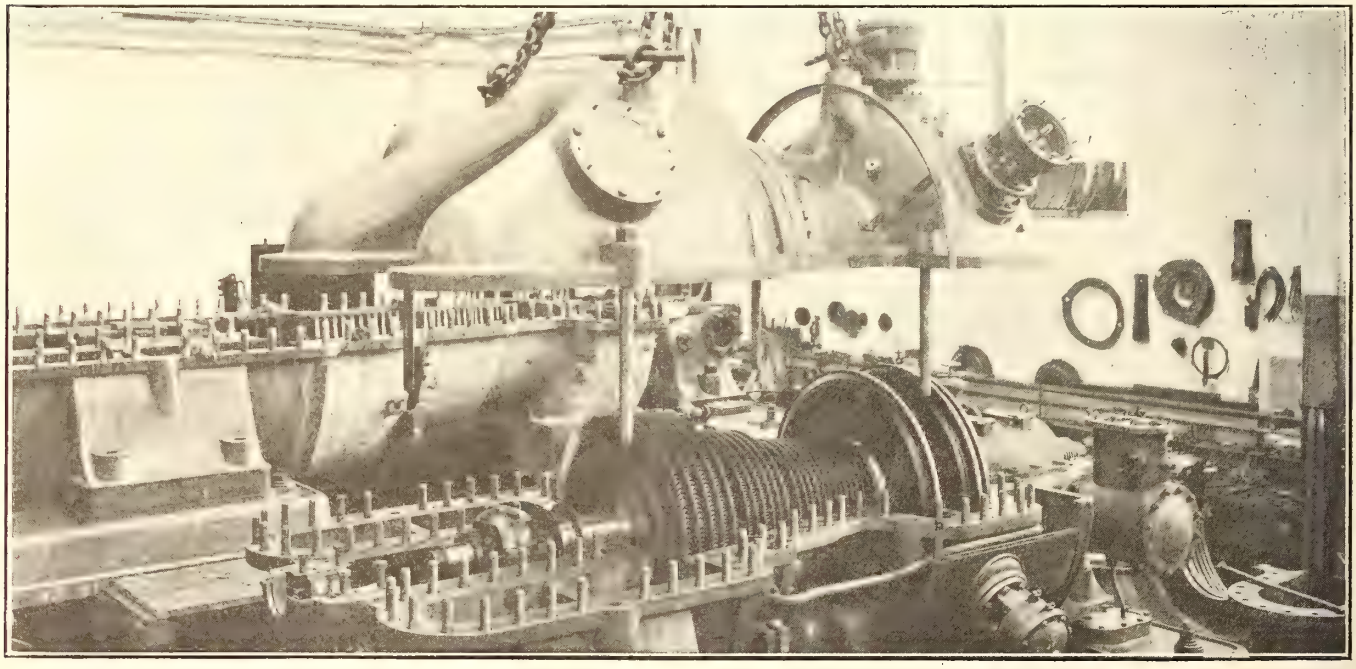


Fig. 6—Tapped Turbine with Upper Casing Removed

tling. In order to increase the precision of the governing action by eliminating the friction of rest an oscillating device Z acts upon the oil system and keeps the whole column of oil, and all the parts connected therewith, in constant motion. The speed-changing device W can be worked by hand or from the switchboard while the turbine is running. It consists of a reduction valve, admitting oil to the upper face of the spring-loaded piston valve of the servo-motor, thus supplementing more or less the force of the spring. By alteration of the passages of the speed-changing valve the turbine speed can easily be fixed within the necessary limits.

To prevent racing of the turbine there is provided an emergency governor R which has its centrifugal weight arranged to form a slide-valve piston and which, as soon as the admissible speed of revolution of the turbine is exceeded by about 10 per cent, releases the pressure of the oil-pressure system, whereby the main throttle valve H, and a second "emergency" throttle vale Q inserted between the main stop valve G and the main throttle valve H, are closed at once. All these parts are arranged to open only when a full oil pressure exists, otherwise they are always closed and it is impossible to start the turbine unless the oil system is under pressure. Hence to start the turbine an auxiliary oil pump is employed to generate pressure in the oil system before starting. This pump is stopped as soon as the turbine is in normal action.

STEAM TURBINES FOR SPECIAL PURPOSES

The Sulzer designs can be adapted for use as exhaust turbines, mixed-pressure turbines, tapped or bleeder turbines and back-pressure turbines. In the exhaust turbine the irregular supply of steam is equalized by heat accumulators between the reciprocating engine and the turbine. If the exhaust steam alone does not suffice, the mixed-pressure turbine is employed. This consists of two impulse wheels with a reaction drum behind them. Normally, the second impulse wheel and the reaction drum only are at work, but as soon as the exhaust steam falls short of a certain pressure live steam is automatically admitted to the first impulse wheel, expanding in it down to the pressure of the low-pressure steam and mixing in the second impulse wheel with the exhaust steam supplied from the reciprocating engine.

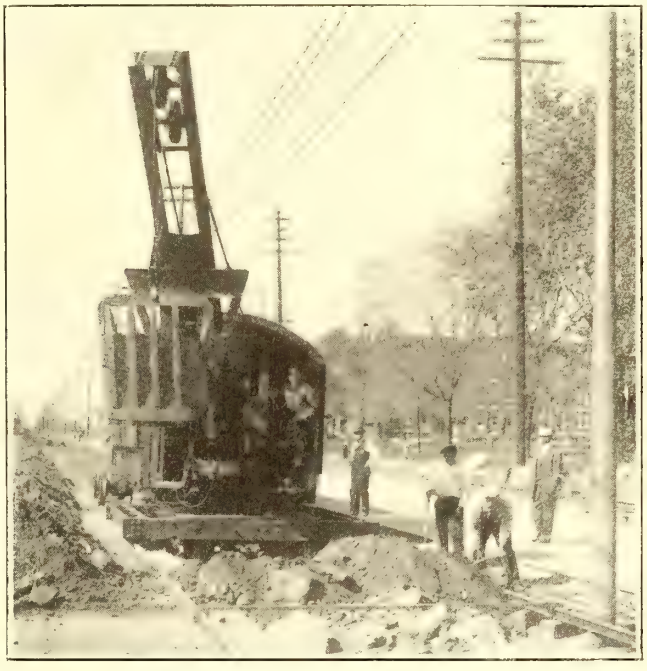
When some of the steam of the turbine at a stated pressure is required for other uses, say for boiling or heating, the turbine adapted is a tapped or "bleeder" turbine which is constructed like the mixed-pressure turbine. Fig. 6 shows one of these turbines at the shops and with cover open. All of the steam is expanded in the first impulse wheel down to the pressure at which a supply of steam is to be tapped from the turbine and is then partly carried off by a supply pipe for other uses and partly passed on to the second impulse wheel, while the pressure at which the steam is tapped is maintained at a uniform level in case of varying loads by means of a mercurial governor. When all of the exhaust steam of the turbine is required for other purposes the turbine used is a back-pressure turbine, which resembles the ordinary steam turbine in construction except that it is of shorter all-over length. If the back pressure (or the pressure at which the steam is to be carried off) is sufficiently high, the reaction turbine portion may even be dispensed with entirely.

TABLES SHOWING NAMES OF PARTS OF COMBINATION TURBINE.

A, Impulse wheel.
B_1, B_2 and B_n, reaction drum.
C, Thrust-balancing disk.
D, Bearings.
E, Elastic coupling.
F, Live steam inlet.
G, Main stop-valve.
H_1, Main throttle valve with yoke and governing gear.
H_2 and H_3, Auxiliary valve with yoke.
I, Engineer's foot-plate with lever for drain-cock and change-over valve (if any).
K, Nozzle chamber.
M, Steam exhaust branch.
N, Hydraulic governor.
O, Supporting feet.
P, Oil servomotor for governor.
Q, Safety or emergency stop-valve.
R, Safety or emergency governor.
S, Oil pump for bearings.
T, Shaft packings.
U, Tachometer.
W, Speed-changing adjustment.
Z, Oscillating device.

ELECTRIC SHOVEL FOR CITY TRACK TRENCH EXCAVATION

The United Railways Company, of St. Louis, has obtained very satisfactory results with an electrically operated shovel which is used to excavate trenches for new and rebuilt track. The shovel installation and the preliminary work leading to the determination of the most efficient methods of use were made under the supervision of Richard McCulloch, assistant general manager. By means of the shovel a trench 21 in. deep, to accommodate ballast, ties and a 9-in. rail, is excavated under city conditions at the rate of about 300 ft. of track in ten hours. It is expected, however, that this rate of digging will be considerably exceeded next year after more experience has been had in the operation of the electric shovel. Trench excavation in the suburbs in clay soil can be made at a faster rate. It has been found most economical to rough out the trench with the shovel, which leaves a smooth bottom, and then shape the sides of the trench with hand shovels. In this way the electric shovel is pushed forward as fast as it can be done and the trimming is done by hand. With three or four laborers the electric shovel is thus used to its full capacity. Track trenches may be excavated and the dirt placed on the adjacent pavement at one-half the cost for hand labor.



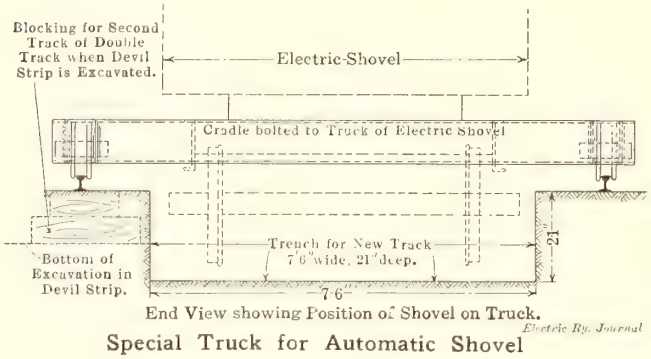
View of Shovel on Paved Street, Showing Cradle Support and Wide-Gage Track

The labor cost is still less if the street conditions permit loading from the shovel directly into cars or wagons.

The type of shovel used is the No. 0 size, manufactured by the Thew Automatic Shovel Company, of Lorain, Ohio. It is constructed entirely of steel and has a ⅝-cu. yd. capacity dipper, supported by a structural-steel boom and operated by chains and a ½-in. steel lifting cable. The shovel boom and cab are mounted on a common base, which is supported on a steel subframe in such a way that the boom and the cab may be swung to either side at the will of the operator. The sub-carriage wheels are connected by gears with the single 30-hp motor which operates the entire shovel. This motor, through different trains of gears and winches, not only does the digging and swings the boom for depositing the material at the side of the track but also serves to propel the shovel along the street.

When a trench is to be dug, say in the suburbs in an ungraded street where the depth of the excavation will be 3 ft. or 4 ft. deep, the truck on which the shovel is mounted is run on 4-ft. sections of temporary track which can be

moved from the rear to the front of the shovel as the work proceeds. As earlier stated, the shovel propels itself along these rails under the control of the operator and is mounted on 27-in. flanged street-car wheels. In paved streets, however, the shovel needs to be advanced much faster, because the shallow trench is more quickly excavated, and thus a cradle had to be devised for mounting the shovel truck over



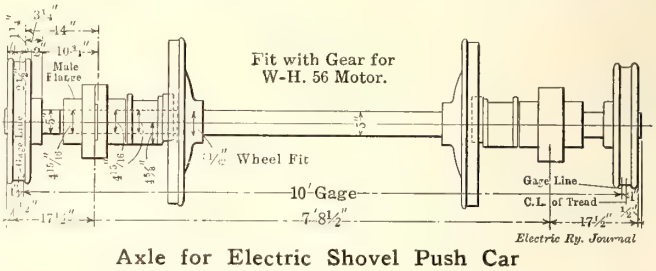
Special Truck for Automatic Shovel

the trench on the temporary track which could be built somewhat in advance of the work. To provide support for the shovel when digging in paved streets, rails are laid on each side of the trench to a 10-ft. gage, being placed directly on the pavement and held by temporary spacing rods clamped over the railheads. A special cradle was built in the United Railways shops to carry the electric shovel truck on these rails at 10-ft. gage. The cradle is bolted to the truck of the electric shovel. It is built of 10-in. channels reinforced at the corners and carrying four 12-in. double-flanged running wheels which support the cradle and in turn the truck on the 10-ft. gage temporary tracks.

The position of the electric shovel, its truck and the cradle over a trench in a city street is illustrated in one of the half-tone views, and a cross-section showing the position of the shovel in relation to the trench is published in a line cut on this page.

It will be noted that when supported by the cradle the propelling mechanism of the electric shovel is useless, because the shovel wheels are held free of the ground by the cradle; therefore when working in paved streets a push car is coupled to the rear of the shovel. At first an electric windlass, such as is used for pulling feeder cables into conduit, was tried for advancing the shovel along paved streets, but the windlass and connecting ropes occupied so much of the street that this method was abandoned and the push car scheme was tried and found very satisfactory.

The push car is an old single-truck, two-motor street car to the axles of which have been added extensions with double-flanged wheels designed for the 10-ft. gage of the temporary shovel track. These axle extensions are bolted onto flanged couplings which are fastened to the ends of the car axles, as shown in an accompanying illustration. Three or four rail lengths of temporary track are laid in

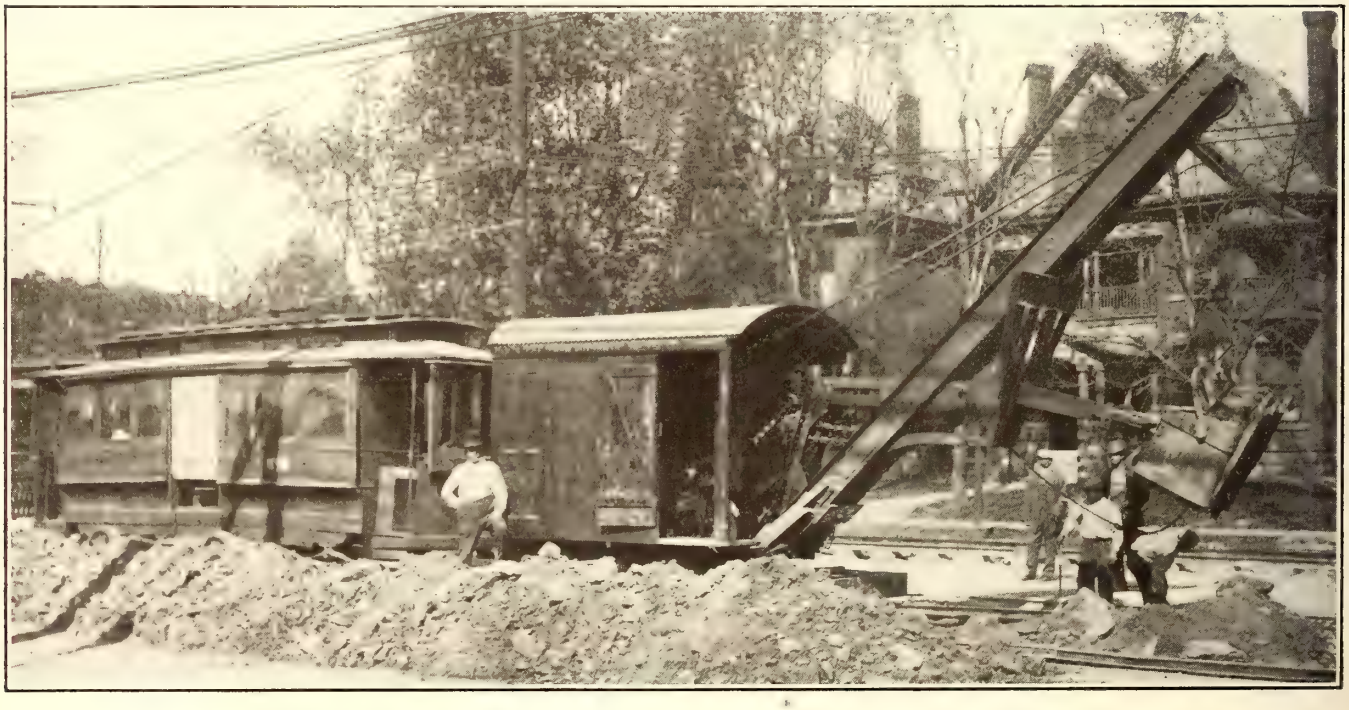


Axle for Electric Shovel Push Car

advance of the shovel. The shovel can be moved forward and back as desired by the use of the motors on the push car.

The body of this type of shovel has a very short overhang and the shovel can be operated continuously without interference with cars passing on an adjoining track. It is said to be one of the few electric shovels which meet this condition. This was one of the reasons for choosing this particular type.

When excavating within the congested district during the daytime the material is deposited on the pavement, but at night, when the line is free from cars, it is deposited directly into dump cars. During the night also the electric shovel may be run back over the scene of its day's work and used to reload the excavated material into the dump cars. This shovel is said to work satisfactorily in the hardest kind of subsoil. Trenches are dug at a good rate of progress in macadam pavement with a Telford foundation. It is the practice of the United Railways, when tearing up old track, to remove the rails and the ties by pulling them up with cranes. This method leaves some ties embedded in the dirt. These are easily removed by the shovel as it excavates the new trench.



Electric Shovel and Push Car Digging a Shallow Trench in Paved Street

LONDON LETTER

(From Our Regular Correspondent.)

A bill is to be introduced in Parliament to secure power to construct an underground electric railway to connect the railway stations in Manchester. The capital stock of the company will probably be £1,000,000. The road will be 4⅓ miles long. The speed of the trains is to be 15 m.p.h.

The conductors of the Sheffield Tramways are now requesting passengers who board the cars at stations other than the busy city stopping places, and intend to ride on the upper deck, to pay their fares on the platform before mounting. The object is to lessen the number of journeys of conductors to the top deck to collect fares and give them more time to attend to their actual duties as conductors. The patrons look upon the request as reasonable and to their own advantage and comfort.

The City Council of Oxford has a contract with the National Electric Construction Company to complete the construction of a combined conduit and overhead system by Jan. 1, 1913. The company approached the Council recently and explained that it was difficult to raise the necessary capital for the combined system, since a similar system at Bournemouth has been abandoned owing to the general inconvenience to passengers and the operating expenses. The company recommended that the overhead system should be used for the entire line, but the City Council has declined the proposal.

The stockholders of the British Electric Traction Company have adopted the amended scheme of reorganization outlined in the ELECTRIC RAILWAY JOURNAL of Nov. 4, 1911, page 1005. Although no pledge has been given, it is understood that on account of the sacrifices made by the preferred stockholders the suggestion to reduce the capital will not be revived.

The East Ham Municipal Tramway shows a deficit of nearly £4,000 for the year as the result of spending a large sum of money on renewals. The gross revenue increased £2,000 over the previous year, but the operating expenses increased £5,500 over the previous year. As there was no reserve fund upon which to draw, all the renewals had to be charged to operation. In previous years the Council has handed over the surplus to the relief of the rates and carried only a small reserve. In the report of the engineer and manager it was stated that maintenance had been increased by the excessive wear caused by motor buses run in competition with the tramway, and it was pointed out that there seemed to be no way to make the bus companies bear any part of the cost of repairing the roads.

The scenery at Bath is very beautiful, and the Bath Electric Tramways has added to its rolling stock two motor charabancs which each accommodate twenty-eight persons to make excursions to parts of Bath not reached by the tramways. Last summer nine excursions were made every week. The company has opened a bureau in London where seats may be booked. Photographs of the places of historical interest at Bath are also exhibited at the London office.

Philip Dawson, the consulting electrical engineer of the London, Brighton & South Coast Railway, has announced that for some time past the company has been preparing plans and estimates for the electrification of its line as far as Brighton. So great was the success of the electrification of the South London line and the extension from Victoria to the Crystal Palace that the use of electricity to Brighton was inevitable. Mr. Dawson hopes to complete the report on the question of the electrification of the main line to Brighton inside of another year. Mr. Dawson will then be able to put before the directors a complete tender for the work so that it can be proceeded with at once if favorably considered. With the present terminal facilities in London and Brighton it is practically impossible to improve the service as run by steam trains. With electricity as motive power service could be doubled, and fifteen-minute trains could be run. The express trains could make the journey in from forty to forty-five minutes, and Brighton, though 50 miles from London, would in a measure become a suburb of London.

Work has been begun on the extension of the Charing Cross and Hampstead tube, which will give direct access to the Charing Cross Station of the District Railway and to the Bakerloo tube at the Embankment station. The new terminus for the Hampstead tube will be built under the Embankment Gardens, to the east of the present station of the District Railway, and an escalator will be provided to carry passengers from the one station to the other. An escalator will also be installed between the Charing Cross station and the Bakerloo Embankment station and the two tube stations on the deep level will be connected by tunnel. The attempt to effect a physical connection between the three railways for the interchange of rolling stock has been given up.

The sum of £11,600,000 has been invested by the London County Council in tramways, and of this only £2,000,000 has been repaid. To complete the Council's present schemes £2,500,000 more will be required. Comparing the tramways and the bus lines, Sir Marcus Samuel said recently that the London General Omnibus Company, with a capital of only £2,500,000, carried 8,000,000 passengers a week, as compared with 10,000,000 for the tramways. Where there is competition between the omnibus and the tramcar the omnibus appears to get more than its share of the traffic. In this connection it is interesting to note that the Council has decided not to proceed with the proposed tramways from Marble Arch to Cricklewood, and the plan to install tramways on the new St. Paul's Bridge has also been put off for the present.

A composite committee from both sides on the London County Council is to be formed to inquire into the future of the electric supply in London and to form rough proposals to be submitted to the Council.

The Town Council of Brighton will promote a bill in Parliament to construct a trackless trolley system in Brighton. The deputation which visited Bradford and Leeds has reported favorably on the trackless trolley, and it is hoped that the adjoining town of Hove will apply for powers so that the two systems can be connected. The Corporation of Hull is also considering the extension of its tramway to Stoneferry and may decide to use the trackless trolley. In Yorkshire there is a scheme to install trackless tramways from Guiseley to Otley and Ilkley, a distance of about 6½ miles. The Corporation of Dundee has ordered some trackless trolley cars. The tramway committee of the Edinburgh Town Council has decided not to apply to Parliament for permission to install the trackless trolley as the members of the Council wish to investigate further the new motor omnibuses placed in service recently in London.

The following operating statistics have been made public by the Sheffield (Eng.) Tramways relative to the cost of repairs and renewals on that system during the year: Car mileage, 7,618,383; car mileage per mile of single track, 96,161; total cost of repairs, £5,370, and of renewals, £19,385; cost of repairs per mile of single track, £67, and of renewals, £244; cost per car mile of repairs, 0.169d., and of renewals, 0.610d; combined cost of repairs and renewals per mile of single track, £312, or 0.779d. per car mile.

The London & North Western Railway has announced that the North London Railway, which it operates, will be electrified and that the new electric railway which it is building from Watford to Euston will be modified. This is to be a surface railway from Watford to Willesden, but an underground line from Willesden to Euston Station. It has, however, been decided to build the London & Northwestern line only to Queens Road. From that point a new tube will be built by the London Electric Railway to connect with the Bakerloo tube. This will permit suburban traffic to reach the West End of London. The line from Earl's Court and Kew Bridge to Willesden, the Hampstead Junction line from Willesden to Camden Town, and other sections, will also be electrified. A. C. S.

G. M. Patterson, chairman of the official map committee of the Central Electric Traffic Association and general freight and passenger agent of the Toledo & Chicago Interurban Railway, Kendallville, Ind., announces that the ballot on the advisability of jointly publishing a map to cover all the interurban railways in the Central Electric Traffic Association territory has been carried. Forty-four of the fifty-three lines interested so far have approved the plan. It is expected that proofs of the map will be available in January.

News of Electric Railways

Conference with Pennsylvania Railroad President on Pittsburgh Transit Matters

E. V. Babcock and J. P. Kerr, members of the City Council of Pittsburgh, Pa., conferred in Philadelphia on Nov. 23, 1911, with James McCrea, president of the Pennsylvania Railroad, in regard to the problem of providing Pittsburgh with improved means of rapid transit. Following the conference an official statement in regard to the matter was issued by the Pennsylvania Railroad in which it was stated that the attitude of the company had been explained to Mr. Babcock and Mr. Kerr and that any further information should come from them. Subsequently Mr. Babcock said:

"While we received no encouragement from President McCrea as the head of the Pennsylvania Railroad, he made several suggestions that will be helpful in solving our transit problem. While we are disappointed in failing to get the support that we expected from the company, both Mr. Kerr and I are well pleased with the outcome of the conference. We explained that the Pennsylvania Railroad was best prepared financially to take the matter up, and gave Mr. McCrea our ideas as to how the railroad could benefit and at the same time solve the transit problem. We explained that it was the opinion of those who had taken up the matter before it was presented to Councils that the Pennsylvania Railroad and the Pittsburgh Railways could agree on some plan between them which would prove beneficial to both sides. The needs of our general public were fully gone over by all, and we pointed out that the Pennsylvania Railroad might build a subway under its right-of-way from Wilkinsburg and also an elevated on its present tracks. At the end of our interview Mr. McCrea said that he regretted that the company could not assist the project in any way. He said the railroad was bending its efforts toward improving the through traffic facilities and that at this time it was not taking up questions relating to short hauls. We could not get even the encouragement that there was a possibility of the railroad taking the matter up at a later date. We were given to understand that, as far as the company was concerned, there could be no help from that source to the project which is now before the Council of Pittsburgh."

A. E. Anderson, counsel for the Painters' Run Railroad, has sent a letter to Councilman W. G. Wilkins, chairman of the committee on public service and surveys, covering the subway proposition, in which he points out that his company will pay to the city for the franchise at least $2,500,000 in the first twenty-five years of the operation of the system. His company agrees, he says, to file with Council within six months contracts and full specifications and complete the first line within three years.

Report of Special Master at Kansas City

According to the report filed by Hermann Brumback, special master, with Judge W. C. Hook in the United States Circuit Court at Kansas City, Mo., $8,274,840 will be required in the next ten years to rehabilitate the physical property of the Metropolitan Street Railway in Kansas City, Mo., and Kansas City, Kan. The two cities petitioned the court to require the receivers of the company to make repairs to tracks, roadbed and paving and furnish additional cars to keep the service up to the requirements of the agreement between the company and the cities. Judge Hook amended the petition by directing the master to base his findings on possible requirements covering ten years. The representatives of the cities maintained that the service should be improved immediately at an estimated outlay of $3,000,000, which would include sixty-seven new cars at $7,000 each.

The report urges the extension of the Woodland-Holmes line to connect with the Swope Park line and the construction of a connection between the Dodson and Roanoke lines. The proposed extension of the Indiana line to Swope Parkway, the proposed Sixty-third Street crosstown line and the extension of the Troost Avenue line south on Troost hill are denied. Mr. Brumback's report indicates that more cars are needed, and he recommends an expenditure of $877,000 for cars, divided as follows: Fifty-four new cars, $378,000; fifty cars, bought but not paid for, $240,000; twenty-four new cars for extensions, $168,000, and thirteen new cars for emergencies, $91,000.

Publicity in Syracuse

The Syracuse (N. Y.) Rapid Transit Railway has printed in pamphlet form for general distribution a synopsis of the recent report by the Public Service Commission of the Second District of New York on street railway operation in Syracuse. Twenty-five thousand of the booklets have been placed in the boxes in the cars of the company for distribution and 15,000 will be delivered at houses in different sections of the city. The pamphlet is introduced with the following statement:

"The Syracuse Rapid Transit Railway presents to its patrons this pamphlet as worthy of their attention and study. It is the aim of this company, as well as its interest, to give the best service possible. The growth of the city and the prosperity of the company are bound together. What helps one helps the other. The business of the company is to provide frequent and adequate service and to secure a reasonable return upon its investment. The goodwill of the communities it serves is one of the company's chief assets, and because good service aids in the growth of these communities and this growth increases the revenues of the company the interests of both are to a very large extent the same.

"That the company's facilities have kept pace with the growth of the city is shown by the following statistics, taken from the Public Service Commission's report:

TEN YEARS' GROWTH OF POPULATION AND FACILITIES COMPARED.

	Per Cent Increase.
Population	27.1
Passengers carried	128.4
Car miles operated	62.8
Miles of track	40.4
Cars owned	127
Seating capacity	172
Gross income	137.7
Operating expenses	210
Additional deductions from income	69.4

"This company wants the confidence and assistance of the public. It is willing to give the public its confidence, and for this reason it welcomed as likely to prove of mutual benefit the recent thorough investigation of its operations by the Public Service Commission. This investigation, made primarily by the expert of the commission, was carefully considered by the commission as a whole before the commission made its recommendations.

"This report of conditions and its accompanying recommendations for improvements are of such importance that the company desires that it should receive the earnest consideration of every patron of the road, and for that reason presents herewith a synopsis thereof, hoping that the patrons of the Rapid Transit service will realize the existence of many obstacles in the way of giving that perfect service which is the aim of this company and at the same time the intention of the company to do every reasonable thing to better such service."

Extracts are next presented from the report proper covering the subjects of service furnished, amount of service furnished, conditions in the eastern sections, power conditions, car equipment, finances, etc. Following this are printed the recommendations made to the commission by Charles R. Barnes, electric railroad inspector of the commission, and the comments of C. Loomis Allen, vice-president and general manager of the company, giving the company's answer. The pamphlet is concluded with a statement of expenditures for extensions of track, purchases of right-of-way and for pavements yearly since 1901, and similar statements of expenditures for the extension and construction of the overhead system, for new cars and for power facilities.

The company has also published in the daily press a half-page advertisement headed "The Service of the Syracuse Rapid Transit Railway Company," based on the contents of the pamphlet. This advertisement is concluded with the statement: "For further information read booklet being distributed in company's cars."

The recommendations of the commission to the company were published in the ELECTRIC RAILWAY JOURNAL of June 17, 1911, page 1082.

Progress Under the New Regime in Cleveland

Peter Witt, street railway commissioner-elect at Cleveland, has announced the selection of George G. Mulhern as superintendent of operation under him. A brief biography of Mr. Mulhern is published elsewhere in this issue.

President Stanley of the Cleveland Railway is quoted as saying that the fare will have to be advanced in a short time. The interest fund is now only $65,000 in excess of $300,000, at which minimum limit the rate of fare must then be increased under the Tayler franchise.

It is possible that the Cleveland Railway, instead of erecting a new power house, will purchase power from the Cleveland Electric Illuminating Company, which is completing a new station. Negotiations have been resumed since the need for increased power has become immediate on account of the addition of a large number of cars. S. Scovil, vice-president of the Cleveland Electric Illuminating Company, stated a few days ago that the terms submitted during the early negotiations were not final.

At a meeting of officers of the Cleveland Chamber of Commerce with Mayor-elect Newton D. Baker, the plan to amend the Tayler franchise so as to allow freight cars or trains to be operated over the streets at night was discussed. Mr. Baker suggested that the cars should be operated over special interurban tracks or through tubes. Munson A. Havens, secretary of the Chamber of Commerce, agreed with Mr. Baker, but impressed upon him the necessity of immediate freight service.

Association Meetings

Street Railway Association of the State of New York.—Syracuse, N. Y., Dec. 5 and 6, 1911.

Pennsylvania Street Railway Association.—Annual meeting, Harrisburg, Pa., Dec. 8, 1911.

Massachusetts Street Railway Association.—Boston, Mass., Dec. 13, 1911.

Central Electric Accounting Conference.—Annual meeting, Toledo, Ohio, Dec. 16, 1911.

New England Street Railway Club.—Boston, Mass., Dec. 28, 1911.

Central Electric Railway Association.—Annual meeting, Dayton, Ohio, Jan. 18, 1912.

B. J. Arnold's San Francisco Investigation.—The committee on public utilities of the Board of Supervisors of San Francisco, Cal., has requested Bion J. Arnold to begin about Dec. 15, 1911, the work of investigating street railway conditions in San Francisco upon which he is to report to the Council.

Express Derailed in New Haven Electric Zone.—An express train of the New York, New Haven & Hartford Railroad, from Boston, due in New York at 5:42 p. m., was derailed on Nov. 27, 1911, at a cross-over at New Rochelle, N. Y., in the electric zone. None of the passengers was injured. An investigation of the accident is being made to determine the cause of the derailment.

Date of C. E. R. A. Meeting Changed.—At the session of the executive committee of the Central Electric Railway Association held in Louisville, Ky., during the recent meeting of the association, it was decided to hold the annual meeting of the association in Dayton, Ohio, on Jan. 25, 1912. As the mid-winter meeting of the American Electric Railway Association is to be held on Jan. 25, 1912, the executive committee of the Central Electric Railway Association has since changed the date for its annual meeting to Jan. 18, 1912.

National Civic Federation Committee Meetings.—Arrangements were made for a meeting of the executive committee on interstate and municipal utilities of the National Civic Federation on Dec. 2, 1911, in New York. Emerson McMillin, chairman of the executive committee of the American Light & Traction Company, is the chairman of the committee, and Prof. John H. Gray, head of the political economy department of the University of Minnesota, is the secretary of the committee. The federation's department on compensation for industrial accidents and their prevention, of which August Belmont is chairman, will meet on Dec. 8, 1911, in New York. Among the subjects to be discussed will be "The Next Step in Workmen's Compensation in New York State," "The Situation in New York Concerning Proposed Amendments to the Constitution Permitting the Enactment of Workmen's Compensation Law," "Compulsory Compensation vs. State Insurance" and "Compulsory Compensation vs. the Elective Plan."

PROGRAM OF ASSOCIATION MEETINGS

Pennsylvania Street Railway Association

The annual meeting of the Pennsylvania Street Railway Association will be held in the auditorium of the Harrisburg Club on Dec. 8, 1911. The session will commence at 11 a. m. A paper, "Value and Uses of the Surface Contact System," will be read by S. R. Hipple, general manager of the Simplex Surface Contact Company, Williamsport, Pa. This system has been installed on the railway between Lewisburg and Montandon, Pa. Lunch will be served at the Harrisburg Club at 2:30 p. m.

Street Railway Association of the State of New York

The fourteenth quarterly meeting of the Street Railway Association of the State of New York will be held at the Hotel Onondaga, Syracuse, N. Y., on the evening of Tuesday, Dec. 5, and on Wednesday, Dec. 6. The Tuesday evening session will be opened with an informal dinner at 7:30 o'clock at the Hotel Onondaga, after which a prominent speaker will make an address. There will be morning and afternoon sessions on Wednesday, Dec. 6, at the Hotel Onondaga, at which the following program will be carried out:

Paper, "Pay-As-You-Enter Cars," by Thomas W. Casey, general manager of the Pay-As-You-Enter Car Corporation, New York.

Discussion by T. C. Cherry, superintendent of the Utica & Mohawk Valley Railway, Utica, N. Y.; J. E. Duffy, superintendent of the Syracuse (N. Y.) Rapid Transit Railway, and C. H. Smith, superintendent of the United Traction Company, Albany, N. Y.

Paper, "Prevention of Accidents," by R. E. McDougall, claim agent of the Utica & Mohawk Valley Railway, Utica, N. Y. This paper will consider (a) what can be done to increase the interest of employees of all departments in this work, (b) the best means of promoting greater caution on the part of platform men, and (c) how the public can be educated in the prevention of accidents.

Discussion by C. J. McAleer, claim agent of the Schenectady (N. Y.) Railway; Dr. F. J. Ryan, chief surgeon of the Syracuse Rapid Transit Railway, and H. C. Beatty, secretary of the Auburn & Syracuse Electric Railway.

Papers, "Life of Railway Physical Property."

(A) "Accounting," by W. O. Ingle, assistant auditor of the New York State Railways, Rochester, N. Y.

Discussion by W. C. Austin, auditor of the Otsego & Herkimer Railroad, Hartwick, N. Y., and F. E. Belleville, auditor of the Schenectady (N. Y.) Railway.

(B) "Engineering," by F. A. Bagg, chief engineer of the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y.

Discussion by M. J. French, engineer of the Oneida (N. Y.) Railway.

Those who intend to be present are requested to notify J. Stanley Moore, general passenger agent of the Rochester, Syracuse & Eastern Railway, Syracuse, N. Y., who will make arrangements for accommodations at the Hotel Onondaga, Syracuse, N. Y.

Financial and Corporate

New York Stock and Money Markets

November 29, 1911.

Business in the New York market during the past few days has been quiet, and prices have been irregular. Acceptance by the Interborough-Metropolitan officials of the plan for settlement of the affairs of the Metropolitan Street Railway to-day brought about an advance of 1¼ points in the preferred shares of the Interborough-Metropolitan Company and a sharp advance in Metropolitan Street Railway bonds. Approach of December payments and large withdrawals of gold for export increased call money rates to-day to 3¾ per cent, the highest rate since January. Time money rates were 3½@3¾ per cent for sixty days.

Other Markets

Prices in the Chicago market to-day were very irregular. Kansas City Railway & Light shares advanced, the common gaining fractionally, and the preferred about 2½ points.

Small gains were made in Philadelphia Rapid Transit and Union Traction in the Philadelphia market yesterday.

Fractional improvement in United Railways income bonds was shown in to-day's transactions in Baltimore. Trading was moderate in volume, but firm in general.

Trading in Boston is fairly active, with interest centered in the copper shares.

Quotations of traction and manufacturing securities as compared with last week follow:

	Nov. 22.	Nov. 29.
American Brake Shoe & Foundry (common)	a89	a90
American Brake Shoe & Foundry (preferred)	127	a133½
American Light & Traction Company (common)	a295	a295
American Light & Traction Company (preferred)	a107	a107
American Railways Company	a45¾	a46¼
Aurora, Elgin & Chicago Railroad (common)	a39½	a37½
Aurora, Elgin & Chicago Railroad (preferred)	a86¼	a84½
Boston Elevated Railway	a129½	a129⅞
Boston Suburban Electric Companies (common)	a15	a15
Boston Suburban Electric Companies (preferred)	a75	a75
Boston & Worcester Electric Companies (common)	a12	a12
Boston & Worcester Electric Companies (preferred)	a58	a58
Brooklyn Rapid Transit Company	77¾	77¼
Capital Traction Company, Washington	a127	127
Chicago City Railway	a180	a180
Chicago Elevated Railways (common)	a30	a30
Chicago Elevated Railways (preferred)	a94½	a93
Chicago Railways, ptcptg., ctf. 1	a95¾	a97
Chicago Railways, ptcptg., ctf. 2	a33	a33⅝
Chicago Railways, ptcptg., ctf. 3	a11	a11⅛
Chicago Railways, ptcptg., ctf. 4	a7	a6¼
Cincinnati Street Railway	a129½	*129⅛
Cleveland Railway	a105	a104½
Cleveland, Southwestern & Columbus Ry. (common)	a47⅞	*48
Cleveland, Southwestern & Columbus Ry. (preferred)	a33¾	*33¾
Columbus Railway & Light Company	a37½	*37½
Columbus Railway (common)	83	*83
Columbus Railway (preferred)	90½	90½
Consolidated Traction of New Jersey	a75½	75½
Consolidated Traction of N. J., 5 per cent bonds	a105	a75½
Dayton Street Railway (common)	a25	a105½
Dayton Street Railway (preferred)	a101	a25
Denver & Northwestern Railway	145	a101
Detroit United Railway	a80	*80
General Electric Company	154¼	154⅝
Georgia Railway & Electric Company (common)	a159	159
Georgia Railway & Electric Company (preferred)	a92	a91½
Interborough Metropolitan Company (common)	*14¾	15⅛
Interborough Metropolitan Company (preferred)	47¾	47
International Traction Company, 4% notes, rcts	70	*70
Indiana Union Traction Company	12	12
Kansas City Railway & Light Company (common)	a21	18
Kansas City Railway & Light Company (preferred)	48	a52
Lake Shore Electric Railway (common)	a7	*7
Lake Shore Electric Railway (1st preferred)	81½	*81½
Lake Shore Electric Railway (2d preferred)	a25	*25
Manhattan Railway	134¾	a136
Massachusetts Electric Companies (common)	a23	a22
Massachusetts Electric Companies (preferred)	a95½	a94
Metropolitan Street Railway, New York	*8	*8
Milwaukee Electric Railway & Light (preferred)	105	105
North American Company	a74¼	73⅞
Northern Ohio Light & Traction Company (common)	a58	58
Northern Ohio Light & Traction Company (preferred)	a105	105
Philadelphia Company, Pittsburgh (common)	a53¼	a53
Philadelphia Company, Pittsburgh (preferred)	a43¾	a43¾
Philadelphia Rapid Transit Company	a23½	a23⅞
Portland Railway, Light & Power Company	99½	99½
Public Service Corporation	a110	a110
Public Service Corporation, ctfs	a106	106¼
Seattle Electric Company (common)	a108	a107
Seattle Electric Company (preferred)	101	101½
Third Avenue Railroad, New York	7¾	3⅝
Toledo Railway & Light Company	a8	8
Twin City Rapid Transit, Minneapolis (common)	106	106
United Ry. & Electric Company (Baltimore)	*18½	18½
United Rys. Inv. Co. (common)	35	34
United Rys. Inv. Co. (preferred)	63	61¼
Washington Ry. & Electric Company (common)	a46¼	46¼
Washington Ry. & Electric Company (preferred)	a88	88
West End Street Railway, Boston (common)	a88	88
West End Street Railway, Boston (preferred)	a103½	103½
Westinghouse Elec. & Mfg. Co.	65⅝	65⅛
Westinghouse Elec. & Mfg. Co. (1st pref.)	a117	a118

a Asked. *Last sale.

ANNUAL REPORT

Northwestern Elevated Railroad

The annual report of the Northwestern Elevated Railroad of Chicago for the year ended June 30, 1911, with a comparison with the preceding year is as follows:

Year ended June 30.	1910	1911
Passenger earnings	$1,969,833	$2,023,963
Other earnings (including loop net earnings)	662,205	707,412
Total earnings	$2,632,038	$2,731,375
Maintenance of way and structure	$56,435	$63,027
Maintenance of equipment	149,593	153,407
Conducting transportation	737,671	751,011
General expenses	111,987	117,359
Total operating expenses	$1,055,686	$1,084,804
Net earnings	$1,576,352	$1,646,571
*Taxes	$244,379	$257,468
Bond interest	944,100	944,100
Other interest	11,775	7,494
Total charges	$1,200,254	$1,209,062
	$376,098	$437,509
Dividends on preferred stock	$150,000	$200,000
Surplus for year	$226,098	$237,509
Ratio of operating expenses to earnings (excluding loop net earnings)	51.25	51.11
Ratio of operating expenses, loop account and taxes to earnings (excluding loop net earnings)	68.49	68.80

*Includes compensation to city on account of loop. Reserve for maintenance has been kept at $250,000.

Britton I. Budd, the president, says in the report:

"Since the close of the fiscal year ended June 30, 1911, the company has made a new mortgage, covering all of its property, to secure $25,000,000 bonds, dated Sept. 1, 1911. All of these new bonds have been issued and sold and the proceeds have been or will be devoted (a) to the payment and discharge of the principal and interest of the company's bonds which matured Sept. 1, 1911; (b) to the payment and discharge of other indebtedness of the company and (c) to other corporate purposes."

The total number of passengers carried in the year ended June 30, 1911, was 44,471,566, as compared with 42,815,132 in the preceding year. The daily average number of passengers carried last year was 121,840, an increase of 4539, or 3.72 per cent over the previous year.

Earnings of Philadelphia Rapid Transit Company for October and Four Months

The report of the earnings of the Philadelphia (Pa.) Rapid Transit Company for October, 1911, and for the four months ended Oct. 31, 1911, has been approved by the executive committee of the company. Earnings in October, 1911, were larger than for any other October in the history of the company, gross receipts being $1,947,003 as compared with $1,858,068 last year. The report for October and for the four months to Oct. 31, 1911, follows:

October.	1911.
Gross passenger earnings	$1,868,739
Receipts from other sources	78,263
Gross receipts	$1,947,003
Operating expenses	1,154,925
Net earnings from operation	$792,077
Fixed charges	737,017
Surplus	$55,059
Four months.	1911.
Gross passenger earnings	$7,167,112
Receipts from other sources	331,048
Gross receipts	$7,498,160
Operating expenses	4,553,472
Net earnings from operation	$2,944,687
Fixed charges	2,948,189
Surplus	*$3,502

*Deficit.

Rumors of Michigan United Railways Sale Denied

George G. Moore, chairman of the executive committee of the Michigan United Railways, Jackson, Mich., has denied that negotiations are pending for the sale or lease of the property of the company as has been persistently

stated in the daily press recently. Mr. Moore is quoted as follows:

"The statement that the Michigan United Railways has leased its properties to an Eastern syndicate is untrue. The statement that there is any relation contemplated with the Commonwealth Power, Railway & Light Company is also untrue. The only thing which could at all give color to the misleading statements which have been recently published is the fact that negotiations have been conducted with a view to providing capital for building additional interurban lines in the State to increase the area now served by the company. These plans are immature. Should the operations of the company be enlarged there will be no change in the personnel of the company. The policy adopted by municipalities with regard to franchises and the lack of help from the Legislature has made it most difficult to do any interurban building within the State for the past five years. The State requires several hundred miles more of interurban railways to serve its needs. Whether we shall be able to provide for this, or any part of it, at the present time, is now most uncertain."

Annual Report of the New South Wales Government Railways and Tramways

The report of the New South Wales Government Railways and Tramways for the year ended June 30, 1911, shows that the tramway system has 189¾ miles of track. The total earnings were $6,828,155 as compared with $5,927,840 for the preceding year, an increase of 15.19 per cent. After making liberal provision for general maintenance and providing $225,000 toward depreciation of the Ultimo power house and $50,000 toward the insurance fund, the expenditures amounted to $5,719,745 as compared with $4,917,935 for the previous year. This expenditure was equivalent to 83.77 per cent of the receipts compared with 82.96 per cent for the preceding year. The surplus was $238,135 as compared with $229,395. During the year 230,275,938 passengers were carried without an accident resulting in the loss of life. There were operated 22,541,429 car miles in the last fiscal year compared with 20,579,386 car miles for the year before. The earnings per car mile were 29 cents and the operating expenses per car mile were 24½ cents. For the year ended June 30, 1911, the tramways employed 6804 people as compared with 6217 during the preceding year. In accordance with a superannuation act, which became operative on Oct. 1, 1910, 1½ per cent is deducted from the salaries of all officers except those who are already entitled to a pension under an earlier act.

Massachusetts Northern Railways Organized

The announcement has been made through the officials of the Connecticut Valley Street Railway, Greenfield, Mass., that there was organized in Boston on Nov. 16, 1911, an association known as the Massachusetts Northern Railways, which is to manage and control the present lines of the Connecticut Valley Street Railway, the proposed Millers River Street Railway, the Athol & Orange Street Railway, the Gardner, Westminster & Fitchburg Street Railway and the Templeton Street Railway. The administration of the association under an agreement with the American Trust Company, Boston, Mass., provides for seven trustees, who for the first five years have been named as follows: Russell G. Fessenden, president of the American Trust Company, Boston; Richard M. Saltonstall, of Galton, Snow & Saltonstall, lawyers; Joseph W. Stevens, president of the First National Bank, Greenfield; Robert L. Warner, of Warner, Tucker & Company, bankers, Boston; Edward C. Crosby, capitalist, Brattleboro; Frederick E. Pierce, president of the Massachusetts Northern Railways, Greenfield; Daniel P. Abercrombie, Jr., clerk and treasurer of the Massachusetts Northern Railways.

According to the announcement the lines controlled by the Massachusetts Northern Railways will include 88 miles of road, passing through fifteen cities and towns, having a population of more than 125,000. The physical value of the property passing into the control of the Massachusetts Northern Railways is stated to be $2,350,000, and the earnings for the year ended on June 30 last exceeded $377,000. The office of the association is to be at Greenfield, where the office of the Connecticut Valley Street Railway is now situated, and the control of the properties is in the hands of the same persons as the control of the Connecticut Valley

---

American Railways, Philadelphia, Pa.—The holders of the $2,435,500 of collateral trust 5 per cent bonds of the American Railways, due on Dec. 1, 1911, have been notified that the principal and interest of this loan will be paid in Philadelphia on and after Nov. 27, 1911, with interest to Dec. 1, 1911, upon presentation at the offices of Bioren & Company, Philadelphia; Newburger, Henderson & Loeb, Philadelphia, or the Provident Life & Trust Company. A limited amount of the bonds may be exchanged for the new convertible refunding 5 per cent bonds of the company, due 1931, bond for bond, with a payment to holders of maturing bonds at the rate of $35 per $1,000 bond, plus due adjustment of interest, provided acceptance of the offer is filed not later than Dec. 1, 1911, with Bioren & Company or Newburger, Henderson & Loeb.

Angola Light & Power Company, Angola, Ind.—The Angola Light & Power Company has been incorporated in Indiana with a capital stock of $50,000 by W. E. Massman, W. J. Vessey, A. J. Vessey, D. M. Vessey, John Dreibiss, Ft. Wayne, Ind., and Eugene Reilly and M. B. Kelly, Pittsburgh, Pa., presumably as the successor to the Angola Railway & Power Company, now in the hands of receivers.

Chicago & Milwaukee Electric Railroad, Chicago, Ill.—Judge Carpenter has declined the draft of the reorganization plan of the Chicago & Milwaukee Electric Railroad prepared by the interests representing the Illinois branch of the system and has referred the case back to the master for further testimony.

Chicago & Oak Park Elevated Railroad, Chicago, Ill.—Britton I. Budd, president of the Chicago Elevated Railways, has been elected president of the Chicago & Oak Park Elevated Railroad to succeed Mason B. Starring, resigned. E. C. Noe, general manager of the Chicago Elevated Railways, has been appointed general manager of the Chicago & Oak Park Elevated Railroad. These changes are the result of the receivership proceedings.

Columbus (Ohio) Interurban Terminal Company.—The Columbus Interurban Terminal Company has applied to the Ohio Public Service Commission to issue $125,000 of twenty-five-year 5 per cent bonds, the proceeds to be used to complete the new interurban terminal at Rich and Third Streets, Columbus.

Grand Rapids, Grand Haven & Muskegon Railway, Grand Rapids, Mich.—W. H. Morley, vice-president and general manager of the Grand Rapids, Grand Haven & Muskegon Railway, issued the following statement on Nov. 16, 1911, in regard to the negotiations which were pending for the sale of the property of the company: "There was a deal in prospect for the sale of the road, but I did not know the prospective purchasers. They had an option that expired at the close of banking hours on Nov. 15, 1911, but they did not exercise the option."

Indianapolis & Louisville Traction Company, Louisville, Ky.—The report of John E. Greely, Scottsburg, Ind., receiver for the Indianapolis & Louisville Traction Company, has been filed with the United States Court in Indianapolis, Ind. The gross earnings for October, 1911, were $11,036; operating expenses, $5,705, and net earnings, $5,350.

Macon Railway & Light Company, Macon, Ga.—The purchase of practically all of the common stock of the Macon Railway & Light Company, and a majority of the stock of the Central Georgia Power Company by A. B. Leach & Company, New York, N. Y., was noted in the ELECTRIC RAILWAY JOURNAL of Nov. 18, 1911, page 1078, as was also the purpose to organize the Georgia Light, Power & Railways Company. W. J. Massee, president of the Macon Railway & Light Company and the Central Georgia Power Company, has issued a statement in regard to the financing, in part as follows: "A. B. Leach & Company, at the solicitation of the Georgia interests in the Macon Railway & Light Company and the Central Georgia Power Company, have undertaken to finance proposed improvements. The sale of these securities means the immediate expenditure of several hundred thousand dollars in the betterment and extension of the property of the Macon

Railway & Light Company, the construction of the Griffin and Atlanta transmission line and the erection of a gas plant. An organization has been formed to hold the securities of the several companies and furnish capital for improvements. I am now, with one exception, the largest stockholder in these different companies and in no sense have the former owners of these properties parted with their holdings or interests. My associates and I have simply secured additional outside capital to make improvements suggested by the growth and demands of this community."

Massachusetts Electric Companies, Boston, Mass.—The trustees of the Massachusetts Electric Companies on Nov. 23, 1911, in addition to declaring the usual semi-annual dividend due on Jan. 1, 1912, recommended the payment of the accrued dividends of 17¾ per cent on the preferred stock in preferred stock at par on July 1, 1912. This will increase the outstanding preferred stock from $20,557,400 to $24,206,338. In a statement which they issued the trustees say in part: "It is the opinion of the trustees that the time has come when the probable future earnings justify the adoption of such a plan. The preferred shareholders are, of course, entitled to their accumulated dividends in cash, but only from net earnings to be so appropriated. To undertake to pay the same in cash in the near future is impracticable, because it would involve the creation of a floating debt which might seriously impair the credit and resources of the association. The issue of preferred shares for such arrears will be of advantage not only to the preferred shareholders but also to the common shareholders, who can receive no dividends until such accumulations have been liquidated. The trustees therefore recommend that the powers given the shareholders by the trust instrument be so exercised as to authorize the trustees to issue as of July 1, 1912, $3,647,000 (par value) of additional preferred shares and to offer these at par in payment of the claims for arrears of dividends on the outstanding preferred shares. At the expiration of the trust, all preferred shares, old and new, will be entitled to payment in cash at par."

New York & North Shore Traction Company, Roslyn, N. Y.—The New York & North Shore Traction Company has applied to the Public Service Commission of the First District of New York for permission to issue $771,764 of stock and $1,500,000 of bonds.

Point Shirley Street Railway, Winthrop, Mass.—It is proposed to apply to the next Legislature for permission to sell or lease the Point Shirley Street Railway to the Boston, Revere Beach & Lynn Railroad.

Springfield & Washington Railway, Washington C. H., Ohio.—The Ohio Public Service Commission has granted the Springfield & Washington Railway the right to issue $200,000 of stock to be sold at par and $300,000 of thirty-year bonds to be disposed of at not less than 85. The proceeds will be used to extend the line from South Charleston to Washington C. H.

Toledo, Ann Arbor & Jackson Railroad, Toledo, Ohio.—The Toledo & Ann Arbor & Jackson Railroad, which has taken over the property of the Toledo, Ann Arbor & Detroit Railroad, as noted in the Electric Railway Journal of Nov. 11, 1911, page 1042, has organized as follows: L. E. Ingalls, Chicago, president; R. E. Hamblin, formerly general manager of the Toledo (Ohio) Home Telephone Company, vice-president; George E. Fisher, Detroit, secretary; J. O. Zabel, attorney. All the grading between Toledo and Ann Arbor, with the exception of 2½ miles, has been completed, and 18 miles of track has been laid. Seven miles of poles with cross-arms have been set, two-thirds of the right-of-way has been fenced, and the power house at Petersburg, Mich., has been about two-thirds completed. The new company expects to have 20 miles of the road in operation by Jan. 1, 1913. The distance between Toledo and Ann Arbor is 45 miles, and between Ann Arbor and Jackson, 55 miles.

Twenty-eighth & Twenty-ninth Streets Crosstown Railroad, New York, N. Y.—Joseph B. Mayer, receiver for the Twenty-eighth & Twenty-ninth Streets Crosstown Railroad, has filed suit against the directors of the Metropolitan Traction Company at the time of its dissolution, to compel them to give an accounting for $1,100,000 of bonds issued for the Twenty-eighth & Twenty-ninth Streets Crosstown Railroad, the proceeds of which, the receiver alleges, were not used for the company's benefit. In their answers to the suit Thomas F. Ryan and P. A. B. Widener say that the bondholders have no legal cause for complaint.

Dividends Declared

American Railways, Philadelphia, Pa., quarterly, 75 cents.

Brooklyn (N. Y.) Rapid Transit Company, quarterly, 1¼ per cent.

Chicago (Ill.) Elevated Railways, quarterly, 1½ per cent, preferred participation.

Citizens' Traction Company, Pittsburgh, Pa., $1.50.

Columbus (Ohio) Railway, quarterly, 1¼ per cent, common.

Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind., quarterly, 1½ per cent, preferred.

Indianapolis (Ind.) Street Railway, 3 per cent.

Massachusetts Electric Companies, Boston, Mass., $2, preferred.

Norfolk Railway & Light Company, Norfolk, Va., 2½ per cent.

Rochester Railway & Light Company, Rochester, N. Y., quarterly, 1¼ per cent, preferred.

Washington Railway & Electric Company, Washington, D. C., preferred, 2½ per cent; common, 1 per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period.			Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
ATLANTIC SHORE RAILWAY, SANFORD, ME.							
1 m.,	Oct.	'11	$23,369	$22,982	$387	‡$582	†$195
1 "	"	'10	28,743	20,695	8,048	‡606	7,442
BANGOR RAILWAY & ELECTRIC COMPANY.							
1 m.,	Oct.,	'11	$53,129	*$24,672	$28,457	$12,756	$15,701
1 "	"	'10	49,593	*21,771	27,822	12,004	15,818
4 "	"	'11	226,848	*98,440	128,408	51,991	76,417
4 "	"	'10	216,472	*94,459	122,013	47,725	74,288
CAPE BRETON ELECTRIC COMPANY.							
1 m.,	Sept.,	'11	$30,314	$14,455	$15,860	$6,174	$9,686
1 "	"	'10	28,835	13,113	15,722	6,149	9,574
12 "	"	'11	333,472	172,402	161,070	73,793	87,276
12 "	"	'10	317,733	170,922	146,811	73,972	72,839
CHATTANOOGA RAILWAY & LIGHT COMPANY.							
1 m.,	Oct.	'11	$83,698	*$49,247	$34,451	$20,198	$14,253
1 "	"	'10	77,993	*42,746	35,247	18,545	16,702
10 "	"	'11	780,934	*456,002	324,932	198,132	126,800
10 "	"	'10	728,940	*422,643	306,297	183,068	123,229
DALLAS ELECTRIC CORPORATION.							
1 m.,	Sept.,	'11	$131,249	$83,301	$47,948	$25,605	$22,343
1 "	"	'10	119,804	75,538	44,266	26,013	18,253
12 "	"	'11	1,582,597	984,873	597,724	313,760	283,964
12 "	"	'10	1,426,433	935,236	491,197	320,133	171,064
GALVESTON-HOUSTON ELECTRIC COMPANY.							
1 m.,	Sept.,	'11	$130,685	$75,550	$55,135	$25,468	$29,667
1 "	"	'10	110,146	63,308	46,838	26,199	20,638
12 "	"	'11	1,468,266	860,378	607,889	301,603	306,286
"	"	'10	1,278,075	776,278	501,798	281,319	220,279
GRAND RAPIDS RAILWAY.							
1 m.,	Oct.,	'11	$93,587	*$54,182	$39,405	$14,980	$24,425
1 "	"	'10	91,267	*50,832	40,435	15,299	25,136
10 "	"	'11	966,461	*546,967	419,494	150,341	269,153
10 "	"	'10	947,929	*508,729	439,200	152,129	287,071
LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY.							
1 m.,	Oct.,	'11	$47,242	*$28,531	$18,711	$14,430	$4,281
1 "	"	'10	49,090	*26,563	16,527	13,145	3,382
4 "	"	'11	226,149	*119,767	106,382	57,828	48,554
4 "	"	'10	217,712	*119,174	98,538	52,560	45,978
MONTREAL STREET RAILWAY.							
1 m.,	Oct.,	'11	$442,393	$232,201	$210,191	$35,697	$174,494
1 "	"	'10	386,688	205,750	180,938	31,998	148,940
NORTHERN TEXAS ELECTRIC COMPANY.							
1 m.,	Sept.,	'11	$136,089	$71,382	$64,707	$25,399	$39,308
1 "	"	'10	118,192	61,594	56,598	19,690	36,909
12 "	"	'11	1,579,244	819,380	747,343	288,322	471,543
12 "	"	'10	1,391,000	759,865	643,658	223,911	419,747
PORTLAND RAILWAY, LIGHT & POWER COMPANY.							
1 m.,	Oct.	'11	$540,764	*$264,614	$276,150	$127,179	$148,971
1 "	"	'10	503,485	*256,748	246,737	120,599	126,138
10 "	"	'11	5,238,372	*2,563,030	2,675,342	1,246,723	1,428,619
10 "	"	'10	4,609,974	*2,236,501	2,373,473	1,155,080	1,218,393
ST. JOSEPH RAILWAY, LIGHT, HEAT & POWER COMPANY.							
1 m.,	Oct.,	'11	$91,442	*$54,746	$36,696	$19,043	$17,653
1 "	"	'10	87,613	*49,046	38,567	18,870	19,870
10 "	"	'11	903,306	*565,038	338,268	192,519	145,749
10 "	"	'10	854,363	*504,396	349,967	181,556	168,411
WHATCOM COUNTY, RAILWAY & LIGHT COMPANY.							
1 m.,	Sept.,	'11	$35,912	$16,998	$15,914	$9,771	$6,143
1 "	"	'10	33,781	17,331	16,450	9,084	7,366
12 "	"	'11	482,624	208,185	183,438	127,491	55,947
12 "	"	'10	410,968	240,704	170,264	104,216	66,049

*Including taxes. †Deficit. ‡Taxes.

Traffic and Transportation

United Railroads, San Francisco, Issues Bulletin on Courtesy

E. D. Hibbs, general superintendent of the United Railroads, San Francisco, Cal., has issued the following bulletin "Concerning Courtesy" to all employees of the company:

"The attention of conductors, motormen, gripmen, inspectors and other representatives of this company is called to the following reasons why courtesy to patrons is expected and insisted upon:

"First—Do unto others as you would they should do unto you. If positions were reversed you would expect to be treated courteously and would naturally resent any lack of it.

"Second—You, with your experience and training, are thoroughly familiar with many things that strangers in the city, and even local people, are in ignorance of, and you should bear that fact in mind, and, in replying to questions, always courteously give the information fully and plainly in as few words as possible and without any suggestion of superiority born of a greater knowledge.

"Third—The manner in which a statement is made or question answered is frequently more aggravating and offensive than the words in which it is framed. A kind and gracious manner is the mark of a self-respecting man—and a man who respects himself rarely fails to command the respect of others with whom he is brought in contact.

"Fourth—True courtesy does not discriminate between a rich man or woman and a poor one—or between a well-dressed person and a poorly dressed one. 'A man's a man for a' that.'

"Fifth—Courtesy is not only something the public has a right to expect of you, but it pays. It pays in the friends it makes for you personally and as a representative of the company. It pays in minimizing the friction of your life, as well as that between the company and its patrons. It pays in raising your standard with the company. It pays in the personal satisfaction resulting from having done the right and kindly thing by your 'neighbor.' It is the wish of the management of this company that all its representatives whose work brings them into contact with the public may appreciate and fully measure up to their duty in this respect."

Joint Service Between New York and Newark.—The joint service over the Hudson & Manhattan Railroad and the Pennsylvania Railroad between New York and Newark, N. J., was inaugurated at 12:01 a. m. on Nov. 25, 1911.

Hearing on Grade Crossings in Indiana.—The Railroad Commission of Indiana has called a hearing for Dec. 5, 1911, on petitions filed with the commission for the elimination of grade crossings of interurban electric railways and steam railroads in Indiana.

Through Cars Between South Bend and Hammond.—It is stated that negotiations have been completed for operating through cars between South Bend and Hammond, Ind., as soon as the 16-mile link between Gary and Goodrum is completed by the Gary & Interurban Railway, Gary, Ind.

Rules for Transporting Dogs in Connecticut.—The Connecticut Company, New Haven, Conn., has decided to charge an extra fare for the transportation of dogs over its lines in Connecticut. The dog must go on the front platform with the motorman. In summer the dog will be permitted to ride with the smokers on the five rear seats. A 5-cent fare will entitle a dog to a transfer.

Police Whistles for Street Railway Employees.—Police Commissioner Waldo of New York has approved an application of the Metropolitan Street Railway for permission to equip its conductors with police whistles. The application was filed after an attempt was made to rob one of the company's conductors. The conductor had a police whistle in his possession and when he blew it his assailants fled.

Hearing in Regard to Fares in Seattle.—The Public Service Commission of Washington has decided to hold a public hearing to determine the reasonableness of an application filed with it to require the Seattle (Wash.) Electric Company to charge a fare of not more than 4 cents with transfer privileges and to sell eight tickets for a quarter, these tickets, however, to carry no transfer rights.

Hearing in New York on Car Temperature.—The Public Service Commission of the First District of New York has ordered a public hearing on Dec. 8, 1911, to determine whether or not it shall issue an order to require a thermometer to be installed in each and every surface, subway and elevated car in Greater New York and to increase the minimum temperature requirement from 40 deg. Fahr., as fixed by the commission some time ago.

Competition in New Jersey.—The Raritan River Railroad, a steam railroad operating between New Brunswick, N. J., and South Amboy, N. J., has filed with the Board of Public Utilities Commissioners of New Jersey a schedule of passenger rates to take effect Jan. 1, 1912, which reduces the average fare from 3 cents a mile to 1¼ cents a mile. The new rates are made the same as those of the Public Service Railway, which parallels the steam railroad. The railroad has also reduced its commutation rates.

Connecticut Company Expects to Comply with Fare Decision.—The Connecticut Company, New Haven, Conn., has issued the following statement in regard to its attitude toward the Public Utility Commission of Connecticut in relation to the fare case before the commission involving passenger rates between Hartford and Manchester, referred to previously in the ELECTRIC RAILWAY JOURNAL: "The Connecticut Company expects to comply with the orders of the commission in the Manchester fare case; therefore, there is no reason for raising any issue regarding the constitutionality of the utilities law."

Complaint Against Syracuse, Lake Shore & Northern Railroad.—The Public Service Commission of the Second District of New York has received a complaint against the Syracuse, Lake Shore & Northern Railroad, Syracuse, N. Y., signed by residents of Syracuse and patrons of that road, protesting against the increased rate of fare charged between Syracuse and Long Branch, or Stop 11, and stops en route, which was put into effect on Oct. 6, 1911. The complaint states that the increase from 5 cents to 10 cents between Syracuse and Stop 4 and from 10 cents to 15 cents between Syracuse and Stop 11 is unjust and unreasonable.

Experimental Owl Service in Portland, Ore.—The street committee of the City Council of Portland, Ore., has postponed action on the proposed ordinance to compel the Portland Railway, Light & Power Company to operate cars on all lines on an hourly schedule between 12:30 a. m. and 6 a. m. Meanwhile the company will establish the special night service suggested by B. S. Josselyn, president of the company. This provides for the operation of each present last car one more trip. Thus on practically every line the last car will leave the down-town terminal at 1:30 a. m., instead of 12:30 a. m., as at present. The fare on the last trip will be 10 cents to compensate for the extra expense involved.

Right to Abandon Line Desired.—The Public Service Commission of the Second District of New York has received from the International Railway, Buffalo, N. Y., a petition for the approval of a declaration of abandonment of the single track of that company's line in Buffalo in North Division Street between Main and Washington Streets, and the single track in Eagle Street, between Main and Washington Streets, which were a part of the William Street line and the Clinton Street line, and which are no longer used because of the removal of the single track in Main Street. The petition states that the portions of the route sought to be abandoned are no longer necessary for the successful operation of the road or for the convenience of the public, as the cars of these routes are operated between Eagle and North Division Streets over the double track railway in Washington Street.

City Restrained from Enforcing Car Capacity Ordinance.—Judge Dykeman has temporarily restrained the city of Seattle, Wash., from proceeding under the ordinance regulating the number of passengers to be carried on street cars and fixing a schedule of running time. Judge Dykeman, in granting the temporary restraining order, held

that the question should await the adjudication of the higher court. The Seattle Electric Company contends that to place cars enough in service during rush hours to comply with the ordinance would block traffic and that to procure extra motormen and conductors for a few hours each day would impose a great financial hardship upon the company. The company also informed the court that a case is pending before the State Public Service Commission in which the commission is requested to make an order prescribing a schedule for the company, and that the divided authority of city and State renders the position of the company confusing.

Report of Metropolitan Street Railway Association.—The report of the Metropolitan Street Railway Association, composed of employees of the Metropolitan Street Railway, New York, N. Y., has been made public for the year ended Sept. 19, 1911. The total amount paid during the year on account of sickness or injury, for death claims and the estimated value of medical advice and attendance was $41,972. The amount of dues and initiation fees received from members was $29,901, making the excess of benefits over the amount paid by members $12,070. The number of members at the close of the association year was 4284. The association was organized in February, 1897. Since then $139,683 has been paid out in death claims, $114,272 in sick and injury benefits, and $114,081 for medical advice and attendance (estimated), making a total of $468,036. The total amount received in dues and initiation fees since 1907 is $374,896, making the benefits over the amount paid by members $93,139. Reference is made in the report to the social gatherings, the lunchrooms, and the loan fund. The pamphlet contains a number of half-tone illustrations, including a group picture of the officials and trustees of the association.

Changes in Schedule of Los Angeles Lines.—With the opening of the Watts-Athens cut-off to Redondo Beach, on the Pacific Electric Railway, Los Angeles, Cal., a number of changes were made in the schedules and running time of various lines of the company. The through operation on the narrow-gage line between Los Angeles and Redondo Beach, via Moneta Avenue, Inglewood and Sunnyside, has been discontinued. The service via Playa del Rey has been extended to Cliffton-by-the-Sea. Thirty minute local service is operated between Hawthorne and Belvidere. The time on the Covina-San Dimas line has been changed so that now there is a thirty-minute service instead of a fifty-minute service as heretofore. The La Habra line has been extended to Stern. A new schedule has been put in effect between Los Angeles and San Pedro, via Vermont Heights, making connections at Hermosillo with the Redondo through line. The direct San Pedro line by the way of Dominguez has been changed so that there is a forty-minute service instead of fifty minutes and one hour as heretofore. The Santa Ana schedule has been rearranged so that several more trains have been added to the run and there is an entirely new service between Los Angeles and Artesia.

Injunction Against Seattle Ticket Ordinance Denied.—The application of the Seattle (Wash.) Electric Company for an injunction to restrain the city from enforcing the ordinance to compel the company to place street car tickets on sale on the cars has been denied by Judge C. H. Hanford of the United States Circuit Court. In asserting jurisdiction, Judge Hanford said: "The ordinance in question is a legislative act of a municipal government. The State constitution is the primary source of the legislative power of the City Council, and the power of the Council to legislate is subordinate, but not secondary, to the power of the State. It is subordinate because the State constitution prescribes that the charter must be consistent with the constitution and subject to it and the laws of the State. If the ordinance does impair the obligation of contracts it is under the ban of the constitution of the United States and the alleged exertion of the legislative power of the State brings it under the constitution of the United States and therefore under the jurisdiction of the federal courts." The attitude of the company toward the ordinance was explained in the statement by Jacob Furth, president of the company, published in the Electric Railway Journal of Nov. 18, 1911, page 1079.

Personal Mention

Mr. Roy Antibus, formerly with the Roberts & Abbott Company, Cleveland, Ohio, has been appointed engineer in charge of construction of the Northern Ohio Power Company's property, at Cuyahoga Falls, with offices at Akron, Ohio.

Mr. H. M. Beardsley, for some time secretary and treasurer of the Elmira Water, Light & Railroad Company, Elmira, N. Y., and for more than a year acting general manager of that company, has been appointed general manager of the company.

Mr. C. Nesbitt Duffy, comptroller of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., spoke on the subject of "Some Features of Electric Service Rates and of Municipal Ownership" before the Milwaukee Company section of the National Electric Light Association on Thursday evening, Nov. 23, 1911.

Mr. E. J. Emerson has resigned as superintendent of the Rapid Transit Railway, Dallas, Tex., controlled by the Dallas Electric Corporation, to become general manager of the Beaumont Ice, Light & Refrigerating Company, Beaumont, Tex. Mr. Emerson was presented with a gold watch and chain by the employees of the Dallas Electric Corporation as a token of esteem when he left Dallas.

Mr. T. G. Wood has been appointed superintendent of transportation of the Bloomington & Normal Railway & Light Company, Bloomington, Ill. Mr. Wood was first employed by the Illinois Traction System as superintendent at Champaign, Ill. When the division of that company between Springfield and St. Louis was opened he was placed in charge of it. He resigned from the company to go into business for himself.

Mr. A. B. Coryell, who resigned recently as general manager of the Dayton Construction Company and the Greenville Railway & Light Company, Greenville, Tex., has been appointed general superintendent and purchasing agent of the Waycross Street & Suburban Railway, Waycross, Ga., in charge of the purchasing of all material and the construction of the company's system. Mr. Coryell entered upon his new duties on Dec. 1, 1911.

Mr. William S. Sargent, for six years chief clerk of the Middlesex & Boston Street Railway, Newtonville, Mass., was tendered a banquet at the Woodland Park Hotel, Auburndale, Mass., on Nov. 20, 1911, in connection with his departure from the company to enter another field of business. Mr. George M. Cox, manager of the company, presided, and at the conclusion of the dinner presented Mr. Sargent with a gold pin on behalf of the officials of the Middlesex & Boston system.

Mr. Samuel Higgins, general manager of the New York, New Haven & Hartford Railroad, New Haven, Conn., who temporarily retired from active service several months ago because of ill-health, has decided to retire from the service of the company, effective with the close of this year. As a result of Mr. Higgins' resignation, Mr. H. J. Horn will be appointed a vice-president of the company in charge of the operating department, effective on Jan. 1, 1912. The position of general manager will remain in abeyance for the immediate future.

Mr. George G. Mulhern has been appointed superintendent of operation under Mr. Peter Witt, street railway commissioner-elect of Cleveland. When the street railways in Cleveland were merged as the Cleveland Electric Railway several years ago, Mr. Mulhern was made superintendent of the system, under Mr. John J. Stanley, general manager. Mr. Mulhern went into politics later and was elected sheriff of Cuyahoga County. At the expiration of his term of office, he built the loops about the Public Square, Cleveland, for the late Mayor Johnson. Later on as a contractor he did much work for the Cleveland Railway.

Mr. Carroll R. Phenicie has resigned as electrical engineer and master mechanic of the Chicago & Milwaukee Electric Railroad, Chicago, Ill., with which company he has been connected for the last eight years, to become electrical engineer for Mr. Clement C. Smith, who is managing the following properties: Eastern Wisconsin Railway & Light

Company, Fond du Lac; Wisconsin Electric Railway, Oshkosh; Green Bay Traction Company, Green Bay Gas & Electric Company, and the Northern Hydroelectric Power Company, Green Bay, Wis.; the Lee County Electric Company, Dixon, Ill.; Sterling, Dixon & Eastern Electric Railway, Dixon, Ill.; Winona Railway & Light Company, Winona, Minn., and receiver of the La Crosse Water Power Company.

Mr. W. A. Clader has resigned as auditor of the C. H. Geist Company, Philadelphia, Pa., to organize the Audit Company of Philadelphia, which will specialize in audits and examinations of public utility corporations. Mr. Clader became connected with the United Gas Improvement Company in 1901. When the company acquired the electric railways at Providence, R. I., in 1902, he was employed there as statistician. He became connected with Mr. S. S. Bush, Louisville, Ky., in 1907. as auditor of street railroad and lighting properties controlled by Mr. Bush and his associates. In November, 1908, Mr. Clader was appointed traveling auditor of the Mohawk Valley Company and the New York State Railways. After doing some special work at Penn Yan, N. Y., for Mr. W. T. Morris, Mr. Clader in November, 1910, was appointed auditor for Mr. C. H. Geist, who is interested in public utility properties. Mr. Geist will be associated with Mr. Clader in the Audit Company of Philadelphia as president of the company.

Mr. P. B. Sawyer has resigned as general manager of the Des Moines Electric Company, Des Moines, Ia., one of the McKinley properties, to become general manager of the Union Electric Company, Dubuque. He is thirty-two years old. He was graduated from Purdue University in the electrical engineering course in 1900. During the summer of 1900 he was connected with the Chandler & Taylor Company of Indianapolis, Ind. In 1901 he completed a postgraduate course at Purdue University in electrical engineering, and later was made assistant to the construction engineer on the underground installation with the Des Moines Edison Light Company. He continued with this company and was appointed superintendent in January, 1902. In April, 1906, he was made general manager of the company, which position he has held until the present time, having been continued in charge of the property when it was sold to the McKinley interests in 1910. He succeeds Mr. L. D. Mathes at Dubuque, whose appointment as manager of the Montgomery (Ala.) Traction Company and the Citizens' Light, Heat & Power Company was noted in the ELECTRIC RAILWAY JOURNAL issue of Nov. 11, 1911.

OBITUARY

John F. Dryden, president of the Prudential Insurance Company, Newark, N. J., and a director of the Public Service Corporation of New Jersey, Public Service Railway and other corporations, died at his home in Newark on Nov. 24, 1911. Mr. Dryden was born in Farmington, Me., in 1839. He attended Yale, but did not graduate. As early as 1865 he entered the insurance field, and in 1873 he and others established the Prudential Insurance Company. Mr. Dryden was elected to the United States Senate from New Jersey in 1901.

J. J. Ferrier, who was connected with the staff of Mr. A. H. Babcock, electrical engineer of the Southern Pacific Company, San Francisco, Cal., died suddenly on Oct. 29, 1911, at his home in Fruitvale, Cal., from overexertion in physical culture exercises. Mr. Ferrier was born in Sussex County, England, in 1883, and came to America in 1903. His first work was with the Mergenthaler Linotype Company, New York, N. Y. In 1905 he joined the electrification department of the New York Central & Hudson River Railroad and rose to chief draftsman in the steam engineering branch of this work. In April, 1907, he entered the office of the electrical engineer of the Southern Pacific Company at San Francisco, Cal., and took a prominent part in the steam and mechanical engineering work of the Oakland, Alameda and Berkeley electrification. Subsequently he was promoted to the position of office engineer, and in this capacity handled many details connected with the Oakland, Alameda and Berkeley installation. He was a member of the Masonic Order, the Foresters and the Eastern Star, and an associate member of the American Society of Civil Engineers and the American Society of Mechanical Engineers.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Fresno & Eastern Railroad, Fresno, Cal.**—Application for a charter has been made in California by this company to build a 78-mile electric railway between Fresno and Shaver Lake. Capital stock, $1,500,000. Incorporators: Fayette M. Meiggs, Oakland; Albert B. Dodd, San Francisco, and George J. Aldrich, Audubon, N. J.

***Marysville-Colusa Railway, San Francisco, Cal.**—Application for a charter has been made by this company, as a subsidiary company of the Northern Electric Railway, to build a 30-mile electric railway between Marysville and Colusa. Capital stock, $1,500,000. Directors: Charles H. Hammon, Berkeley; Leon J. De Sabla and Samuel Lilienthal, San Francisco; George B. Springer, Piedmont, and Herbert W. Turlong, Pleasanton.

***Arkansas Valley Railway, Light & Power Company, Pueblo, Col.**—This company has been incorporated in Colorado in the interest of H. M. Byllesby & Company, Chicago, Ill., to take over the Pueblo Suburban Traction & Lighting Company and the Colorado Light & Power Company, Canon City, recently acquired. Capital stock, $10,000,000. Incorporators: W. F. Raber, T. H. Devine and F. W. Insull.

Angola Light & Power Company, Angola, Ind.—Incorporated in Indiana, presumably as the successor to the Angola Railway & Power Company, now in the hands of receivers. Capital stock, $50,000. Incorporators: W. E. Massman, W. J. Vessey, A. J. Vessey, D. M. Vessey, John Dreibiss, Ft. Wayne, Ind., and Eugene Reilly and M. B. Kelly, Pittsburgh, Pa.

Perry (Ia.) Electric Railway.—Incorporated in Iowa to build an electric railway in Perry. Capital stock, $100,000. Incorporators: B. C. Dilenbeck, J. E. Hambright, Chas. E. Wilson, C. C. McCreery, H. C. Modlin, J. E. Wilson and H. G. Giddings. [E. R. J., Oct. 28, '11.]

Toledo, Ann Arbor & Jackson Railroad, Monroe, Mich.—Chartered in Michigan to take over the Toledo, Ann Arbor & Jackson Electric Railway. Of this line 18 miles are completed to Petersburg and from Petersburg to Ann Arbor, 26 miles, the grading is done and the bridge abutments are built. The right-of-way is secured to Jackson, which is 48 miles from Toledo. Capital stock, $500,000. Officers: L. E. Ingalls, Chicago, Ill., president, and George E. Fisher, 433 Majestic Building, Detroit, secretary. [E. R. J., Oct. 28, '11.]

Elwood City & Kopple Electric Railway, Elwood City, Pa.—Chartered in Pennsylvania to build a 1-mile electric railway from Elwood City to Koppel. Capital stock, $6,000. Incorporators: T. A. Wilson, R. A. Todd, F. C. Johnson, H. K. Gregory and W. J. Coursin, all of Beaver Falls. [E. R. J., July 29, '11.]

FRANCHISES

Phoenix, Ariz.—The Salt River Valley Electric Railway has asked the Common Council for a twenty-five-year franchise in Phoenix. This 60-mile railway will connect Phoenix, Scottsdale, Tempe, Mesa, Chandler, Alhambra, Glendale and Peoria. F. M. Winter, Phoenix, president. [E. R. J., Nov. 18, '11.]

Bakersfield, Cal.—The San Joaquin Valley Electric Railway, Stockton, has received a forty-nine-year franchise from the City Council on North Chester Avenue in Bakersfield.

Covington, La.—W. J. Tracy, Cleveland, Ohio, has received a franchise for an electric railway from Slidell to Houltonville. It is said that this line will be a link in a proposed electric railway between Slidell and Hammond, and that the proposed road will eventually be extended to Baton Rouge. [E. R. J., Oct. 28, '11.]

Elizabeth, N. J.—The Public Service Railway, Newark, has received the approval of the joint committee on railroads, streets and street railways to double-track its line on South Broad Street in Elizabeth. The company will next ask the City Council for a franchise.

New Rochelle, N. Y.—The Public Service Commission, Second District, has given its permission for the construction of the extensions of the Westchester Street Railroad in New Rochelle.

Statesville, N. C.—The North Carolina Public Service Company, Greensboro, will ask the City Council for a franchise in Statesville.

Cleveland, Ohio.—The Cleveland, Youngstown & Eastern Railway has asked the Mayor to approve the franchise to build its line down Kingsbury Run to the center of Cleveland.

Dayton, Ohio.—The Dayton, Springfield & Xenia Southern Railway has asked the City Council for a twenty-five-year extension of its franchise in Dayton.

North Dayton, Ohio.—The People's Railway, Dayton, has received a franchise from the City Council in North Dayton to construct curves, switches and turnouts along the loop in North Dayton, provided it conformed with certain conditions that were outlined.

Pittsburgh, Pa.—The Pittsburgh, Steubenville & Wheeling Street Railway has asked the City Council for a franchise in Pittsburgh. This line will connect Pittsburgh, Pa., Steubenville, Ohio, and Wheeling, W. Va. Surveys have been made and most of the right-of-way secured. W. H. Hildebrand, Pittsburgh, is interested. [E. R. J., Dec. 10, '10.]

Providence, R. I.—The Rhode Island Company has received a franchise from the Board of Aldermen to double-track its Plainfield Street line from Olneyville Square westerly in Providence.

Spartanburg, S. C.—The Greenville, Spartanburg & Anderson Railway, Greenville, has received a fifty-year franchise from the City Council in Spartanburg.

Salt Lake City, Utah.—The Salt Lake & Los Angeles Railway has asked the City Council for a franchise to extend its tracks in the western part of Salt Lake City and to run its cars over certain tracks of the Utah Light & Railway into the business section of Salt Lake City.

***Salt Lake City, Utah.**—The Saltair Railroad has asked the City Council for a franchise to operate an electric railway over certain streets in Salt Lake City.

Weston, W. Va.—The Clarksburg & Weston Electric Railway, Clarksburg, has asked the City Council for a franchise to extend its line in Weston to Mount Clare.

Milwaukee, Wis.—The Milwaukee Electric Railway & Light Company has asked the Common Council for a franchise for a crosstown line over the Twenty-seventh Street viaduct in Milwaukee.

TRACK AND ROADWAY

***Bassano, Alta.**—The Gorman, Clancy & Grindley Company, Calgary, has received a contract to build a 5-mile electric railway between Bassano and the Canadian Pacific Railway's irrigation dam.

Lethbridge (Alta.) Municipal Tramway.—At the municipal elections on Dec. 11 the citizens will be asked to vote on a by-law for the raising of $450,000 for the construction of an electric railway in Lethbridge next year. The sum of $300,000 will go to the railway, the remaining $150,000 to be used for the necessary extensions to the power plant. [E. R. J., Nov. 25, '11.]

Ft. Smith Light & Traction Company, Ft. Smith, Ark.—It is reported that this company has awarded a contract for grading its extension to South Ft. Smith to Hays & Payne Company.

Phoenix (Ariz.) Railway.—This company expects to extend its Glendale line to Marinette, a distance of 16 miles northwest of Phoenix.

Clear Lake Railroad, Lakeport, Cal.—Work has been begun by this company on its 24-mile line between Hopland and Lakeport, with branches through Kelseyville and Upper Lake. Charles M. Hammond, Lakeport, is interested. [E. R. J., Oct. 14, '11.]

Oakland (Cal.) Traction Company.—Plans are being considered by this company to build several extensions in Santa Clara County.

Washington Railway & Electric Company, Washington, D. C.—This company plans to build an extension of its Ninth Street line as far as Soldiers' Home Junction on Georgia Avenue in Washington.

Macon Railway & Light Company, Macon, Ga.—This company will spend $300,000 on various improvements and extensions of its lines. Among these extensions will be a line to the Idle Hour Country Club, for which the contract has already been awarded.

Waycross Street & Suburban Railway, Waycross, Ga.—This company has placed orders for material and work will soon be begun on its line to connect Hebardville, Deenwood, Winona Park, Waresboro and Waycross. H. H. Burnet, secretary. [E. R. J., Oct. 21, '11.]

Waukegan, Rockford & Elgin Traction Company, Waukegan, Ill.—During the next two months this company will award contracts to build 7 additional miles of track. It will purchase 56-lb. or 60-lb. relaying rails for this work.

Chicago, Lake Shore & South Bend Railway, Michigan City, Ind.—It is reported that this company plans to build from Kensington to Chicago, a distance of 14 miles.

Indianapolis, New Castle & Toledo Railway, New Castle, Ind.—It is reported that this company will soon build its extension from Indianapolis to Muncie.

Eastern Indiana Traction Company, Richmond, Ind.—Surveys will be begun at once by this company on its 85-mile electric railway. The southern terminus will be Hamilton, Ohio, from which point the line will extend northwesterly across the Indiana line to Oxford, Ohio, College Corner and Richmond, Ind. From Richmond the line will extend northeast to Union City and Portland. Financial backing has been secured and it is expected to begin construction in the spring. Sharon E. Jones, president. [E. R. J., Oct. 7, '11.]

Kansas City & Ft. Scott Electric Railway, Stanley, Kan.—Surveys are being made and right-of-way obtained by this company for its projected line between Kansas City, Mo.; Rosedale, Stanley, Stilwell, Louisburg, Pleasanton and Ft. Scott, Kan. Capital stock, $10,000, to be increased as soon as the surveys are completed. Officers: W. T. Quarles, Stanley, president; John Roe, Meriden, vice-president; A. J. Calvery, Stilwell, secretary; J. H. Schroeder, Stanley, treasurer, and M. M. Sweetman, Stanley, general manager. [E. R. J., Nov. 18, '11.]

Frederick (Md.) Railroad.—Plans are being made by this company to begin the construction of its line between Jefferson and Brunswick.

Milford & Uxbridge Street Railway, Milford, Mass.—Plans are being considered by this company to extend its lines from Milford to the North Milford district.

Meridian Light & Railway Company, Meridian, Miss.—This company plans to build an extension of its Compress Street line in Meridian to the cotton mills.

Yazoo Valley Electric Railway, Light & Power Company, Yazoo City, Miss.—James H. Collins, Chicago, has been awarded the contract by this company to make a survey for the proposed interurban railway between Yazoo City and Canton and which may later extend to Jackson via Tougaloo, Ridgeland, Madison and Gluckstadt. It is reported that financial backing has been secured. H. Wise, Yazoo City, is interested. [E. R. J., Oct. 7, '11.]

Nebraska Transportation Company, Omaha, Neb.—This company is receiving bids for material and will let contracts during December to build its electric railway to connect Omaha, Elk City, Arlington, Craig, Oakland, South Sioux City and Fremont. A single track from Omaha to Fremont will be built first. C. W. Baker, Omaha, president. [E. R. J., Nov. 5, '11.]

Public Service Railway, Newark, N. J.—Plans are being considered by this company for an extension on Bloomfield Avenue in Newark.

United Traction Company, Albany, N. Y.—This company has placed in operation its new Arbor Hill line in Albany.

Catskill (N. Y.) Traction Company.—This company plans to build an extension from Cairo to East Durham and Oak Hill.

Elmira Water, Light & Railroad Company, Elmira, N. Y.—Work has been begun by this company on the construction of a double-track line between Elmira and Rorick's Glen.

New York & Queens County Railway, Long Island City, N. Y.—In the spring this company will double track all its lines in Flushing, and between Flushing and Jamaica and over the causeway to College Point.

North Carolina Public Service Company, Greensboro, N. C.—It is reported that this company plans to extend its line to Statesville.

North Carolina Interurban Railway, Raleigh, N. C.—This company has removed its principal office from Rutherfordton to Shelby. This line will connect Charlotte, Gastonio, Dallas, Cherryville, Shelby, Rutherford, Fairview and Asheville. J. A. Harrill, president and J. T. Gardner, secretary. [E. R. J., May 20, '11.]

Springfield, Wilmington & Cincinnati Railway, Cincinnati, Ohio.—It is reported that this company has financed and will begin construction in the spring on its line which is to connect Springfield, Cincinnati, Wilmington and Norwood. G. H. Frey, Springfield, is interested. [E. R. J., Aug. 5, '11.]

***Coshocton, Ohio.**—Frank A. McGowan, Canton, plans to build a line in Coshocton. It is proposed to operate storage battery cars.

Shawnee-Tecumseh Traction Company, Shawnee, Okla.—The people of Sulphur have accepted the proposition of this company and will give the company a bonus of $40,000, depot grounds and a franchise to operate a line from the Artesian Hotel in Sulphur to Bromide Spring.

London & Northwestern Railway, London, Ont.—Extensive preparations are being made by this company for the construction of a radial railway between London and Sarnia. Daniel A. Stewart, London, is interested. [E. R. J., Oct. 15, '11.]

Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont.—It is reported that this company will extend its lines early next year from Port Colborne to Ft. Erie, and from that place to Niagara Falls.

***Portland, Ore.**—An extension of the Hawthorne Avenue line in Portland 2½ miles eastward on Division Street and the Section Line road has been definitely arranged for by the property owners along the proposed route. A provisional company is to be organized with a capital stock of $30,000, which will construct the line and turn the property over to the Portland Railway, Light & Power Company when completed.

Montreal & Southern Counties Railway, Montreal, Que.—This company has leased the lines of the old Central Vermont Railroad from McGill Street, Montreal, to Richelieu, 14 miles from St. Lambert. The line will be electrified and, besides new rails, a new bridge with a span of 140 ft. is to be built over the Little Montreal River near Chambly Basin.

Valley Street Railway, Sharon, Pa.—Plans are being made by this company to construct an extension in Sharon and at South Sharon.

Sunbury & Northumberland Electric Railway, Sunbury, Pa.—Surveys are being made by this company for its extension from Sixth Street via Queen Street over Kapp Heights to the upper end of the company's yards in Northumberland.

Woodland & Southern Railway, Woodland, Pa.—This company has completed its line and will place it in operation early in December. It connects Woodlawn and Aliquippa with a branch line on Franklin Avenue, Woodlawn, extending toward New Sheffield. J. I. Moore is interested. [E. R. J., May 6, '11.]

Knoxville Railway & Light Company, Knoxville, Tenn.—Surveys are being made, right-of-way has been obtained and construction will be begun soon on the extension of this company's Sevierville Pike line to the Island Home property.

Middle Tennessee Traction Company, Nashville, Tenn.—About 19 miles of grading have been completed by this company from Franklin to Eagleville. This 40-mile line will connect Franklin, Eagleville, Shelbyville and College Grove. P. E. Cox, Franklin, president. [E. R. J., Sept. 23, '11.]

Greenville, Spartanburg & Anderson Railway, Greenville, S. C.—Contracts for the grading and laying of all necessary piping, etc., for the main line entering Anderson and for that connecting the Riverside-Toxaway and Orr Mills have been awarded by this company to J. C. Ross.

Galveston-Houston Electric Railway, Houston, Tex.—This company has completed its railway between Galveston and Houston via Virginia Point, Texas City Junction, Lamarque, Dickinson, League City and Genoa.

***Mission, Tex.**—At a recent meeting of the Mission Business League, Mission, the plans of the proposed electric railway from Mission to Monte Cristo were accepted. The construction of the line is to begin two weeks after the bonus of $15,000 is secured. The ultimate terminus of this line will be San Antonio. S. Robertson, San Benito, is interested.

San Antonio (Tex.) Traction Company.—A 1-mile extension will be built by this company on Nogalitos Street, from South Flores Street, in San Antonio.

San Benito (Tex.) Interurban Railway.—Construction will be begun at once by this company on the extension of its Santa Maria line. The right-of-way is being cleared.

***Centralia Light & Power Company, Centralia, Wash.**—This company will build a 10-mile electric railway between Centralia and Rochester. It is proposed to extend this line to Gray's Harbor. The right-of-way has been secured. Current will be supplied by the Eastern Railway & Lumber Company.

Olympic Electric Railway, Port Angeles, Wash.—The necessary money has been raised by this company to obtain the right-of-way in Jefferson and Clallan Counties. The line will connect Port Angeles, Port Ludlow and Oak Bay, from which a fast ferry service will be established to Seattle. J. A. Adams is interested. [E. R. J., Sept. 16, '11.]

Merrill Railway & Lighting Company, Merrill, Wis.—Plans are being made by this company to build an extension to the Sixth Ward in Merrill.

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—This company has begun work on its new station in Long Beach. The Townsend-Vandewater Realty Company has the contract for the construction of the building and J. Y. Parker has the contract for the brick work.

San Diego (Cal.) Electric Railway.—This company plans to build a new station on the north side of Adams Avenue in San Diego.

Chicago & Southern Traction Company, Chicago, Ill.—It is reported that this company is considering plans to build a new freight station on North Schuyler Avenue in Chicago.

Gary & Southern Traction Company, Crown Point, Ind.—Work will be begun at once by this company on its new carhouses and repair shops at Lottaville, south of the Gary city limits. The structure will contain a storehouse and general offices for the company.

St. Joseph Valley Traction Company, Elkhart, Ind.—This company's carhouse and machine shops at Lagrange, which were destroyed by fire on Nov. 11, will be rebult at once and new equipment will be purchased.

Kokomo, Frankfort & Western Traction Company, Kokomo, Ind.—Work has been begun by this company on its new interurban depot in Russiaville. The structure will be one story high and of brick and steel construction.

United Railways & Electric Company, Baltimore, Md.—A tract of land on the Hartford Road, adjoining Weber's Park, has been bought by this comapny, on which it will begin shortly the erection of a large carhouse and station.

POWER HOUSES AND SUBSTATIONS

Macon Railway & Light Company, Macon, Ga.—Among the various improvements to be made in the near future by this company will be the construction of a new power house on Ocmulgee Street in Macon.

Gary & Southern Traction Company, Crown Point, Ind.—This company will begin work at once on the construction of its new power plant at Lottaville.

Gulfport & Mississippi Coast Traction Company, Gulfport, Miss.—This company is installing a new 450-hp boiler at its power house in Gulfport.

Manufactures & Supplies

ROLLING STOCK

People's Traction Company, Galesburg, Ill., is in the market for heaters for two cars.

Waukegan, Rockford & Elgin Traction Company, Palatine, Ill., expects to purchase a gasoline motor car.

Macon Railway & Light Company, Macon, Ga., expects to be in the market shortly for six cars. This order may be increased to twelve cars.

York (Pa.) Railways has ordered four 26-ft. semi-convertible motor car bodies mounted on Brill 27-GE1 trucks from The J. G. Brill Company.

Chillicothe Electric Railroad, Light & Power Company, Chillicothe, Ohio, has ordered four Brill 39-E trucks from the G. C. Kuhlman Car Company.

Capital Traction Company, Washington, D. C., has ordered fifty Brill 39-E plow carrier trucks without wheels and fifty Brill 39-E non-plow carrier trucks without wheels from The J. G. Brill Company.

Omaha, Lincoln & Beatrice Railway, Lincoln, Neb., has ordered one 24-ft. electric switching locomotive from the Baldwin Locomotive Works. It will be equipped with Westinghouse motors and type HL control.

Metropolitan Street Railway, Kansas City, Mo., has been recommended by Hermann Brumback, special master appointed by Judge Hook of the federal court, to expend $537,000 for the purchase of ninety new cars.

American Railways, Philadelphia, Pa., has ordered for the People's Railway, Dayton, Ohio, ten single-truck cars from the St. Louis Car Company through Wendell & MacDuffie. The cars will be 26 ft. 6 in. long and equipped with Warner trucks.

Oregon Electric Railway, Portland, Ore., has ordered ten 57-ft. 8-in. passenger trail car bodies, three 57-ft. 8-in. combination passenger and baggage motor car bodies, and three 57-ft. 8-in. combination passenger, baggage and smoking motor car bodies from the American Car Company, through Pierson, Roeding & Company.

Chicago (Ill.) Railways is building 215 closed double-truck cars of the pay-as-you-enter type in its own shops. The car bodies are 31 ft. 2 in. long. The company will also rebuild seventy-seven old double-truck cars to the pay-as-you-enter type. This will make a total of 1620 double-truck pay-as-you-enter cars to be operated by this company by the end of 1912.

Bakersfield & Kern Electric Railway, Bakersfield, Cal., has included the following in its specifications for the six California type combination motor cars which are being built by the American Car Company:

Seating capacity.....40	Axles .....Brill
Bolster centers, length, 23 ft. 4 in.	Bumpers.....American Car
	Curtain fixtures...Cur. S. Co.
Length of body....28 ft. 3 in.	Headlights ....Crouse-Hinds
Over vestibule.....41 ft. 2 in.	Journal boxes.....Brill
Width over sills..7 ft. 10½ in.	Motors..... .....GE-203
Over all.....8 ft. 5 in.	Registers .....S. & M.
Height, rail to sills...33⅞ in.	Seats .....H. & K.
Sill to trolley base, 8 ft. 11 13/16 in.	Step treads.....QMS
	Trolley catchers, Elec. Serv. S. Co.
Body .....wood	
Headlining .....agasote	Trucks.... ....Brill, 27-GE1
Roof .....monitor	Varnish .....Valentine
Underframe .....semi-steel	Ventilators ...American Car

TRADE NOTES

Edgar Allen Manganese Steel Company, Chicago, Ill., has appointed Walter H. Evans manager of the motor-gear department with headquarters in Chicago. Mr. Evans was formerly superintendent of motive power of the Indiana Union Traction Company, Anderson, Ind.

Canadian Car & Foundry Company, Montreal, Que., reports net profits of $1,007,137 for the year ended Sept. 30, 1911, and a surplus after paying preferred dividends of $622,137. After dividends amounting to 4 per cent were paid on the common stock, there remained $467,137 to be added to the profit and loss account. The gross sales for the year, which aggregated over $12,500,000, showed a considerable increase over those of the previous year.

The J. G. Brill Company, Philadelphia, Pa., has received the following orders for export: E. G. Long & Company, New York, N. Y., ten Brill 21-E trucks; Noyes Brothers, Australia, two Brill 21-E trucks, without wheels and axles; Alejandro Angel & Company, New York, N. Y., four 30-ft. second-class passenger cars mounted on Brill 57-D trucks; Dick, Kerr & Company, London, Eng., for Newcastle Tramways, six Brill 21-E trucks without wheels and axles.

General Electric Company, Schenectady, N. Y., has received the following orders for export: Havana Central Railway, Havana, Cuba, one ABH 25-500 430-volt, 25-cycle transformer, one 3000-cu. ft. blower set, one 500-kw rotary converter and switchboard; Australian General Electric Company, twenty K-11 controllers, twenty circuit breakers, six 6000-cu. ft. blower sets, ten complete air brake equipments; South American General Electric Company, twelve GE-90 double motor equipments with controllers.

Wonham, Sanger & Bates, New York, N. Y., report that during October, in addition to an order received from the Chicago Railways for 900 H-B life guards and from the Chicago City Railway for 576 guards, repeat orders were received from the Westchester Electric Company for twenty sets and the Third Avenue Railroad for thirty sets for the equipment of their new cars. The Philadelphia Rapid Transit Company also applied 1675 guards and the Montreal Street Railway 600 guards during the month. The company has appointed the Railway Sales Company, with offices at 1224 First National Bank Building, Chicago, Ill., as its Western agents.

Scholey & Company, Ltd., is a new firm recently organized in London which will make a specialty of stimulating the export of British electrical manufactures. Mr. Scholey, the organizer of the firm, has had a long and successful career in the electrical business. For ten years he was assistant editor of *The Electrical Review* of London. Afterward he gained a few years' experience in electrical manufacturing and the sale of electrical goods while in the employ of Mather & Platt, of Manchester. For the last ten years he has been intimately associated with Dick, Kerr & Company. For some time, however, Mr. Scholey has been considering plans for increasing the export trade of British electrical manufactures. Many millions of money are invested in Great Britain in the smaller companies manufacturing electrical goods. A large number of these companies have specialized in their lines and are thus in a position to make their own specialties much more cheaply and accurately than companies making a greater variety of material. Such firms, however, are frequently so engrossed by their manufacturing that they have little time for the marketing of their goods outside their own local territory, and especially outside of Great Britain. Mr. Scholey believes that by creating a selling organization and by making special arrangements with a number of these specialists in electrical manufactures he will be able to supply the wants of foreign companies that may be desirous of getting the best British manufactured goods but do not well know where or from whom to buy them. At the same time he will be benefiting these manufacturing companies by taking the expense and worry of selling off their shoulders. Scholey & Company have already entered into definite agreements with a number of firms manufacturing electrical specialties, and in time they will add others to their list. Though the main feature of the business of the new firm will be the development of export trade, it is not intended to neglect the home markets. Mr. Scholey has taken into partnership with him C. W. Hill, who until within the last few weeks was the manager of the Bournemouth Tramways. The new firm has taken offices at 151 Queen Victoria Street, London, and has already done a considerable business. As quickly as opportunity occurs agencies will be opened up in this country and in the most prominent cities in the British colonies and South America.

ADVERTISING LITERATURE

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 4899, illustrating and describing its expulsion fuses and fuse holders. These are for use on circuits having voltages up to and including 110,000 volts.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVIII NEW YORK, SATURDAY, DECEMBER 9, 1911 No. 24

PUBLISHED WEEKLY BY

McGraw Publishing Company

JAMES H. MCGRAW, President; C. E. WHITTLESEY, Sec'y and Treas.

239 WEST THIRTY-NINTH STREET, NEW YORK

TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1021 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Wednesday, 9 a. m., of the week of issue.

Copyright, 1911, by MCGRAW PUBLISHING COMPANY.

Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

The Association of American Advertisers has examined and certified to the circulation of this publication. The figures of circulation contained in the Association's report only are guaranteed.

ASSOCIATION OF AMERICAN ADVERTISERS.
No. A—82. *Whitehall Bldg., N. Y. City.*

NEW YORK, SATURDAY, DECEMBER 9, 1911.

CONTENTS.

The Los Angeles Disclosures..... 1185
Changes in Financial and Fare Conditions in Cleveland..... 1185
Energy Consumption Tests in Chicago..... 1186
The Syracuse Meeting..... 1186
The Use of Large Boiler Units..... 1187
Power Plant Extension of the Denver City Tramway..... 1188
Meeting of the New England Street Railway Club..... 1191
Study of Operating Characteristics of Chicago Railways Company's Cars as Influenced by Coasting Time..... 1192
Papers Read at New York State Association Convention..... 1201
System of Accounts in New Jersey..... 1206
Syracuse Meeting of the New York Street Railway Association.. 1207
Manufacture of Electrical Machinery, Apparatus and Supplies..... 1212
Order for Additional Equipment Authorized in Philadelphia.... 1213
Date of the Mid-Year Conference..... 1213
Annual Meeting of the American Society of Mechanical Engineers 1213
News of Electric Railways..... 1214
Financial and Corporate..... 1217
Traffic and Transportation..... 1219
Personal Mention..... 1220
Construction News..... 1221
Manufactures and Supplies..... 1224

The Los Angeles Disclosures

It did not require the confession of the McNamara brothers in Los Angeles to place upon organized labor at least the moral responsibility for violence during strikes. The disclosures there simply proved to the community that the labor leaders were not merely the abettors of that crime, they were the principals. People are so accustomed to the prevalence of lawlessness at the time of a strike that the enormity of such action and of its tacit approval by those in charge of the labor campaign during such a time is overlooked. It is as if the moral sense of the community has become blunted in this particular through constant familiarity with disregard of law. At present, the premonitory signs of a strike on a street railway system are always a warning that the company must not only prepare to operate its lines without the help of its employees but that it must be ready to defend its property and its new employees from injury. We do not mean that the leaders openly advocate violence. That would be going a little too far even in the present state of the public conscience. They may even mildly deprecate it and claim that no union men are participants. But there is little moral difference between active participation in crime and an enjoyment of the benefits derived from its perpetration. If the strike leaders were in earnest in regard to their opposition to stone-throwing, the use of dynamite and other means of intimidating an electric railway company engaged in fighting a strike, they could stop them quickly in most cases. A few words of straightforward condemnation, a statement that union men who engaged in disorder would be expelled from the union and a real effort to co-operate with the authorities in the maintenance of order and in the apprehension of the rioters would soon settle the matter. But to do so would be to lose such benefit as might be derived from terrorizing an opponent by unlawful means. Hence the acquiescence and tacit encouragement of violence which makes the strike leader morally as responsible for the destruction of property, assaults and murder as the man who wields the blackjack or throws the stone or bomb.

Changes in Financial and Fare Conditions in Cleveland

The changes in the Cleveland Railway franchise authorized recently by the voters of Cleveland tend to make more effective the protection of capital value which was designed to be one of the cardinal principles of this measure. In anticipation of the approval of the voters of Cleveland, the stock of the Cleveland Railway advanced in market price before the election and is now selling around 104. This is due to a stronger belief by the banking and investing public in Cleveland in the security for the stock which

is afforded by the present grant. Other changes appear to be under way which will affect the financial position of the company. At present the rate of fare charged on the Cleveland local lines is 3 cents if the passenger tenders the exact change or a ticket. Otherwise a fare of 5 cents is charged. If a transfer is requested it is given by the conductor on payment of 1 cent by the passenger, and this sum is returned when the transfer is presented to another conductor for a second ride. This low rate of fare has prevailed most of the present year. However, the ordinance provides that when the "interest fund," the account to which the surplus or deficit after provision for operating expenses is carried, falls to $300,000, it shall be evidence of the necessity of raising the rate of fare. Conversely, if the interest fund rises to $700,000, it shall be evidence of the necessity of reduction in the rate of fare. For some months, owing to deficits in the operating and maintenance accounts, the interest fund has been approaching the point at which, under the ordinance, the rate of fare would be increased automatically. Of course, a further curtailment of service may be ordered by the city with the object of preventing any increase in the rate of fare, but this would lead to still greater crowding on the cars than now exists. It would thus produce increased public inconvenience in order that the rate of fare might be kept at the present low point.

Energy Consumption Tests in Chicago

During the rehabilitation period of the Chicago Railways the engineering department of that company has conducted an elaborate series of investigations into the principal factors of the cost of car propulsion. Some months ago we described the notable economies effected by the Chicago Railways Company in car lighting as the result of a somewhat similar series of observations with different types of lamps, extending over a period of twelve months. It is understood that in this case the saving already secured by the use of the more efficient lamps amounts to more than all the expenses of the test. In this issue we present the records of an exhaustive study which the engineering department of the Chicago Railways has made to determine how the energy consumed in car operation may be reduced to a minimum by properly proportioning the periods of acceleration, coasting and braking of each car movement. The extent and duration of this test have been such that the results are far more reliable than if they had been obtained during a shorter test period on a smaller number of cars. As an indication of the thoroughness of the test, it will be noted that 7 miles of track on one of the most congested streets in Chicago were segregated from the rest of this large railway system for a period of more than four months, and that the characteristics of operation there have been continuously observed during this period. The power delivered to the trolley wires was separately metered, the mileage run and the operating speeds of the cars were carefully recorded, and the passengers were counted. The proportionate coasting time on each trip was determined, and careful records were kept of the details of maintenance of equipment. With the data thus obtained basic curves were drawn and operating factors were derived which disclosed the relative values of the chief factors of the energy consumption during a car run. The principal variable among these factors is the motorman. He can exert such an important influence on the power situation of a road as to double the power requirements, or he can, by careful manipulation of his controller and brake, bring about a saving in power of nearly 30 per cent compared with that which ordinarily obtains.

THE SYRACUSE MEETING

The papers and discussions at the quarterly meeting of the Street Railway Association of the State of New York, published elsewhere in this issue, indicate that the association has adopted the Empire State's motto, "Excelsior." There are few larger organizations which have produced two such thoroughly compiled or valuable reports as those of the committees on passenger traffic and on the joint use of poles. The extent of the first report and its late receipt preclude its publication in this issue, but an abstract will be published next week. The report of the committee on the standard form of contract for the use of poles is an elaboration of the draft submitted by the same committee last June. It has proved a most difficult task to harmonize the conflicting interests of all the various public utility corporations which have pole lines, but some such agreement is essential unless the companies interested wish to have many of their wires forced underground in a large number of the larger cities of the country.

The discussion on pay-as-you-enter cars was notable for the figures contributed on earnings, schedules and accidents, as affected by the adoption of prepayment operation, The most striking feature brought out was that while the prepayment car may increase the number of accidents, the total cost of the accidents is less. Of course, the reason for this is that the prepayment car has greatly reduced the serious boarding and alighting accidents, which have been very expensive, but it has originated certain minor accidents on the rear platform, due to sudden starting of the car while fares are being collected. This objection is not serious but is annoying and may be minimized by a more effective arrangement of platform railings, coupled possibly on longitudinal-seated cars with the installation of vertical stanchions.

The discussion on accident prevention brought out the novel opinion that the State owes a duty to its citizens to warn them against the consequences of their own negligence on railway property, similar to that which it has in educating them against epidemics. Of course, the State has not hesitated to enforce the installation of safety devices, but this has been done on the assumption that the greater part of the accidents would thereby be prevented. As statistics show, however, by far the greater number of accidents on street railways could have been avoided by the exercise of care on the part of the injured person. Hence, there is ample reason why the State should encourage every educational campaign against accidents. We fear, however, it will be a long time before laws similar to those in force in European countries are passed to punish passengers who leap on or off moving cars.

The papers and discussion on the life of railway physical property disclose the common interest of the accountant

and engineer in keeping accurate cost data principally by means of the job order system and mileage or other life records.

In conclusion, attention might well be directed to President Choate's statement at the banquet that the greatest field for the future usefulness of the association is the fostering of closer relations with the public and the national and State commissions which are its accredited representatives. The electric railways have much to gain by a policy of frank publicity concerning their problems of operation and their desire to take a leading part in developing the communities which they serve.

THE USE OF LARGE BOILER UNITS

A paper by D. S. Jacobus read at the last meeting of the American Society of Mechanical Engineers reports a series of tests on large boilers which point to a possible revolution in power station practice. It has long been known to engineers who were original enough to rise above the limitations imposed by manufacturers' catalogs that the furnace and boiler plant is the weak spot in station design and that in particular, through misjudged conservatism, designers have been in the habit of using boiler units absurdly small for the huge prime movers now customarily employed. Until the advent of successful mechanical stokers there was a natural limit imposed upon the sizes of boilers available because of the difficulty of hand firing in furnaces having very large grate areas, but successful mechanical stokers have now been with us for more than a decade and nothing much has been done in the way of increasing the size of the boiler units. Granted the ability to keep the fires in good condition over a large grate area by suitable mechanical appliances, it is perfectly obvious to every student of thermodynamics that the advantage in efficiency should rest with large boiler units because of the smaller heat losses, the higher temperatures obtained in the furnace and the diminution of incidental losses due to the long and complicated piping necessarily employed in utilizing the steam from a huge battery of small boilers. Of course, there have always been timid souls afraid of using large units lest the temporary crippling of one of them should cut down the available capacity, but precisely the same argument was used against the large electrical units which have done so much to increase the economy of power generation.

The boilers tested in the paper under consideration mark a very great advance over anything that has been done toward rational station design either here or abroad. It is true that some of the Continental stations have considerably passed the limits of advanced American practice in the size of the boiler units, but there has been nothing done, so far as we recall, comparable with these great boilers built for the Detroit Edison Company, each with nearly 24,000 sq. ft. of heating surface and more than 400 sq. ft. of grate area. Their nominal rating is 2365 hp each, as against less than 1000 hp employed as the maximum size of unit in most of the very large modern stations. In actual practice each of the Detroit boilers supplies steam to turbines developing 6000 kw to 8000 kw easily. In other words, two of these units will carry a 15,000-kw turbine which in common practice would be coupled to, say, eight boilers of the largest "standard" capacity in regular use. The results obtained are the due reward of progressive engineering, and they are indeed altogether remarkable. Obviously there should be gains from lessened radiation and high furnace temperature, but there are in addition to these great practical gains in the simplification of the entire steam plant and in the reduction of the number of boiler-room attendants, not to mention the reduction of standby losses when the fires are banked.

The tests themselves were of the most elaborate character, extending over a period of nearly three months and involving the services of over fifty men working in eight-hour shifts for about half this long period. The coal used was of good grade, averaging about 14,000 b.t.u. per pound, with ash averaging about 6.5 per cent. The tests were mostly from twenty-four to thirty hours on a single run and the general result was to show a combined efficiency of boiler and furnace rising to fully 80 per cent at the rated load of the boilers. This, of itself, is remarkable enough, although an increase of efficiency over anything attainable in smaller boilers was certainly to be expected, but even more extraordinary and not so easily foreseen was the remarkable efficiency attained under the conditions of forced combustion sufficient to carry the boilers to double their rating. Under these circumstances the boiler and furnace efficiency still held up to about 76 per cent, which is considerably better than most first-class boilers will do at the highest point of their efficiency.

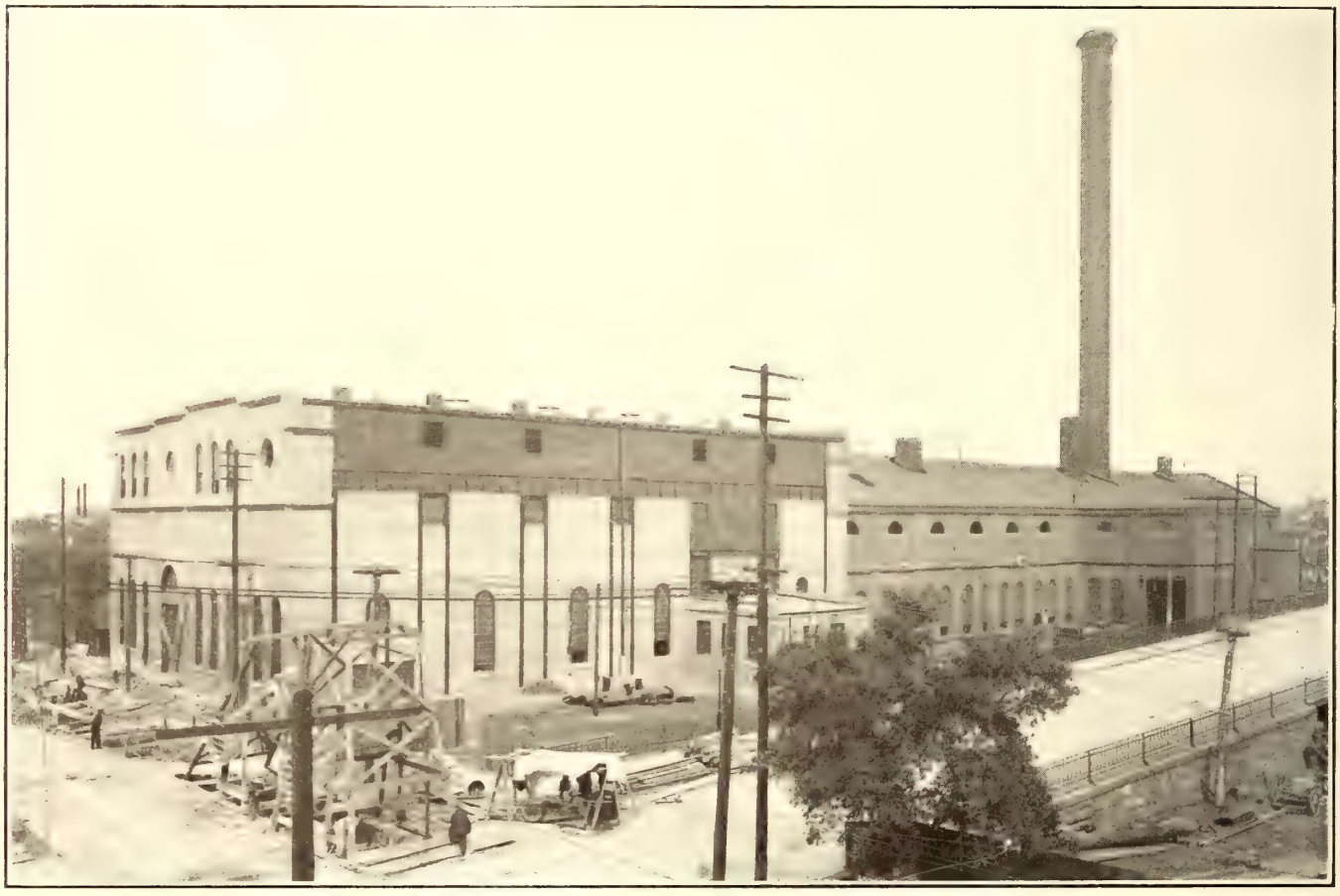
Apparently the unusually large furnace space and the high temperatures reached in combustion over so large a confined area made it practicable to burn efficiently a much larger amount of coal per unit of grate area than is the case with smaller grates. These boilers, therefore, seem not only to give most extraordinary results under circumstances of ordinary use, but to stand forcing with much higher efficiency than has usually been reached even in first-class practice at normal load. In view of these facts it would seem wise from now on to abandon the use of a numerous battery of boilers to supply a single large turbo-generator and to go once for all to boiler units commensurate in size with the rest of the plant. The simplification of station design will be very notable. It will no longer be necessary to construct a huge boiler room with elaborate piping connections merely to accommodate an expensive and relatively inefficient group of small boilers. The whole steam supply system can thus be simplified and the condition reached in which a station of very great output will be merely a station having a modest number of very large units from the boiler furnaces clear through to the generators.

With the over-load capacity which can be carried by modern turbines and such boilers as were under test there is relatively small inconvenience from the temporary loss of any single unit and indeed nothing to be gained on the whole in reliability by adhering to the older and less efficient practice. To use eight or ten boilers where two or three will give the same output of steam at higher efficiency is merely a wasteful concession to timidity, which should not be tolerated in a station designed for economical generation of power.

Power Plant Extension of the Denver City Tramway Company

The New Equipment Includes a 2,000-kw Turbo-Generator and Six 700-hp Boilers—Each Boiler Has a Separate Short Stack with a Motor-Driven Induced Draft Fan in the Uptake

The Denver City Tramway Company, of Denver, Col., has recently built an addition to its Platte Street generating station. The enlarged station is an interesting combination of engine and turbine-driven equipment for handling efficiently the street railway load of a rapidly growing municipality. In the past ten years the population of Denver has increased from 133,859 to 213,381, or 59.5 per cent, and accompanying this growth has been a demand for more electric transportation facilities which has severely taxed the power system of the street railway company. During the entire period the service has been handled from the Platte Street station, which originally contained only direct-current equipment delivering electrical energy to the system at 600 volts. With the growth of the system and extension of new routes into the outlying suburban districts there arose a demand for alternating-current transmission to distributing substations located at important load centers remote from the business section of the city. The station to-day furnishes an example of the efficient use of both direct and alternating current in handling a heavy city and suburban traffic, and its recent enlargement illustrates the availability of the steam turbine to meet new demands for additional power.

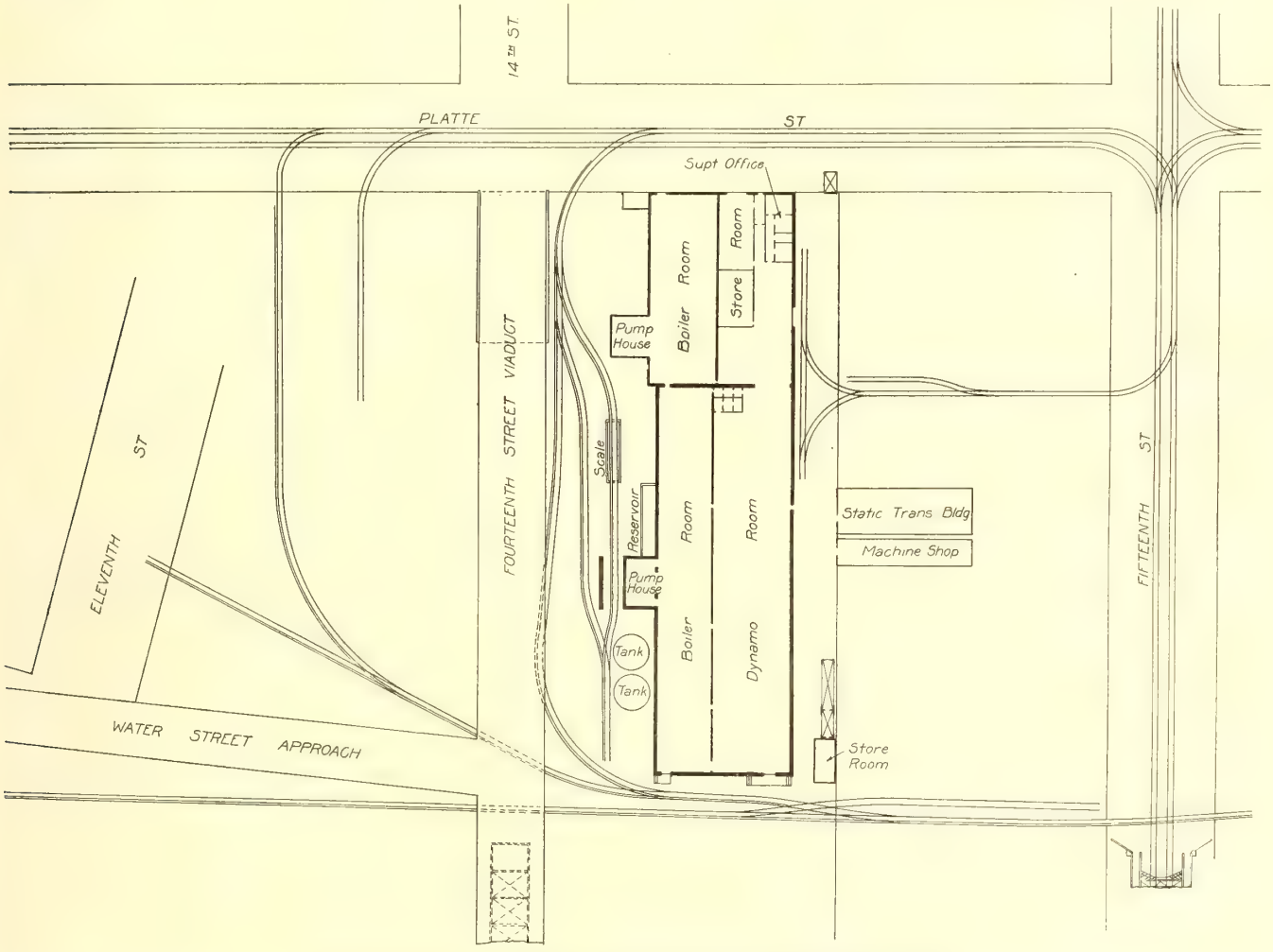


Denver Power—Exterior View of Enlarged Platte Street Station

Less than ten years ago the equipment of the Platte Street plant consisted of three 800-kw, 600-volt General Electric generators direct-connected to Green-Wheelock horizontal cross-compound engines running at 78 r. p. m. In 1904 a 1600-kw, 600-volt direct-current General Electric generator, direct-driven by an Allis horizontal cross-compound engine, was added. At about this time the demands of voltage regulation in the suburban districts led the company to install a 1500-kw, 2300-volt, 25-cycle General Electric alternator of the three-phase type, direct-driven by an Allis horizontal cross-compound engine. A little later three 600-kw transformers were installed for raising the potential to 13,200 volts for transmission to substations located at Clear Creek and in an outlying section of Broadway. In 1908 the capacity of the plant was further increased by the addition of a Westinghouse-Parsons 2000-kw, 6600-volt, 25-cycle turbo-alternator, and the latest machine added is a duplicate of this, bringing the total normal capacity of the station up to 9500 kw. To enable the alternating-current machines to operate in parallel in feeding various substation loads, a suitable installation of raising transformers has been made in a separate brick and steel building adjoining the main generating plant. The general plan of station operation includes the division of the units between the urban and suburban load in such a manner as to secure so far as possible the most efficient outputs from the individual machines, and by careful attention to this matter, combined with close scrutiny of the handling of boilers and the strict accounting for supplies, the cost of power production has been reduced 20 per cent within the past year.

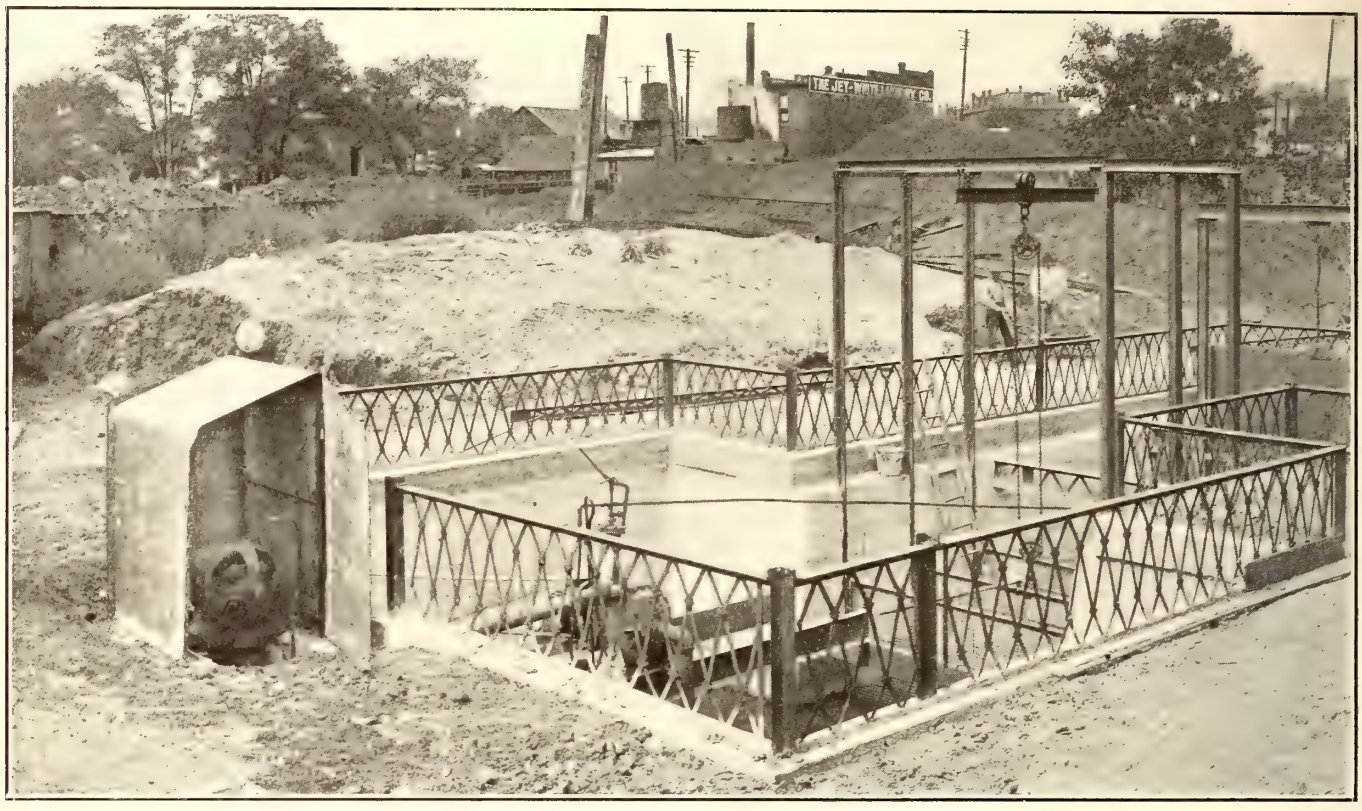
The Platte Street station is located on the north bank of the Platte River about 1 mile from the business center of the city. The building is a brick and steel structure, the total length being about 460 ft., with a width of about 108 ft. over all. The latest extension includes a boiler room about 48 ft. wide and a turbine room 60 ft. in width, the length of each being 143 ft. Both rooms are practically extensions northward of the corresponding sections of the original plant, and the station now occupies practically the entire block between the river and Platte Street, lying between Fourteenth and Fifteenth Streets as indicated on the accompanying general plan. The enlarged plant contains nineteen Stirling water-tube boilers operating at 176-lb. steam pressure, the last six boilers, which are rated at 700 hp each, being located in the boiler room extension. Green chain grate stokers are used in all furnaces, and the new boilers are provided with mechanical draft and short steel stacks for each unit. The steam is superheated from 50 to 60 degrees Fahr. Lignite coal mined in Colorado is burned successfully by the stokers. The stokers for the thirteen original boilers are operated by two 15-hp motors, and those in the six new boilers are driven by a separate 15-hp motor. The early boiler installation discharged the smoke into a steel stack 185 ft. high and 12 ft. in inside diameter, located near the southerly end of the plant. The enlargement of the boiler plant required the provision of three supplementary stacks about 8 ft. in diameter and 10 ft. high in the old boiler room section, while each of the six new boilers is equipped with a steel smoke discharge 5 ft. in diameter which projects 4 ft. above the roof.

Condensing water for the station is drawn from the Platte River. At the water's edge a concrete intake 78 ft. long x 25 ft. wide x 18 ft. deep has been built and equipped with a 6-in. centrifugal pump belt-driven by a 25-hp motor. Sheet steel piling installed in a diagonal line on the opposite side of the river deflects the water toward the intake, from which it is pumped through a reinforced concrete pipe 5 ft. in diameter and about 100 ft. long into a concrete screen basin located about 260 ft. from the plant. This basin is provided with a 4-in. centrifugal dredge pump belt-driven by a 10-hp motor, and is fitted with three vertical wire mesh screens which are conveniently handled by a pulley and chain hoist running on a channel iron mounted above the basin. The screen meshes are respectively 1 in., ¾ in. and ½ in. in size, and the condensing intake and piping between the river and the plant have sufficient capacity to handle water for an ultimate installation of 30,000 kw in steam generating machinery. From the screen basin a pipe line runs under ground to the condensing apparatus in the power house. A feature of the intake chamber is the provision of four gates operated by screws with ball bearings at the threads, the gates being of 3-in. x 6-in. timber set in steel frames. They cut off the supply of water from the river to the extent required by operating conditions. The intake chamber is thus sectionalized, and each section is equipped with a separate suction pipe. The station is well equipped with transportation facilities, each side of the plant being served by a spur track connection. The yard space beneath the Fourteenth Street viaduct is utilized for the storage of heavy supplies and material, but within the station the section of the turbine room extension at present not required for generating apparatus is fitted up as a storeroom for power house and substation material. This portion of the building is equipped with temporary shelves, work and supply benches, and is protected by stiff wire screening to the

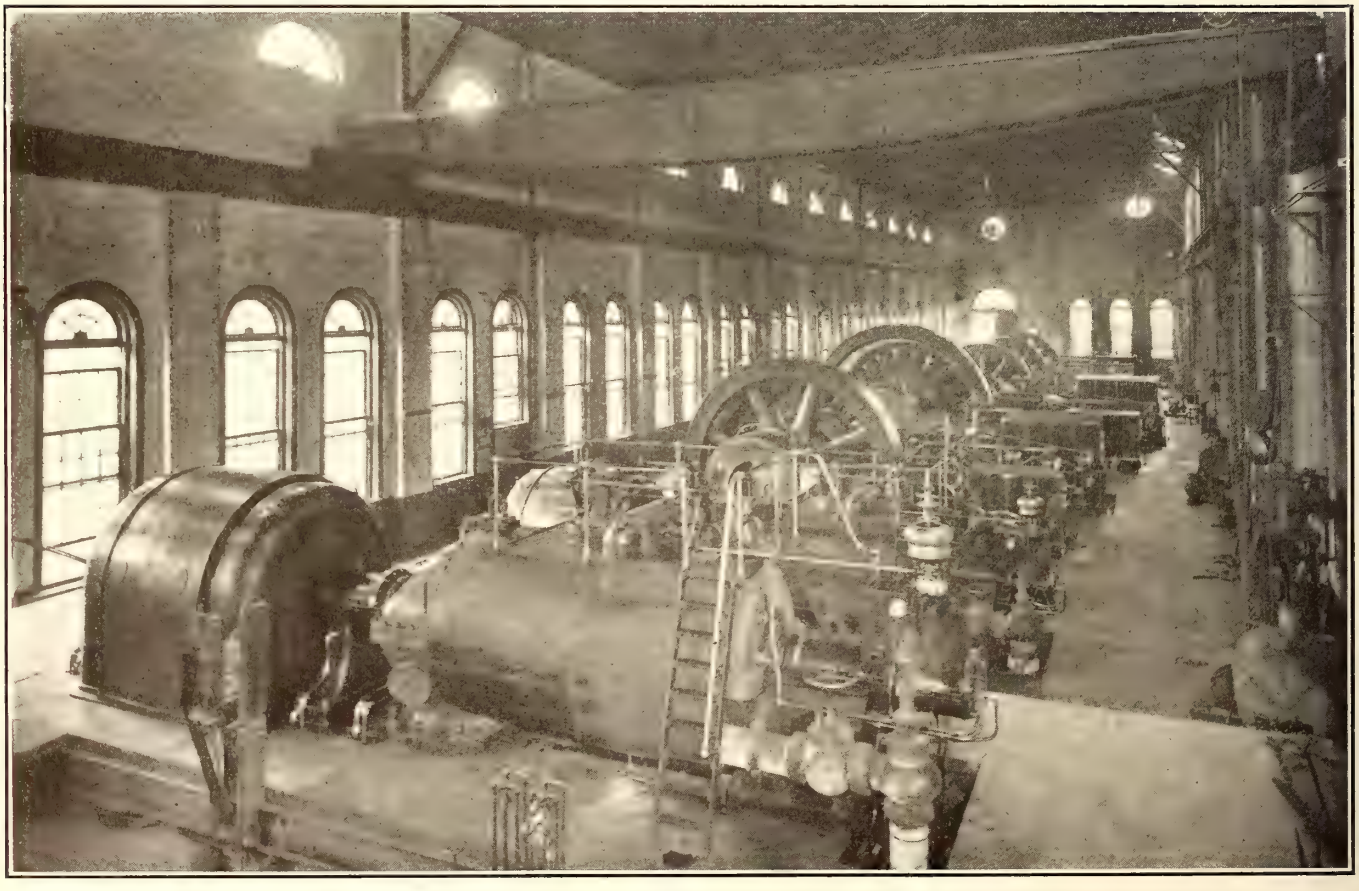


Denver Power—Map of Platte Street Power Station Site

height of the ceiling. Records are kept of all material issued for power generation and distribution service, with the result that substantial economies have been effected in the cost of such items.



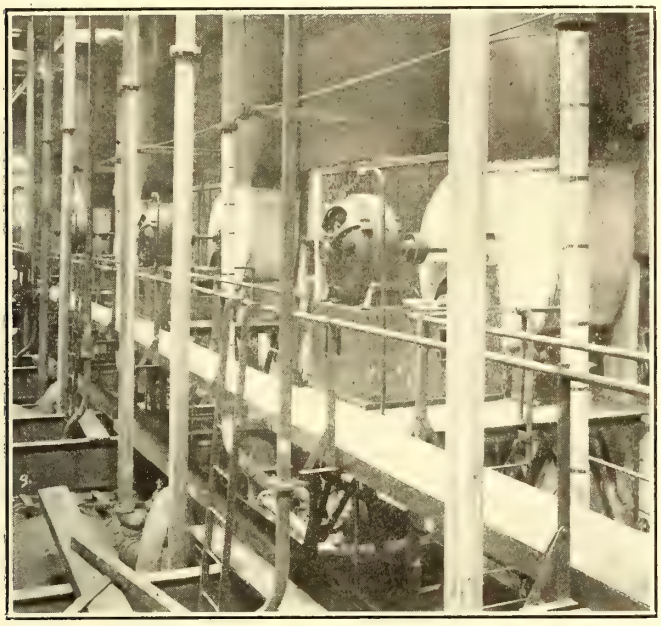
Denver Power—Condensing Water Screen and Pump Well



Denver Power—Interior of Engine Room Showing Turbine Units

Auxiliaries in the plant extension in general are driven by 600-volt direct-current motors. The fans on the new boilers are each of the horizontal type, direct-driven by 20-hp motors mounted on sheet steel housings at the sides of the blowers. All motor wiring is run in conduit, and the motors have rheostatic two-to-one speed control regulated from the boiler room floor. A very flexible installation has resulted from the use of motor-driven fans on individual boiler uptakes. It is possible to follow the load changes with unusual accuracy, and to fit the draft condi-

tions to the most economical operation. Other auxiliaries include a 115-hp, motor-driven LeBlanc circulating and air pump on the latest turbine set; a 25-hp motor driving a McCaslin coal conveyor with a capacity of 250 tons per



Denver Power—Individual Draft Fans in Boiler Uptakes

hour and a total length of 1000 ft.; two 15-hp motors operating cross-conveyors, and a 25-hp motor driving a coal crusher. All fuel is handled by the McCaslin conveyor, which elevates it and distributes it from the receiving hopper into steel-plate bunkers located above the boilers. The ashes fall into hoppers built as a part of the boiler settings, from which they are carried by the conveying system to cars located on a siding near the end of the building.

The pipes distributing compressed air around the fan gallery section of the boiler room are utilized as railings at the sides of foot passages, fittings being provided at various points where an outlet is needed. Increased aisle space and enlarged width characterize the new boiler room, which, with the north end of the turbine room addition, is



Denver Power—Storeroom in Power Station

separated from the rest of the plant by a brick fire wall.

The load factor of the station on a twenty-four-hour basis is about 50 per cent. Service from 1 a. m. to 6 a. m. is usually handled by one 800-kw, 600-volt direct-current generator at the station, all substations being shut down during this period. Four substations are now in regular service on the system, these being located outside the business district in each case. In general, 500-kw rotary converters are employed, there being two of these machines in each of the substations designated as Argo and Clear Creek, three at Broadway, and three 300-kw machines at the Colfax substation, serving the easterly side of the residential district back of Capitol Hill. The extension above described has been completed under the supervision of the company's own staff.

MEETING OF THE NEW ENGLAND STREET RAILWAY CLUB

A regular monthly meeting of the New England Street Railway Club was held at the American House, Boston, on Nov. 23, 1911, with President Franklin Woodman in the chair. Owing to the continued illness of John J. Lane, secretary of the club, E. P. Shaw, Jr., South Framingham, Mass., acted as secretary pro tem. during the meeting. At the conclusion of the usual dinner a paper was read by C. C. Copp, foreman car painter Boston & Maine Railroad, Boston, Mass., on "Car Painting." Mr. Copp gave many interesting reminiscences of the easy-going methods of painting departments in the earlier days of railroading, and contrasted the pressure for quick deliveries of cars to-day with the time permitted for the paint-shop work years ago. In the modern rush to accomplish rapid maintenance the work of different departments tended to overlap. It was quantity rather than quality of painting that appeared to count to-day, although a reasonable life was required after each shopping. The rapid increase in the amount of rolling stock to be handled and the inadequacy of shop facilities had in many cases led to infrequent painting, with the result that the appearance of cars had suffered badly, and when the painting was finally done the job cost twice what it would have cost if the work had been done at the proper time.

More time should be spent in putting on material than in securing a highly finished surface. The scraping knife and sandpaper instead of the rubbing stone were the important tools to-day. The car painter sought to get the greatest durability consistent with a fair finish. Lead and oil played an important part in modern priming practice. Mr. Copp spoke briefly in favor of substituting piece work and bonus systems for day work, and urged that fair prices and a careful selection of men be made when the piece work system was introduced. The results under such conditions would be surprisingly good. The payment of labor on a day basis had passed in progressive shops. Piece work put production on a strict foundation of cost. Mr. Copp touched upon the importance of relieving large plain painted surfaces with striping. This frequently was possible with little if any additional expense. He recognized the greater need of decoration on city street cars than in the steam railroad field and emphasized the tendency of managers to forget that new cars had thin skins of paint, especially when received from contract shops. He urged that operating officials honor the requisitions of the paint shop with liberality, and pointed out that it paid to paint as well as to advertise.

Replying to several questions, the author stated that in his opinion there were no serious difficulties to fear in the painting of all-steel cars. Steam locomotive tenders had been successfully painted for years, and there was no more severe test of paint than on a tender behind a locomotive. Lead and mineral brown were both used in priming steel cars, and the knife was freely used in skimming. The sun rather than wind and rain was the chief cause of paint destruction. Expansion, contraction and vibration were the main causes of the cracking of paint and varnish.

Study of Operating Characteristics of Chicago Railways Company's Cars as Influenced by Coasting Time

Engineers Who Conducted Exhaustive Tests to Determine the Saving in Power Consumption and Brakeshoes Which Would Result from the Use of Coasting Time Recorders on All of the Double-Truck Cars of the Company Estimate that the Annual Net Saving Will Be $265,792

A detailed study of the operating characteristics of the cars and motormen of the Chicago Railways Company has recently been made by the engineering department of that road. The results show possibilities of making a considerable saving in cost of power and wear of brakeshoes. Very elaborate observations were taken of car acceleration, running speeds, retardation, energy consumption and the correlated factors which so largely influence the cost of street-car operation. Continuous tests were made and observations taken on the Van Buren Street line during the period beginning Feb. 25, 1911, and ending July 1, 1911. The fifty all-steel, double-truck, pay-as-you-enter cars operated on this line are equipped with Rico coasting time recorders, and the purpose of the investigation of operating characteristics was to determine the merits of the coasting time recorder as a factor in reducing the energy required for operating the line, reducing the brakeshoe wear and otherwise improving the service. The results of the tests made are incorporated in a report signed by J. D. Elsom, engineer in charge of tests for the Chicago Railways Company. The following data have been abstracted from this official report.

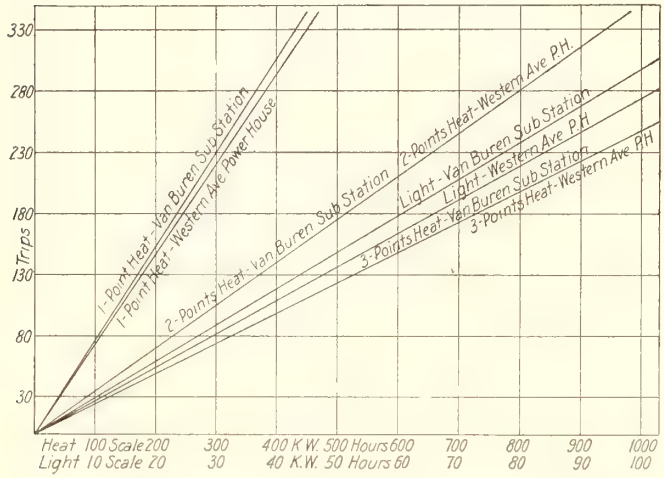


Fig. 1—Chicago Coasting Tests—Current Consumption for Heat and Light

The introduction to the report includes the following statement: "It is a well-known fact that the best results in operating cars are obtained by efficient acceleration, efficient braking and anticipating the stops or slow-downs for traffic." The Railway Improvement Company of New York, manufacturer of the coasting time recorder, presented claims to the Chicago Railways that its device would serve to obtain these results by increasing the coasting time on all runs without decreasing the schedule time. It also claimed that the increased coasting resulted in the following: (1) A saving in power consumption; (2) the percentage of power saving is directly proportional to the increased percentage of coasting; (3) a lowering of the peak on the power station is accomplished, due to a decrease in the power consumption and also because the motormen's time in accelerating becomes more uniform and approximates the calculated time which is consistent with the established scheduled running time; (4) a direct saving in brakeshoe wear; (5) lessening of armature and other motor troubles due to smaller rise in temperature resulting from lower average current passing through motor; (6) decrease in wear and tear on equipment in general, resulting also in saving in maintenance and renewals of wheels, gears, controllers, etc.; (7) a lessening of accidents in general, due to more uniform speed and more uniform braking, as well as because power is on a smaller percentage of the time, thus requiring one less operation to stop the car, and also because to obtain maximum coasting the motorman must always be on the alert to avail himself of opportunities, and if a motorman is on the alert accidents to pedestrians and street traffic will diminish; (8) regular running time is made more uniform on each trip and the schedule is followed more closely because of ease of checking these details with coasting time recorders.

The object of the tests made by the Chicago Railways Company was to determine the correctness of the foregoing claims of the manufacturer of the coasting time recorder under the conditions of operation on the Chicago Railways lines. It was decided that the most reliable method of determining the saving in power consumption was to select a line on which it was most difficult to coast and to meter the substation output to this line. The Van Buren Street line, on account of the narrow street, extreme congestion of team traffic and relatively fast schedule, was chosen as the line on which to make the test.

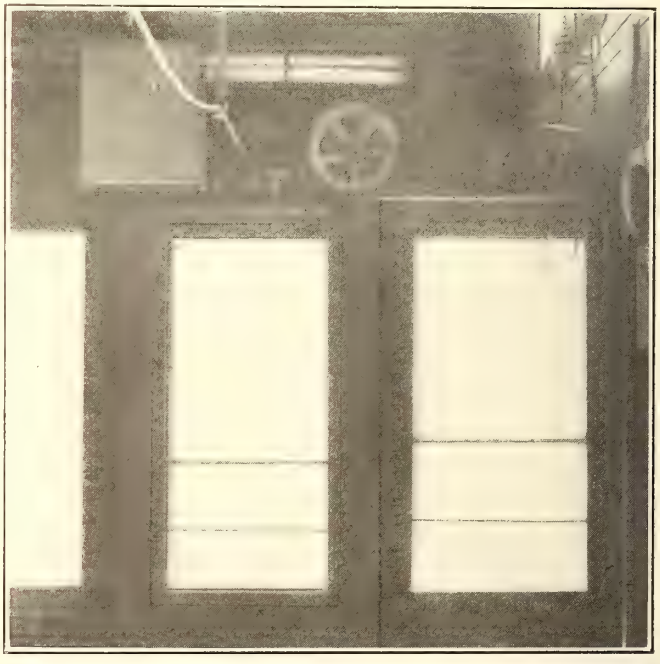


Fig. 2—Chicago Coasting Tests—Coasting Clock, Mounted in Car

This line consists of five trolley sections and extends

from Kedzie Avenue on the west to State Street on the east, a round-trip distance of 8 miles. It is one of the principal thoroughfares for heavy team traffic leading westward from the "Loop" district of Chicago. To make possible an accurate checking of the energy consumption on the line during the test period, four of the five trolley sections, extending from Kedzie Avenue to the center of

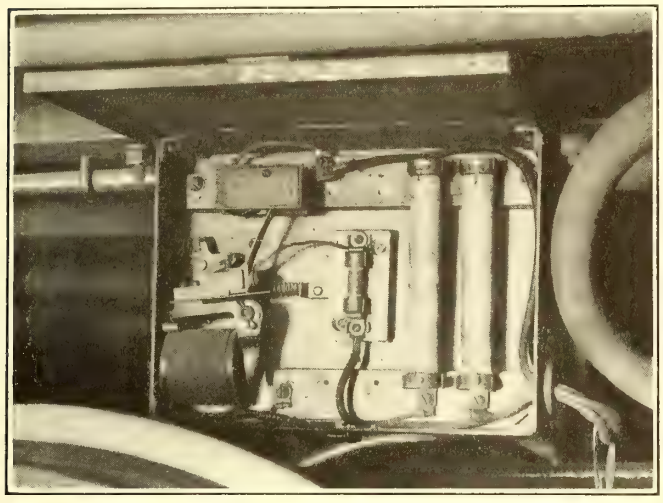


Fig. 3—Chicago Coasting Tests—Relay Box Mounted Under Car Body

the Chicago River, a round-trip distance of 7.02 miles, were independently fed through meters in the Van Buren Street substation and the Western Avenue power house. The meters used were the General Electric type G-3 of 2000-amp capacity, and these meters, as well as all other instruments used in the tests, were carefully calibrated at the close of the test period. The rolling-stock equipment of the Van Buren Street line consists of fifty all-steel, pay-

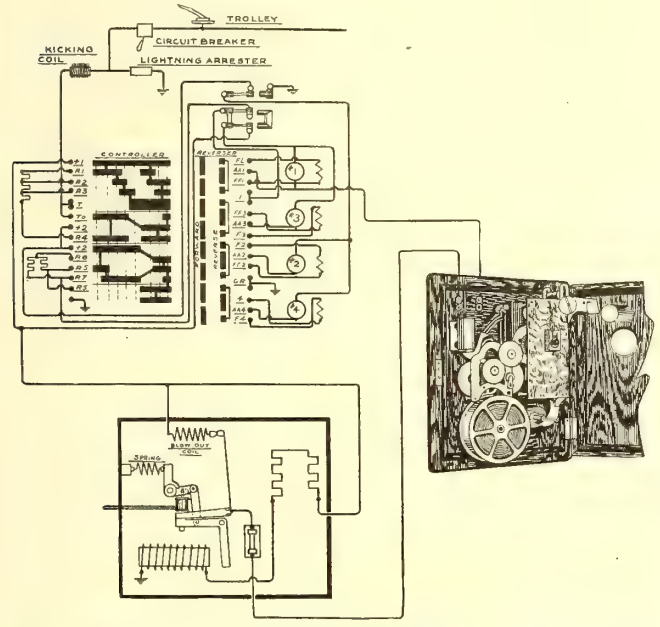


Fig. 4—Chicago Coasting Tests—Wiring Connections of Coasting Clock and Relay

as-you-enter type, double-truck cars having the following general dimensions:

Length over all	49 ft. 2 in.
Width over corner posts	8 ft. 9 in.
Height, rail to trolley board	11 ft. 8 in.
Truck-center distance	20 ft. 1 in.
Length of body	32 ft. 5 in.
Truck wheel base	4 ft. 10 in.
Seating capacity	40 passengers

Motors, four General Electric No. 216.
Controllers, two K-35 C.
Air brakes, National with A-4, 16-ft. compressors.
Heaters, Consolidated electric.
Trucks, Baldwin-Pullman No. 150.
Weight complete, 52,000 lb.

The report considers the several claims of the Railway Improvement Company in the order in which they have been stated above, and then summarizes the results of the tests on the Van Buren Street line. It applies the results established on this single line to the entire system of the Chicago Railways, and concludes with a statement showing a total net saving on 1560 cars for one year in kw-hours of current and increased life of brakeshoes of $265,791.94.

SAVING IN POWER CONSUMPTION

Previous to the installation of the coasting time clocks on the cars the energy fed to the Van Buren Street line was carefully metered for five weeks and the car miles run and the ton miles moved were determined. The energy consumption was found to be 3.890 kw-hours per car mile and 141 watt hours per ton mile. These figures include

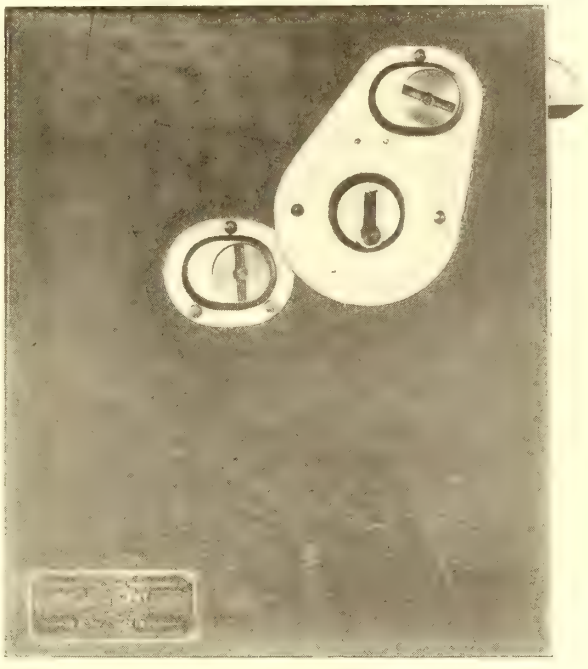


Fig. 5—Chicago Coasting Tests—Coasting Clock

power for operating only the car motors and the air-brake motor compressor. A special series of tests to determine the current consumption of the heaters in the steel cars was made on March 6. The average result of fifteen-second voltage and ampere readings taken on four trips over the length of the line showed the following hourly consumption of energy for the electrical heaters:

	At Western Ave. Power House.	At Van Buren St. Substation.
One point of heat	3.475 kw	3.766 kw
Two points of heat	7.300 kw	8.241 kw
Three points of heat	10.356 kw	11.757 kw

The foregoing energy consumption demand for the heaters was used in reducing the total metered output for the line for the five weeks of the test during which the heaters were used to a basis of energy for car propulsion only. The accompanying curves, Fig. 1, show the energy consumption for the heating and lighting as fed from the two sections of supply plotted with the number of trips as ordinates and the kw-hours as abscissae. The horizontal scale for the heater consumption is ten times that for the lamp consumption.

During the fifth week of the test period the coasting

time recorders were used all on the fifty cars operating on the Van Buren Street line. The accompanying engravings, Figs. 2, 3 and 4, show the location of the recorder above the door at one end of the car, the relay under the car body and the wiring connections of the relay and recorder.

Previous to the installation of the coasting clocks the motormen had not been advised that any measurements were being taken of the energy consumption of the cars which they were operating. The average percentage of coasting during this time was found to be 19 per cent. This was determined by a large number of stop-watch observations.

The first bulletin showing the relative rank of the motormen based on percentage of coasting time was published on April 8 and similar bulletins were published each week thereafter until May 13 when daily bulletins were published until the end of the test on July 1. After about four weeks of operation with the coasting time recorders it was found that the relay, type D-B-590, form B-1, did not fulfil the requirements because it permitted motormen to falsify their records by allowing their cars to drift to a standstill without applying the brakes, thus permitting the coasting clock to continue running after the car had stopped. The possibility of thus manipulating the recorders was overcome by substituting form F-3 relays, which prevent the coasting clocks from operating unless the car is in motion and the brakes and current are off.

The report includes records of the weekly coasting percentages of the various motormen, including both the regular and extra men. These records provided a basis for the classification of motormen into "good," "fair" and "indifferent." The record of a motorman who had for years been recognized as one of the best operators and one of the most consistent men on the system is of interest. On tests made previous to the installation of the recorders his coasting time was found to be approximately 20 per cent. After the installation his increase in coasting was gradual until the high mark of 51.5 per cent was reached. He made as high as 63.7 per cent coasting time for a single day's run.

The report states that this is typical of the gradual increase in efficiency of motormen classified as "good," which was made possible by the checking system inaugurated by the coasting time recorders, thus enabling the management as well as the motormen to check efficiency, trip by trip, day by day and week by week. Each man on the Van Buren Street line was made the subject of a special test under regular operating conditions. Thus each man had the opportunity of operating the test car for an entire day, and his efficiency was determined by other instruments besides coasting time recorders. With the men under observation on the test car runs it was found possible and practical to maintain an average of 50.9 per cent coasting for all scheduled runs, which is practically 15 per cent more than the average coasting of all motormen on regular cars.

Table I is a summary by weeks of the coasting percentages, kw-hours per car mile, percentages of saving, etc., as established by the tests. The average saving for the entire test period after the installation of the coasting clocks was 12.5 per cent. Table II shows the average by weeks of the different classes of motormen.

A fairly constant percentage of coasting and consequent saving was reached about the eleventh week after installing the coasting time recorders. Therefore, the savings obtained for seven weeks, including the last three weeks of the test period ending July 1, 1911, and the first four weeks under regular operation, were averaged and found to be 15.6 per cent, which is thought to be a conservative estimate of the saving that can be effected without special effort on the part of the motormen.

Special test car runs showed it to be practicable to run with an average of 15 per cent more coasting time than is done at the present time, which would mean an additional saving over the saving actually accomplished of approxi-

Table I.—Chicago Railways—Summary by Weeks on Operation of Cars Equipped with Coasting Time Recorders

Week Ending	Total Kw hours Traction	Total Car Miles Operated	Kw-hours per Car Mile	Total Passengers	Watt Hours per Ton Mile	Total* Running Time in Minutes	Total Coasting Time in Minutes	Percentage of Coasting	Percentage of Saving	Remarks
March 4	108,120	26,678	4.053	319,024	146	.....	.....		....	.....
March 11	101,475	26,678	3.804	322,441	137	.....	.....		....	.....
March 18	104,285	26,678	3.909	330,961	140	.....	.....	19%	....	.....
March 25	100,898	26,678	3.782	326,807	136	.....	.....		....	.....
April 1	103,592	26,678	3.883	323,872	140	.....	.....		....	.....
Averages & Totals	518,370	133,390	3.890	324,621	141	.....	.....	....	....	.....
April 8	102,442	26,678	3.838	331,436	138	.....	.....	....	1.3	Transition
April 15	87,367	25,415	3.438	339,900	124	146,171	37,493	31.8	11.6	.....
April 22	86,344	25,415	3.397	340.360	122	176,270	52,725	33.0	12.7	.....
April 29	83,333	25,415	3.277	334,224	118	181,289	59,974	36.3	15.8	.....
May 6	87,837	25,415	3.456	333,909	125	180,084	54,171	31.0	11.2	.....
May 13	89,524	25,415	3.522	338,046	127	152,634	38,342	29.5	9.5	.....
May 20	89,388	25,415	3.511	338,527	126	186,086	54,113	29.3	9.8	.....
May 27	89,069	25,415	3.505	341,637	126	195,900	61,462	31.2	9.9	.....
June 3	83,079	24,176	3.439	328,144	124	184,982	62,936	34.2	11.6	.....
June 10	85,468	25,431	3.363	340,741	121	200,065	67,573	33.8	13.5	.....
June 17	85,999	25,431	3.383	338,297	121	201,433	66,819	33.2	13.0	.....
June 24	85,252	25,431	3.352	343,706	120	195,142	64,059	32.8	13.8	.....
July 1	82,055	25,515	3.316	336,122	115	198,297	67,854	37.0	17.03	.....
Averages & Totals	1,034,715	303,889	3.405	337,801	122.5	2,168,353	68,752	31.7	12.5	.....
July 1–7	76,766	24,260	3.160	316,849	114	186,277	62,350	36.8	18.8	.....
July 8–14	83,722	25,431	3.292	323,081	119	184,313	57,266	34.4	15.4	.....
					New Schedule					
July 15–21	83,854	24,880	3.370	328,295	121	187,536	55,550	29.6	10.4	*4.03
July 22–28	85,726	24,661	3.476	352,935	125	.....	.....	.....	15.0	**4.09

**Schedule changed, running time reduced 3 min. 4.09 kw-hours per car mile used instead of 3.89.
*4.03 kw-hours per car mile used instead of 3.89.

Table II.—Chicago Railways—Weekly Records of Motormen's Coasting Percentages.

	Week Ending									
	May 20	May 27	June 3	June 10	June 17	June 24	July 1	July 7	July 14	July 21
Average for regular men	30.0	32.2	34.6	34.6	35.0	34.0	38.5	37.4	34.8	29.7
Average for extra men	26.8	28.4	30.7	30.6	29.4	30.1	29.3	30.7	28.8	28.2
Average for night men	27.3	32.1	35.2	34.1	33.5	34.7	36.8	36.2	37.8	36.5
Average for all men	29.3	31.2	34.2	33.8	33.2	32.8	37.0	36.8	34.4	29.6
Record for best man	33.2	36.1	45.2	44.9	44.0	46.1	49.5	51.5	45.9	44.4

Average of all runs = 350 trips on test car = 50% coasting.

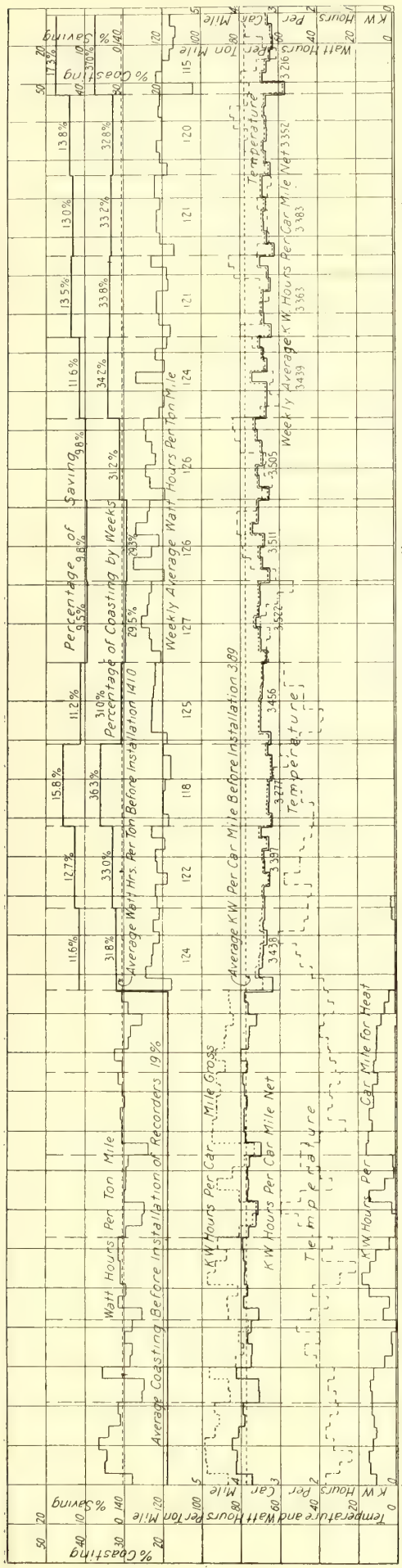


Fig. 6—Chicago Coasting Tests—Chart of Summarized Data for Test Period.

mately 12 per cent. This would mean a total saving of 27 per cent if the men did as well on their regular runs as they did on the special test car runs.

The author of the report holds the opinion that 27 per cent saving in power consumption is possible and practicable. He states that this opinion has been arrived at with a full realization that considerable pressure and co-operation must be brought to bear to compel the motormen to maintain on their respective regular runs the records established by themselves voluntarily on the test car runs.

Fig. 6 is a summary of the data obtained for the entire period under consideration. The completeness of the information presented by the curves of this chart should be

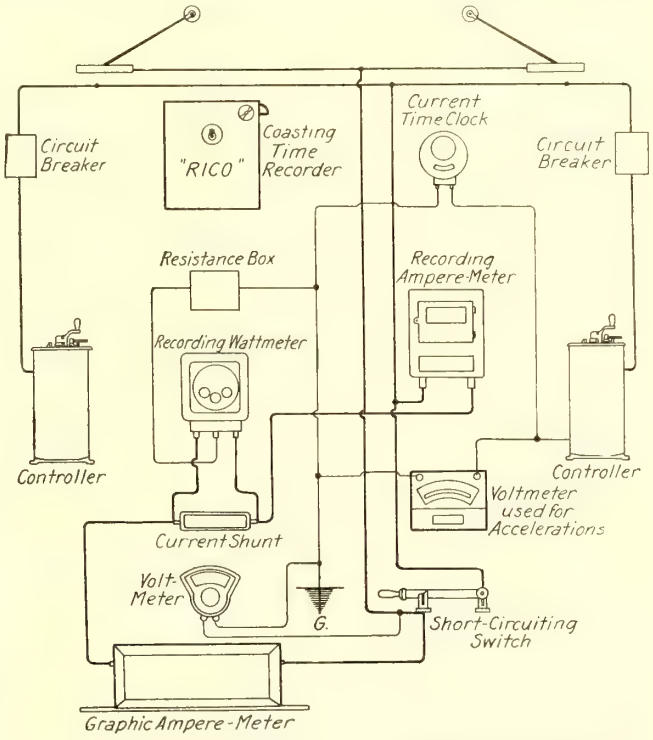


Fig. 7—Chicago Coasting Tests—Instruments Installed on Test Car

noted. It should be remembered that the figures for watt-hours per ton mile exclude the current used for heating and lighting, but include the current required to propel the passenger load. The method of obtaining the weight of passengers was as follows: First, an investigation of the length of riding on this line determined that the average passenger rode 2 miles. Thus, the total number of passengers handled when multiplied by two and divided by the total car miles gave the average passengers per car. The average weight per passenger was estimated as 140 lb. The average number of passengers per car multiplied by 140 lb. and divided by 2000 gave the tons of passenger load, which was added to the dead weight of the equipment before calculating the watt-hours per ton mile.

In connection with the temperature curve on Fig. 6 and the kw-hours per car mile required for heat it will be noted that on some days when the temperature was high the heaters were used. Heat was required on these days on account of dampness.

RELATION BETWEEN THE PERCENTAGE OF SAVING AND PERCENTAGE OF COASTING

In order to substantiate the manufacturer's claim that the percentage of saving is directly proportional to the increased percentage of coasting, a regular car was equipped with the instruments as shown in Fig. 7 and approximately 350 regular trips were made for the purpose of obtaining data which would apply to existing conditions. The meters used were calibrated after the test and the results corrected

accordingly. From these four curves (Fig. 8) were plotted, showing:

(1) Variation in kw-hours per car mile with percentages of coasting based on actual running time.

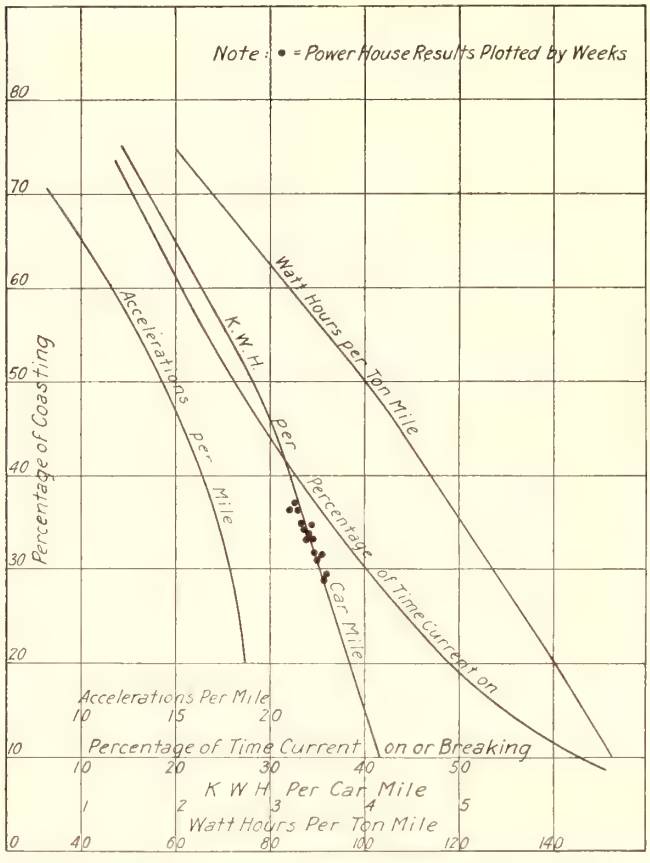


Fig. 8—Chicago Coasting Tests—Effect of Coasting Percentage on Energy Consumption and Other Factors

(2) Variation in watt-hours per ton mile at car with percentages of coasting based on actual running time.

(3) Variation in percentage of time current was on, with percentage of coasting based on actual running time.

(4) Variation in accelerations per mile with percentages of coasting based on actual running time.

The manufacturer's claim that the percentage of saving is directly proportional to the increased percentage of coasting was practically substantiated. For example, assume 20 per cent as normal coasting and increase this coasting step by step to 50 per cent. It will be noted from the following tabulation that an increase of 30 per cent coasting gives a corresponding saving of 27.3 per cent in power consumption. After passing 50 per cent the coasting ratio becomes slightly greater than one to one, instead of slightly less.

Per Cent Coasting.	Difference in Per Cent Coasting.	Per Cent Saving.	Kw Car Mile Saving.	Kw Car Mile.
20	..	....	....	3.835
30	10	8.5	.325	3.51
40	20	16.9	.645	3.19
50	30	27.3	1.045	2.79
60	40	41.6	1.595	2.24
70	50	56.5	2.160	1.675

With the curve of kw-hour per car mile in Fig. 8 are shown the variations in kw-hours per car mile at the bus, with percentages of coasting based on schedule running time in actual operation, allowing 10 per cent for line losses.

The power house results obtained in kw-hours per car mile are indicated by dots, each dot representing one week. This close relation of the power house and test-car figures tends further to substantiate the statement that the percentage of saving is directly proportional to the increased percentage of coasting when applied to substation output.

Lowering of Peak on Power Stations

To determine what effect the 15.6 per cent saving had on the peaks at the Van Buren Street substation the engineers plotted the station load by hours (Fig. 9), and for comparison plotted the total car miles by hours operated on the Van Buren Street line, the corresponding percentages of coasting and the total kw-hour consumption.

It will be noted that the coasting is divided into three periods:

	Coasting Percentage.
1—7 p. m. to 7 a. m.	40.7
2—5 p. m. to 7 p. m., 7 a. m. to 9 a. m.	average 31.8
3—9 a. m. to 5 p. m.	33.8

The coasting for all-day runs (7 a. m. to 7 p. m.) is prac-

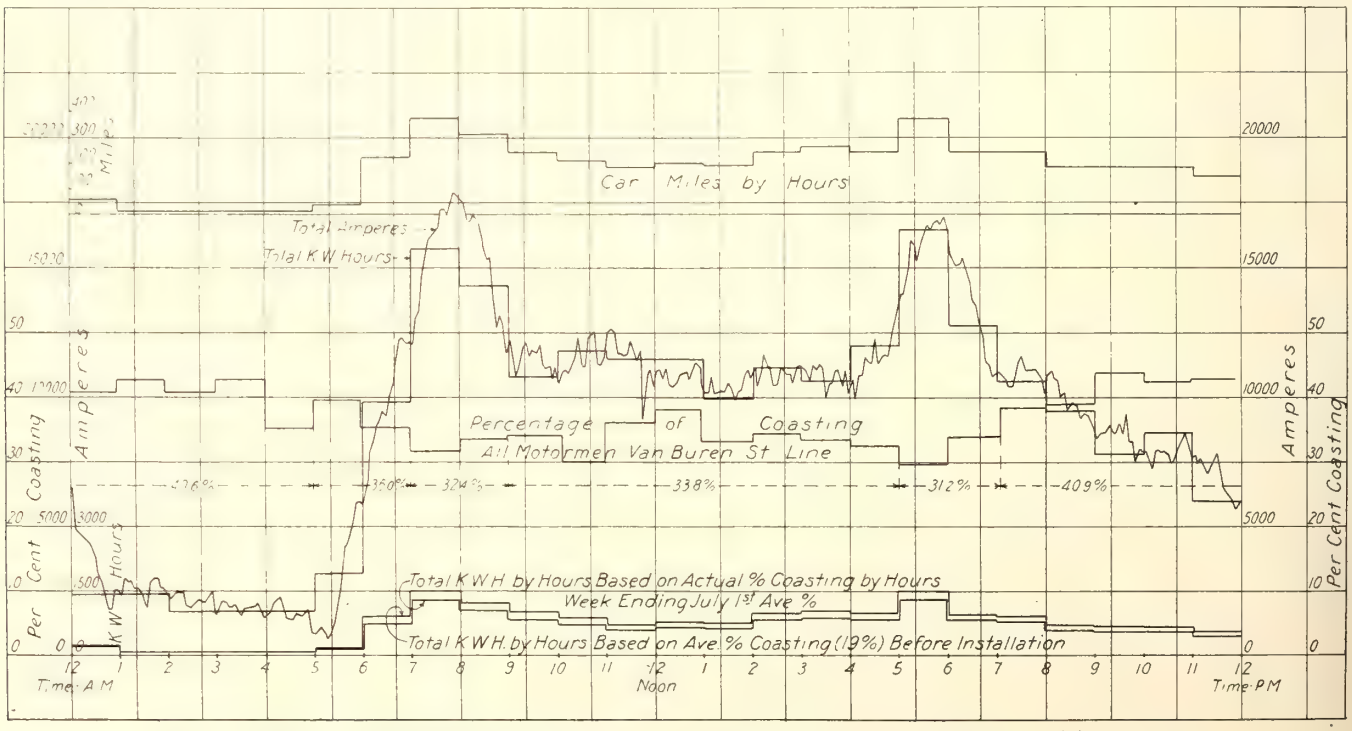
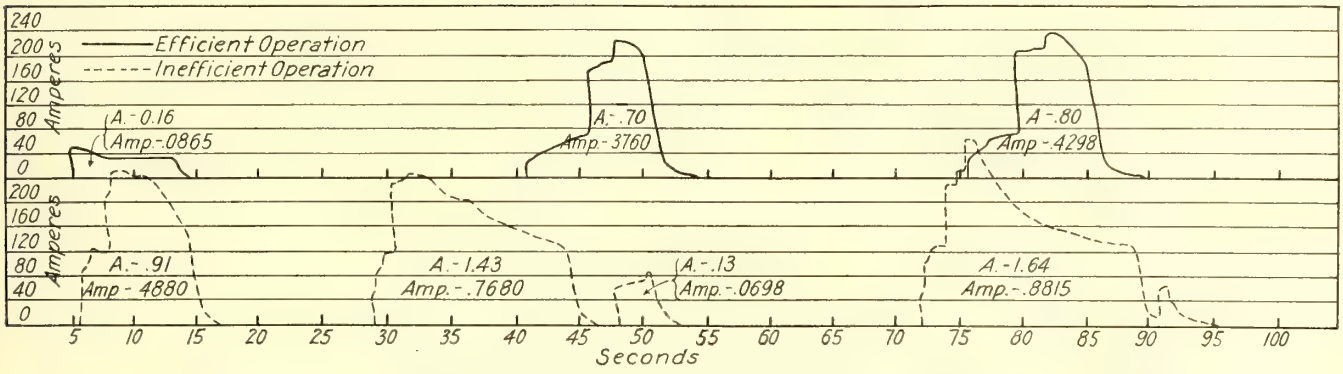


Fig. 9—Chicago Coasting Tests—Percentage of Coasting by Hours and Daily Load in Amperes

tically the same, being only 2 per cent less during the peak hours. It will be noted that the peaks on the several curves correspond in general. Therefore it will be seen that a 15.6 per cent saving in total kw-hours results in approximately 14 per cent lowering of the peak, allowance being made for the difference in coasting in accordance with the same general conditions are shown in Fig. 10. The inefficient motorman approaches the general conditions of running, both as to power consumption and coasting, which prevailed on the Van Buren Street line before the installation of the coasting time recorders. The marked difference in power consumption of the equipment as handled by the



	RUNNING TIME IN MIN.	COASTING TIME IN MIN.	% OF COASTING	NO. ACCEL.	TOTAL AMP. HRS.	TOTAL K.W HRS	K.W.H. P.C.M.	AVERAGE LINE VOLTAGE
Efficient Operation	25.5	12.4	48.6	46	16.40	8.98	2.087	546
Inefficient Operation	25.0	5.5	22	46	30.85	16.30	3.800	528

Comparison of Efficient and Inefficient Operation of Test Car for Complete Trip on Van Buren St. Line

Fig. 10—Chicago Coasting Tests—Comparison of Energy Consumption by Efficient and Inefficient Motormen

the ratio of coasting to kw-hours per car mile, shown in the curves in Fig. 8.

Lowering the peak at the cars assists largely in lowering the peaks at the power house. Low peaks at the cars are obtained by:

(1) Accelerating only to the necessary speed, whether by the use of one or eight points on the controller.

(2) Adhering at all times to the prescribed rate of acceleration.

Both of these methods, while decreasing the peaks, will

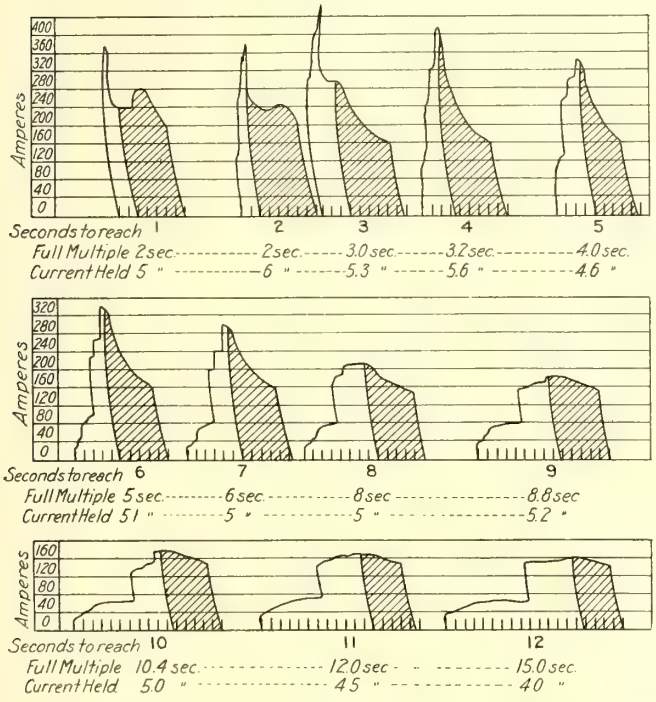


Fig. 11—Chicago Coasting Tests—Comparison of Energy Consumption with Different Rates of Feeding

materially increase coasting as well. To illustrate graphically the effects on peaks and the continuous power house load produced by coasting, two partial records which are representative of efficient and inefficient operation under

two men over the same track with the same stops is easily noted. The inefficient operator used 81.8 per cent more power than the efficient operator, although to a casual observer the only difference in car operation on the two trips was in the starting and stopping of cars more evenly and in a less jerky manner.

As a general check on these two runs shown in part in Fig. 10 tests were made to determine the rate of acceleration and the possible coasting distances resulting from the use of from one to eight points on the controller. These special tests were made with the test car at night and readings were made to check the curve-drawing instruments which were used to obtain the current curves.

Fig. 11 shows graphically the current values when accelerating to full multiple from a dead stop in various progressive intervals of time. These curves clearly illustrate the excessive peaks brought about by feeding faster than the proper rate for the motors and their gearing.

Fig. 12 shows graphically the current values and variations which occur when the car is in motion and the con-

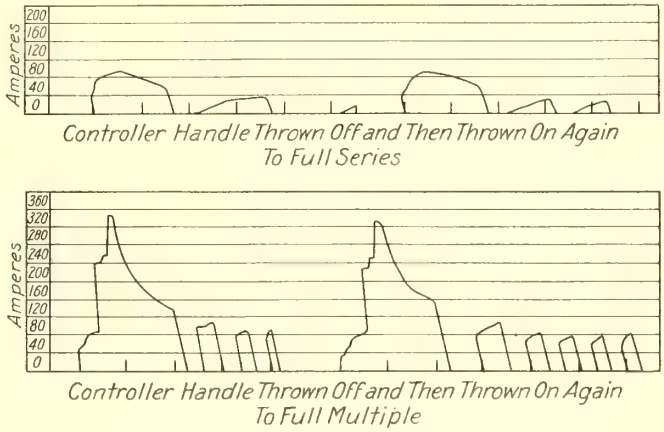


Fig. 12—Chicago Coasting Tests—Current Variations on Moving Car When Current Is Thrown On and Off

troller is thrown on and off from full series and full multiple. The effect of the counter emf of the motors, when the armatures are revolving at running speeds, in holding down the peaks should be noted.

Fig. 13 shows graphically the current variations, coasting distances and rates of acceleration when starting a car with from one to eight points of the controller using the uniform and correct rates of feeding.

These curves clearly substantiate the statement that the peaks on the inefficient runs are too high, averaging per acceleration 250 amp, against 117 amp on the efficient runs. This is the direct result of too rapid acceleration and use of poor judgment in estimating the speed necessary to carry the car to the next stop.

The general summarization of the distances that can be coasted with the use of from one to eight points on the controller indicates how further savings can be made if the facts are properly brought to the attention of the motormen. No fixed rules for operation can be laid down, but the realization of distances that can be covered in coasting when applied practically by the motorman will enable him to anticipate correctly the necessary amount of energy his car must store up to coast to the next stop, thus greatly increasing his efficiency in coasting. The proper time element for feeding is between five and seven seconds. Feeding faster than this tends toward crowding the motors and slipping the wheels. Slower feeding results in too low acceleration and heavy rheostat losses, as shown in Fig. 11. All the graphic results made during the tests checked closely with the theoretical speed-time curves, which showed that the theoretical rate of acceleration actually gives the best results in practice and should be adhered to.

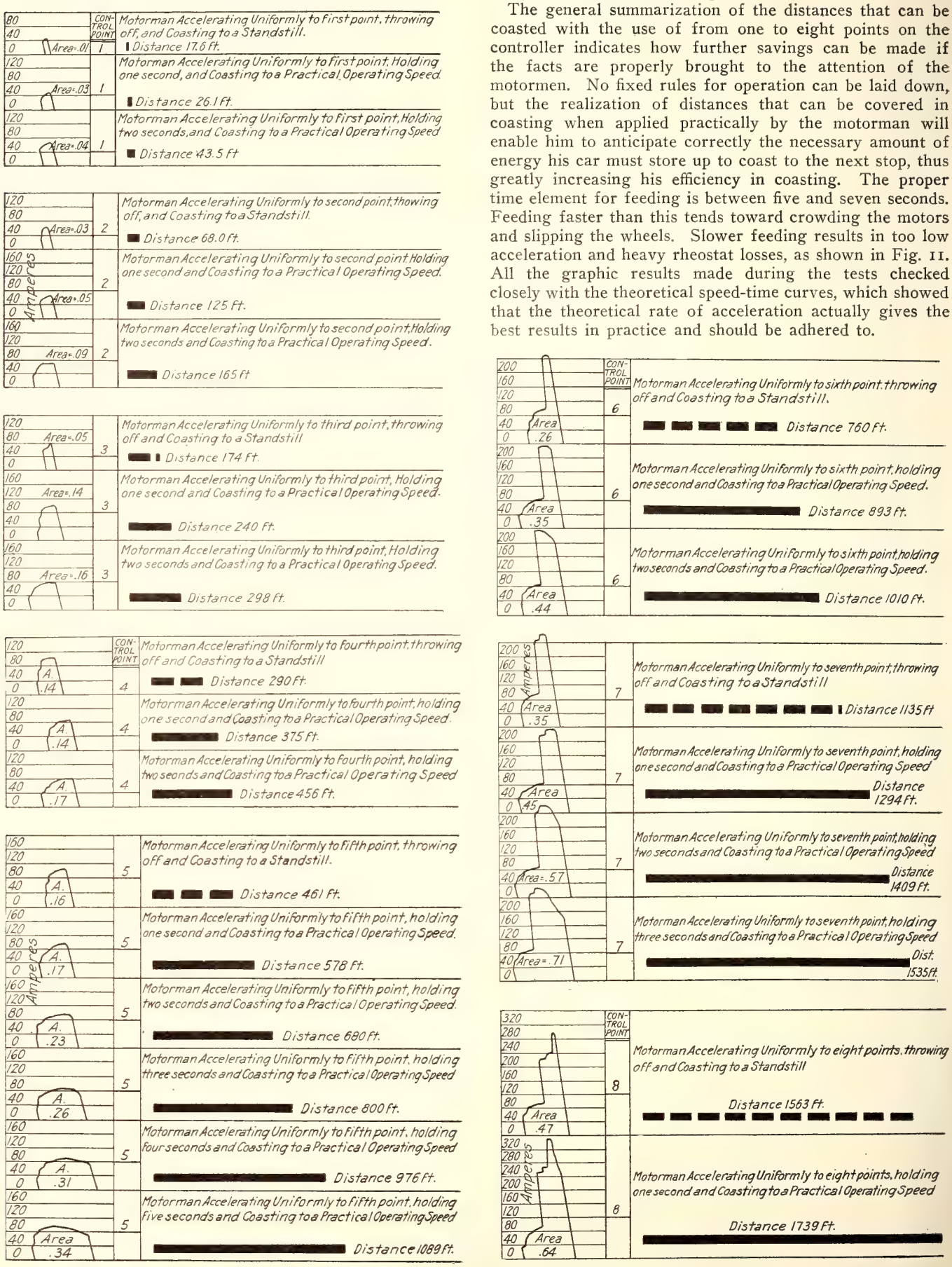
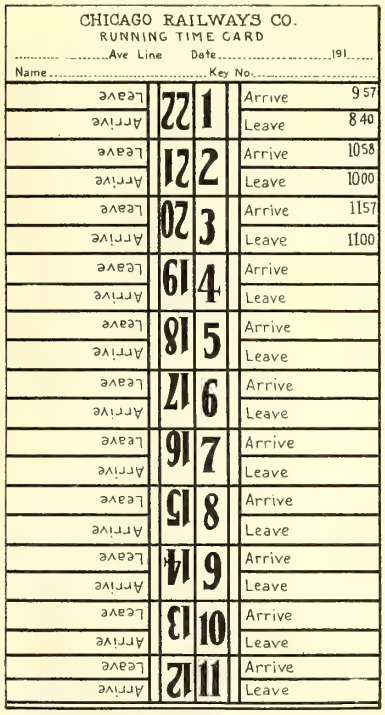
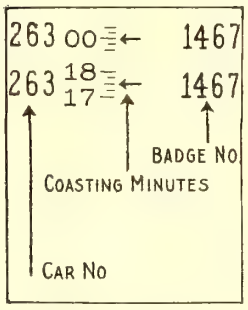


Fig 13—Chicago Coasting Tests—Current Variations and Coasting Distances for Different Controller Operations

In line with the foregoing observations the engineer in charge of the test suggested that a special instruction car should be equipped and a competent instructor be placed in charge. Each motorman should be required to pass an examination as to his efficiency and then be required in actual operation to approximate his established efficiency, and, failing to do so, should be sent to the instruction car for further instruction. This practice gradually would raise the standard of efficiency of all the motormen until the full benefit from the general use of the coasting time recorders was realized.





Figs. 14 and 15—Chicago Coasting Tests—Trip Envelope and Sample Coasting Clock Record

DIRECT SAVING IN BRAKESHOE WEAR

The report states that increased coasting is the result of efficient acceleration and retardation. Efficient retardation results in a minimum dissipation of energy through brakeshoes, which means a direct saving in brakeshoe wear. This in practice means the stopping of a car on one application of air when practical, and also eliminating "fanning of air." Extensive tests were conducted and an average saving of 40.8 per cent in the wear of brakeshoes was found.

Tables III and IV show the unit wear of brakeshoes, their life in terms of car miles, the pounds lost per car mile and a summary of the average saving after coasting time recorders had been installed, compared with the brakeshoe wear on twenty-three cars on the Kedzie Avenue line, which were not equipped with the recorders.

The following data are the results of tests made with one of the all-steel cars earlier described, the object of the test being to check the braking time and braking distance for making stops from various maximum speeds. In connection with these tests it should be noted that the track was wet, clean and very good for braking. The following figures are averages of several observations:

No. of Points Run on.	Maximum Speed m.p.h.	Braking Time.	Braking Distance.
	NORMAL OPERATION.		
1	12.8	6.5 Sec.	78 ft.
2	14.7	7.6 "	97 "
3	16.0	8.4 "	116 "
4	16.2	8.2 "	126 "
5	17.6	8.2 "	125 "
6	25.8	10.6 "	221 "
7	26.9	10.2 "	247 "
8	28.6	11.4 "	281 "
	VERY RAPID RETARDATION USING SANDER WHEN NECESSARY.		
1	12.8	4.0 Sec.	38 ft.
2	14.7	3.7 "	48 "
3	16.0	4.1 "	57 "
4	16.2	4.7 "	66 "
5	17.6	5.3 "	79 "
6	19.0	8.1 "	158 "
7	26.9	7.9 "	171 "
8	28.6	8.7 "	220 "

The report contains the following general conclusions regarding the claims made for coasting time recorders:

EQUIPMENT

"From facts brought to light in previous discussions and evidenced in practice, armature and motor troubles as well as the wear and tear on equipment in general will be lessened. Actual figures in percentage of saving for the entire system are not available, as the Van Buren Street line forms but a small unit of the railway company's whole equipment. The saving along this line is necessarily difficult to ascertain in as short a time as the test period covered.

ACCIDENTS

"The claims regarding accidents made by the Railway

TABLE III.—CHICAGO RAILWAYS—BRAKESHOE TEST BEFORE INSTALLATION OF COASTING RECORDERS.

Number	Car Number	Total Trips Made	Total Car Miles	Weight New Shoe Set (8)	Weight Old Set	LOSS IN WEIGHT PER SET (8) Total Car Miles	Pounds per Car Mile	Pounds per 1000 Car Miles	Remarks
1	717	175	1400	192	107	85	.0607	60.7	Entirely worn out
2	702	178	1424	192	111	81	.0568	56.8	Entirely worn out
Average.....		176.5	1412	....	109	83	.0587	58.7	

TABLE IV.—CHICAGO RAILWAYS—BRAKESHOE TEST OF CARS EQUIPPED WITH COASTING TIME RECORDERS.

Number	Car Number	Total Days on Car	Total Trips Made	Total Car Miles	Bad Castings in Set	Percentage of Bad Castings	Weight of Old Shoe per Set	LOSS IN WEIGHT PER SET (8) Total Car Miles	Pounds per Car Mile	Pounds per 1000 Car Miles	Remarks
1	733	14	160	1280	0	0	148.50	44.86	.0350	35.0	Not worn much
2	729	20	179	1432	2	25.	138.93	54.51	.0378	37.8	6-Badly worn
3	701	18	191	1528	0	0	142.00	51.36	.0336	33.6	Not worn much
4	725	17	195	1560	0	0	140.45	52.71	.0338	33.8	Uniformly worn
5	720	17	205	1690	2	25.	133.60	59.76	.0364	36.4	3-worn out
6	746	25	208	1664	0	0	143.20	50.16	.0345	30.5	1-Badly worn
7	720	19	220	1760	0	0	139.50	53.86	.0306	30.6	1-Badly worn
8	739	25	226	1808	0	0	128.50	64.86	.0359	35.9	Uniformly worn
9	743	21	231	1848	0	0	128.00	65.36	.0352	35.2	4-Badly worn
10	722	19	237	1896	1	12.5	126.48	66.88	.0352	35.2	2-Badly worn
11	717	29	247	1976	0	0	127.44	65.97	.0334	33.4	3-Badly worn
12	735	24	252	2016	0	0	132.00	61.36	.0306	30.6	1-Badly worn
13	714	22	262	2096	0	0	128.48	64.88	.0309	30.9	4-Worn out
14	707	25	269	2152	0	0	117.50	75.86	.0352	35.2	Uniformly worn
15	703	21	271	2168	0	0	129.53	63.83	.0294	29.4	Uniformly worn
16	709	21	272	2176	0	0	118.00	75.36	.0346	34.6	Worn out
17	744	20	272	2176	1	12.5	127.48	70.88	.0363	36.3	Uniformly worn
18	702	24	278	2224	2	25.0	122.88	70.48	.0316	31.6	Uniformly worn
19	749	26	298	2384	0	0	122.96	70.40	.0295	29.5	Uniformly worn
20	718	28	311	2488	3	37.5	109.96	83.44	.0334	33.4	Uniformly worn
21	705	29	327	2616	0	0	129.25	64.11	.0245	24.5	Uniformly worn
22	711	32	328	2624	3	37.5	110.62	82.74	.0315	31.5	1-Worn out 7-uniform
23	745	30	328	2624	0	0	120.00	73.36	.0229	27.9	Uniformly worn
Average.....		32.9	250.074	2005.9	14	7.6	127.83	64.65	.0322	32.2	

Average saving based on Van Buren St. before installation = 45.1 per cent.
Average saving based on Kedzie Ave. before installation = 35.7 per cent.
Average saving based on Van Buren St. and Kedzie Ave. before installation = 40.8 per cent.

Improvement Company are both logical and conclusive, and agree with the opinions of several of our operating officials as well as with the experience of the motormen themselves. Although the period of operation with coasting time recorders has only been a few months, the official records of accidents on the Van Buren Street line show a considerable decrease.

RUNNING TIME

"The operating department has been able with the records of actual running time for each motorman, obtained as part of the system inaugurated by the Railway Improvement Company, so to check the motormen as to maintain schedule running time, both at the terminals and time points."

SUMMARY

Based on the test described, the saving that can be converted into dollars and cents is presented by the engineers of the Chicago Railways Company in their report as follows:

1—Power ..... 15.6 per cent
2—Brakeshoes ..... 40.8 per cent

The actual saving in power on the Van Buren Street line, up to the present time, due to the use of "Rico" coasting time recorders is shown below:

Feb. 26 to April 8, six weeks consumed in determining kw-hours per mile, namely	3.890
April 8 to July 1, twelve weeks, actual consumption of power for traction	1,034,715 kw-hours
Total car miles operated	303,889
Average kw-hours per car mile	3.405
Average saving per car mile	12.5 per cent
Had the above 303,889 car miles been operated on a basis of 3.890 kw-hours per car mile the power consumption would have been	1,132,128 kw-hours
A saving in total kw-hours of	147,413
The above saving figured on a basis of 1 cent per kw-hour	$1,474.13
Saving in brakeshoes during the test period was 22.2 lb. per 1000 car miles. This would amount on the mileage made during the test to	132.22
Total saving in power and brakeshoes	$1,606.35
During the month of July the saving in kw-hours was 64,360, which at 1 cent would be	643.60
Saving in brakeshoes	43.16
Total saving to July 31 (16 weeks)	$2,293.11
During the next thirty-six weeks, estimating a saving of 15.6 per cent, will amount to	$5,664.14
Estimated saving based on above, actual saving in brakeshoes (36 weeks)	386.30
Actual and estimated saving of power	$7,781.87
Actual and estimated saving of brakeshoes	561.68
Actual and estimated total saving for year based on the operation of fifty cars on Van Buren Street line	$8,343.55
Cost of fifty "Rico" coasting time recorders, $5,000, at 10 per cent interest and depreciation	500
Cost of installation at $5 per car, $250 at 10 per cent interest	25
Total interest	$525
Cost to keep records, repairs, etc.	$1,200
Paper, envelopes, proportion of supplies and proportion of rent, etc.	200
Total operating charges	$1,925
Net income first year Van Buren Street line	$6,418.55

The dividend on the investment necessary to equip this line would be ..... 122.2 per cent.

ANNUAL SAVING ON ENTIRE ROAD

The established savings applied to the entire system of the Chicago Railways Company based on operation during 1910 would be as follows:

Total car miles operated	51,646,428	
Total kw-hours, traction	182,171,511	
Power saving at 15.6 per cent as shown on Van Buren Street line, kw-hours	28,418,756	
The above at 1 cent per kw-hour		$284,187.56
Total tons of brakeshoes consumed.	2,100	
Total saving based on 22.2 lb. per 1000 miles		$22,472.38
Total saving brakeshoes and power consumption due to installation of coasting time recorders		$306,659.94
Cost of 1560 "Rico" time recorders, $156,000, assuming 10 per cent interest and depreciation	$15,600	
Cost of installing 1560 recorders at $3 per car, $4680, assuming 10 per cent interest	468	
Cost of maintaining records	20,000	
Cost of paper	1,800	
Sost of motormen's envelopes	1,200	
Cost of rent	1,800	
Total cost of operation	$40,868	
Total net saving for one year in kw-hours and brakeshoes		$265,791.94

KEEPING RECORDS

Fig. 14 shows a sample envelope used by motormen on which to record their arriving and leaving time as indicated on the terminal printing time clock. This gives a valuable check on any variations from the scheduled running time.

A sample of the slip taken from the coasting time recorders at the end of each trip also is shown. This gives the recorded coasting time in minutes and the necessary badge number to identify the record. These slips are placed in the envelopes previously mentioned and are dropped in a cabinet by the motormen at the end of their day's runs. The envelopes are gathered once a day and sent to the engineering department for analysis and tabulation. At the end of each week a bulletin is published showing the percentage of coasting and average running time for all motormen.

The latest designs of "Rico" coasting time recorders print the elapsed coasting time, car number and motormen's key number. The new feature of recording the elapsed coasting time will materially decrease the cost of maintaining the records, shown in the summary of savings applied to the entire system.

The engineer of tests concludes the report as follows:

"From the foregoing discussion and facts gathered during the test the claims made by the Railway Improvement Company for its coasting time recorders have been fully substantiated.

"The test of the coasting time recorders has brought to light the enormous waste in power, brakeshoes, etc., and the use of the coasting time recorders has furnished a practical method of eliminating such waste. * * * I therefore recommend their adoption for use on our entire system."

Papers Read at New York State Association Convention

The Subjects Include Pay-as-You-Enter Cars, Accident Prevention, and Life of Railway Physical Property from the Standpoint of the Engineer and the Accountant

THE ADVANTAGES OF THE PAY-AS-YOU-ENTER CAR

BY THOMAS W. CASEY, GENERAL MANAGER PREPAYMENT CAR SALES COMPANY

In considering the developments of the pay-as-you-enter system, it must be remembered that the all-important and basic principle back of these developments and on which they are all founded is found in the standard open platform pay-as-you-enter car originally installed in Montreal, Chicago and New York. It has never been found necessary to change these cars in the five or six years of operating experience, and all prepayment cars in use to-day are operated on the same principle as the original pay-as-you-enter cars. Practically all benefits to be derived from prepayment operation were obtained in these original cars. There have been developments, however, of the prepayment principle, which, while not materially altering or interfering with the original design, have reduced the cost of converting old-style cars to the new type, and to a great extent have increased the general efficiency of the system.

When the first pay-as-you-enter cars were installed in Montreal in 1904, it was thought necessary to have a considerably enlarged rear platform for the accommodation of passengers boarding the car, this platform, in some instances, having a length of 9 ft. Practical operating experience proved that this extremely large platform was unnecessary as the passengers boarded the car and paid their fares much more promptly than had been anticipated, thus causing practically no congestion on the rear platform. Therefore the size of the platform has been reduced until to-day the maximum size is 6 ft., while many prepayment cars with rear platforms only 5 ft. long are being successfully operated. These platforms, therefore, are practically the same size as those on standard cars of the old type. This reduction in the size of the rear platform is an important one from the standpoint of the railway company as it eliminates the expense of providing an extra long platform. This saving is especially noticeable in the cost of converting existing old-style cars to the prepayment type, making it unnecessary to rebuild the rear platforms when they are of a reasonable size and greatly reducing the cost when rebuilding is found necessary.

FARE COLLECTION

One of the principal objects of the pay-as-you-enter car is to collect a fare from every passenger. To accomplish this the conductor has a permanent station on the rear platform and collects the fares as the passengers enter the car. Perhaps the greatest problem of the traction manager is the elimination of the "missed fare," caused by the failure of the old method to meet adequately modern operating conditions. The prepayment system is the only known method of overcoming this difficulty; that it does overcome it is a matter of record. While the results achieved from the first pay-as-you-enter cars were highly satisfactory from the start and showed a substantial increase in the receipts of the railway companies, a further development to insure that every fare would reach the company's treasury has been the use of the fare-box. There are a number of different styles of fare-boxes which can be satisfactorily used in connection with pay-as-you-enter cars.

A second advantage of almost equal importance is the better maintenance of schedule time. One of the most satisfactory results shown in actual practice has been the speed with which a crowd can be loaded and unloaded simultaneously at the stopping points. This means economy in operation and a marked reduction in expense.

ACCIDENT PREVENTION

Perhaps the most important feature of the prepayment car is the prevention of accidents. The primary design of the car with the fixed station of the conductor on the rear platform places him at all times in a position to observe the passengers, stop and start the car when it is safe to do so and be ready and able to prevent an over-eager passenger from possible injury. As the front platform of the first prepayment cars was used only for an exit, it was found desirable to have an inclosing door on the front platform in order to prevent passengers entering there. This was found wholly to eliminate alighting accidents at the front platform as the inclosing door was not opened by the motorman until the car had come to a full stop. This naturally suggested that the same result could be accomplished by inclosing the rear platform; thus the next development of the prepayment principle was the inclosing of the rear platform, thereby preventing passengers from alighting before the car had come to a full stop, and resulting in eliminating alighting accidents.

The other most prolific source of accidents was from boarding the car while in motion, and while such accidents were greatly reduced by the inclosing door on the rear platform, yet so long as the stationary step offered the opportunity some passengers who were over-zealous to enter the car would jump on the step only to find their way blocked by the inclosing door. Therefore, in order entirely to eliminate boarding accidents, the folding step was the next development. Such a step, working simultaneously with the inclosing door, completely shuts in the rear platform and removes any opportunity for "flipping" the car.

The pay-as-you-enter car with these additions effectually prevents the two most common causes of accidents. The claim agent of one well-known road testified in a recent suit that while the company had had 681 accidents during a period of nine months with the old-type cars, since the introduction of the pay-as-you-enter cars there had been only three accidents in six months. None of these accidents had resulted in any claim against the company. In this connection the figures contained in the report to the Pennsylvania State Railroad Commission of March 7, 1911, are interesting. These figures show that the ratio of boarding accidents had diminished from 84 per cent on old cars to 16 per cent on the prepayment type cars; that alighting accidents had decreased from 93.5 per cent to 6.5 per cent, and that the percentage of passengers falling from cars had dropped from 97 per cent to 3 per cent. These figures are startlingly conclusive and are confirmed by similar results in other states. According to the last published United States Census report, the cost of damages and legal expenses incident thereto resulting from accidents to street car passengers throughout the country totaled the gigantic sum of $18,176,305 during the year under review. During the same year the companies concerned paid out in dividends a sum of $54,000,000; thus nearly 40 per cent of the sum paid in dividends was wasted in preventable accidents.

When the pay-as-you-enter car was first placed in opera-

tion it was thought that its use would be limited, as it was feared that the prepayment principle could not be adapted to more than one type of car. Experience has demonstrated the fallacy of this opinion. Single-truck cars of the prepayment type are being as successfully operated as double-truck cars, although at one time this was believed to be impossible. As further evidence of the flexibility of the prepayment principle, showing that it can be adapted to practically all operating conditions, attention might be called to the one-man prepayment car, now being successfully operated in Oklahoma. In this type of pay-as-you-enter car the front platform is designed with a separate entrance and exit, the motorman acting as conductor and collecting the fares as the passengers board the car. This is considered advantageous on small lines where the travel is light and economy in platform expense is a factor.

Another modification is the center-entrance type of car, successfully operated in Tacoma, Wash., Oklahoma and Montreal. This car is most flexible in its operation, as it can be used for first and second-class passengers, or for smokers and non-smokers, or in the South for the separation of white and colored passengers.

Another recent development of the prepayment principle is the near-side, one-end prepayment car now being operated in Buffalo and Philadelphia. With this car the conductor and the motorman are stationed at the front end of the car, the passengers boarding and alighting from that end; this is an added advantage in those cities where traffic regulations compel a stop on the near side. Through only recently introduced, these cars have shown themselves to be very successful in operation and are an added illustration of the adaptability of the pay-as-you-enter principle.

Still another modification is what is known as the "Universal" prepayment car, which is designed for either near-side or far-side operation, as may be desired. The ordinary type of car is adapted only for far-side operation; the one-end near-side car can be used only for near-side operation, but the universal prepayment car is adaptable to both methods of operation. As near-side stops are required in certain sections of some cities, while far-side stops are required in other sections of the same cities, this is an important feature.

Growth of Prepayment System

Regarding the growth of the pay-as-you-enter principle, prepayment cars have been adopted by over 100 traction companies, which are operating more than 10,000 prepayment cars to-day, while more than 50 per cent of all the cars built for city use in the United States and Canada during the first six months of the present year were prepayment cars.

Prepayment cars are now giving satisfactory service under all kinds of operating conditions. They are being used in large cities, such as New York, Chicago and Philadelphia, where the traffic is much congested, and also in Hutchinson, Kan., with a population of 16,000, where eight cars comprise the entire rolling stock. It is very evident, therefore, that the original impression that the prepayment principle was only suitable for large cities was an erroneous one. The constant increase of companies adopting the system, and in particular the fact that these same companies are day by day increasing the number of cars in use on their respective lines, offers the best evidence of the advantages which the system has been proven in actual tests to present.

The advantages of pay-as-you-enter operation are now being recognized abroad and a company was recently formed, under the name of the International P-A-Y-E Tramcar Company, Limited, to exploit and develop the system. Within a reasonably short time, pay-as-you-enter cars will be familiar sights in foreign cities.

At the Tramway Congress recently held in Glasgow, the presidential address, read by J. Dalrymple, general manager of the Glasgow Corporation Tramways, contained the following:

"In America considerable changes have been made within the past few years in the style of car, and now nearly all the large street railway companies collect the fares of the passengers on the platform before they enter the car. That change, which seems a very simple one, must have proved in many ways a great boon to the street railway companies of America. It must have been the means of increasing the revenue enormously, and the adoption of this system must have minimized to a considerable extent the number of platform accidents. What would it mean to us here if we could devise some method which would insure that the conductor would never require to leave his platform?"

In the city of Sheffield, England, the collecting of upper-deck fares in advance has been instituted, and plans are now in the shops of the company for the remodeling to pay-as-you-enter operation of certain cars of the Gateshead & District line of the British Electric Traction Company, an organization controlling some thirty English lines.

It is eloquent testimony to the appreciation of American far-sightedness that such European cities as Paris, Milan, Rome and The Hague are now closely investigating the pay-as-you-enter system with the officials of the International Company.

In the following four prime elements the prepayment system of fare collection presents a solution of the chief difficulties confronting the street railway operator:

The abolition of missed or lost fares.

The reduction of car hours, or economy in operation.

The prevention of accidents and reduction of claims and damages.

The definite and unquestioned advantage of the approval of the public.

Operation of Pay-as-you-enter Cars in Syracuse

By J. E. Duffy, Superintendent Syracuse Rapid Transit Railway

Pay-as-you-enter cars were put in use by the Syracuse Rapid Transit Railway on Oct. 2, 1910, so that at the present time the results of a full year are available for comparisons and deductions.

The type of car put in service was a double-truck, single-end car, 45 ft. long over all, with a rear platform 6 ft. 6 in. long, and seating forty-two passengers. As the rear half of the platform, which is used as an entrance, was not protected by a door, the mechanical facilities for preventing boarding accidents were no better than with the older type of car, but it was hoped that on account of the conductor being on the rear platform at all times there would be a very material reduction in the accidents of this class. These frequently happen when the conductor is engaged in collecting fares in the forward part of the car and depends upon passengers on the rear platform to notify him when the steps are clear and when it is safe to start the car. The fact that each exit was controlled by an agent of the company and no passenger would be able to alight without one of these agents permitting him to do so led to the expectation of a marked reduction in, if not the total elimination of, alighting accidents.

These cars were put in operation on what is known as the Dudley & East Genesee division, which is 4.84 miles long. Previous to the introduction of the pay-as-you-enter cars the cars on this division were operated on a four and five-minute headway with an allowance of thirty-five and thirty-six minutes for each half trip, which is a schedule speed of 8.3 m.p.h. Although at first it was thought that the slower operation of the pay-as-you-enter cars would require the running time to be increased, this was not

found necessary after the first week. The same schedules have been maintained with the pay-as-you-enter cars as were in use with the other type of car. The operation of this line through the center of the city is particularly favorable, as it traverses the business section for a distance of only two blocks.

Following are some statistics which will serve to show the success of the operation of pay-as-you-enter cars on this division:

The receipts from this division for twelve months ending Sept. 30, 1910, during which period the old cars were in use, were $241,898, which was an increase of 6.38 per cent over the previous year, while for the same period the increase on the whole system, including this division, was 8.86 per cent. This shows that this particular division did not keep up with the general increase for the whole system for the period mentioned.

The receipts from this division for the twelve months ended Sept. 30, 1911, were $269,556, an increase of 11.4 per cent over the preceding year, while the increase on the whole system, including this division, was 6.66 per cent.

While this division showed 2.48 per cent less increase than the percentage increase for the entire system for the year ending Sept. 30, 1910, it showed 4.74 per cent more than the percentage increase for the entire system for the year ending Sept. 30, 1911. This proved quite conclusively that the larger part of the increase in 1911 was due to the operation of the pay-as-you-enter type of car. It was not caused wholly, as one would expect, by failure to register fares, but rather because the conductor was in a position to see that every person paid his fare. The public is more to blame for the loss of fares than the conductor.

ACCIDENTS

Prior to the introduction of this type of car in Syracuse several companies reported marked reductions in the number of accidents occurring on divisions where they were in operation. Our experience, so far as platform accidents were concerned, was not as satisfactory as we had anticipated. The increase outside of this division for the year ending Sept. 30, 1911, for platform accidents was but 4 per cent, while the increase on this division was 46 per cent, divided as follows: Alighting accidents decreased 0.085 per cent, boarding accidents increased 66 per cent, and "injured on car" accidents increased 171 per cent; all as compared with the previous year.

We found that the accidents classed as "injured on the car" increased greatly on account of the numerous grades and curves on this division. As soon as the passengers were on the rear platform the conductor started the car. Many times people were thrown either to their knees or against the sides of the vestibule as the car was rounding a curve or starting down grade. Upon analysis, however, it was found that the amount of money paid out for platform accidents was much less than during the previous year. This showed that while they increased in number they were of a less serious nature.

The amount of money paid out for alighting accidents which occurred on this division decreased 63.5 per cent. The amount for boarding accidents decreased 15 per cent, and the amount for "injured on the car" accidents decreased 22.5 per cent, making a total decrease of 40 per cent for all platform accidents. This means that, while the number of accidents increased 46 per cent for the period named, the amount of money paid for the same period decreased 40 per cent.

We found that about one-half of the money paid for alighting accidents was due to women catching their skirts on the snow scraper handle, which is located on the front platform near the exit door. When this was discovered a guard was placed over the handle and our records show that but one accident of this nature has occurred since.

Our patrons from the first have been well pleased with this type of car, and by October, 1911, the company had found them so satisfactory in operation that twelve more were added to the original twenty-three cars. These twelve new cars are practically the same type as the ones which have been in service on the Dudley & East Genesee division, except for the addition of a folding door at the rear entrance and folding steps at the rear entrance and exit.

The twenty-three cars purchased a year ago recently have been equipped with folding rear steps and a folding door at the rear entrance. This makes the rear platform arrangement uniform on all cars of this type now in operation. This feature should effect a very material reduction, both in the number of accidents and in the amount of money paid out for accidents, if the conductors and motormen obey instructions that the doors must not be opened until the car stops and that the car must not be started until the doors are closed.

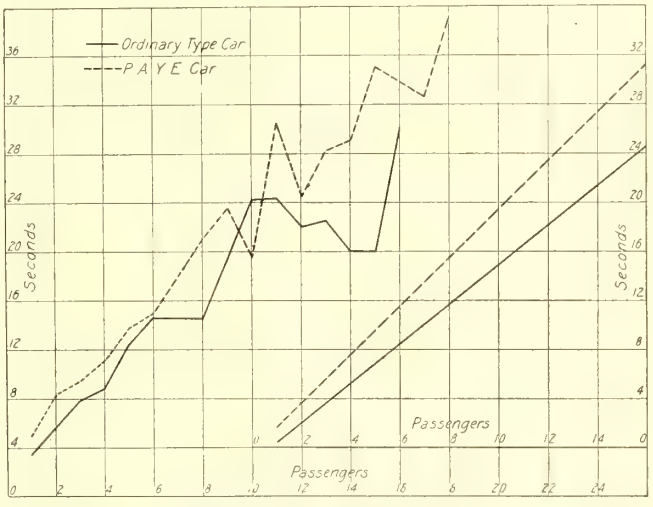
The "injured on the car" accidents have a tendency to increase in number but not in severity. We hope, however, by educating the conductors to allow elderly or feeble persons to reach the seats before starting the car to keep down the number of accidents of this class.

CONCLUSIONS

We have drawn the following conclusions as to the advantages of pay-as-you-enter cars:

First—The abolition of lost or missed fares is accomplished.

Second—A reduction in car hours and economy in operation is not obtained, judging from our experience. It



Loading and Unloading Time of Prepayment and Ordinary Type Cars

might be possible that the pay-as-you-enter cars with open front and rear platforms could accomplish this, but that type of car could not be used in a climate such as we have in Syracuse. On the Dudley & East Genesee division, where the pay-as-you-enter cars were first put in service, it has been possible to use the same running time per trip as was used with the old type of car, but on the Midland & Butternut Park division, which was the last line equipped with pay-as-you-enter cars, it was found necessary to add practically 7½ per cent to the running time. This perhaps is due to the fact that this line runs through the business district for a considerable distance, where it is the practice to stop at both the near and far sides of the streets. From tests made under practically the same conditions with the pay-as-you-enter type and a full convertible car it was found that as the number of passengers per trip increased the pay-as-you-enter car was slower in operation.

The conclusion as to reduction in car hours is based upon a series of tests made with full convertible cars from which passengers may leave by the front door. In 215 cases recorded where only one passenger boarded or left the car at any point seventy-two boarded or alighted without the car coming to a full stop, or with a stop of such short

duration that it was impossible to record it with a stop watch. From the same series of experiments it was found that in eleven out of 114 cases where two passengers boarded or left the car at one point the car did not stop.

To indicate that the pay-as-you-enter type is used efficiently in Syracuse, as a result of eleven tests made on the Dudley & East Genesee division and thirteen tests on the Midland-Butternut Park division, 60.7 per cent of the passengers left the car through the front exit. In comparison with this, sixteen tests made on the Court & Salina division, where the full convertible type of car is used, showed that only 30 per cent of the passengers left by the front door.

The chart on page 1203, based on these tests, shows the average length of time required to receive and discharge different numbers of passengers varying from one to eighteen at a single point.

Length of Stops with Convertible and Pay-as-You-Enter Cars.

Number of Passengers.	—Full Convertible Car.— No. of Tests.	Av. Seconds.	—Pay-as-You-Enter Car.— No. of Tests.	Av. Seconds.
1	215	3.4	347	4.9
2	114	5.6	184	8.3
3	81	7.8	100	9.4
4	46	8.8	58	11.1
5	18	12.4	34	13.8
6	13	14.6	24	15.0
7	13	14.5	23	18.0
8	4	14.5	17	21.1
9	8	19.7	6	23.6
10	3	22.2	6	19.5
11	0	24.3	4	30.5
12	1	22.0	2	24.5
13	2	22.5	4	28.2
14	1	20.0	1	29.0
15	1	20.0	2	35.0
16	1	30.0	0	...
17	..	...	3	32.6
18	..	...	1	39.0

Third—The prevention of accidents and reduction of claims and damages are marked. The statistics given in the first part of this paper, which showed the amount of money paid out by this company, indicate that this claim is well founded.

PREVENTION OF ACCIDENTS

BY R. E. M'DOUGALL, CLAIM AGENT UTICA & MOHAWK VALLEY RAILWAY

Each year shows a decided increase in the number of accidents and the amount of damages that companies are compelled to pay because of them, no matter how efficient the claim departments may be in their settlement. All common carriers are giving the matter attention, and are trying to devise ways and means of preventing accidents.

Traction companies on the Pacific coast for some years have been conducting a campaign of accident prevention, and the results obtained by them have been such as to justify other companies in taking up the question. More than one-half of the accidents that occur are due entirely to carelessness, either on the part of the person hurt or someone else. Many of these accidents can and should be prevented. This prevention can be brought about by organization and education. By this I mean systematic education of employees and of the public, thus getting their interest and co-operation. Much can be done along this line.

WHAT CAN BE DONE TO INCREASE THE INTEREST OF ALL EMPLOYEES IN ACCIDENT PREVENTION?

The following classes of accidents in many instances can be prevented by employees of the various departments outside of the transportation department:

(1) Miscellaneous accidents, such as passengers and others being injured on or near railway property, but not while on cars or struck by cars.

(2) Platform and station accidents.

(3) Injuries to employees.

Let the heads of these departments get together and organize a campaign for the prevention of accidents among the employees. For example, the track employees should be impressed with the necessity of keeping platforms, steps, walks, station entrances and exits in good repair and free from snow and ice at all times; of guarding holes and excavations made by them in the performance of their work; of properly barricading and lighting at night all unfinished work in streets and highways. Particular attention should be given to the condition of the 2-ft. strip outside of the track in streets and to landing places where cars stop for passengers to alight, so that a passenger who gets off a stationary car and falls cannot make the claim that the fall was due to the company's negligence in having an improperly constructed landing place or in permitting a hole to remain alongside of the track.

What applies to the trackmen also applies to the linemen, carmen, shopmen and all other employees. They should be reminded constantly that they are to be careful to protect themselves and others at all times. Get the men to know that this is expected of them and see that they do it.

THE BEST MEANS OF PROMOTING GREATER CAUTION ON THE PART OF PLATFORM MEN

This is also a matter of education, and I believe that this education should be carried on jointly by the superintendent and claim agent. After the new man has been "broken in," and before he reports for work, he should see either the superintendent or the claim agent for instruction in accidents and their prevention. It should be impressed on him how to handle an accident; what he can and should do to prevent one; that he should be sure no one is boarding or alighting before he starts the car; that he should warn passengers who are getting on or off a moving car. These points and many more should be thoroughly gone over with him before he reports for work. While breaking in, the new man has had his whole attention centered entirely on how to collect and account for fares or how to operate a car, and the accident end of the business has been given but little thought by him. Get him thinking and then follow him up.

Talks with the platform men in a body, say every two or three months or oftener, will produce the best kind of results. Have short talks by representatives of both the operating and claim departments, giving figures as to number and cost of accidents; the cause of accidents and how they could have been avoided, etc. If you interest your men you will get much in the way of results and also suggestions from the men that are oftentimes valuable.

HOW CAN THE PUBLIC BE EDUCATED IN THE PREVENTION OF ACCIDENTS?

This is where your real work can be done, and there are many ways to go about it. While much can be done among the adults, better and more lasting work can be accomplished with the children. If the necessity of being careful at all times is thoroughly impressed on them the impression will remain, and the results will be felt now and in the future. They are your riders of to-morrow. A special effort should be made to get to them to see that they are instructed where the danger is, and that they are taught to be always on the safe side. How to go about the work is a question that each must decide for himself.

As to the education of the adult population let me make these suggestions: Get in touch with employers of teamsters, such as truckmen, liverymen, express men and the like, and ask them to take up the subject directly with their men. Get traffic regulations passed in your municipalities and see that they are enforced. Get the newspapers interested in the subject; they would be only too glad to assist if the matter is put before them. Use printed cards in your cars with short, pointed warnings. These and a hundred other things will tend to educate the public along this line.

If a campaign of this kind is started, however, it should be followed up continuously and not be allowed to lag.

Better not start it at all if you do not intend to follow it up. This policy does not necessarily mean the expenditure of a great deal of money, but it does mean a considerable amount of work. There is no method of knowing what or how many accidents a campaign of this kind prevents, but every road that has tried it asserts that it has been benefited through very material reductions in the number of accidents.

LIFE OF RAILWAY PHYSICAL PROPERTY FROM THE ACCOUNTING STANDPOINT

BY W. O. INGLE, ASSISTANT AUDITOR NEW YORK STATE RAILWAYS

This important subject has been taken up by a committee of the Accountants' Association with the view of compiling and getting information on all of its aspects. When this committee presented its report in October at the Atlantic City convention the suggestion was made that the Engineering Association be asked to co-operate. The suggestion was a timely one. The committee of the Accountants' Association has already prepared plans for obtaining information on which to base its report next year. The importance of keeping complete detail records cannot be emphasized too strongly. The more complete are the records the more information can be obtained on the life of the property. This matter is something which possibly has not been given necessary attention. Records are deemed an expensive burden to keep up, but their importance is forcibly called to the attention of railways to-day when it becomes necessary to clear fixed capital accounts of the original costs and an estimate has to be made of the cost instead of having the actual figures. With a complete job order system this would be changed, as it would be possible to get the original costs of installation of any particular piece of property, track or equipment, and also the maintenance costs in complete detail year by year. Such a system would show at a glance the original cost of laying a piece of track, giving in complete detail the kind, weight and length of rail, number and kind of ties, the paving, etc., entering into the construction, together with the date of installation and dates when repairs were made and the various kinds of repairs. But in considering the life of this piece of track should not the territory through which the road runs be taken into consideration? It may run through low land where the soil or the weather conditions are such as to cause rapid depreciation, such as decay of the ties; or it may be laid in soil in which the ties would have a very long life. The kind of ties should be considered also, as this has a close bearing on the life. A road built by a contractor who uses a lot of cull or second-hand ties would not be so good physically as one which was laid with the very best material. Again, the section where the track is laid might have very heavy grades. This would cause greater wear and tear on the rails as well as on the equipment which was operated. On a city property having much special work over which city and interurban cars are operated there is always great wear and tear due to the heavy interurban cars which are operated. This fact not only affects the wear and tear of the track, but very materially shortens the life of special work, causing repairs to be made more often as well as requiring replacements after a very short service. The charges for operating foreign cars over city tracks should be based to a certain extent on the wear and tear of track and special work used.

Another important item in considering the life of track is that, while the car mileage made on a certain route is often taken as a measure of the life, the fact that there are several lines operating over a common piece of track is overlooked. The total mileage made by all these lines over this common piece of track is not considered. One section of track in a street may be giving twice as much service as another. In making comparisons of costs and life of various sections, if the various operating conditions and elements are taken into consideration some interesting information of great value to the engineer would be obtained.

With regard to the life of equipment of the various classes, consideration should be given to the fact that certain equipment may become obsolete through more effective and economical equipment taking its place, or through the growth of the community, which would demand improved equipment.

For some time past the writer has kept the costs of maintenance of various types of motors, controllers and their different parts and it is and has been the intention each year to try to keep such individual records of the various types of equipment as will furnish all information on the life of these parts that will be of value. However, the mileage and elements of operation should be taken into consideration. This is just as important as other records. The operating man realizes more and more the importance of keeping individual car mileage for use, not only in overhauling and inspecting cars, but in comparing the wear and tear of different parts. Brakeshoes are now furnished on the basis of mileage of the shoes.

Should we not make and keep more accurate and permanent records of individual car mileages? One car may be out continually, making a large mileage, while another of the same type in every respect and built at the same time may not be making one-half the maximum mileage. This illustrates the need of individual records.

The accounting department should keep such detail records of the life of maintenance of way and equipment as will be of value to the engineer, who must take into consideration the various elements of operation which enter into the same.

LIFE OF RAILWAY PHYSICAL PROPERTY FROM THE ENGINEERING STANDPOINT

BY F. A. BAGG, CHIEF ENGINEER FONDA, JOHNSTOWN & GLOVERSVILLE RAILROAD

Reliable information on the probable and actual life of the various physical elements which make up railway property is often called for in these days for various purposes, and each railroad company would do well if it would keep up a system of records covering the life of the physical parts of the property from which such data may be obtained. There is no good reason why such information should be hidden from ourselves or from the public.

Physical valuation is largely but not entirely a summation of the cost less depreciation of all the various items which make up the physical property, and the depreciation, of course, is based on the known or assumed life of each item. Depreciation on account of obsolescence is not here considered, for it would be taken into account only in exceptional cases pertaining to the equipment of power plants or buildings.

The economy of one kind of material or one type of construction compared with another is not determined by first cost alone, but in the light of the known or estimated life of each. Durability depends upon inherent qualities, conditions of manufacture, installation, maintenance and service, and no records are valuable without a certain amount of information concerning such matters.

In our reports to the State Board of Tax Commissioners we are required to estimate the cost of reproduction new, also the cost new less depreciation, and the reliability of these estimates will depend upon the correctness of our assumption of the life of each item.

In this paper two classes of railway property are considered, the track and the overhead lines, and following is a list of most of the items making up these two classes. Track is divided under two heads, open and paved:

Under open tracks are—grading, stone ballast, gravel

ballast, other ballast; ties—chestnut, cedar, yellow pine, oak, treated or untreated; switch timber; rail—Bessemer, open-hearth, specially treated, new or relaid; joints; joint bonding; frogs and switches; switch stands; bridge masonry—rubble, ashlar, concrete; bridge superstructure—timber, steel, concrete; fencing—chestnut posts, cedar posts, concrete posts, galvanized wire, board fence, permanent snow fence, movable snow fence, public crossings, private crossings.

Under paved track are—grading, ballast, cedar ties, pine ties, treated ties, steel ties; rail—Bessemer, open-hearth, special high carbon, other specially treated, section of rail to be noted in each instance; joints; joint bonding; special work—regular construction, hardened steel center, solid manganese; paving—gravel, macadam, brick, asphalt, asphalt block, granite block; overhead transmission lines—wooden poles, treated and untreated cross-arms; insulators, copper wires and cables, aluminum wires and cables; towers, tower foundations; trolley line and distribution system—cedar poles, chestnut poles, yellow pine poles, treated poles; cross-arms—pine, fir, treated arms; feeder insulators; feeder cables, bare and insulated; trolley wire, section and size to be given; galvanized wire spans; hangers and ears; telephone lines.

It is practicable for every railroad to keep records of the life of nearly all these parts, and from such records simple empirical formulas may be deduced for determining the depreciation of each particular item, and more elaborate formulas for any portion made up of a number of items.

On the Fonda, Johnstown & Gloversville Railroad records are made of every new section of track when it is laid. These records give detailed information concerning date when laid, length, location, character of foundation, ballast, ties, joints, rail fastenings, bonds and paving. Similar records are made of every piece of special work. Records are kept of the number of ties put in and the number, age and cause of removal on each track section each year. The age is known by the date mark on the tie.

The date of the erection of all trolley wires is kept. Pole records are not so complete, but the company recently has begun to number all poles systematically and those located in the streets will be plotted on appropriate maps together with the number, date of erection and any other data desired.

Reliable data on the life of joint bonding is now possible by the use of the autograph bond-testing car of Albert B. Herrick. All of the track of the Fonda, Johnstown & Gloversville Railroad has recently been gone over with one of these cars and the condition of the bonding of every joint is clearly shown on the record.

The following general figures as to the life of some of the most important elements of railroad property are submitted, principally to bring out in the discussion the judgment of others as to the life of some of these elements based on their records and observations:

Material.	Life, Years
Ties in open track:	
Cedar	15 to 20
Yellow pine	10 to 15
Treated ties	25 and more
Untreated ties in pavement or concrete	15 to 20
Treated ties	30 and more
Galvanized wire fencing	10
Wooden bridges	20
Steel bridges	30 and over
Ashlar concrete bridge masonry	100 and over
Asphalt pavement	10 to 15
Brick pavement	15 to 25
Yellow pine trolley poles	10 to 15
Chestnut trolley poles	15
Cedar trolley poles	15 to 20
Trolley wire	15 to 20

Rail in paved streets in cities up to 25,000 population; weight 70 lb. or less, life fourteen years, and weight over 70 lb., life eighteen to twenty years; rail on interurban lines, weight 60 lb. or less, life fifteen years, and over 60 lb., life twenty-five years; special work one year to ten years—depending upon type of construction and character of service.

On 49 miles of interurban track consisting of 80-lb. rail laid in 1902, joints connected with 8⅛-in. pin expanded No. 0000 bonds, a recent test showed that 13.8 per cent of the bonds were open or defective, an average of 1.53 per cent a year. On about 4 miles of track in paved streets laid during the past four years no bonds were found defective. The latter bonds are of the compressed terminal type. This result would indicate that their depreciation would be about one-half that of bonds in open track.

SYSTEM OF ACCOUNTS IN NEW JERSEY

Hearings were held by the Board of Public Utility Commissioners of New Jersey on Dec. 5 and 6 at Trenton in reference to a tentative scheme of general balance sheet and income accounts applicable to all utilities. The proposed balance sheet divides fixed assets acquired prior to Jan. 1, 1912, from those acquired after Dec. 31, 1911. The text of the balance sheet account "reserve for accrued amortization" is as follows:

"On and after Jan. 1, 1912, every public utility shall carry on its books a reserve for accrued depreciation of tangible fixed assets and for accrued amortization of intangible assets. To this account should be credited and charged to 'operating expenses' or other accounts the amount estimated to be necessary to cover such wear and tear and inadequacy as have accrued during the year in the tangible fixed assets of the corporation, such portion of the life of intangible assets as has expired or been consumed during the year, and the amount estimated to be necessary to provide a reserve to cover the cost of property destroyed by extraordinary casualities, less the amount charged to the various maintenance accounts for repairs.

"When any property is retired from service the original money cost thereof (estimated if not known; where estimated, that fact and the facts upon which the estimate is based should be stated in the entry), less salvage, should, except as provided in the account 'fixed assets acquired prior to Dec. 31, 1911,' be charged to this account. The amount originally entered or contained in the charge to any fixed asset account with respect to property going out of service should be credited to that account, and any necessary adjusting entry should be made through 'profit and loss' account.

"Note.—Until otherwise prescribed, the amount estimated to be necessary to cover such wear and tear and obsolescence and inadequacy as have accrued during the year should be based on a rule to be determined by the accounting corporation. Such rule may be derived from consideration of the said corporation's history and experience. A general statement of the rule used by each company, together with the general information upon which it is based, should be filed with the Board of Public Utility Commissioners.

"Separate accounts should be carried for depreciation accrued prior to Jan. 1, 1912, and for depreciation accrued since Dec. 31, 1911, or since Dec. 31, 1910, in case of those utilities for which depreciation accounts have already been prescribed."

At the conference of the board and representatives of electric railway, electric light and power, and gas companies on Dec. 5 considerable objection was made to the plan to require a full compliance with the proposed system of accounting to be adopted by the board for the year beginning Jan. 1, 1912.

It was decided by the board that for the current year the companies should file reports consistent with their current system of accounting. It was agreed by the board and representatives of the companies present that a committee should be appointed, representing each utility, that the statistician of the Board of Public Utility Commissioners should be ex officio a member of each committee, and that on April 1, 1912, the committees be called upon to report progress made in the formulation of a uniform system.

Syracuse Meeting of the New York Street Railway Association

The Principal Subjects Discussed Were the Operation of Pay-as-You-Enter Cars, the Prevention of Accidents, Joint Use of Poles and the Life of Railway Physical Property—A Complete Guide for the Making of Passenger Tariffs Was Also Submitted

The fourteenth quarterly meeting of the Street Railway Asssociation of the State of New York was held at the Hotel Onondaga, Syracuse, N. Y., on the evening of Tuesday, Dec. 5, and Wednesday, Dec. 6. The meeting was well attended, over seventy-five delegates being present at the business session.

WEDNESDAY SESSION

The proceedings on Wednesday were confined to a continuous session from 10:30 a. m. to 2 p. m. for the convenience of those members who wished to leave on early afternoon trains.

The first order of business was the presentation of a paper on "Pay-as-You-Enter Cars" by Thomas W. Casey, Prepayment Car Sales Company. An abstract of Mr. Casey's paper is published elsewhere in this issue.

DISCUSSION ON PAY-AS-YOU-ENTER CARS BY T. C. CHERRY, SUPERINTENDENT UTICA & MOHAWK VALLEY RAILWAY

Mr. Cherry said in part:

"Mr. Casey has called attention to the three cardinal benefits to be derived from the operation of pay-as-you-enter cars, as follows:

"First—The solution of the problem which all operating men have sought, that is, the positive collection of a fare from everyone boarding a car.

"Second—The better maintenance of schedule time.

"Third—The practical elimination of the boarding and alighting accidents.

"I believe that there is no doubt in the minds of railway men that the pay-as-you-enter car has accomplished much in solving the problem of collecting fares. This seems to be generally conceded, although I feel that many improvements will be made in the manner of the collection and registration of these fares. With reference to Mr. Casey's statement that pay-as-you-enter cars maintain better schedule time, I believe that there will be some difference of opinion which can be supported by actual operating records. I have prepared some figures obtained on the Utica & Mohawk Valley Railway which tend to cause us to disagree somewhat with Mr. Casey.

"On Oct. 1, 1911, ten pay-as-you-enter cars were installed on the Utica & Mohawk Valley Railway. These cars have bulkheads, folding doors and folding steps. The cars are 44 ft. 6 in. over all, equipped with four GE-216 motors. They seat forty-three passengers and have 5-ft. 6-in. platforms. The test covered three weeks, ending Dec. 1, 1911. We found that an average passenger would consume 3.5 seconds in either boarding or alighting from these cars, while he would consume three seconds in either boarding or alighting from the old-type car. These figures would tend to show that the pay-as-you-enter car with folding doors and steps is about 16 per cent slower than the old type of car. It was found that the doors were opened at about the time the car came to a stop, but that after the passengers had boarded the car at least five seconds were consumed in closing the doors and steps before the car started.

In total time consumed in loading and unloading, the pay-as-you-enter and old-type cars show practically the same, namely, three seconds per passenger. I believe that this proves that, while the pay-as-you-enter car is slower for the single operation of either boarding or alighting, yet, when passengers are boarding at the rear end and alighting from the front end during the same period, the time per passenger is much less on the pay-as-you-enter car than on the old type of car unless the passengers are allowed to leave by the front end on the old type of car, as is the practice on the Utica & Mohawk Valley Railway. Confirming this statement, our tests show conclusively that in the business districts where passengers are both boarding and alighting during the same period the time consumed per passenger is 2.7 seconds as against 3.25 seconds in residential districts.

"It is doubtless a fact that the statement that pay-as-you-enter cars better maintain schedule time would be true on a line which was operated entirely through congested business districts, as it has been shown that where passengers are loading and unloading simultaneously the time consumed per passenger is less than on the old type of car; but on a line which runs a short distance through a business district, and a much greater distance through a residential district, the pay-as-you-enter car has proved itself at least 16 per cent slower.

"In discussing the third benefit mentioned in Mr. Casey's paper, 'the prevention of boarding and alighting accidents,' a comparison of the month of October, 1911 (which was the first month of operation of pay-as-you-enter cars on the Utica & Mohawk Valley Railway), with October, 1910, would be of interest. On the pay-as-you-enter division the company also operated suburban cars and Oneida Railway cars for part of the distance, so that accidents occurring on any of these cars would be charged against this division. While the boarding and alighting accidents on this division have increased 233 per cent comparing October, 1911, with October, 1910, but one accident of this class occurred on a pay-as-you-enter car during October, 1911. This was a report of a woman stumbling after she was inside the car, and no claim was made. The increase shown in all classes of accidents was largely due to the fact that the men have been impressed with the necessity of reporting all unusual occurrences and incidents as well as accidents. The company now feels that it has practically eliminated the boarding and alighting class of accidents by the installation of pay-as-you-enter cars.

"An interesting change was the removal of the rear vestibule grab handle, which passengers who come around the rear of the car are so apt to grab while the car is in motion, thereby causing accidents which are often of a serious nature.

"On these prepayment cars all fares are registered by the conductor on a car register. These cars are also equipped with Johnson fare boxes, which receive cents, nickels and dimes, registering and returning all cash to the conductor for change purposes. This fare box does not take tickets or transfers, but, inasmuch as less than 0.1 per cent of the receipts on the prepayment division are in tickets, the company believes that the fare box which receives the cash, registers and returns it to conductor is an ideal one for its operating conditions.

"A comparative statement of earnings shows that the pay-as-you-enter cars during October, 1911, earned 11.06 per cent more than the old type of cars during October, 1910, while the entire city division showed an increase of but 6.42 per cent for the same period. These cars also

earned 2.5 cents per car mile more for October, 1911, than the old type of cars for October, 1910.

"The cars have been in service on the Utica & Mohawk Valley Railway for sixty days, and the company feels that, in view of the increased earnings and decreased accidents, the cars may be considered a success for its service. It also believes that after these cars have been in service for one year they will be as fast (taking everything into consideration) as the public will board or alight; in other words, the act of depositing fares or receiving change on the platform will not retard the boarding of passengers to any noticeable degree. Furthermore, when the carmen become accustomed to the operation of the doors and steps, very little if any delay will be caused by this operation.

"The Utica & Mohawk Valley Railway spent about $1,200 in educating the public as to the use of prepayment cars. This was done by full-page advertisements in all the English, Italian, German and Polish newspapers. The company was rewarded by the prompt as well as intelligent use of the pay-as-you-enter cars by all of its patrons. The pay-as-you-enter car pleases the public, makes good return to the company and taken all in all is entirely satisfactory for operation."

John E. Duffy, Syracuse Rapid Transit Railway, presented a written discussion of Mr. Casey's paper. This discussion is printed in another column in this issue.

GENERAL DISCUSSION ON PAY-AS-YOU-ENTER CARS

C. H. Smith, superintendent United Traction Company, Albany, said that on Nov. 18 his company had installed ten pressed-steel cars which were 47 ft. 2 in. long over all and seated fifty-six passengers. These cars, which were of the pay-at-entrance type, had not been in use long enough to determine what advantages if any they had over the pay-as-you-enter car, but up to the present time they have been very satisfactory. The passengers were somewhat slower in boarding and alighting as compared with the old cars, but this slowness was probably due to lack of familiarity with the car. The revenue of the Pine Hills line, on which these cars were installed, had increased in fifteen days from 33 cents per car mile to 50 cents per car mile. The line is 4¼ miles long and operates on a schedule of 8 m.p.h. It had been thought by some that the United Traction Company had made a mistake in putting on a car weighing as much as 28 tons for service through congested sections, but so far as its present experience went the company felt that it had done the right thing. Furthermore, it believed that when the conductors and motormen, as well as the passengers, became more familiar with this type of car there would be no appreciable delays. The prepayment car was the only type which should be operated on city lines.

Charles R. Barnes, electrical expert Public Service Commission, Second District, said that the prejudice first manifested against prepayment cars had gradually worn away and that now the general public was well pleased with them. He believed that they had justified almost all of the assertions made for them by the people interested in their manufacture and sale. Even a fraction of a second delay per passenger was of moment in handling traffic in congested sections, but it was his feeling that greater familiarity with the prepayment car would gradually eliminate any disadvantages which it now suffered in this respect.

W. C. Callaghan, superintendent transportation New York State Railways, Rochester, said that his company had long advocated that passengers should leave by the front doors no matter what type of car was used. In fact, the conductors were disciplined if when passing through the business district they failed to call out that passengers should leave by the front door. In Rochester men were stationed in the congested sections to assist in loading the cars. Actual tests had shown that but 1½ seconds per passenger are required on pay-as-you-enter cars from the time that the wheels are stopped until they are started again. The company was now trying the experiment of eliminating the conductor's hood-bell signal entirely. The starting signal was obtained by the closing of the signal circuit when the doors closed against certain contact plates. This scheme was similar in principle to that used in New York subway cars. The Rochester company had rebuilt twelve cars along pay-within lines; that is, without a front bulkhead. One of these cars ran into a steam roller because the vestibule window was covered with snow. It was apparent that in snowy weather the motorman must be permitted to lower the vestibule window, but if he did this on a pay-within car the passengers would certainly complain. The pay-as-you-enter design was very popular in his city.

R. H. Smith, general manager Albany Southern Railroad, asked what causes were assigned for the increased traffic on the steel prepayment cars in Albany.

C. H. Smith, superintendent United Traction Company, Albany, replied that possibly some of the increased traffic was due to the novelty of the car, but it was not noticeable that any traffic had been drawn from neighboring lines.

E. S. Fassett, general manager United Traction Company, Albany, said that the new cars had been of particular value in relieving congestion over the first mile of the Pine Hills line, which was very crowded.

In reply to a question of J. H. Cain, superintendent transportation Buffalo, Lockport & Rochester Railway, Mr. Casey said that pay-as-you-enter cars had not yet been applied to interurban service. They were in use, however, on two suburban lines, one of them running out of Montreal. On the latter line the conductor collected the first fare on the platform at the beginning of the trip, but entered the car when it reached the second fare zone to collect the fares of the few passengers who were still in the car.

Referring to C. H. Smith's statement that the new Albany cars had decreased the car mileage about 2 per cent, A. L. Linn, Jr., assistant secretary and assistant general auditor Utica & Mohawk Valley Railway, suggested that the users of prepayment cars should employ some common unit for comparing results. Many companies were deceiving themselves, he thought, with the car-mile unit. In Albany, for example, the same unit was used for the new long cars as for the old short ones. It might prove on closer analysis that the extra gross income of 17 cents per car mile gave no greater profit, if any, when all of the extra costs were considered. He had no special unit to offer himself, but said that no matter what unit was used all of the attendant circumstances should be stated so that the comparisons could be made intelligently.

REPORT ON THE JOINT USE OF POLES

The report of the committee on the joint use of poles was then presented by its chairman, W. J. Harvie, chief engineer Utica & Mohawk Valley Railway. Mr. Harvie offered a revised report of the proposed standard agreement which was presented at the Cooperstown convention June 27 and June 28, 1911, and published in the Electric Railway Journal of July 1, 1911. The revisions, which were mostly of minor character, were made after a conference held on Nov. 2, 1911, by the committee of the association, William McClellan, engineer Public Service Commission, Second District, and W. T. Oviatt, superintendent Narragansett Electric Light Company, Providence, R. I., who represented the overhead line construction committee of the National Electric Light Association. Invitations to be present had also been sent to C. R. Barnes and E. B. Rogers, of the Public Service Commission, and to H. L. Davis, of the New York Telephone Company, but these gentlemen had found it impossible to be present.

The discussion on the report was opened by H. L. Davis, New York Telephone Company, who said that an agreement for the joint use of poles was economical for the companies and also desirable from the public standpoint.

He had found that many of the companies in the upper part of the State preferred rental rather than joint ownership agreements. His company had printed an agreement but it was merely as a matter of convenience, as it had made no attempt to force a standard upon anybody. He was glad that it was proposed to refer this subject to the national associations interested as it was most desirable to have one standard for the whole country. He understood, however, that two years must elapse before the American Electric Railway Association could approve a standard. It would seem advisable, therefore, that the New York interests should come to an agreement of their own pending action by the national association.

H. M. Beardsley, general manager Elmira Water, Light & Railroad Company, stated that the report would be a great help in discussing the joint use of poles with other companies. In his experience it would be more desirable to make individual agreements for particular pole lines rather than one agreement to cover all cases. It might be that a blanket agreement would be satisfactory in an ideal organization, but unfortunately organizations were not ideal. There was a possibility that attachments might be made to poles and no rental paid for them.

J. L. Hinkley, secretary Poughkeepsie City & Wappingers Falls Electric Railway, mentioned that he was also negotiating with other companies in his territory and wanted to follow along the lines of the committee's report.

W. H. Collins, general manager Fonda, Johnstown & Gloversville Railroad, said that the number of poles of the several companies had increased to such an extent that one of the cities which his company served had seriously considered the question of putting all electric wires underground. Owing to the fact that the committee's report had not been completed as soon as expected he had made a joint agreement with the telephone interests for particular situations. His company was going largely into the joint ownership of poles.

Mr. Barnes, who had attended several meetings of the committee, expressed his appreciation of its thorough work. There were too many poles in the public streets and the Public Service Commission had already taken some steps to reduce their number by suggesting their joint use. He believed that an opportunity would soon present itself for the discussion of this report before the commission.

Mr. Fassett thought that the telephone interests had anticipated the electric railways by getting out their joint agreement first. He believed that the differences between the two forms of agreement could be reasonably adjusted. Most of the differences were probbly due to the attorneys, who naturally tried to shift the burden of accident liability one way or the other.

Mr. Harvie said that the form of agreement presented was intended to cover both general situations and specific situations. Continuing, in reply to a criticism by Mr. Davis, he stated that the committee had not presented detailed rental charges because it believed that this point should be settled by the local conditions.

C. Loomis Allen, vice-president and general manager Utica & Mohawk Valley Railway, said it seemed to him that the electric railways had been asleep on this question. The electric light and telephone companies had been considering the problem for six years whereas the electric railways had been considering it for only one year. Nevertheless there was hope that all interests could come together to-day, whereas ten years ago few if any would have admitted the possibility of the joint use of poles by railways, lighting, telegraph and telephone companies. He asked if there was any objection to submitting this agreement to the Public Service Commission for its approval until such time as a national agreement could be made.

The following resolutions contained in the committee's report were then put to a vote and carried:

"Resolved, That this association lay before the American Electric Railway Association this joint pole agreement, together with a résumé of the situation in the State of New York, urging upon the American Association the advisability of making a thorough investigation of the entire subject of the joint use of poles, including such standard construction as it may be advisable to take up, and that the American Electric Railway Association be requested to take up the matter jointly with the National Electric Light Association and the American Institute of Electrical Engineers and by the appointment of such joint committee as may seem advisable either to indorse one of the existing agreements or develop one which will be more satisfactory to the railway and other interests involved, and further, that the agreement produced shall be such that it can consistently be approved by such public service commissions as may have jurisdiction in any section of the country, and

"Resolved, That the agreement herewith presented be adopted as the standard of this association for use by its members until such time as a more suitable one is produced and approved and that the secretary be instructed to keep on hand a supply of these agreements which can be had on request at a nominal cost."

Upon motion it was decided to continue the committee with instructions to confer with organizations representing the electric light, telephone and telegraph interests of the State of New York to consider mutual agreements until such time as the national bodies act.

PREVENTION OF ACCIDENTS

The subject of the prevention of accidents was opened by a paper by R. E. McDougall, claim agent Utica & Mohawk Valley Railway. The paper is printed elsewhere in this issue.

The discussion on the prevention of accidents was opened by H. C. Beatty, secretary Auburn & Syracuse Electric Railway, who considered the subject from the legal rather than from the operating standpoint. A most important factor in preventing accidents was the careful selection and the thorough instruction of the men chosen for trainmen. The proper material must be had to begin with if a good finished product was wanted. After the men had received the usual instruction in the operation of the cars they should be turned over to the claim agent, if the latter is a lawyer, or to the trial attorney to receive an explanation of the legal duties and obligations of a railway and its employees. Regarding the instruction of the public, he said that probably 75 per cent or more of all accidents were due to the sudden momentary negligence of the passenger or pedestrian rather than to a deliberate act. If statutory requirements were made against the comparatively small percentage of accidents for which the railways were held responsible, why should the State not make some effort to see that its citizens exercise at least ordinary caution on or near railway vehicles? He thought that the fundamental duty of education rested on the State in this particular just as it did in matters relating to the public health. A campaign of education carried on by the railway companies alone could produce no great improvement. One thing that ought to be done at once was to demand punishment for trespassing. The public should be taught that the right-of-way of a railway was not only a dangerous highway, but also an unlawful one. Furthermore, he believed that the power which the Governor now has to vest police authority in steam railroad trainmen should be broadened to include the same employees on suburban and interurban electric lines.

J. P. Maloney, superintendent of transportation and claim agent Albany Southern Railroad, said that his company had recently installed signs warning pedestrians and others that there was a dangerous crossing 500 ft. away. These danger signs cost about $1.50 each. Lights, which were visible at a distance of 500 ft., had also been installed.

W. H. Hyland, division superintendent Fonda, Johnstown & Gloversville Railroad, believed that while it was the

duty of the State to take care of the children in the schools and elsewhere it was the duty of the railways to take care of their passengers. The railways could do much to mold public opinion in their favor by arranging to give full publicity to every important accident. It was the policy of his company to give a frank report of all accidents to the newspapers with the result that its account was published first. This action prevented the publication of garbled reports which would instil prejudices hard to overcome. Some capable member of the claim department should call upon the dispatcher or traffic superintendent every night to gather such material for publication.

LIFE OF RAILWAY PHYSICAL PROPERTY

The next order of business was the subject of the life of railway physical property. The first paper, entitled "Life of Railway Physical Property from the Accounting Standpoint," was presented by W. O. Ingle, assistant auditor New York State Railways, Rochester. This paper is presented elsewhere in this issue.

W. C. Austin, auditor Otsego & Herkimer Railway, Hartwick, said that he thought Mr. Ingle's paper would be along the lines of depreciation. This question varied so greatly on different properties that a general rule for its treatment would be almost impossible on account of physical conditions, methods of construction, character of equipment and service, type of men operating the cars, etc. The question of obsolescence was also a difficult one, particularly in cases where the installation of high-powered, large cars on one line awakened the public appetite for similar cars on lines where slower and smaller rolling stock was ample for the service. He agreed with Mr. Ingle that individual records and job orders were of value to every property.

Following Mr. Austin's remarks a paper entitled "Life of Railway Physical Property from the Engineering Standpoint" was presented by F. A. Bagg, chief engineer Fonda, Johnstown & Gloversville Railroad. This paper appears elsewhere in this issue.

The following discussion on Mr. Bagg's paper was presented by M. J. French, engineer maintenance of way Oneida Railway, Syracuse.

DISCUSSION ON LIFE OF PHYSICAL RAILWAY PROPERTY BY M. J. FRENCH

"Up to the present time practically all estimates of the life of electric railway track structures have been merely intelligent guesses. The increase in weight of rolling stock, the change in depth of wheel flanges, the change from single to double-truck cars and continually increasing traffic have been large factors in upsetting calculations based on previous experience. In some of the larger cities like New York, Boston and Philadelphia the life of railway structures on the more frequented streets is determined by the wear due to vehicular traffic. Yet with the advent of motor trucks for the heaviest draying, calculations made last year may be decidedly below the ultimate life of the track structure, as rail and pavement wear will undoubtedly be greatly reduced under soft tires and horseless vehicles.

"Another cause of failure that cannot be foreseen and that is most aggravating to the way department is the continual undermining of tracks by contractors or by corporations working under city permits for the construction of sewers, subways and water or gas mains or house connections. Usually the track is tunneled and the excavation is improperly back-filled, unless the railway company has its own men on the work, with the result that the track soon settles and cannot be restored to its former surface or line. On the other hand new devices or means for rehabilitation of track may lengthen the life at comparatively small cost. The use of base-supported, upset joints and grinding of rails with a power-driven grinder have, in the writer's experience, prolonged the life of track at least 25 per cent at comparatively slight cost.

"The above reasons might be considered sufficient excuse for dodging the question of life of the track structure or at least leaving the matter to be determined after a long term of years by the experts of the State Tax Commission or the Public Service Commission from the data that are contained in the annual reports of the railway companies.

"The amount of wear obtainable from the rail head determines the life of the track structure if we discard all foreign elements and improper construction methods that may cause premature failure. The writer's investigations of rail wear have determined that under ordinary city traffic 1/16 in. of wear a year under one-minute car headway is about right for Bessemer girder rails of regular mill specifications. This rate was determined in 1903 in the city of Cleveland, and recent measurements taken on the Lorain Steel Company's 95-lb. No. 297 9-in. girder rail have practically checked this figure. The latter measurements were taken in four places differing as to car operation, sixty measurements being taken. The method employed was to invert a section cut from new rail, resting its head on the tram of the worn rail. By inserting a tapered and graduated wedge between the head of the worn rail and the tram of the full section, the wear was accurately determined to 1/64 in.

"Under this rule, a rail having 1¼ in. depth of head should have a life of thirty years under ⅞-in. wheel flanges on cars operating on five-minute headway. Yet where is the road that can report such good rail service? The joints fail and the rails become permanently cambered under the cold rolling action of the car wheels.

"Improved types of rail joints such as the Clark joint, the old and new type thermit-welded joints, electric and cast-welded joints have not been in use a sufficient time to obtain data on which to base an intelligent estimate. However, it is safe to estimate the life of common twelve-bolt joint plates on girder or high T-rail at eight years under heaviest city traffic and twelve years under ordinary conditions.

"For exposed track work there is in the writer's opinion no doubt as to the economy of a base-supported joint. The Utica & Mohawk Valley Railway interurban lines are built with 80-lb. A.S.C.E. T-rail spliced with 24-in. Continuous joints. After an average service of nine years on 60 miles of track the joints are in an excellent condition, with no wear apparent in either the rails at the joints or in the plates. We are using this type and Atlas joints on girder and high T-rail repairs with most gratifying results.

"Untreated merchantable ties in exposed or unpaved track have an average life of eight or ten years as determined by our experience. We have begun the use of treated ties for main-line service. Our specifications call for hewed, long-leaf Southern pine, square-edge ties, sap no objection, impregnated with 10 lb. of creosote oil per cubic foot of timber. This treatment increases the cost 60 per cent and we feel confident of 100 per cent increase in life over untreated ties. We have no failures due to rail wear, our loads being light compared with those of steam roads.

"Our experience has been that ties on crushed stone ballast with concrete between and on top of the ties are in good condition when ties of the same quality placed in open track have become worthless. I do not believe it necessary to use creosoted ties in concrete. I should prefer to apply the cost of treatment to purchase a better grade of timber, a better type of joint, or better grade of rails.

"Economy of track construction requires the use of paving materials that wear out at the same time as the rails or that are of such a durable nature as to warrant relaying and giving satisfactory service throughout the life of the renewed rails.

"For heavy vehicular traffic stone paving block has no superior. Some large cities are giving creosoted Southern pine blocks a thorough test. The advantage of a block pavement is its elasticity and relaying qualities. Stone blocks may be reclipped with economical results. We have standstone block pavement on Genesee Street in Utica that will undoubtedly outwear the present rails which are the second installation and will be serviceable for a third time when reclipped.

"The joint is at present the weak point in track construction with ordinary plates. We cannot tell as yet what life the newer types of joints will give us.

"In 1906 the Utica & Mohawk Valley Railway Company adopted the following percentages per year for track depreciation: Congested districts under heaviest operation, 10 per cent to 12 per cent; principal residential districts, 8 per cent; lightest traffic conditions, 6 per cent.

"After five years of service we are firmly convinced of the fairness of the above estimate."

REPORT OF COMMITTEE ON PASSENGER TRAFFIC

The report of the committee on passenger traffic, of which J. M. Campbell, co-receiver Buffalo, Lockport & Rochester Railway, is chairman, was presented by B. E. Wilson, general passenger agent New York State Railways. The report, as submitted, consists of approved copies of model forms of title pages and arrangements of contents of the various fare schedules which member companies are compelled to file with the Public Service Commission and the Interstate Commerce Commission. These, and the various rules and regulations covering tariffs, have been drawn to conform with the requirements of both commissions. The committee also included rules and regulations of miscellaneous character in connection with the transportation of passengers and their effects. It is believed that the information in this report is extensive enough to enable a traffic man of little or no experience to issue a tariff of such nature that it will be accepted as satisfactory by either the Public Service Commission of the Second District, New York, or the Interstate Commerce Commission. The committee acknowledged the material assistance of Commissioner Martin S. Decker and W. E. Griggs, chief of the Tariff Bureau, Public Service Commission, Second District, and J. M. Jones, chief of the Tariff Bureau, Interstate Commerce Commission.

Both commissions had complimented the association, through the members of the committee, on the fact that it was the pioneer in the movement toward uniformity of tariffs and tariff conditions. The committee deemed it advisable to submit the report in the form of sample proofs, believing that it would be better to have the recommendation and approval of the association before ordering the finished copies for distribution.

After R. M. Colt, general passenger agent Fonda, Johnstown & Gloversville Railroad, had described the procedure followed by the committee on passenger tariffs, Mr. Wilson moved that the sum of $250 be appropriated to complete the work of the committee. This subject was referred to the executive committee for further action after the report itself had been accepted.

The meeting then adjourned.

THE BANQUET

The banquet held on Tuesday evening was the opening feature of the meeting. It was attended by about 100 members and guests.

Among the entertainment features of the banquet were topical verses and cartoons on Messrs. Choate, Peck, Collins, Duffy, Reel, Allen, Fassett, Beebe, Stedman, Hamilton and other members. These verses and pictures were projected by a stereopticon on the wall back of the toastmaster's chair, where they were visible to all. A professional quartet, reinforced by the volunteer glee club of the association, sang frequently throughout the evening.

President Choate announced that, instead of having one address as expected, he would call upon various individuals present to give short talks on the best methods of advancing the interests of the Street Railway Association of the State of New York. He said that this occasion was the beginning of the thirtieth year of the association and that the association now represented a larger membership and greater mileage than ever before. This anniversary was therefore an appropriate time to discuss what should be done during the coming year to continue the policies which had made the association successful in the past and which would keep it abreast of the times in the future. The association should study more closely such questions as relations with the public, familiarity with the work of public utility commissions of the State and nation, and public welfare problems in general, besides the most scientific methods of operation. This year, he said, a determined effort would be made to have approved by the Public Service Commission of the Second District those rules and regulations for the operation of city and interurban railways which had been adopted at the Cooperstown meeting of the New York Association in 1911 and at the last Atlantic City convention of the American Electric Railway Transportation & Traffic Association. If the commission did not see fit to approve these rules the New York association would endeavor to have the commission formulate its own codes of rules which could be submitted to the companies within its jurisdiction. There was no question in his mind but that the safety of life and property would be served best by using the same rules not only in one State but throughout the entire country. Questions of safety in operation should be among the most prominent considered during the coming year.

Continuing, President Choate said that more consideration would be given to the relations of electric railways with steam railroads and other public service companies. A splendid start in this direction had been made by Mr. Harvie's committee on specifications for the joint use of poles by electric railway, lighting, telegraph and telephone companies. With a view to reducing the unsightly pole conditions in villages and towns, this committee had formulated an agreement which was fair to all concerned. It was the most thorough report which, to his knowledge, had ever been submitted to the association.

President Choate was followed by W. C. Callaghan, superintendent of transportation of city lines New York State Railways, Rochester, and C. Gordon Reel, former secretary of the association and now first deputy superintendent of State highways. Both speakers cordially indorsed the policies outlined by Mr. Choate.

C. Loomis Allen, vice-president and general manager Syracuse Rapid Transit Railway, made a plea for more hearty personal interest in the association, which now had thirty years of excellent work behind it, from the early horse car days to the Cooperstown meeting which had been signalized by the splendid and inspiring address of Oscar T. Crosby, one of the great pioneers of electric traction. The electric railway man should work every minute to make the transportation business the greatest under the sun. He said further that the great future of the association lay in committee work. Much had been done in such matters as accounting and rules, but much more could be done on the subject of standards.

Charles R. Ellicott, speaking in behalf of the allied members, said that the manufacturers' representatives always felt encouraged because of the courteous treatment given to them by the railway members whether or not there was a possibility of business in hand.

H. C. Donecker, secretary American Electric Railway Association, spoke on committee work. The parent body and its allied organizations now had about fifty committees composed of some 350 members. Most of these com-

mittees were working along technical lines, but, as President Choate had pointed out, the greatest work to be done was the cultivation of better relations with the public at large and with public utility commissions.

Charles R. Barnes, electrical expert Public Service Commission of the Second District, said that the efforts of the association to improve electric railway operating conditions throughout the State were highly appreciated.

W. J. Harvie, chief engineer Syracuse Rapid Transit Railway, said that President Choate had struck the keynote in saying that the association should keep abreast of the times. He would go even further, for he wanted the association to keep in advance of the times. Many of the problems now before it could be handled most advantageously by committees.

E. S. Fassett, general manager United Traction Company, Albany, appreciated what had been said about committee work, but deplored the tendency to load all the work on the chairmen of committees.

T. C. Cherry, superintendent Utica & Mohawk Valley Railway, Utica, thought that every member should do four things, namely, attend the meetings, take part in discussions, accept committee appointments and work.

C. D. Beebe, president and general manager Auburn & Syracuse Electric Railroad, pointed out that the interurban electric railway was doing a great work in bringing the benefits of civilization to the country districts. The cities had been growing and the country standing still because the country districts lacked accessibility and many other conveniences of life. The interurban railways, however, were directing the people back to the country and he thought that there was an opportunity for greater effort in that direction. He had advocated for his lines the establishment of an industrial department through which the officials could come into closer touch with the farms, villages and towns along the lines to learn the needs of their inhabitants. By the upbuilding of these rural districts the interurban roads would build up their own lines besides developing business for the steam railroads. There should be closer contact with boards of trade and business associations in the districts served in order to have this industrial development handled intelligently. The development of the country would also prove of benefit to the cities in fostering more frequent intercourse.

J. Stanley Moore, general passenger agent of the Beebe system, said that the electric railway of any community was the one organization which catered to the greatest number of people and therefore it should have the most friendly relations with the greatest number of people.

A. L. Linn, Jr., assistant secretary and assistant general auditor Utica & Mohawk Valley Railway, stated that so far as accounting matters were concerned the relations of member companies of the association with the Public Service Commission were most satisfactory.

R. H. Smith, general manager Albany Southern Railroad, believed that the future of the association's best activities was in committee work.

W. H. Collins, general manager Fonda, Johnstown & Gloversville Railroad, said that during all his long membership he had always found the meetings of the association of the most interesting character and he had gladly labored for the usefulness of the association. Mr. Harvie's report on the joint use of poles was characteristic of the detailed and thorough methods developed by the association. In conclusion, he said that the quarterly meetings were productive of even better results than the annual convention.

S. R. Payne, general superintendent Western District, New York Central & Hudson River Railroad, and Frank Cizek, superintendent Syracuse & Utica division of the Lackawanna Railroad, complimented the members on the progress of the association and electric railroading in general. Mr. Cizek was deeply impressed with the great advance of interurban electric railways as compared with steam railroads. The steam railroad men were no longer depreciating the electric railways since the latter had begun to enter the long-distance, heavy-traction field. Referring to the question of accident prevention, Mr. Cizek said that the employees of the Lackawanna Railroad had been organized into committees of safety with excellent results.

E. J. Dickson, manager Springfield (Mass.) Street Railway and a former steam railroad operator, said that the interurban railways of New York were ahead of his own State in such important matters as joint operation with steam railroads and length of right-of-way. Standards and accident prevention offered a big field for future work.

J. C. Calisch, vice-president and assistant treasurer Buffalo & Lake Erie Traction Company, made an address favoring committee work and the adoption of standards.

H. M. Beardsley, general manager Elmira Water, Light & Railroad Company, said that the companies should follow the policy of taking the public into their confidence.

J. Harry Stedman, the well-known raconteur, as a fitting postlude to this December meeting, recited a Christmas poem entitled "The Little Gray Lamb." The assembly was then adjourned after all those present had joined in singing "America."

MANUFACTURE OF ELECTRICAL MACHINERY, APPARATUS AND SUPPLIES

A preliminary statement of the general results of the thirteenth census of establishments engaged in the manufacture of electrical machinery, apparatus and supplies was issued on Nov. 28 by Director Durand, of the Bureau of the Census, Department of Commerce and Labor. The manufacture includes dynamos and dynamotors, transformers, railway and other motors, storage and primary batteries, arc and incandescent lamps, searchlights, transmitters and receivers, rheostats and resistances, electric welding and therapeutic apparatus, electric switches, signals and attachments, and similar machinery, apparatus, and supplies. The report was prepared under the direction of William M. Steuart, chief statistician for manufactures, Bureau of the Census, and contains a summary which gives the general figures for 1904 and 1909. The figures are subject to such revision as may be necessary after a further examination of the original reports.

THE TABULAR SUMMARY.

A comparative summary follows, giving the general statistics for the industry, 1909 and 1904:

	Census		Per Cent of Increase, 1904-1909.
	1909.	1904.	
Number of establishments	1,009	784	29
Capital	$267,844,000	$174,066,000	54
Cost of materials used	108,566,000	66,837,000	62
Salaries and wages	69,574,000	42,933,000	62
Salaries	20,193,000	11,091,000	82
Wages	49,381,000	31,842,000	55
Miscellaneous expenses	23,630,000	17,949,000	32
Value of products	221,309,000	140,809,000	57
Value added by manufacture (products less cost of materials)	112,743,000	73,972,000	52
Employees:			
Number of salaried officials and clerks	17,905	10,619	69
Average number of wage earners employed during the year	87,256	60,466	44
Primary horsepower	158,768	105,376	51

It is reported that the Prussian State Railways are planning to electrify the suburban service in and about Berlin with single-phase locomotives despite the successful operation of single-phase motor cars on the Blankenese-Hamburg Ohlsdorf lines. This decision is not only due to the fact that the present steam trail cars must be used, but also on account of the lower cost of maintaining one large engine as compared with eight to ten motor cars.

ORDER FOR ADDITIONAL EQUIPMENT AUTHORIZED IN PHILADELPHIA

Directors of the Philadelphia Rapid Transit Company, at a special meeting on Dec. 6, authorized the purchase of 500 additional near-side cars. Formal announcement of the proposed action of the company was made in a statement issued on behalf of the board of directors after the conclusion of the meeting.

The statement by the board of directors follows:

"The thirty new cars recently purchased for the Market Street Elevated line are now being delivered. The company purposes by the addition of these cars to operate trains of from five to six cars in length at intervals of two minutes during the rush hours of the Christmas holidays. This service, it is expected, will adequately serve patrons of the Market Street Elevated road during the Christmas holiday season.

"The Stotesbury management regrets that the service on the surface lines will not be as satisfactory, owing to shortage of surface equipment. Every car at the company's command will, however, be in operation, including the fifty new near-side cars which have been delivered this fall, and as these cars have now stood the test of actual use and have demonstrated that they are the best type yet developed to meet the needs of this system, the board of dirctors has accordingly adopted this type of car as the Philadelphia standard, and at the special meeting called to-day for this purpose has ordered 500 more of these cars, with the option on the part of the company to increase the order to 800.

"The H. B. wheel guard, which is now the standard of the Philadelphia Rapid Transit Company, and with which these cars will be equipped, is now making an exceptional record. During the month past this guard picked up 96 per cent of the persons struck by the company's cars.

"Deliveries of these new cars should commence by April 1, 1912, and be made at the rate of 100 a month, thus completing the whole number well in advance of the following winter's traffic requirements."

LETTER TO THE STATE COMMISSION

President Charles O. Kruger, of the Philadelphia Rapid Transit Company, sent a letter to the Pennsylvania State Railroad Commission on Dec. 6 in reference to the plans of the company. An abstract follows:

"It gives us great pleasure to acknowledge your hearty expression of approval following the inspection of our 'near-side' cars in service Nov. 28.

"In this connection, we desire to advise you that, following a satisfactory report upon the sufficiency of the ventilating system by Dr. Joseph S. Neff, director of the department of health and charities, and an inspection of the general excellence of the car by Mayor Blankenburg and of the accident elimination features by the committee on public safety, it has been determined to adopt this type of car as a Philadelphia standard.

"Fifty 'near-side' cars have been in continuous operation upon route No. 2 (old Twelfth-Sixteenth Streets line) for almost two months. The result of the operation of this experimental line has been to demonstrate that the 'near-side' cars are admirably suited to meet Philadelphia traffic conditions, and the directors of this company have, therefore, recognizing the insufficiency of the present equipment, to-day authorized the purchase of 500 cars of the 'near-side' type, which, with the 50 'near-side' cars heretofore purchased, makes a total of 550 surface cars, against the immediate requirement of 489 cars, as set forth in the report made to your commission by Ford, Bacon & Davis.

"Forty-five elevated cars have also been purchased, as compared with the twelve additional elevated cars recommended in the Ford, Bacon & Davis report."

DATE OF THE MID-YEAR CONFERENCE

Secretary H. C. Donecker, of the American Electric Railway Association, has issued a preliminary announcement regarding the forthcoming mid-year conference, which will be held at the headquarters of the association, New York, on Jan. 26, 1912.

This conference will follow the regular mid-year meeting of the executive committee at the same place on Jan. 25. The plan of having various committees meet during the conference has been successful and will be maintained at the next conference, affording an opportunity for these committees to report their progress to the executive committee.

The notice issued by Mr. Donecker states that the allied Manufacturers' Association, following precedent, will invite the members of the executive committee and visiting railway officials to be its guests at a banquet to be held at the time of the conference. The exact date and place of the banquet and the program of speakers will be announced later.

In conclusion the preliminary announcement says:

"The committee on subjects has already tentatively arranged the program for the conference, the details of which will be sent you shortly. The development of the proposed plans will insure a meeting of unusual worth and importance to those to whom is intrusted responsibility for the proper conduct and results of the business of our member companies. You can aid materially in carrying out the objects for which it is held by personal attendance and participation in this mid-year meeting."

ANNUAL MEETING OF THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS

The American Society of Mechanical Engineers held its thirty-second annual meeting in the Engineering Societies Building, New York City, Dec. 5-8, 1911. Six professional sessions were held, and an elaborate program of entertainments and excursions to points of engineering interest occupied the remainder of the time. On Tuesday evening the annual election of officers took place. Dr. Alexander C. Humphreys, president of Stevens Institute, Hoboken, N. J., and one of the foremost gas plant engineers in America, was elected president, succeeding Col. E. D. Meier.

At the professional session on Wednesday afternoon D. S. Jacobus presented an interesting paper on "Tests of Large Boilers at the Station of the Detroit Edison Company." The tests described in this paper were made on two boilers at the plant of the Detroit Edison Company. Each of the boilers has a rated capacity of 2365 hp on the basis of 10 sq. ft. of boiler heating surface per horsepower, and in everyday practice carries a load of 6000 kw and in the evening from 7000 to 8000 kw. One of the boilers tested was fitted with Roney stokers and the other with Taylor stokers. The test results secured indicated that the efficiency obtainable with each stoker is about the same. The combined efficiency of the boiler and furnace varied from about 80 per cent at slightly below rating to about 76 per cent at double rating, on the basis of 10 sq. ft. of boiler heating surface per rated horsepower. In obtaining these efficiencies the steam used for driving the stokers and for producing the forced blast in the Taylor stokers has not been deducted from the total steam generated by the boiler. The amount of steam used by the Roney stokers was about 1½ per cent of the total steam generated by the boilers, and for the Taylor stokers about 2½ to 3 per cent.

At the meeting on Thursday several papers on gas and oil engines were presented.

News of Electric Railways

Investigation of Electrification of Railway Terminals in Chicago

At the "municipal dinner" given by the Chicago Association of Commerce on Nov. 28 the first official progress report of the Chicago Association of Commerce committee of investigation on smoke abatement and electrification of railway terminals was made public. This report was prepared under the supervision of the chief engineer for the committee and took the form of a sketch of the origin and progress of the investigation of the subjects mentioned in the long title of the committee. By way of introduction to the report a brief history of smoke abatement in Chicago was given, leading up to the statement that in the report of the smoke inspector of Chicago for 1910 it was declared frankly that there was necessity of a radical change in existing conditions of smoke abatement, so far as the railways are concerned; in fact, the electrification of railway terminals within the city was recommended in explicit form.

The recent history of the agitation for railway terminal electrification in Chicago is recounted. In October, 1909, a committee of experts appointed by the Chicago Association of Commerce reported favorably on electrification as a mechanical problem, but was less confident as to the financial feasibility of the proposal. About that time co-operation between the city administration and the Association of Commerce was suggested, with the formation of a joint committee of investigation. It was understood that the railways would provide the funds for the promotion of the investigation. At a meeting of the association held in September, 1910, representatives of a dozen different railways declared that the electrification of the railway terminals in Chicago would involve an enormous expense which would have to be borne by the commerce of the city and that immediate electrification was premature. Smoke abatement, it was added, need not depend wholly upon electrification. At a meeting of the Chicago Association of Commerce held on March 18, 1911, a general committee of eighteen was appointed to investigate the whole subject. This committee consisted of representatives of the city, steam railway executives and other citizens, with Jesse Holdom as chairman and Frederick H. Rawson as secretary. It is this committee under whose auspices the present investigation is being conducted. The engineering staff organized to do the work of this committee is as follows: Chief Engineer, Horace G. Burt; electrical engineer, Hugh Pattison; terminal engineer, Louis H. Evans; mechanical engineer, Theodore H. Curtis; consulting electrical engineers, Messrs. Gibbs & Hill, New York, N. Y.; consulting mechanical engineer, George R. Henderson, Philadelphia; assistant engineer, James Walker; editor for the engineers' staff, Benjamin C. Burt. Headquarters are maintained in the People's Gas Building, Chicago.

The scope of the investigation includes: (1) A determination as to the necessity of changing the motive power of steam railways to electric or other power; (2) the mechanical or technical feasibility of such a change; (3) the financial practicability of such a change. In the scope of the investigation as to the necessity of changing the motive power of steam roads to electric or other power are embraced the following heads: (1) Safety, (2) health, (3) comfort and convenience, (4) questions of loss and damage. Under each of these heads are included the subdivisions "passengers," "employees" and "the public." Each of these subdivisions is in turn subdivided. Much of the attention of the engineering staff so far has been devoted to the smoke abatement portion of the problem, and it has been decided to eliminate coke entirely from further consideration as locomotive fuel.

In concluding its progress report the committee says that the investigation so far (the report is dated Nov. 24, 1911) has been chiefly occupied with the subject of locomotive smoke abatement. Nevertheless, the subject of the electrification of terminals has been kept well in view, and a beginning made in the consideration of it. The concluding sentences of the report follow:

"In proportion as it has progressed the problems presenting themselves for solution have rather increased than diminished in number, and it is sufficiently clear, even at the present stage, that for the accomplishment of definite and valuable results much labor and considerable time will be required. The task imposed upon the committee proves to be one that is rather special, even unique, in scope and character, and while much may be learned from what has already been accomplished in various lines, yet much will have to be done *de novo* or for the first time. It is confidently hoped, and even believed, that if that which has to be done is well done the results will be of interest and value, not only for the present time and place, but for other times and places as well."

F. R. Coates Succeeds A. E. Lang as President at Toledo

Frank R. Coates, of Chicago, was elected president of the Toledo Railways & Light Company, Toledo, Ohio, to succeed Albion E. Lang at a meeting of the directors on Dec. 5, 1911. Mr. Lang continues as a member of the board of directors. Mr. Coates succeeds W. J. Walding as a director. Mr. Coates and Mr. Lang were authorized to frame a franchise plan to be presented to the city at a meeting to be held on Dec. 11. No details of the plan discussed at the meeting were made known. The representatives of the bondholders and creditors' committee have decided to extend the expiring bonds another year. The right of calling in the bonds on sixty days' notice to the holders was agreed upon by the members of the board. The bonds which were extended cover a total of $6,000,000. Of this amount $5,300,000 expire on Jan. 1, 1912, and the other $700,000 were due on Feb. 1, 1910. The bondholders and creditors were represented at the meeting by W. W. Miller, of New York; J. R. Nutt, Cleveland, chairman of the creditors' committee, and others.

Mr. Coates is reported to have said after the meeting:

"During the week Mr. Lang and I will try and frame a proposition to be made to the city and have it ready to submit at the meeting with the city committee on Dec. 11. Mr. Lang and I will work together on the plan. We have not decided definitely what it will be. Each department of the company is in charge of capable men. There will be no changes."

Mr. Miller was quoted in part as follows:

"The city expects the Toledo Railways & Light Company to make a proposition in an effort to settle the franchise question, but what kind of a proposition can the company make when it does not know what the city wants? If I should say to the people of Toledo to-morrow 'I am going to give you 3-cent fares,' they would not accept. They would say that I had something up my sleeve, that I was going to play a joke on them.

"The city is said to be willing to give us a reasonable return on our investment. What do the citizens think a reasonable return is? We have not heard their opinion on that. A rate of fare which will assure the company a reasonable return can only be determined by a valuation. The city is welcome to place its engineer at work on the books of the company and determine the valuation of the street railway property. If city officials believe that the operation of the lighting and heating plants complicates matters they can secure the separate valuations."

Inspection of Property of United Railroads, San Francisco

Patrick Calhoun, president of the United Railroads of San Francisco; Mason B. Starring, president of the United Railways Investment Company, and James H. Reed, president of the Philadelphia Company and first vice-president of the Pittsburgh Railways, arrived in San Francisco on Nov. 20, 1911, to inspect the property of the United Railroad. Mr. Calhoun said:

"There will be no stockholders' meeting at this time, as has been reported, and there may not be a meeting of the stockholders until next spring. At any rate, I am not

going to abandon the presidency of the United Railroads. I believe that there is a great upbuilding coming to the Pacific Coast, and I think that there will be a great improvement in San Francisco during the next few years.

"Ernest Thallman, whom Mr. Starring succeeded as president of the United Railways Investment Company, is sick, and Mr. Starring will automatically take his place eventually in the Investment Company. The development of our system will be along lines parallel with the development of San Francisco. I am optimistic in my estimate of the future of California in general, and San Francisco in particular. The development of the intramural roads, in connection with the handling of the Panama-Pacific Exposition traffic, is a matter of detail. Arrangements will be made for that traffic as the demands increase. In connection with the matter of power, we now have more power than we know what to do with."

Mr. Starring said:

"This, my first trip to California since my connection with the United Railways Investment Company, is for the purpose of inspecting the properties and of gaining information as to their physical condition and environments. It has no other significance. My relation to the United Railroads of San Francisco is that of a stockholder, not that of an officer or director, in charge of or operating the properties. I have long entertained the view that the duties and obligations to the public on the part of public service corporations and those on the part of the public for such corporations are reciprocal. That is to say, that the greatest benefits to each can only be reaped by each showing a due regard for the rights of the other."

Preliminary Tax Values Fixed in Wisconsin

The Wisconsin Tax Commission has made public the preliminary assessment of property of the public service corporations of Wisconsin for 1912. The total assessment is fixed at $48,825,000, as compared with $42,163,000 for 1911. The values for 1912 as made public follow:

Ashland Light, Power & Street Railway	$500,000
Bay Shore Street Railway	20,000
Beloit Traction Company	200,000
Chicago & Milwaukee Electric Railroad	225,000
Chippewa Valley Railway, Light & Power Company	1,350,000
Duluth Street Railway	1,100,000
Eastern Wisconsin Railway & Light Company	1,050,000
Grand Rapids Street Railroad	120,000
Green Bay Traction Company	750,000
Janesville Traction Company	45,000
Kenosha Electric Railway	350,000
La Crosse & Onalaska Railway	25,000
La Crosse City Railway	500,000
Manitowoc & Northern Traction Company	120,000
Menominee & Marinette Light & Traction Company	250,000
Merrill Railway & Lighting Company	130,000
Milwaukee Electric Railway & Light Company	28,000,000
Milwaukee Light, Heat & Traction Company	7,280,000
Milwaukee Northern Railway	1,650,000
Rockford & Interurban Railway	340,000
Sheboygan Railway & Electric Company	900,000
Southern Wisconsin Railway	1,050,000
Twin City General Electric Company	65,000
Waupaca Electric Light & Railway Company	80,000
Wausau Street Railroad	725,000
Wisconsin Electric Railway	650,000
Wisconsin Traction, Light Heat & Power Company	1,350,000
Total	$48,825,000

Transit Affairs in New York

The Attorney-General of New York State has begun a proceeding in the Supreme Court to take away from the Metropolitan Street Railway its franchises for several of its subordinate lines and for the removal of the tracks of these lines on the ground that they constitute a nuisance. The Attorney-General said in the complaint that the Metropolitan Street Railway is the successor to the companies originally owning the franchises and that the lines about which complaint is made have not been used for several years.

By unanimous opinion the Appellate Division has refused to grant an injunction in a taxpayer's action to prevent the carrying out of the contracts for the construction of the new subways allotted to the Brooklyn Rapid Transit Company by the Board of Estimate in July, 1911.

Bids have been opened by the Public Service Commission of the First District of New York for the construction of Section 9 of the Lexington Avenue subway, which extends from Sixty-seventh Street to Seventy-ninth Street.

The Board of Estimate of New York has before it a proposition for a surface railroad to operate over the Manhattan Bridge and transfer to the Third Avenue Railroad in Manhattan and to the lines of the Brooklyn Rapid Transit Company and certain other surface lines in Brooklyn, one transfer to be given free with the original 5-cent fare. The proposition includes a 3-cent local bridge service, two local tickets to be sold for 5 cents. The franchise asked for covers the construction and operation of a surface line from the North River in Manhattan through Canal Street, across the Manhattan Bridge to the Flatbush Avenue extension, to Fulton Street, the junction with the lines of the various Brooklyn companies to be made there. The communication to the Board of Estimate is signed by Edward A. Maher, general manager for the receiver of the Third Avenue Railroad; Timothy S. Williams, president of the Brooklyn Heights Railroad, the lessee of the Brooklyn City Company; C. D. Meneely, vice-president of the Nassau Electric Railroad, and S. W. Huff, president of the Coney Island & Brooklyn Railroad.

Rapid Transit Developments in Pittsburgh

The Pittsburgh (Pa.) Subway Company has written a letter to the Council of Pittsburgh calling attention to the applications for rapid transit rights in Pittsburgh and stating that its proposition is not open for an indefinite period. The United Terminal System, through the Painters Run Railroad Company, has presented a resolution to the Council which provides that the United Terminal System shall comply with the specifications and conditions of the subway ordinance and then be granted a franchise, the ordinance to be introduced in Council and referred to the special committee. A communication has been filed with the Council from J. D. Callery, president of the Pittsburgh Railways, saying he had prepared a statement on the construction work done by the company in 1911 and the work contemplated in 1912 and asking for a conference with the Council.

The Pennsylvania Railroad has denied the report that the plans which it is making for improvements in Pittsburgh and vicinity call for the electrification of the main line between Pittsburgh and Pitcairn, 15 miles, and the construction of subways to do away with many grade crossings.

Outline Plan for Subway in Toronto

City Engineer Rust, of Toronto, Ont., has forwarded to the Board of Control of Toronto an outline of the system of subways which Assistant Engineer Cousins has prepared, the whole to cost approximately $23,000,000. Mr. Rust declares his preference for diagonal subways if diagonal streets are to be opened through.

The subways which are designed to be added to this take the form of east and west lines, which, with connecting north and south surface lines, form a belt around the city. The subways run adjacent to Queen Street from the Woodbine to High Park, and adjacent to Bloor Street from Broadview to High Park. An express surface line along the edge of High Park connects these two systems on the west, while on the east the line is carried from the Bloor viaduct along Danforth Street as a surface line and down Coxwell Street to the other subway.

Entrance for the radial railways is provided at the Woodbine on North Yonge Street, at the south of High Park, and at Davenport Road. Many proposed surface lines are shown on the map in the report, in addition to those now authorized and under way.

Mr. Cousins concludes his report in part as follows:

"Rapid Transit facilities, or what are frequently termed exclusive lines of travel, will, in the judgment of the undersigned, have to be constructed. Messrs. Jacobs and Davies in their report to the city have shown that if the Toronto Railway franchise were terminable in 1915 a system of subways consisting of about 11.6 miles of double tracks, operated in conjunction with the present Toronto Railway, with liberal transfer facilities, would be self-sustaining, from which I conclude that the conditions in 1921 will be even more favorable.

"In my judgment it would be advisable to continue the policy already adopted; that is, constructing surface lines in the outlying districts, which, for the present, if operated at a loss, are only meeting the requirements of the citizens in those districts and at the same time giving them no more than they are justly entitled to. These surface lines at some future date must act as a feeder to a rapid transit system or become part of the street railway system.

"I think we should begin subway construction somewhat as outlined on attached plan having in view the completion of the rapid transit system in 1921, at which time it can be operated in conjunction with the present Toronto Railway with universal transfer system.

"The estimated cost of the rapid transit lines complete and ready for operation, including equipment, is $23,000,000. With this system complete the city would in 1921 be practically in an independent position. As different portions were constructed and put in operation I feel, in all probability, they would at least meet the operating expenses and carrying charges, or, in other words, be self-supporting, and from a municipal ownership viewpoint that is all that is required, provided adequate service is given the public. Serious consideration should, I think, be given to the fact that it takes a considerable length of time to construct rapid transit lines and have them ready for operation."

Freight Terminal Plans in New York

The construction of a freight tunnel under the Hudson River, to be built by New York and New Jersey, for the use of all the railroads, with the rates to be fixed by the Interstate Commerce Commission, in that way abolishing terminal competition, is part of the comprehensive plan for the development of the port submitted to Mayor Gaynor by Calvin Tomkins, commissioner of docks. Mr. Tomkins says the physical plan of the New York Central & Hudson River Railroad to extend its tracks along the river front of the lower west side agrees closely with the plan proposed by the Dock Department. The difference is in the control, whether it shall be private under the company or public under the port authority. He declares in favor of the joint use of the improved terminal, the New Jersey roads using the elevated freight structure by ramping to it from the car floats and yards. Mr. Tomkins says in part:

"A comprehensive port plan and policy must include a full discussion of the port relations of New Jersey and of New York. All the railroads agree that freight tunnels must some day be built and that whenever this shall be done the elevated freight way will be available to them as to the New York Central & Hudson River Railroad. The city cannot build these tunnels, neither is any one of the New Jersey roads now able to do so, nor in view of their traditional habit of competing at terminals rather than joining in common use are they able jointly to accomplish such purpose."

Transfer Order in New York

The Public Service Commission of the First District of New York formally issued on Dec. 5, 1911, an order requiring the restoration of free transfers at 151 points in Manhattan and the Bronx. This order was referred to in the Electric Railway Journal of Dec. 2, 1911, page 1168.

The order set forth that after Jan. 1, 1912, passengers must be permitted to transfer from the cars of one company to those of another and back again, if they desire, to the cars of the first, but not to the cars of a third company. However, when a passenger has returned on a free transfer to the cars of the company to which he paid his fare he will be entitled to any further free transfers that that company is accustomed to grant.

In its opinion the commission refers to the failure of the 8-cent and 10-cent transfer system, which has been tried for several months on the Fifty-ninth Street line, and declares "That the curtailment of the transfer privilege in 1908 worked a great hardship to many, and was a great inconvenience to many more is shown by the testimony, and is generally conceded. Industrially the city had become adjusted upon the basis of a 5-cent fare with free transfers."

To show the effects of the discontinuance of transfers the commission takes the years 1907 and 1909, those immediately preceding and following the revolution in the street car system. It gives this table:

	Year Ending June 30, 1907.	Year Ending June 30, 1909.	Decrease.
Passenger car miles	57,676,104	55,255,497	2,420,607
Free transfers	194,820,920	139,607,286	35,213,654
Paying passengers	377,017,192	362,077,663	14,939,527
Amount of fares	$18,810,457	$17,997,252	$813,205
Operating expenses	$11,383,557	13,326,858	*1,943,301

*Increase.

The commission also says:

"From this comparison it appears that any expectation which the receivers of the companies or the court that authorized the abandonment of the transfers may have entertained that the restriction of transfer privileges would transform millions of free passengers into paying passengers was not fulfilled. Instead of an increase of passenger revenue there was an actual decrease of $813,205, or approximately 15,000,000 pay passengers."

The opinion is expressed that the passenger who under the new conditions refused to pay two fares "either walked to their destination from the former transfer point or took a more roundabout journey (making a longer haul for the street railroads) or were driven to the subway and elevated lines."

Boston & Eastern Railroad Location.—At the continued hearing on Nov. 20, 1911, by the joint board composed of members of the Boston Transit Commission and the Massachusetts Railroad Commission on the location of the proposed tunnel of the Boston & Eastern Railroad under Boston Harbor, the board postponed further action until the location of the road in East Boston has been determined by the Railroad Commission. A hearing has been set for Dec. 11, 1911, by which time it is expected that the Railroad Commission will have acted upon the surface location in East Boston.

First Year of Pennsylvania Railroad Terminal in New York.—At 12:01 a. m. on Nov. 26, 1911, the first year of operation of the new Pennsylvania Station in New York was completed. In the year approximately 10,000,000 passengers used the station. There was not in the year a single serious accident on the entire New York terminal division, and of the 111,942 trains operated in and out of the station 99.59 per cent made schedule time over the division. The Pennsylvania Railroad has 750 employees at its terminal in New York whose duties have solely to do with operating trains and accommodating patrons. In the first year of the operation of the station a total of 1,929,320 tickets were sold. Approximately 1,500,000 pieces of baggage were handled and hundreds of thousands of parcels checked. There were 230,197 taxicab calls and the bureau of information, at which telephone inquiries alone are received, answered 377,714 calls, more than 1,000 a day.

PROGRAM OF ASSOCIATION MEETINGS

Central Electric Accounting Conference.

The following program has been announced for the annual meeting of the Central Electric Accounting Conference to be held at the Boody House, Toledo, Ohio, on Dec. 16, 1911:

MORNING SESSION.

10 a. m.—Annual address of the president. Regular business session and reports of special committees.

Address, "Departmental Co-operation," by E. B. Peck, president of the Central Electric Railway Association.

Report of the standing committee on freight accounting.

Discussion.

Adjournment for luncheon.

AFTERNOON SESSION.

2 p. m.—Report of the standing committee on passenger accounts.

Discussion.

Report of the committee on constitution and by-laws.

Election of officers.

The executive committee will meet at the Boody House at 7:30 p. m. on Dec. 15.

Financial and Corporate

New York Stock and Money Markets

Dec. 6, 1911.

With the opening of the exchange on Monday a spirit of hesitancy appeared in the market, and price changes and volume of transactions have been unimportant since that time. The opening of Congress, with its uncertainties, and the question of the tone of the presidential message were cited as the causes of Monday's inactivity. At the end of last week call money reached 6 per cent, but has declined slightly. Quotations to-day were: Call, 4@5 per cent; ninety days, 4 per cent.

Other Markets

Chicago Railways Series 2 certificates led the activity in the Chicago market to-day, making a slight gain over the quotation at last night's close.

Business in Philadelphia has been lifeless thus far in the week and aside from Steel shares the list has been uninteresting.

Similar indifference has been shown in the Boston market and prices have been irregular.

The Baltimore market has been quiet and featureless.

Quotations of traction and manufacturing securities as compared with last week follow:

	Nov. 29.	Dec. 5.
American Brake Shoe & Foundry (common)	a90	a90
American Brake Shoe & Foundry (preferred)	a133½	a131½
American Light & Traction Company (common)	a295	a295
American Light & Traction Company (preferred)	a107	a107
American Railways Company	a46¼	a46
Aurora, Elgin & Chicago Railroad (common)	a37½	36
Aurora, Elgin & Chicago Railroad (preferred)	a84½	a84
Boston Elevated Railway	a129⅞	a130
Boston Suburban Electric Companies (common)	a15	a15
Boston Suburban Electric Companies (preferred)	a75	a74
Boston & Worcester Electric Companies (common)	a12	*12
Boston & Worcester Electric Companies (preferred)	a58	a55
Brooklyn Rapid Transit Company	77¾	77
Capital Traction Company, Washington	127	a127½
Chicago City Railway	a180	180
Chicago Elevated Railways (common)	a30	a30¼
Chicago Elevated Railways (preferred)	a93	a93
Chicago Railways, ptcptg., cft. 1	a97	a97
Chicago Railways, ptcptg., ctf. 2	a33⅝	a35
Chicago Railways, ptcptg., ctf. 3	a11¼	a11½
Chicago Railways, ptcptg., ctf. 4	a6¼	a7
Cincinnati Street Railway	*129½	a130½
Cleveland Railway	a104½	a104½
Cleveland, Southwestern & Columbus Ry. (common)	*47⅞	*47⅞
Cleveland, Southwestern & Columbus Ry. (preferred)	*33¾	*33¾
Columbus Railway & Light Company	*37½	a37½
Columbus Railway (common)	*83	a83
Columbus Railway (preferred)	90½	a90
Consolidated Traction of New Jersey	75½	a75½
Consolidated Traction of N. J., 5 per cent bonds	a105	a105½
Dayton Street Railway (common)	a25	a25
Dayton Street Railway (preferred)	a101	a101
Denver & Northwestern Railway	145	*145
Detroit United Railway	*80	a85
General Electric Company	154⅜	152¼
Georgia Railway & Electric Company (common)	159	a158½
Georgia Railway & Electric Company (preferred)	a91½	a92
Interborough Metropolitan Company (common)	15⅛	15
Interborough Metropolitan Company (preferred)	47	45½
International Traction Company, 4% notes, rcts	*70	*70
Indiana Union Traction Company	12	11
Kansas City Railway & Light Company (common)	18	a20½
Kansas City Railway & Light Company (preferred)	a52	52
Lake Shore Electric Railway (common)	*7	*7
Lake Shore Electric Railway (1st preferred)	*81½	*81½
Lake Shore Electric Railway (2d preferred)	*25	*25
Manhattan Railway	a136	a137
Massachusetts Electric Companies (common)	a22	a21⅞
Massachusetts Electric Companies (preferred)	a94	a93¼
Metropolitan Street Railway, New York	*8	*8
Milwaukee Electric Railway & Light (preferred)	*105	*105
North American Company	73⅞	a73½
Northern Ohio Light & Traction Company (common)	58	a58½
Northern Ohio Light & Traction Company (preferred)	105	a105
Philadelphia Company, Pittsburgh (common)	a53	53
Philadelphia Company, Pittsburgh (preferred)	a43¾	a43¾
Philadelphia Rapid Transit Company	a23⅞	23¼
Portland Railway, Light & Power Company	99½	*99½
Public Service Corporation	a110	a110
Public Service Corporation, ctfs	106¼	a106¼
Seattle Electric Company (common)	a107	a107
Seattle Electric Company (preferred)	101½	a101¾
Third Avenue Railroad, New York	3⅝	5
Toledo Railway & Light Company	8	4½
Twin City Rapid Transit, Minneapolis (common)	106	a105¼
United Ry. & Electric Company (Baltimore)	18½	18½
United Rys. Inv. Co. (common)	34	32
United Rys. Inv. Co. (preferred)	61½	59
Virginia Railway & Power Company (common)	.....	a41½
Virginia Railway & Power Company (preferred)	.....	81
Washington Ry. & Electric Company (common)	46¼	a47
Washington Ry. & Electric Company (preferred)	88	a88
West End Street Railway, Boston (common)	88	a87½
West End Street Railway, Boston (preferred)	103½	a103½
Westinghouse Elec. & Mfg. Co.	65⅛	a65¼
Westinghouse Elec. & Mfg. Co. (1st pref.)	a118	a118

aAsked. *Last sale.

ANNUAL REPORT

Columbus, Delaware & Marion Railway

The annual report of Eli M. West, receiver of the Columbus, Delaware & Marion Railway, covering the year ended June 30, 1911, has been filed in the Court of Common Pleas, Franklin County, Ohio. The principal figures, with a comparison, are as follows:

Year ended June 30.	1911.	1910.	1909.
Gross earnings from operation	$385,345	$352,658	$316,424
Operating expenses	223,380	201,336	178,830
Net earnings from operation	$161,965	$151,322	$137,594
Fixed charges and other deductions	157,662	150,521	140,111
Surplus income	$4,303	$801	*$2,517

*Deficit.

Mr. West says in part:

"During the receivership the service on the road has been greatly improved and in order to do this it has been necessary to spend a large amount of money in improving the physical condition of the roadbed, the power plant and the rolling stock. I believe that our roadbed is now in fairly good condition, although it had been allowed greatly to deteriorate for several years prior to the receivership.

"During the receivership I have also put nearly all of the main line equipment through the shops and have put the power plant in good condition and substantially increased its generating power.

"As a result of the work mentioned I have been enabled to operate limited cars on a fast schedule and have shortened the local schedules somewhat. During the greater part of the day we are also operating a thirty-minute service between North Columbus and Glenmary Park. We have also shortened the street car schedules in Marion and Delaware.

"I have eliminated some of the bad curves on the railroad at a considerable cost and have begun filling in some of the smaller trestles, thus avoiding a large maintenance cost in the future.

"No receiver's certificates have so far been issued and no money has been borrowed, excepting $10.000, which was borrowed during the first month of the receivership for the purpose of making a permanent improvement in the city of Delaware.

"Several new shelter houses have been constructed along the right-of-way. Corrugated culverts have been placed at more than fifty road crossings and a substantial and permanent improvement has been made in the right-of-way in the street just north of Clintonville.

"The State Tax Commission has fixed a valuation of $1,255,030 on the properties covered by the receivership and it is on this valuation that taxes will have to be paid in the future.

"Our total valuation heretofore has been $460.748, but we expect a substantial reduction in the tax rate. It is probable, however, that our total taxes in the future will be substantially increased on account of this increase in valuation and in spite of the reduction in the tax rate.

"I think the auditor's report speaks for itself and I have no comment to make, except to call the court's attention to the apparent increase in expenses for maintenance of ways, structures and equipment since the receivership. For the year 1909 the company charged up to maintenance approximately $28,000, while the first year of the receivership exceeded $44.000 for the same purpose; and the year ending June 30, 1911, exceeded $49,000 for maintenance. Prior to the receivership the company charged up at least 50 per cent of its total maintenance charges to 'additions to property,' instead of to operating expenses, where they properly belonged."

The traffic statistics relating to the interurban line are as follows:

Year ended June 30.	1911	1910	1909
Passenger car mileage	759,730	740,491	660,648
Revenue passengers carried	1,335.874	1,185.872	1,081,853
Passenger earnings per car mile	.2710	.2664	.2722
Average amount received per passenger	.1541	.1663	.1682
Freight car mileage	97,536	98,683	124,741
Number tons freight carried	12,050.52	9,246.18	8,336.97
Average distance haul of one ton	28 84	29.29	27.48
Average amount received per ton	3.30	3.78	3.45
Freight earnings per car mile	.4073	.3540	.2303

Georgia Light, Power & Railways

The Georgia Light, Power & Railways has been formed under the laws of Massachusetts as a voluntary association to acquire the securities of the Macon Railway & Light Company, Macon, Ga.; the Central Georgia Power Company, the Central Georgia Transmission Company and the Macon Gas Company and to acquire the securities of other public utilities in Georgia, in accordance with the plan mentioned in the Electric Railway Journal of Nov. 18, 1911, page 1078, and Dec. 2, 1911, page 1177. The authorized capital liabilities of the company total $14,500,000, consisting of $8,000,000 of common stock, $2,000,000 of 6 per cent preferred stock and $6,500,000 of first lien bonds. Of the authorized common stock $6,000,000 is outstanding, of the authorized preferred stock $100,000 is outstanding, and of the first lien bonds $2,355,000 are outstanding and $4,145,000 are reserved under careful restriction to acquire other properties and for extensions and improvements. The bonds will be secured by a first lien on practically all of the common stock of the Macon Railway & Light Company, practically all of the common stock and $300,000 of preferred stock of the Macon Gas Company and $2,000,000 out of $4,000,000 of stock and $4,500,000 of notes of the Central Georgia Power Company, all of which securities will be deposited with the New York Trust Company, New York, N. Y., the trustee. A sinking fund is provided to retire the bonds. To this fund $50,000 will be contributed annually from 1916 to 1920; $75,000 annually from 1921 to 1925, and $100,000 annually from 1926 to 1940.

A. B. Leach & Company, New York, N. Y., are placing at 92½ and interest, yielding 5½ per cent income, the present issue of $2,355,000 of first lien 5 per cent sinking fund gold bonds of the Georgia Light, Power & Railways, dated Sept. 1, 1911, and due Sept. 1, 1941. The bonds are redeemable on any interest date at 105 upon 30 days' notice.

Arkansas Valley Railway, Light & Power Company, Pueblo, Colo.—The Arkansas Valley Railway, Light & Power Company has been incorporated in the interest of H. M. Byllesby & Company, Chicago, Ill., as noted in the Electric Railway Journal of Dec. 2, 1911, page 1181. The company has an authorized capital stock of $10,000,000 of which $4,000,000 is preferred and $6,000,000 common. There is no preferred stock outstanding, but there is $3,500,000 of common stock outstanding, of which the Standard Gas & Electric Company owns all but the shares held by the qualifying directors. Of the $10,000,000 of bonds of the company the Standard Gas & Electric Company owns $3,500,000 and $3,147,000 have been reserved to retire a like amount of underlying bonds. The $3,500,000 of bonds of the Arkansas Valley Railway, Light & Power Company which the Standard Gas & Electric Company owns are pledged to secure the new 6 per cent convertible bonds.

Boise Railroad Company, Ltd., Boise, Idaho.—W. E. Pierce, president of the Boise & Interurban Railway Company, Ltd., and his associates are said to have secured control of the property of the Boise Railroad Company, Ltd.

Chicago (Ill.) Railways.—The Chicago Railways has sold to the National City Bank, New York, N. Y., and Harris, Forbes & Company, New York, N. Y., enough of its consolidated "A" bonds to redeem at par on Feb. 1, 1912, all of its $4,776,000 of collateral trust 6 per cent notes and $1,000,000 of funding 6 per cent notes, which are secured by the deposit of $8,433,200 of "A" 5 per cent bonds.

Citizens' Light & Transit Company, Pine Bluff, Ark.—It is understood that negotiations are pending for the consolidation of the Citizens' Light & Transit Company and the Pine Bluff Corporation, which operates a power and light system in Pine Bluff.

Joliet & Southern Traction Company, Joliet, Ill.—The Continental & Commercial Trust & Savings Bank, Chicago, Ill., as trustee under the mortgage of the Joliet & Southern Traction Company of 1907 has begun foreclosure proceedings against this company in the Kane County Circuit Court in Geneva, Ill. This action is in accordance with the instructions of the bondholders' protective committee, representing more than 75 per cent of the bonds. The resolution authorizing this step was noted in the Electric Railway Journal of Nov. 4, 1911, page 1009.

Lincoln (Neb.) Traction Company.—O. W. Webster has been elected a director of the Lincoln Traction Company to succeed S. A. Foster, resigned.

Montgomery County Rapid Transit Company, Norristown, Pa.—The Montgomery County Rapid Transit Company has gone out of the hands of a receiver and has been reorganized under the name of the Montgomery Transit Company, with N. H. Larzelere president. A new mortgage of $150,000 has been provided to settle all claims and build extensions.

Waterville & Oakland Street Railway, Waterville, Maine.—Papers have been filed to change the corporate name of the Waterville & Oakland Street Railway to the Waterville, Fairfield & Oakland Street Railway and to increase the authorized capital stock from $100,000 to $500,000. The Waterville & Oakland Street Railway and the Waterville & Fairfield Railway & Light Company recently passed into the control of the Central Maine Power Company.

Dividends Declared

Brooklyn (N. Y.) Union Elevated Railroad, 2½ per cent, preferred; 2½ per cent, common.

Chippewa Valley Railway, Light & Power Company, Eau Claire, Wis., quarterly, 1¾ per cent, preferred.

Continental Passenger Railway, Philadelphia, Pa., $3.

Second & Third Streets Passenger Railway, Philadelphia, Pa., $3.

United Railways & Electric Company, Baltimore, Md., 2 per cent, preferred.

Virginia Railway & Power Company, Richmond, Va., 2½ per cent, preferred.

West Penn Traction Company, Pittsburgh, Pa., quarterly, 1 per cent, common.

ELECTRIC RAILWAY MONTHLY EARNINGS

Period.			Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
CLEVELAND, PAINESVILLE & EASTERN RAILROAD.							
1m.,	Oct.	'11	$30,975	$18,699	$12,275	$8,691	$3,584
1 "	"	'10	31,818	16,397	15,421	8,083	7,338
10 "	"	'11	310,567	169,826	140,741	83,066	57,675
10 "	"	'10	301,199	155,443	145,756	80,691	65,066
CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY.							
1m.,	Oct.,	'11	$100,010	$56,529	$43,481	$30,070	$13,412
1 "	"	'10	97,087	54,462	42,624	29,794	12,831
10 "	"	'11	952,146	533,236	418,909	300,862	118,047
10 "	"	'10	888,546	512,523	376,024	297,939	78,084
FEDERAL LIGHT & TRACTION COMPANY.							
1m.,	Oct.,	'11	$138,305	$80,355	$57,953	.....	.....
1 "	"	'10	127,343	72,457	54,886	.....	.....
10 "	"	'11	1,074,558	642,842	431,716	.....	.....
10 "	"	'10	986,215	576,818	409,398	.....	.....
LAKE SHORE ELECTRIC RAILWAY.							
1m.,	Oct.,	'11	$107,620	$58,876	$48,744	$34,625	$14,119
1 "	"	'10	105,075	55,941	49,135	34,669	14,465
10 "	"	'11	1,069,857	565,105	504,753	347,026	157,727
10 "	"	'10	1,018,739	529,101	489,638	347,678	141,961
NORTHERN OHIO TRACTION & LIGHT COMPANY.							
1m.,	Oct.,	'11	$220,343	$123,854	$96,488	$44,321	$52,168
1 "	"	'10	208,342	113,371	94,971	43,367	51,604
10 "	"	'11	2,240,081	1,234,359	1,005,730	443,391	562,340
10 "	"	'10	2,045,748	1,123,229	922,528	433,528	488,991
TOLEDO RAILWAYS & LIGHT COMPANY.							
1m.,	Oct.,	'11	$265,654	$166,721	$98,933	$84,523	$14,411
10 "	"	'11	2,561,071	1,595,022	966,049	802,235	163,814
TWIN CITY RAPID TRANSIT COMPANY.							
1m.,	Oct.	'11	$655,591	$313,915	$341,676	$341,676	$201,597
1 "	"	'10	645,358	308,743	336,616	336,616	196,295
10 "	"	'11	6,508,029	3,212,702	3,295,327	3,295,327	1,894,536
10 "	"	'10	6,265,727	2,996,850	3,268,878	3,268,678	1,866,904

A compilation by the *Journal of Commerce*, New York, shows that papers filed in the Eastern States during November for companies with an authorized capital of $1,000,000 or over, including increases in capital, represent a total of $150,593,400, an increase of $26,373,400 over October, and $31,570,400 as compared with November, 1910. Charters taken out by other companies with an individual capital of $100,000 or over, including states other than those in the East, increased the month's total to $362,158,400, which compares with $187,178,500 in October and $183,388,000 in November last year.

Traffic and Transportation

Stops and Transfers in the Twin Cities

C. G. Goodrich, president of the Twin City Rapid Transit Company, Minneapolis, Minn., has issued a statement in which he recommends to the City Council that the near side stop should be confined to the loop district, bounded by High Street, Seventh Street, First Avenue, North, and Second Avenue, South, and has announced a change in the transfer system by which passengers will be allowed to transfer from short-line cars to long-line cars. Mr. Goodrich says in part:

"Our company has been criticised considerably as to the near-side and far-side stop systems now in effect. I agree with our patrons that the present plan is confusing and annoying, but in simple justice we should not be entirely blamed for it. The present system was developed on account of the reasonable rules of the traffic squad. To prevent congestion and facilitate travel it was necessary for them to order our cars, after crossing the street, to run to the middle of the next block. This plan confused passengers, who never knew just where their cars would stop. Hoping to relieve the situation, we announced the near-side stop system wherever there was pavement and the far-side system where there was no pavement. This plan did not meet with the entire approval of the city authorities, and so the present zone system was established and confirmed by ordinance.

"I have been asked to state what I would consider the best stop system to adopt. Perhaps a number of years' operating experience entitles me to explain. I believe we would handle our traffic more satisfactorily by having cars stop on the near side, but owing to many unpaved crossings I would suggest near side on all streets in the loop district, bounded by High Street, Seventh Street, First Avenue, North, and Second Avenue, South, and far-side crossings everywhere else.

"Traffic officers are obliged to hold cars on the near side before allowing them to cross streets, and we can use such time to load and unload without delay. Such stops mean safety to pedestrians, autos and all street traffic, and altogether the near-side stop in the business district means the safest way to handle the growing business of the city. Our company stands ready to do just what the people want it to do in this respect, and I am sure the City Council stands ready to do what the people want it to do.

"I take this opportunity of announcing some changes in our transfer system which are made with the idea of improving our service generally, and I hope the changes will please our patrons."

The company has announced that R. W. Harris, of the engineering staff of the Railroad Commission of Wisconsin, has been retained to investigate street railway conditions in Minneapolis. W. J. Hield, vice-president and general manager of the company, said:

"Mr. Harris is here at our solicitation, with the idea of going into conditions, not theorizing, but to get at the real facts. We want him to investigate thoroughly and find what they are. This investigation is the result of the general agitation that has been going on about street railway conditions, and we want to find out what these are. Mr. Harris has conducted investigations for the Wisconsin commission. In this connection he has been in Minneapolis and is more or less familiar with the city. He is well informed and is a traction expert."

Conference in Indiana on Signals Postponed.—The conference to consider the report of the block signal committee called by the State Railroad Commission of Indiana for Dec. 4, 1911, has been postponed until Dec. 11, 1911.

Exchange of Traffic in Carload Lots in Indiana.—The Railroad Commission of Indiana has ordered the Chicago, Cincinnati, Cleveland & St. Louis Railroad to turn over coal in carload lots to the Belt Railroad at Indianapolis to be switched to the tracks of the Terre Haute, Indianapolis & Eastern Traction Company and transported by that company to Plainfield, a distance of 12 miles. The electric railway is held responsible for all damage to the cars while they are in its possession.

Proposed Terminal Improvements in Atlantic City.—It is understood that at a meeting in Atlantic City, N. J., on Dec. 1, 1911, between members of the Council of that city and representatives of the Pennsylvania Railroad preliminary plans were discussed looking toward the expenditure by the company of $2,000,000 for a new terminal station to be used jointly by the Pennsylvania Railroad and the West Jersey & Sea Shore Railroad and in track elevation work in Atlantic City.

Street Railway Congestion in Montreal.—City Surveyor Barlow of Montreal, Que., has submitted to the City Council a communcation on street railway congestion in Montreal. He recommends the construction of lines along both Dorchester Street and Sherbrooke Street, which have been reserved as residential thoroughfares, and he points out that much might be done by limiting the distance between stops to 600 ft. It is also suggested that the Montreal Street Railway should establish a two-and-a-half-minute service during the day and a five-minute service from the cessation of the eventing rush until midnight.

Appeal to Supreme Court in Maine Bridge Case.—The Bangor Railway & Electric Company, Bangor, Maine, has appealed to the Supreme Court of Maine from the decrees of the Railroad Commission of Maine ordering the company to rebuild and maintain the highway and electric railway bridge over Stillwater River in Orono. The decree provides that the town reimburse the company for a portion of the expenses of construction and maintenance. The appeal petition asserts that the decree is in violation of the law which provides that the company shall maintain that portion of the highway which it uses for railway purposes.

United Traction Company Will Comply with Service Order.—Edgar S. Fassett, general manager of the United Traction Company, Albany, N. Y., has announced that the company will comply with the order of the Public Service Commission of the Second District of New York directing it to increase the seating capacity of its cars on the hill lines. The order directs the company to provide a seating capacity of 1000 persons on eastbound service between 7:30 a. m. and 9 a. m., on the Pine Hills line, and a seating capacity of 1300 on that line westbound between 5 p. m. and 6:30 p. m. The order also provides for a seating capacity of 1000 persons eastbound between 7:30 a. m. and 9 a. m., on the West Albany line, and 1400 persons westbound between 5:30 p. m. and 6 p. m., on that line.

Rerouting Cars in Los Angeles.—An order was issued recently by the Los Angeles (Cal.) Railway eliminating cars of the Temple Street line from the most congested district of the city. The Temple Street cars now terminate on Broadway, north of First Street, instead of continuing east on that thoroughfare, crossing Broadway, Spring, Main and Los Angeles Streets as heretofore. The removal of the cars of the Temple Street line from First Street has lessened the congestion on First Street and has helped considerably in accelerating the movement of cars on Broadway, Spring Street and Main Street, and to clear the way at the Los Angeles Street curve where the Pasadena, South Pasadena, El Molino, San Gabriel and other Pacific Electric Railway trains leave the business district to operate into the rural regions.

New Jersey Commuters Indorse Fare Increase.—The New Jersey State Commuters' Association and the Commuters' League of New Jersey have issued the following statement indorsing as reasonable the increase in fares announced recently by the Hudson & Manhattan Railroad: "After a careful examination and consideration of the sworn public statements filed with the Interstate Commerce Commission and presented by W. G. McAdoo in person, Resolved, that the statement issued Nov. 23 by Howard Marshall, president of the Commuters' League of New Jersey and the New Jersey State Commuters' Association, in regard to the proposed increased fare on the Thirty-third Street branch of the Hudson & Manhattan Railroad as being reasonable and just, be and the same is hereby approved by the officers of both organizations in joint meeting assembled."

Personal Mention

Mr. James W. Fox has been elected president of the Northampton, Easton & Washington Traction Company, Easton, Pa., to succeed Mr. R. M. Petty.

Mr. J. Frederick Mooney has been elected treasurer of the Northampton, Easton & Washington Traction Company, Easton, Pa., to succeed Mr. R. M. Eilenberger.

Mr. F. E. Marsh, who has been assistant superintendent of the Athol & Orange Street Railway, Athol, Mass., has been appointed assistant superintendent of the Massachusetts Northern Railways, Greenfield, Mass., under Mr. John A. Taggart.

Mr. John A. Taggart, who has been superintendent of the Connecticut Valley Street Railway, Greenfield, Mass., has been appointed general superintendent of the recently organized Massachusetts Northern Railways, which has taken over the Connecticut Valley Street Railway and other lines as noted in the Electric Railway Journal of Dec. 2, 1911, page 1177.

Mr. Russell Armstrong has been elected first vice-president and a member of the executive committee of the Federal Utilities, Inc., New York, N. Y. Mr. Armstrong was connected with Harvey Fisk & Sons, New York, N. Y., for many years and more recently was vice-president of the Electric Bond & Share Company, New York, N. Y.

Mr. Charles E. Lenhart has been appointed master mechanic of the Mahoning & Shenango Railway & Light Company, with headquarters at Youngstown, Ohio. Mr. Lenhart began electric railway work in November, 1888, after nine years' service in the engineering and mechanical departments of steam railways. He has lately been connected with the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., and the Lehigh Valley Transit Company, Allentown, Pa.

Mr. John D. Sallee, for the last six years superintendent of the lines of the Kentucky Traction & Terminal Company, Lexington, Ky., in Frankfort, Ky., has been appointed general freight agent of the company, a newly created position. Mr. Sallee will continue to have supervision over the Frankfort terminal and will also look after the terminals at Paris, Georgetown and Nicholasville, his duties as general freight agent requiring him to visit these cities at regular intervals. Mr. Sallee is one of the oldest men in point of service now with the company. Previous to going to Frankfort he was for several years dispatcher in Lexington.

Mr. Frank R. Coates was elected president of the Toledo Railways & Light Company, Toledo, Ohio, on Dec. 5, 1911, to succeed Mr. Albion E. Lang, who remains a director of the company. Mr. Coates was born in Philadelphia in June, 1869, and was educated in the public schools of that city and at Lehigh University, from which he was graduated in 1890. He took a post-graduate course in 1891. He became connected with the Baltimore & Ohio Railroad immediately after graduating. He was later transit man and assistant engineer, being appointed supervisor of track on the Wheeling division in 1892. Early in 1893 he accepted a position with the New York, New Haven & Hartford Railroad and continued with that company until May, 1904. He next engaged in engineering construction work until February, 1908, and then became connected with Stone & Webster, Boston, Mass. In December, 1910, he accepted the vice-presidency of the Inter-Ocean Steel Company at Chicago.

Mr. Albion E. Lang resigned as president of the Toledo Railways & Light Company, Toledo, Ohio, on Dec. 5, 1911, and Mr. Frank R. Coates was elected to succeed him. Mr. Lang, however, remains as a director of the company. Mr. Lang was born at Huntington, Lorain County, Ohio, and settled in Toledo in 1869, entering at that time the employ of the Western Union Telegraph Company. He remained with that company until 1874, when he entered business for himself in Toledo. In 1881 he purchased an interest in the Monroe & Dorr Street Railway and soon thereafter was elected president of the company. In January, 1885, while acting as president of the company, he effected a consolidation of several of the local companies, and in 1888 was elected vice-president and general manager of the Toledo Consolidated Street Railway. Soon thereafter followed the consolidation of all the street railway companies in Toledo, including the Robison lines, under the name of the Toledo Traction Company. Mr. Lang was elected president of this company and was also placed at the head of the Toledo Consolidated Electric Company, which for a time owned and operated all the electric plants in the city. In 1901 the Toledo Traction Company passed to the control of the Everett-Moore syndicate and was reorganized as the Toledo Railways & Light Company, Mr. Lang remaining as president until 1902, when he resigned and was succeeded by Mr. H. A. Everett. Mr. Lang retained a large interest in the company, and from 1901 to 1908 annually succeeded himself as a director and chairman of the board of directors. He was re-elected as president of the Toledo Railways & Light Company in 1908.

OBITUARY

Francis May, who was president and a director of the Dunkirk & Fredonia Railroad, which is now part of the system of the Buffalo & Lake Erie Traction Company, Buffalo, N. Y., is dead.

Frank Ridlon, president of the Berlin (N. H.) Street Railway, president of the Boothbay Harbor Electric Light & Power Company, Boothbay Harbor, Maine, and president of the Ridlon Electric Company, Boston, Mass., died at his home in Brookline, Mass., on Dec. 1, 1911, after a lingering illness.

W. S. Franklin, who was president of the Baltimore (Md.) City Passenger Railway prior to the organization of the United Railways & Electric Company, Baltimore, died in New York on Dec. 3, 1911. Mr. Franklin was graduated from Harvard in 1857. In 1870 he entered business in Baltimore and at various times was connected with the Ashland Iron Company, Maryland Steel Company, Towson Bank of Maryland, Baltimore City Passenger Railway and the Provident Savings Company of Baltimore. Mr. Franklin also served for a time as a director of the United Railways & Electric Company, Baltimore.

George B. Moffatt, a director of the Electric Bond & Share Company, New York, and formerly president of the Oregon Electric Railway, Portland, Ore., died in Portland on Dec. 4, 1911. Mr. Moffatt was born in Brooklyn, N. Y., in 1854. He entered banking in New York as a clerk in 1879 and subsequently was connected with Spencer Trask & Company, White, Weld & Company and Moffatt & White, New York, N. Y. He was largely instrumental in organizing the Oregon Electric Railway in 1906 and succeeded in interesting in the company influential men like Mr. Charles M. Pratt and Mr. A. C. Bedford, of the Standard Oil Company. In 1910 control of the Oregon Electric Railway was acquired by interests in the Great Northern Railway and the Northern Pacific Railway, and Mr. Moffatt retired as president of the company and as a director in favor of Mr. John F. Stevens.

A. M. Young died suddenly on Dec. 3, 1911, in New York. Mr. Young was born in Hadley, N. Y., in 1853. He spent his early life in Connecticut. He was connected with the Connecticut Railway & Light Company, Bridgeport, before it was taken over by the New York, New Haven & Hartford Railroad. At the time of his death Mr. Young was the senior member of the firm of Young & Warner, New York, N. Y. At the convention of the National Electric Light Association in Chicago in 1898 Mr. Young was elected president of that body, succeeding Mr. Samuel Insull. Mr. Young at the time of his death was associated with the following public service corporations either as an executive officer or as a director: Albany & Hudson Railroad, American Gas & Electric Company, Corning Gas & Electric Company, Dayton Lighting Company, Edison Electric Illuminating Company of Brooklyn, Electric Bond & Share Company, Fairmont & Clarksburg Traction Company, Kings County Electric Light & Power Company, New London Gas & Electric Light Company, Northern Westchester Lighting Company, Norwich Gas & Electric Light Company, Rockville Gas & Electric Company and the Stamford Gas & Electric Company. He was also a director of the National Carbon Company and the Consolidated Engine Stop Company and president of the New England Engineering Company and other industrial enterprises.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Birmingham & Chattanooga Railroad, Birmingham, Ala.**—Application for a charter has been made by this company in Alabama to build an electric or steam railway to connect Birmingham and Chattanooga, via Albertville and Boaz, passing through seven Alabama counties and three Tennessee counties. Capital stock, $5,000. Officers: J. M. Spradlin, Boaz, president; W. W. Shortridge, Albertville, vice-president and treasurer, and D. J. Spradlin, Boaz, director.

***Sacramento & Eastern Railway, Sacramento, Cal.**—Application for a charter has been made by this company in California to build a 60-mile electric railway between Sacramento and Folsom. Capital stock, $1,000,000. Charles H. Hammond, Berkeley; Leon J. de Sabla and Samuel Lilienthal, San Francisco; George E. Springer, Oakland; Herbert W. Furlong, Pleasanton.

***Southwestern Traction Company, Indianapolis, Ind.**—Application for a charter has been made in Indiana by this company to build an electric railway between Mooresville and Sullivan, via Eminence, Cloverdale, Cataract, Clay City and Terre Haute. Capital stock, $50,000. Directors: Joseph A. Davidson, John W. O'Hara, Gilbert Bray and F. F. James.

***Washington Trunk Railway, Vancouver, Wash.**—Incorporated in Washington to build an electric railway between Vancouver, North Yakima and Ellensburg. Incorporators: E. E. Waite, Lawrence Harmon and E. R. Ernsberger. [E. R. J., Nov. 11, '11.]

FRANCHISES

Edmonton, Alta.—The Edmonton Radial Railway will ask for an extension of time at the next session of the Legislature in which to build its line from the end of Pirron Street, St. Albert, to the Edmonton city boundary.

Jonesboro, Ark.—The Jonesboro & Nettleton Interurban Railway has received a six-months extension of time on its franchise in which to complete its electric railway in Jonesboro. It will connect Jonesboro and Nettleton. J. E. Thompson, Jonesboro, vice-president. [E. R. J., Nov. 18, '11.]

***Los Angeles, Cal.**—The City Council has authorized the publication of a notice for the sale of a franchise to construct a cross-town line in Los Angeles. Bids are to be opened on Dec. 19.

Pasadena, Cal.—The Pacific Electric Railway has asked the City Council for a franchise over East Washington Street in Pasadena.

Sacramento, Cal.—The Pacific Gas & Electric Company has received a franchise from the Board of Trustees to extend its lines through the recently annexed districts in Sacramento.

San Jose, Cal.—The San Jose & Almaden Railway, San Jose, has received a franchise from the City Council in San Jose. Charles A. Nones, Almaden, is interested. [E. R. J., Nov. 4, '11.]

San Luis Obispo, Cal.—W. G. Lincoln, San Luis Obispo, has received a franchise from the Board of Supervisors to build an electric railway from the coast as far north as Coalinga and east to Bakersfield. [E. R. J., Sept. 23, '11.]

Santa Clara, Cal.—The Peninsular Railway, San Jose, will ask the Town Trustees for a franchise over certain streets in Santa Clara to the city limits, where it will connect with the line that is to extend along the Saratoga Road to Meridan Corners.

Stockton, Cal.—The Tidewater & Southern Railroad has asked the City Council for a forty-three-year franchise to extend its lines over various streets in Stockton.

***East Pueblo, Col.**—The East Pueblo Tramway has received a franchise from the City Council in East Pueblo through the East Side to the city limits.

Moline, Ill.—Moline, East Moline & Watertown Railway has asked the City Council for a franchise to extend its Fourth Avenue line south to the city limits of Moline.

Louisville, Ky.—The Louisville & Interurban Railway has asked the General Council for franchises in Louisville. One franchise is for the extension of a double-track line from the loop at the old city limits on the Bardstown road to the new city limits, nearly a mile further east. The other franchise is to permit the company to operate a trunk line over this route, which will result in the present Louisville & Interurban Railway's tracks on the north side of the road being removed nearer the center of the highway, to be used by both city and interurban cars.

***Brandon, Man.**—B. C. Donham & Company, 52 Broadway, New York City, have applied to the Council for a franchise to build and operate the water supply, electric light and power and the electric railway systems in Brandon.

St. Boniface, Man.—The Winnipeg Electric Railway, Winnipeg, has asked the City Council for a franchise for the extension of its lines from Marion Street to the southern limits of St. Boniface, along the St. Mary's Road.

Somerville, Mass.—The Boston Elevated Railway has received the approval of the Railroad Commission and the Board of Aldermen to double track some of its lines in Somerville.

Fulton, Mo.—The Mexico, Santa Fé & Perry Traction Company, Mexico, has received a year's extension of time on its franchise in Fulton. The company has also been granted a year's extension of time by the City Council in Columbia.

Dolgeville, N. Y.—The Little Falls & Johnstown Electric Railway, Little Falls, has received a franchise from the Town Board in Dolgeville. It will connect Little Falls, St. Johnsville, Ephratah and Johnstown. J. L. Hess, 103 Park Avenue, New York, president. [E. R. J., Nov. 18, '11.]

Tonawanda, N. Y.—The Frontier Electric Railway, Niagara Falls, has received a franchise from the Common Council in Tonawanda. This line will connect Niagara Falls, Buffalo, Tonawanda and North Tonawanda. [E. R. J. Oct. 28, '11.]

Dilworth, N. D.—The Fargo & Moorhead Street Railway, Fargo, will ask the City Council for a franchise in Dilworth.

Dayton, Ohio.—The Dayton, Springfield & Xenia Southern Railway has received a twenty-five-year extension of time of its franchise in Dayton.

Lima, Ohio.—The Ohio Electric Railway, Cincinnati, has received a twenty-one-year franchise from the County Board of Commissioners in Lima.

Troy, Ohio.—The Cincinnati, Hamilton & Dayton Traction Company, Cincinnati, has received a franchise from the City Council to extend its tracks in Troy.

Portland, Ore.—The Portland Railway, Light & Power Company has asked the Council for approval of franchises to double track its line into Rose City Park, an extension of its line to Reed Institute, a Stark Street loop and a crossing on the Broadway bridge in Portland.

Bentleyville, Pa.—The West Side Electric Railway, Charleroi, has received a franchise from the Council to build through Bentleyville. Eventually this line will be extended to Ellsworth.

Pottsville, Pa.—The Schuylkill Electric Railway has asked the City Council for a franchise in Pottsville.

Sunbury, Pa.—The Sunbury & Selinsgrove Street Railway has received a franchise from the City Council to relocate its tracks from the Reading Railroad bridge to Market Street in Sunbury and to extend the line to the proposed site of the new bridge across the river near Fort Augusta.

Chattanooga, Tenn.—The Chattanooga Traction Company will ask the City Commissioners for a franchise to build interurban railways out of Knoxville. Four definite routes are asked reaching the corporate limits. C. E. James is interested. [E. R. J., Nov. 18, '11.]

Dallas, Tex.—John T. Witt, Dallas, has received a franchise from the County Commissioners' Court to build an electric railway from the west bank of the Trinity River to a point 10 miles west of Dallas. [E. R. J., Nov. 11, '11.]

TRACK AND ROADWAY

Ft. Smith Light & Traction Company, Ft. Smith, Ark.—Work has been begun by the Hayes & Pogue Company on an extension from Ft. Smith to South Ft. Smith.

Little Rock, Pine Bluff & Eastern Traction Company, Little Rock, Ark.—Plans are being considered by this company to build a $650,000 bridge across the Arkansas River at Pine Bluff. This interurban railway will connect Little Rock, Altheimer, Stuttgart, Helena, Clarendon and Pine Bluff. C. C. Kavanaugh, president. [E. R. J., July 8, '11.]

British Columbia Electric Railway, Vancouver, B. C.—Bids will be called for shortly for the construction of an extension of this company's Main Street line in South Vancouver. The grading of Main Street from the terminus of this line to meet the Eburne line will be begun in the near future.

Clear Lake Railroad, Lakeport, Cal.—This company advises that it will use steam to haul freight and gasoline or electricity for passenger service on its 23-mile railway to connect Hopeland, Kelseyville, Lakeport and several large summer resorts. Capital stock authorized, $500,000. Capital stock isued, $100,000. Bonds authorized, $350,000. The company's repair shops will be located in Lakeport. Officers: C. H. Hammond, Lakeport, president; M. M. Gopcevic, Lakeport, vice-president; E. Howard, Lakeport, secretary; Joseph Levy, treasurer; C. R. Rankin, Hopeland, superintendent and engineer. [E. R. J., Dec. 1, '11.]

Oakland, Antioch & Eastern Railway, Oakland, Cal.—This company has secured the right-of-way for an extension through Contra Costa and Alameda Counties to Oakland.

San Jose Terminal Railway, San Jose, Cal.—Plans are being prepared by this company to build a line between San Jose and Hollister. This railway will connect San Jose and Alviso, a distance of about 12 miles, where it will connect with a fast line of steamers that will run to San Francisco. R. Metson and E. H. Lee are interested. [E. R. J., Sept. 30, '11.]

San Joaquin Valley Electric Railway, Stockton, Cal.—This company has completed the roadbed for its line between Modesto and Stockton.

Grand Junction & Grand River Valley Railway, Colorado Springs, Col.—This company plans to build a 6-mile extension from Grand Junction northeast to Clifton.

Key West Electric Company, Key West, Fla.—This company has awarded a contract for rebuilding its lines in Key West to Ferguson & Ward.

Macon Railway & Light Company, Macon, Ga.—This company has awarded a contract to the Hall-Parker Construction Company to build its 3-mile extension to the Idle Hour Country Club. Grading has been begun.

Northern Illinois Electric Railway, Chicago, Ill.—This company plans to build a 5-mile extension from its present terminus in Bradford, eastward to Newburg, this year.

Chicago (Ill.) Railways.—This company has placed in operation the 10-mile extension of its Fortieth Avenue line in Chicago.

Richmond & Eastern Indiana Traction Company, Richmond, Ind.—This company has awarded the contract for the surveys for its railway between Richmond and Portland to Jesup & Moore, Indianapolis. Construction of this line will be begun in the spring. A. H. Bartel is interested. [E. R. J., Oct. 7, '11.]

Boone (Ia.) Electric Company.—This company plans to build an extension to Ogden. The line will cross the Des Moines River just north of the Chicago & Northwestern Railway viaduct.

Ft. Dodge, Des Moines & Southern Railway, Ft. Dodge, Ia.—It is reported that this company has purchased the abandoned line of the Northwestern Railroad between Des Moines and Newton and will electrify it at once.

Sioux City, Crystal Lake & Homer Railway, Sioux City, Ia.—This company plans to build an extension from Dakota City to Homer, Neb., and from Sioux City to South Sioux City.

***South Hutchinson (Kan.) Street Railway.**—This company has been organized to build an electric railway in South Hutchinson and a pile bridge across the Arkansas River.

Kentucky Southwestern Railway, Light & Power Company, Hickman, Ky.—An announcement was made by E. F. Wheaton, general manager of this company, which is constructing an interurban line in western Kentucky, to the effect that the American Traction & Power Company has authorized him to sign a contract with the interurban company for the delivery of $1,000,000 to a Paducah bank on Feb. 1, 1912, and $100,000 per month thereafter until the cost of the construction work has been defrayed. [E. R. J., Oct. 23, '11.]

Towson & Cockeysville Electric Railway, Cockeysville, Md.—Track laying has been begun by this company on its line to connect Towson and Cockeysville, via Lutherville, Timonium, Texas and Marble Hill. This line has been graded between Towson and Lutherville and will be operated first. J. A. Shriver, Belair, president. [E. R. J., June 10, '11.]

***Detroit, Mich.**—Surveys are being made for an interurban railway between Detroit and Bad Axe, via Mt. Clemens, Capac, Brown City, Snover, Argyle and Ubly, with the ultimate destination of Port Austin. It is said that the use of gasoline motor cars on the new line is being considered.

Flathead Interurban Railway, Kalispell, Mont.—This company advises that construction has been begun on its 74-mile electric railway to connect Kalispell, Whitefish, Somers and Big Fork. The company will purchase power. Capital stock authorized, $50,000. Bonds authorized, $50,000. David R. McGinnis, Kalispell, president. [E. R. J., Nov. 25, '11.]

West Jersey & Seashore Railroad, Camden, N. J.—This company is considering plans to elevate its tracks in Atlantic City in connection with the construction of a new terminal.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y.—This company plans to build an extension on Twelfth Street from East Street to the city limits of Erie.

Corning, Keuka Lake & Ontario Railway, Corning, N. Y.—This company has asked the Public Service Commission, Second District, for a certificate of necessity to build an 83-mile electric railway from Corning to Sodus Bay, via Savona, Bradford, Penn Yan and Geneva.

Syracuse (N. Y.) Rapid Transit Railway.—Plans are being made by this company to double track its present line to Liverpool and extend a double track line through Liverpool.

Piedmont Traction Company, Charlotte, N. C.—This company plans to build a line from Greensboro to Durham, via Saxapahaw and Chapel Hill.

Akron, Canton & Youngstown Electric Railway, Canton, Ohio.—Work has been begun by this company on its line from Britain to Akron, a distance of 4 miles, and from Erie Junction to East Akron, 1 mile. It will be extended east to Youngstown, via Mogadore. F. E. Bissell, Canton, chief engineer. [E. R. J., July 22, '11.]

Ohio Electric Railway, Cincinnati, Ohio.—This company has placed in operation its extension from **Trenton to** Middletown.

Sand Springs Interurban Railway, Tulsa, Okla.—This company has laid 8 miles of track between Tulsa and Sand Springs and plans are being made to build a 20-mile extension from Tulsa northeast to Collinsville.

***London, Ont.**—The Lake Erie Coal Company has made a proposition to City Council to electrify the London & Port Stanley Railway, owned by the city, when the lease with the Père Marquette Railway, which company now operates the London & Port Stanley Railroad, expires in 1914.

Niagara Falls, Welland & Lake Erie Railway, Niagara Falls, Ont.—This company has received construction material and work will now be rushed to completion on its electric railway to connect Niagara Falls, Welland and Port Colborne with branches to Port Dover on Lake Erie and to Fort Erie on the Niagara River opposite Buffalo. C. J. McLaughlin, Toronto, is interested. [E. R. J., May 13, '11.]

Grant's Pass & Rogue River Railroad, Grant's Pass, Ore.—Preliminary surveys have been made by this company for its railway through the Rogue River Valley between Grant's Pass, Medford and Ashland. The following officers were elected: J. Arnold Doyle, president; H. M. Farren, vice-president and general manager; George E. Boos, secretary; L. A. Rosenbaum, Seattle, counsel; George Godfrey, Spokane, treasurer. [E. R. J., Nov. 18, '11.]

***Metslin, Ore.**—Louis Gerlinger, Jr., Dallas, Ore., and associates plan to build an electric railway from Metslin to Prineville, via the Ochoco River and Crooked River valleys in central Oregon.

Portland, Eugene & Eastern Railway, Portland, Ore.—It is reported that this company will soon build an extension between Salem and Stayton.

Ellwood City & Kopple Electric Railway, Ellwood City, Pa.—Work has been begun by this company on its line at Koppel and the contract for three miles of the track to Morado Park, near Beaver Falls, has been awarded. It is expected to award the contract for the line between Ellwood City and Koppel in the near future. H. K. Gregory, president. [E. R. J., Dec. 1, '11.]

Conestoga Traction Company, Lancaster, Pa.—Surveys are being made, right-of-way has been secured and it is expected to begin construction in the spring on this line between Lititz and Rothsville.

Pittsburgh, McKeesport & Westmoreland Railway, McKeesport, Pa.—This company is preparing to enter McKeesport over its own tracks. It is stated that this company's line from West Newton to Herminie is being financed and that work will be begun in the spring.

***Palmyra, Pa.**—M. S. Hershey and associates are securing right-of-way for an electric railway between Palmyra and Campbelltown.

Philadelphia & Western Railway, Philadelphia, Pa.—This company has completed its bridge over the Schuylkill River and viaducts at Norristown. Grading from the Pennsylvania Railroad to Bridgeport is also well advanced. This line will connect with the Lehigh Valley Transit Company's lines at Norristown. It will also connect at Sixty-ninth and Market Streets in Philadelphia with the Philadelphia & West Chester Traction Company.

Pottstown & Phoenixville Railway, Pottstown, Pa.—Plans are being made by this company to build a 1-mile extension in Lower Pottsgrove and Limerick. This is supposed to be a link in the line from Spring City to Pottstown and Reading. George N. Malsberger, president. [E. R. J., June 10, '11.]

***Florence, S. C.**—It is reported that Charles E. Johnson, Raleigh, president of the Yadkin River Power Company, and associates plan to build an electric railway from Raleigh to Florence.

Knoxville Railway & Light Company, Knoxville, Tenn.—This company has begun construction along its new line to Sevierville, about 1 mile out of Knoxville. It is expected that the road will be ready for operation by the first of the year.

Denton (Tex.) Traction Company.—The contract between this company and the Chamber of Commerce has been approved and construction will be begun soon for the north side extension of the line.

Greenville Railway & Light Company, Greenville, Tex.—Work has been begun by this company on its extension from Greenville to Peniel.

Marshall (Tex.) Traction Company.—Preliminary arrangements have been made and construction will soon be begun by this company on its new line in North Marshall.

San Benito (Tex.) Interurban Railway.—Work will be begun at once by this company on its line in Brownsville.

Tioga (Tex.) Interurban Promoting Company.—This company will begin construction within the next sixty days on its 109-mile electric railway between McKinney, Tioga, Gainesville, Montague and Nocona. The company's power house and repair shops will be located at Tioga. Capital stock, authorized, $600,000. Officers: J. P. Mason, president and general manager; A. R. Bradley, vice-president; A. J. Scott, secretary, all of Tioga. [E. R. J., Nov. 18, '11.]

Gray's Harbor Railway & Light Company, Aberdeen, Wash.—Plans are being considered by this company to extend its line north to Forks.

Highland Park & Lake Burien Railway, Seattle, Wash.—This company has awarded the contract for grading its line to McQuade & Moore Company. It will be 7 miles long and will extend from Oxbow to Lake Burien, via Highland Park. Officers: W. H. Murphy, Seattle, president; George W. H. White, vice-president, and Charles Schoening, treasurer. [E. R. J., Oct. 14, '11.]

Morgantown & Dunkard Valley Railroad, Morgantown, W. Va.—This company's extension from Barker to Cassville has been placed in operation. The company expects to extend this line to Blacksville, a distance of about 13 miles.

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—Plans and specifications for the new and enlarged carhouses which will be built in Redondo are now being considered by this company.

Pueblo & Suburban Traction & Lighting Company, Pueblo, Col.—This company has purchased the White Triangle block at the intersection of Main Street and Union Avenue in Pueblo. Plans for a structure to be erected on this site have been prepared and work will soon be begun. The building will contain the offices of this company.

Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind.—About April 1, 1912, the interurban passenger station and the baggage station of this company will be moved to the premises which the company has recently acquired on West Main Street in Ft. Wayne.

West Jersey & Seashore Railroad, Camden, N. J.—Plans are being considered by this company, which is controlled by the Pennsylvania Railroad Company, to build a new terminal at Atlantic City for the use of trains of both the steam and the electric divisions.

Salisbury & Spencer Railway, Salisbury, N. C.—It is reported that this company will build a new carhouse at the site of the present switch in Salisbury.

Northern Ohio Traction & Light Company, Akron, Ohio.—This company will construct a new passenger and freight depot with train sheds on Main Street and High Street in Akron. The structure will be 180 ft. x 250 ft. Work will be begun in the spring.

Niagara Falls, Welland & Lake Erie Railway, Niagara Falls, Ont.—It is reported that this company will soon build its new carhouse at Lincoln Street and Muir Street in Welland. C. J. McLaughlin, Toronto, is interested.

POWER HOUSES AND SUBSTATIONS

Boston (Mass.) Elevated Railway.—Plans have been completed by this company for the construction of a new transformer station for the Malden terminus of the proposed elevated structure from Sullivan Square to Malden.

Norfolk & Bristol Street Railway, Foxboro, Mass.—This company will soon purchase one 250-hp or 300-hp boiler for its power plant.

Twentieth Century Transportation, Winona, Minn.—This company plans to build power houses at Lancaster, Wis., and at Watertown, S. D., in the spring to furnish current for its proposed road. Ernest Norwood, Lancaster, general manager.

Nebraska Transportation Company, Omaha, Neb.—This company will soon build a new power house plant at Elk City, having a capacity of 21,000 hp. The structure will be 600 ft. long.

Trenton, Bristol & Philadelphia Street Railway, Bristol, Pa.—This company has awarded a contract for a 650-hp Hamilton compound Corliss engine. An addition will be built to the company's present plant in Croydon to accommodate this new equipment.

Central Pennsylvania Traction Company, Harrisburg, Pa.—This company has placed an order with the Harrisburg Foundry & Machine Works for two engines with a total capacity of 300-hp.

Manufactures & Supplies

ROLLING STOCK

Slate Belt Electric Street Railway, Pen Argyle, Pa., is in the market for several new cars.

Pittsburgh, McKeesport & Westmoreland Railway, McKeesport, Pa., it is reported, will soon purchase several new double-truck cars.

Savannah (Ga.) Electric Company has been recommended by the State Railroad Commission to add eight cars to its rolling stock equipment.

Seattle (Wash.) Electric Company has ordered one double-truck car of the standard Stone & Webster T-post construction from the St. Louis Car Company.

Keokuk Electric Railway & Power Company, Keokuk, Ia., has ordered four single-truck cars from the St. Louis Car Company, through Stone & Webster, Boston, Mass.

Stark Electric Railway, Alliance, Ohio, has ordered three quadruple equipments of No. 304-A motors with type HL unit-switch control from the Westinghouse Electric & Manufacturing Company.

TRADE NOTES

Mesta Machine Company, Pittsburgh, Pa., is erecting an addition to its office building at its plant in West Homestead, Pa.

Root Spring Scraper Company, Kalamazoo, Mich., has shipped sixty No. 2 special scrapers to the Montreal (Que.) Street Railway.

Whipple Supply Company, New York, N. Y., has been appointed Eastern sales agents for the Railway Supply & Curtain Company, Chicago, Ill.

Alvey Brothers Machinery Company, St. Louis, Mo., has been organized by G. Alvey, P. C. Alvey and others of Elizabethtown, Ky., to manufacture conveying machinery.

H. P. Ahrnke, who has been associated with the Barrett Manufacturing Company, has accepted a position with the Dairy Machinery & Construction Company, Derby, Conn.

Chicago Pneumatic Tool Company, Chicago, Ill., has awarded the contract for the construction of a factory on East Forty-ninth Street, near Lakewood Avenue, in Cleveland, Ohio, to Edward A. Weiland.

Western Electric Company, New York, N. Y., has appointed Charles B. Barnes assistant works engineer of the Hawthorne works, Chicago. Mr. Barnes was formerly connected with Holabird & Roche, Chicago.

Universal Safety Tread Company, Boston, Mass., has received an order for step treads for the 215 cars which the Chicago Railways is building in its own shops. The company will also furnish the step treads for the seventy-seven cars which the Chicago Railways is rebuilding to the pay-as-you-enter type.

Hall Signal Company, New York, N. Y., has almost completed its financial reorganization. The company now has contracts and orders on hand aggregating $450,000, and its business prospects are very good. Plants of the company continue to operate with an extra night shift three times a week, and there are more orders on hand than at any time since the summer of 1909, when full double-time shifts were worked.

John A. Roebling's Sons Company, Trenton, N. J., had one of its shops partly destroyed by a fire on Dec. 2. The fire was confined to one shop only, which is used in the manufacture of special wire. The facilities of the other shops will be ample to accommodate for the present the work which would have been done in the burned shop. The company states that no difficulty will be experienced in filling all contracts and orders.

Walter B. Snow, Boston, Mass., publicity engineer, has recently added to his staff Sidney G. Koon, who was editor of *International Marine Engineering* for four years and later metallurgist with the Jones & Laughlin Steel Company. Mr. Snow has also added to his staff John S. Nicholl, lately with the New York Edison Company, and formerly acting manager for F. W. Horne, importer of American machinery, Yokohama, Japan.

ADVERTISING LITERATURE

Hess-Bright Manufacturing Company, Philadelphia, Pa., has issued several data sheets on H-B ball bearings and their correct use.

Emerson Company, New York, N. Y., efficiency engineer, has issued a booklet entitled "A Comparative Study of Wage and Bonus Systems."

Ohmer Fare Register Company, Dayton, Ohio, is mailing a folder entitled "Records versus Receptacles" which discusses the many advantages of the company's recording registers.

W. N. Matthews & Brother, St. Louis, Mo., are mailing a circular which contains some suggestions for using Matthews guy anchors in difficult situations. The circular also gives net quantity prices and a convenient order form.

Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., has issued Bulletin No. 1003, which illustrates and describes a complete line of high-grade telephone construction material and specialties. The catalog contains 208 pages.

Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has issued Circular No. 1198, which illustrates and describes the different types of alternating-current water-wheel generators, both vertical and horizontal, manufactured by the company.

N. W. Halsey & Company, New York, N. Y., who financed the Peoria Railway, the St. Louis, Springfield & Peoria Railroad and the Bloomington, Decatur & Champaign Railroad, all of which are included in the Illinois Traction System, are distributing among investors copies of the illustrated booklet describing the features of the physical property of the Illinois Traction System prepared recently by the railway company's publicity department. This booklet was reviewed in the Electric Railway Journal of Oct. 28, 1911, page 966.

NEW PUBLICATIONS

"Das Deutsche Eisenbahnwesen der Gegenwart" ("German Railway Practice of the Present"). Published by Reimar Hobbing: Berlin, 1911. Cloth, two volumes; 1170 pages, 9½ in. x 12½ in.; illustrated. Price, $4 net.

This work, which is published under the auspices of the several state railway administrations of Germany, is a summary of German trunk-line, interurban, mountain, narrow-gage and colonial railway practice. The several sections were prepared by recognized authorities in the respective fields treated. To familiarize laymen with the broader outlines of railroading, the text is arranged so that the popular descriptions are in large type and the technical details in small type. The work opens with the social, economic and engineering history of German steam railroad systems. The following chapters then describe in logical order the construction of a steam railroad, such as the survey; the construction of bridges, viaducts and tunnels; the track and special work; yards, stations, terminals and similar structures; signal systems; locomotives and auxiliary equipment; rolling stock, brakes and draft rigging; experiments with storage battery cars. Chapter XIII describes inspection and track lighting, snow removal and forest-fire fighting. The next two chapters discuss track, shops and cars. Chapter XVI describes the sources, costs and characteristics of locomotive fuels. Chapters XVII to XXXII treat, in order, the preparation of schedules, make-up of trains, passenger and freight tariffs and service, railway law, forms of organization, relations with employees, methods of accounting in interline business, transportation of mail and military trains, etc., and relations between earnings and expenses. Special topics are considered in the rest of the work. Thus Chapter XXXIII is a comprehensive study of freight and passenger movement into and out of Berlin, by G. Kemmann, retired government councilor. Chapter XXXVI reviews the work done on the Oranienburg experimental line in studying the effect of electrical operation on various forms of track construction. About 500 pages are used to describe the shops and products of the principal makers of steam and electric railway equipment. It is announced that an English edition of this work will be issued at $4 net about April, 1912.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVIII NEW YORK, SATURDAY, DECEMBER 16, 1911 No. 25

PUBLISHED WEEKLY BY

McGraw Publishing Company

JAMES H. McGRAW, President; C. E. WHITTLESEY, Sec'y and Treas.

239 WEST THIRTY-NINTH STREET, NEW YORK

TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1021 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Wednesday, 9 a. m., of the week of issue.

Copyright, 1911, by McGRAW PUBLISHING COMPANY.

Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

The Association of American Advertisers has examined and certified to the circulation of this publication. The figures of circulation contained in the Association's report only are guaranteed.

ASSOCIATION OF AMERICAN ADVERTISERS.
No. A—82. *Whitehall Bldg., N. Y. City.*

NEW YORK, SATURDAY, DECEMBER 16, 1911.

CONTENTS.

Coal Storage 1225
Railway Capital Needs 1225
The Thirty-eighth Street Substation of the Brooklyn Rapid Transit System 1226
Increases in Western Interurban Fares 1226
Spreading the Peak Load 1227
The Thirty-eighth Street Substation of the Brooklyn Rapid Transit System 1228
T. E. Mitten Resigns as President and Director of the Chicago City Railway 1232
Philadelphia Near-Side Cars 1232
Increases in Fares on Western Interurban Lines 1233
Convention of the Pennsylvania Street Railway Association 1238
Hearing on Heating and Ventilation of Cars in New York City 1239
Report of Committee on Passenger Traffic 1240
Opinion of Commission on Which New York Transfer Order was Based 1228
Provisions of the New Detroit Ordinance 1244
Progress Bulletin on the Keokuk Dam 1246
Report of Railroad Securities Commission 1246
Franchise Settlement Proposal Submitted to City of Toledo by Company 1247
New Officers of Manufacturers' Association 1249
Hydroelectric Power Expansion in Massachusetts 1249
Proposed Order to Stencil and Number Poles in New York 1249
Statistics of Water Power Development 1249
Next International Convention at Christiania 1249
Committee on Accounts in New Jersey 1250
Comparative Costs of Tile and Fiber Conduit 1250
Signals on the Ft. Dodge, Des Moines & Southern 1250
News of Electric Railways 1251
Financial and Corporate 1254
Traffic and Transportation 1258
Personal Mention 1260
Construction News 1261
Manufactures and Supplies 1264

Coal Storage

The results of the tests on coal recently made by the United States Bureau of Mines show that the calorific losses in coal, while in storage, are so small that they are not worthy of consideration, and that the real problem of coal storage is one of protecting the coal against spontaneous heating and slacking. This protection is more necessary with the lower grades of soft coal used throughout the West than with anthracite. Quite a number of the larger utility companies in the Western territory have evidently anticipated the results of these tests and have built at central points large basins or coal storage pits for storing low-grade coals under water. In this territory at certain periods of the year the markets are flooded with soft coal screenings, and the price per ton drops to a minimum. Screenings have been found to have great fuel value, particularly when mixed with crushed run-of-mine, but they are consumed at a uniform rate throughout the year. This condition required some economical method of storage, and the coal storage pits resulted. The practice of storing screenings has had a tendency to increase the average annual market value of the screenings, but at the same time the annual power house fuel costs are kept more uniform. A great deal of care was exercised in locating these pits with a view to a minimum cost of rehandling, and in several cases special loading and conveying machinery has been installed. These pits are also found to be of great value during extended strike periods in the mining industry, and a real economy in power production costs has resulted.

Railway Capital Needs

The comprehensive report of the Railroad Securities Commission, which was transmitted to Congress this week, emphasizes the importance, in whatever attitude the government may take finally on this subject, of encouraging further investment in railway development. Thus, the commission says, that, as a result of the present misunderstanding, the necessary development of railroad facilities is now endangered by the reluctance of investors to purchase new issues of railroad securities in the amounts required, and that this reluctance is likely to continue until the American public understands the essential community of interest between shipper and investor and the folly of attempting to protect the one by taking away the rewards of good management from the other. It is axiomatic that no public utility located in a developing community can meet the increasing needs of the public without constant addition to its facilities. If, in the case of a railway, more trackage is not needed, additional cars, terminal facilities

or other improvements are required from time to time. The bankers, the direct purchasers of bonds to whom the railways look for capital, acquire these securities as merchants, and are willing to take them only when the public is equally ready to absorb them in small lots without unreasonable delay and at a price which yields the underwriter a profit for the risk and the use of his money. When additional stock of a railroad is issued for construction purposes the best market is found, as a rule, with the existing shareholders. In order that they may be encouraged to buy, however, it is advisable that the subscription price be sufficiently below the market to afford a profit. Anything which tends to destroy the expectation of the shareholders of a reasonable profit tends to make it impossible to finance by the issue of stock. The only other avenue open for financing is through the issue of bonds, and the danger of continual resort to this class of security is that the fixed charges of the property may, in time, reach an amount that cannot be earned in periods of business depression. Dividends can be cut or passed in times of severe financial stress. If the conservative report of the commission is effective in restoring conditions by which capital will turn freely again to railway investment, it will have accomplished an act of signal service to the country.

The Thirty-eighth Street Substation of the Brooklyn Rapid Transit System

Substation design and operation have followed such set lines within the past decade that it is almost startling to find a variation from the fixed types. It is, therefore, rather satisfying to present elsewhere in this issue a description of the Brooklyn Rapid Transit System's latest substation which does embody several noteworthy improvements in the arrangement and use of the apparatus. Doubtless the most commendable feature of the building itself is the ample provision for natural light and ventilation. Despite the obvious need for light and air, there are plenty of city substations which seem to have been designed for operation by bats and moles rather than by human beings. It is hardly needful to point out that a dark and poorly ventilated building tends to depress the men who work in it instead of keeping them alert for emergencies. The cost of a skylight is not too high a price for better service. In addition, the rules for the protection of the employees and for insuring the proper sequence of operations in starting the machinery show that much thought also has been given in other directions toward eliminating human error in substation service. The arrangement of equipment in so large a plant as the Thirty-eighth Street substation was quite a problem on account of the limited space. Nevertheless, it was found possible so to install the apparatus that a man can start a rotary converter without first rushing into the cellar or climbing into the gallery, as is necessary in some other stations. The ample clearances and the abundant light insure freedom of movement, ease of inspection and general neatness. Although no benchboard is installed, there are various auxiliary circuit lamps on the switchboard to indicate to the operator at a glance the condition of the more remote apparatus. The use of a duplicate high-tension bus is uncommon, but it is justifiable in a substation of such importance as this. Another innovation is the provision for starting the rotaries from a main transformer in case a starting transformer is disabled. The adoption of hinged wire-glass doors for the oil-switch compartments proves that room for betterment may exist even in thoroughly standardized devices. The blow-up of a high-grade oil switch of to-day is a remote possibility, but it is well to take precautions which will insure little or no damage even if an accident does occur.

INCREASES IN WESTERN INTERURBAN FARES

The increases in fares made on certain lines in Massachusetts are familiar to most if not to all of our readers, but it may not be so generally known that fares have also been increased on various Western roads to furnish needed larger earnings. Those described in the article published elsewhere in this issue followed periods of experiment with lower rates of fare which were established to demonstrate whether they would stimulate a greater density of traffic. Larger loads at a lower rate of fare may lead to better earnings under some conditions than lighter loads at a higher rate of fare, but on lines of relatively small traffic there is not sufficient business to furnish the car loads required to justify much of a reduction in rates. This was demonstrated by Clement C. Smith, the president of the Wisconsin companies whose experiences are reported. The experimental low rate of fare had substantially no effect on the development of traffic.

As the need for greater revenue was plain, it was decided to make an increase, but not until after a full explanation had been given to the public of the reasons for the change. The statement issued was much more than a declaration that the money was needed. It showed, first, that the company had assumed additional expense as a result of an advance in the wages of trainmen. It referred to the doubling of taxes and the higher prices of all materials entering into the costs of electric railways. It also directed attention to the necessity of a provision for depreciation, which was made emphatic by the decision of the United States Supreme Court in the Knoxville water case. The statement was concluded with a declaration of the interest of the company in the communities served and a frank expression of willingness to open the books for inspection at any time in order that full evidence of the necessity of the step taken might be had by any who were interested. It was reasonable, strong and convincing.

Partly as a result of these careful preliminary steps the increases in rates have been maintained, and have resulted in a greater revenue. As is shown by the figures presented, a larger revenue was secured notwithstanding that there was a reduction in the number of passengers carried. This reduction is attributed to the less favorable business conditions in the communities served and not to the increases in rates. This lessening in industrial activity, without a coincident advance in railway rates, would have had a marked effect upon earnings.

Each of the properties described in our article, if taken by itself, is a comparatively small system, but the manifest condition of finances which made higher earnings imperative to financial progress is just as applicable in principle at this time to the electric railway situation as a whole as

if the properties had been among the largest of the interurban railways of the country. Part of the lines, at least, had been involved in heavy loss because of their inability under a predecessor company to become established on a basis of satisfactory earning capacity. In this respect also the lines are like other interurban systems in the Central West which include properties acquired at foreclosure or forced sale.

For years it was the theory of promoters and others that interurban electric railways could operate for less than the steam railroads. The reasons for this belief then were not wholly illogical. They consisted of an apparently tenable theory that an electric railway operating one or two trains an hour could secure greater revenue from the fixed investment in the track and other main elements of the property than a steam line operating a few trains a day. With this hope many roads were promoted, and a number of the properties remain in the aspiring hands of those who built them, while others have passed to the control of those who purchased the securities.

Time has revealed reasons for dissatisfaction. It has shown that between active centers of population and business there is the real public demand that was anticipated for the hourly or two-hourly service maintained by the interurban electric railway. But it has also shown that this service, like other similar forms of progress, is adapted to successful patronage when certain conditions prevail, and that in the absence of these conditions unfortunate results may ensue. Such conditions relate to a favorable rate of progress of the industries of the territory; to the manner in which business in the district is sustained through occasional periods of depression; to the development of liberal riding habits by the population; to the degree of competition from other transportation agencies, and to other like considerations. In addition to these, an influence which has hurt the interurban roads is the movement for low rate passenger fares on steam railroads. Whether the interurban electric lines were subject to similar reduction or not, the movement led to agitation for a reduction in the rates of all railways. Such a sentiment has discouraged the managements of some interurban lines from making the increases in rates with which they had hoped to overcome the higher costs of operation.

The final inimical effect on interurban operation of some of the conditions affecting traffic earnings might have been anticipated if foresight had been as sure as hindsight, but if these conditions had been as plain to the eye before construction as they were after a few years of operation, some of the roads which are now furnishing valuable service to the community would not have been built. General business throughout the country has not been as favorable as the outlook five years ago promised. There has been an increasing public outcry against costs of living; and the interurban lines have not generally believed it possible to advance rates sufficiently to offset the greater expenses that confront them.

Mr. Smith, by his experience with the properties described, gives encouragement to lines whose needs of increased revenues are clear to tell the facts to the public and rely upon the fair-minded attitude of citizens for acceptance of the higher charges.

SPREADING THE PEAK LOAD

The complaint about the excessive peak loads on electric railways in industrial communities is not a new one, but hitherto no united attempt has been made by the railways themselves to show how rush-hour traffic could be more effectively distributed. It is a welcome sign, therefore, that this matter is one of the subjects which has been assigned to the committee on passenger traffic of the American Electric Railway Transportation & Traffic Association. The peak-load evil is to be found at its worst not in large cities with a variety of industries, but in towns with less than half a dozen enormous manufactories, all of which open and close their gates at the same time. Steam railroads usually handle situations of this kind merely by keeping a number of outworn passenger cars in reserve on the factory sidings. On the other hand, the public demands better service from an electric railway and looks askance even at the single-truck trailer. It goes without saying that the economic aspect of using a motor car for only one or two round trips a day is distinctly unfavorable. Yet even if the cars were available, it would be well-nigh impossible to find crews for them unless a company could afford to give men a day's pay for two hours' work.

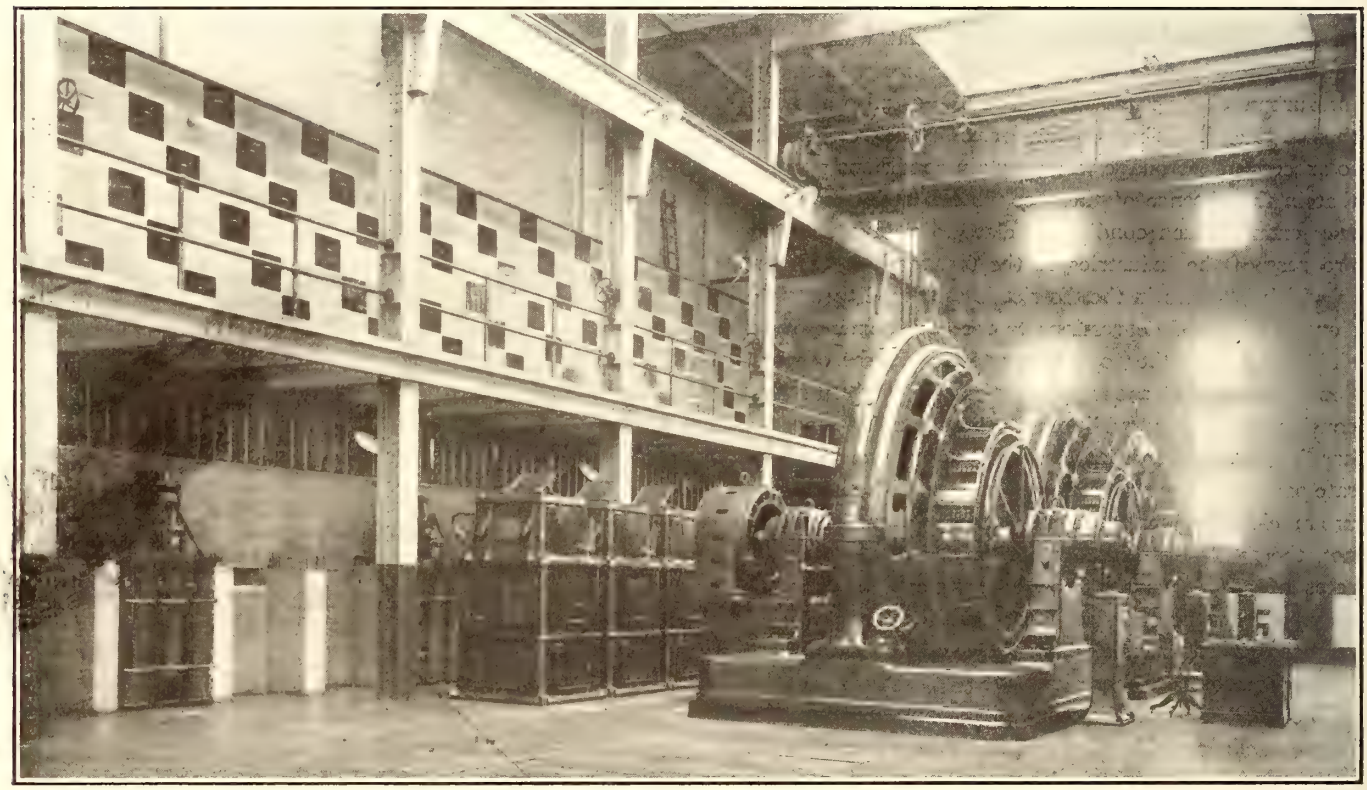
These facts are obvious to the railway manager, but not so to the public. All that the latter sees is cars loaded to the guards, and complaints and sarcastic comments about overcrowding are common. Few people realize that the railways are not only willing but anxious to improve these conditions but are powerless to do so. The solution is out of their hands and, in the case which we are considering, that of a factory town, almost entirely in the hands of the public. In one such case the subject was taken up very earnestly with the factory owners in a certain city to try to induce them to agree among themselves so that a slight shift should be made in the working hours of some of the factories. No attempt was made to advocate a longer or a shorter day, but simply that the hands in all of the factories should not begin and finish work at exactly the same time. Even a slight shift of, say, fifteen minutes, or better, of thirty minutes, would accomplish what was wanted, but the appeal was unsuccessful.

One reply often made to a suggestion of this kind has been that such an arrangement would upset the balance of inter-department production and distribution. This sort of objection might be valid in the case of a rolling mill or bakery, but it would hardly apply to a shoe factory or other shop where such things as "critical temperatures" are unknown. There is, for example, a large establishment in New York where one group of men work from 7 a. m. to 5 p. m., another from 7 a. m. to 6 p. m. and a third from 9 a. m. to 5 p. m., although their activities are interdependent. It is quite likely that the employers' real objection to a change in working hours is the feeling that any readjustment will provoke labor troubles. If this is true, it would seem that the campaign for better distribution of rush-hour traffic should be directed toward educating the wage-earning public rather than the employers. No sensible man is likely to be dissatisfied because his workday has been put forward or backward for a few minutes or even for half an hour if he should profit by the change.

The Thirty-eighth Street Substation of the Brooklyn Rapid Transit System

Among the Interesting Features of This Substation Are the Simplicity of Layout, the Compact Arrangement and Accessibility of the Equipment, the Interlocking and Indicating Devices and the Provisions for the Safety of the Employees

Since May 28, 1909, the Brooklyn Rapid Transit System has had in service a substation on Thirty-eighth Street between Fourth and Fifth Avenues. The ultimate capacity of this station will be 10,000 kw; of this 6000 kw is now installed in 2000-kw units. The station is located in the South Brooklyn section about midway between the Brooklyn Bridge and the beaches. It is tied in on the side toward New York with the d.c. generating equipment of the Central power station and on the ocean side with the New Utrecht and Southern substations. In common with these distributing points it supplies power to the West End, Culver and Bay Ridge elevated lines and to the Second Avenue, Third Avenue, Fifth Avenue, Hamilton Avenue, Fifteenth Street and Thirty-ninth Street surface lines. The following paragraphs will describe the constructional and operating features which are typical of the advanced methods originated by the engineers of this company.



Brooklyn Substation—View of the Three Rotaries and of the High-Tension Equipment on the Main and Gallery Floors of the Thirty-eighth Street Substation

BUILDING CONSTRUCTION AND LAYOUT

The building was erected on a plot 50 ft. wide x 100 ft. deep to a height of 31 ft. 6 in. from the main floor to the bottom of the roof girders. The general construction and the arrangement are shown in the accompanying cross-section, which also indicates in part the character of the building materials. The exterior is of red brick, the interior wainscoting of enameled brick, while buff brick is used for the rest of the inside walls and for the oil-switch and high-tension bus structures. Concrete is employed exclusively for all foundation walls and flooring. The roof consists of a steel frame which carries reinforced concrete slabs with a tar and gravel covering. The most striking feature of the roof is the unusually large monitor skylight to insure ample natural light and ventilation. The side and end windows of the skylight are controlled from the floors or gallery by means of a bevel-gear transmission. The window system was also arranged to secure liberal lighting and ventilation, as will be readily apparent from the view of the interior. Most of the side windows are 16 ft. 6 in. high x 4 ft. wide and of four-sash construction. The upper two sashes are pivoted. The lower sash is of sliding type. The lower sashes as well as the lights indoors are protected by iron grill work. All glazing throughout, including the entrance doors, skylight and oil-switch compartment doors, is of Mississippi wired glass for fire protection and durability.

The cross-section shows that the station is divided into a main section in which are installed the transformers, rotaries and switchboard, and a side bay with gallery. The main floor of the substation accommodates the high-tension oil switches, selector switches and starting set transformers, while on the gallery or upper level are the high-tension bus and synchronizing transformer compartments, a front room for employees' toilet and lockers, and a rear room for a storage battery. The basement under the main floor is divided into two sections by the rotary foundation wall and contains an air room of ample size directly under the rotary transformers and a passageway under the rotaries. The incoming high-tension feeders and outgoing d.c. feeders enter or leave the building underground through vitrified conduit to feeder pits which are constructed along the side walls of the building. These feeder pits are covered by removable slate floor slabs. The crane girders for a 25-ton

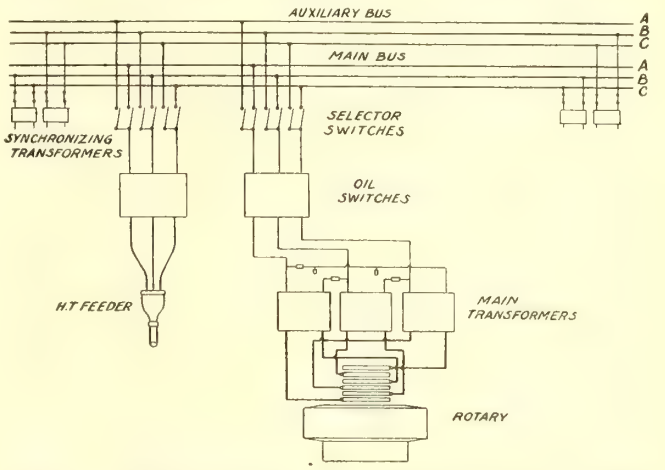
manually operated Reading crane of 35-ft. span are carried by the main side wall pilasters and by the latticed columns which support the roof girders and gallery.

Ample clearances are obtained throughout the building, as may be seen, owing to the arrangement of the equipment. The principal dimensions are as follows: height from floor of main section to base of crane, 24 ft.; width of main section over all, 36 ft. 8 in.; clearance between rotary pedestal switches and switchboard, 9 ft. 6⅜ in.; clearance between switchboard and pilasters, 2 ft. 11 in.; width of bay, 10 ft. 4 in.; clear height of lower floor of bay, 11 ft. and of upper floor, 10 ft. 6 in.

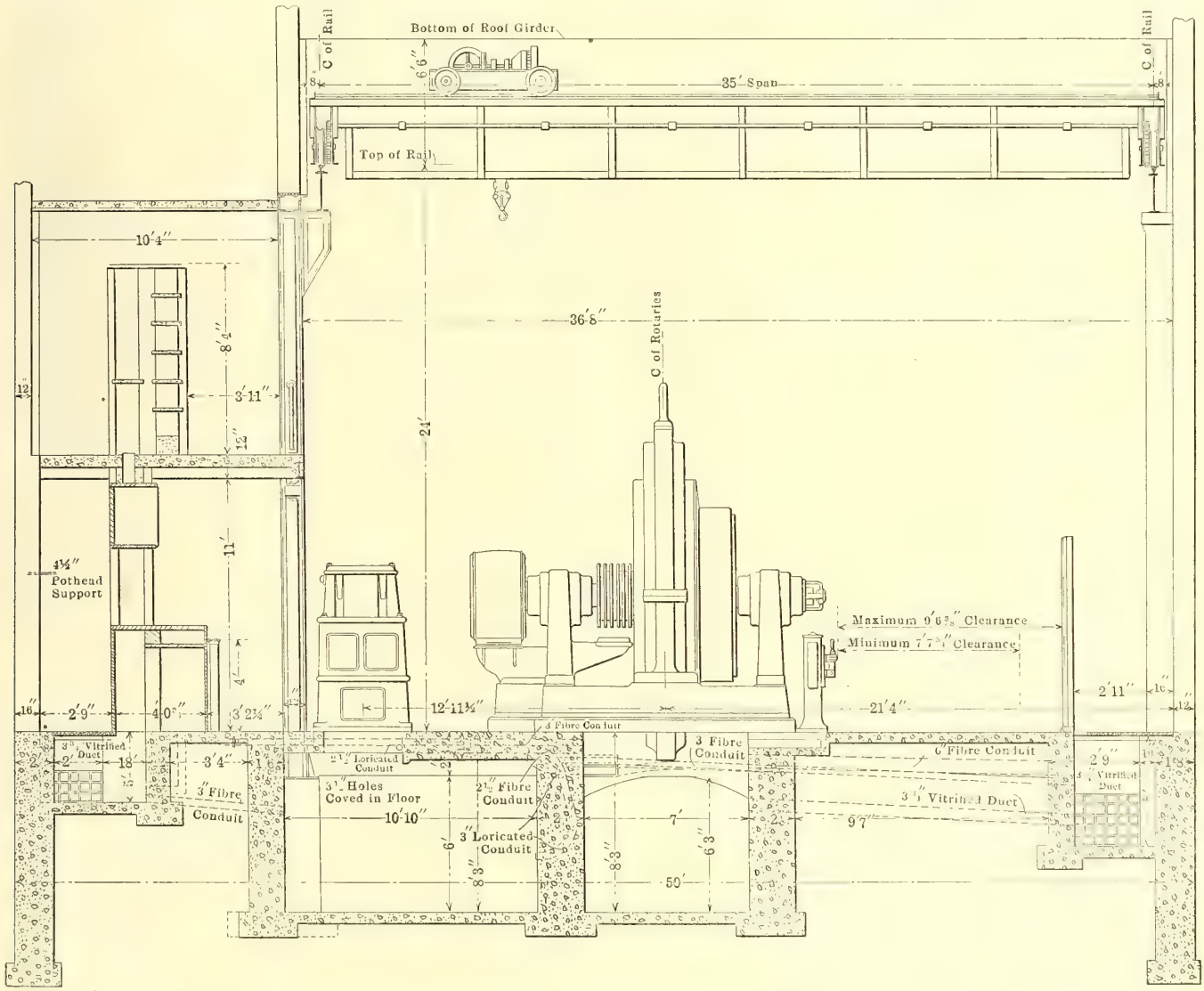
ARRANGEMENT OF CIRCUITS

Current is received at the station at 6600 volts, three-phase, 25 cycles, but the wiring and installation in general has been laid out for the eventual use of 11,000-volt lines. The accompanying sketch represents a schematic wiring diagram of a high-tension feeder and a rotary and shows that the high-tension feeder on leaving the pothead passes through the feeder oil switch and selector switches to the main or auxiliary bus and then from either bus through similar rotary selector switches and oil switches to the main transformers and rotary. From that point the current passes to the d.c. bus and outgoing d.c. feeders.

All d.c. feeders leave the station underground to manholes in the street and thence are distributed by subways or along the elevated structure, according to conditions. The ground wires enter at the front of the building, where they connect to the negative bus which is installed along one wall of the passageway under the rotaries. The connection to the rotary is made through a 4500-amp hand-operated pedestal switch, one being located in front of each rotary. This arrangement gives the shortest practicable connection from the negative bus to the machine. From the cross-section, showing the arrangement of equipment, it will be noted that the wiring from the potheads to the d.c. feeders is as direct as possible, any unnecessary looping being avoided.



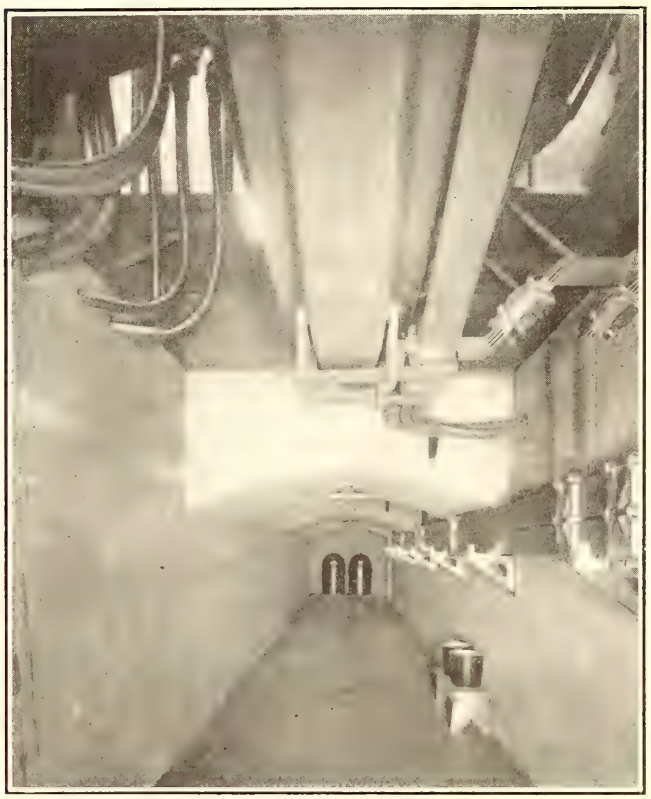
Brooklyn Substation—Simplified High-Tension Wiring Diagram



Brooklyn Substation—Cross-Section, Showing Tunnels, Ducts and Location of the Principal Apparatus

Each phase of the high-tension line, after leaving the pothead, is carried on high-tension porcelain insulators

through separate brick or alberene compartments to the high-tension bus. Access to the supports and the terminal connections in these compartments may be had through removable alberene or sheet-iron doors. Each compartment or phase is properly designated according to the phase relation of the connection to the high-tension bus.



Brooklyn Substation—View Under a Rotary, Showing All Connections, Including the Negative Busbars

The high-tension selector switches are interlocking so that it is impossible to close a machine or feeder on both the main and auxiliary buses at the same time. As these selector switches are located directly over the oil switches, there is no occasion for an operator to make a mistake in pulling the wrong selector switch while the oil switch is closed in on the line. As an additional precaution, each set of selector switches is designed by letter to show to which bus it is connected. At the rear of each set of selector switches are pilot switches which are operated automatically by the shifting of the interlocking bar. The pilot switch, in the case of a feeder equipment, picks up the proper circuit and, by means of a green or red light located on the high-tension feeder panel, indicates whether the selector switches are closed on the main bus or on the auxiliary bus, as the case may be. The object of the pilot switches on the rear of the machine selector switches is to pick up a similar indicating circuit on the corresponding d.c. rotary panel and the synchronizing circuit for the bus to which the rotary is connected by its selector switches.

The high-tension bus compartment is located on the gallery directly over the oil switches and selector switches. This structure is so built that the six busbars lie in a vertical plane. Each busbar is in a separate compartment, and access to its supports or connectors is obtained through the removal of sheet-iron doors. The compartments for the high-tension fuses and synchronizing transformers which provide for two separate and independent synchronizing circuits are built at each end of the bus structure.

The oil switches for both the high-tension feeders and machines are of 300-amp, 13,000-volt capacity each. They are placed in brick compartments on the main station floor, each compartment being provided with a transparent wire-glass door which hinges from the top. Besides giving a very neat appearance to the switch, these doors are light and easily handled as compared with the usual alberene doors; furthermore, they allow external inspection of the switch tanks and oil levels without the removal of the doors. The position in circuit of the oil switches is indicated by means of lamps which are located on their respective panels. A red lamp means that the switch is closed and a green lamp that the switch is open.

The lead-covered, high-tension leads from the machine oil switch terminals pass through fiber conduit to the air chamber under the transformers. Provisions have been made so that connections to the transformer terminals can be readily changed from 6600-volt delta to 11,000-volt star, by means of hard-rubber insulated connectors. The main transformers are of the single-phase, air-cooled type of 750 kva capacity, having a transformation ratio of 6450 volts to 390 volts, with taps to provide for additional voltages and thus to allow for line drop.

As the rotaries are synchronized on the high-tension side of the transformers, the secondary connection from the transformers is direct to the a. c. terminals of the rotary without the use of any intermediate switches. The diametrical connection is employed between transformers and rotaries.

The rotary converters are of 2000-kw capacity, sixteen poles, 187½ r.p.m., six-phase, shunt-wound, and operate at 550 volts or 600 volts d.c. The rotaries are synchronized by means of an induction starting motor which is mounted on the extended shaft of the armature.

SWITCHBOARD

The switchboard, which is of blue Vermont marble, is



Brooklyn Substation—Monitor Roof and Side Windows as Seen from the Gallery

arranged with panels in line along one side of building, and consists of two sections. One section includes the panels for control of the battery circuits and motor generator set, the a.c. starting set and the high-tension feeders, provision having been made for seven high-tension feeder equip-

ments. Each high-tension feeder panel consists of three sections. On the upper are mounted a static voltmeter, a.c. ammeter and the red and green bus indicating lamps; on the center section a three-pole, double-throw relay switch, a double-pole, single-throw power switch and the oil switch controller with red and green indicating lamps; on the lower section a two-pole G.E. time-limit relay. The other section of the switchboard includes the d.c. rotary panels, load panels and surface railway and elevated railway d.c. feeder panels.

The rotary panels are arranged in the center, with the surface feeder panel to the right and the elevated feeder panel to the left. Power supplied to the surface and elevated railway feeders is metered separately by two load panels, which are located between the rotary panels and the d.c. feeder panels. The cut illustrating the switchboard shows a blank space, which is for the two additional d.c. rotary panels when installed.

The d.c. rotary panels are in three sections. On the upper section is mounted a 5000-amp circuit breaker and red and green bus indicating lamps, which are picked up by the selector switches, as previously noted. The middle section contains an ammeter, power factor meter, field rheostat face plate and hand-wheel voltmeter receptacle, two synchronizing receptacles, 4500-amp positive switch and oil switch controller with indicating lamps showing the open or closed position of the oil switch. The lower section carries a three-pole, single-throw induction motor starting switch.

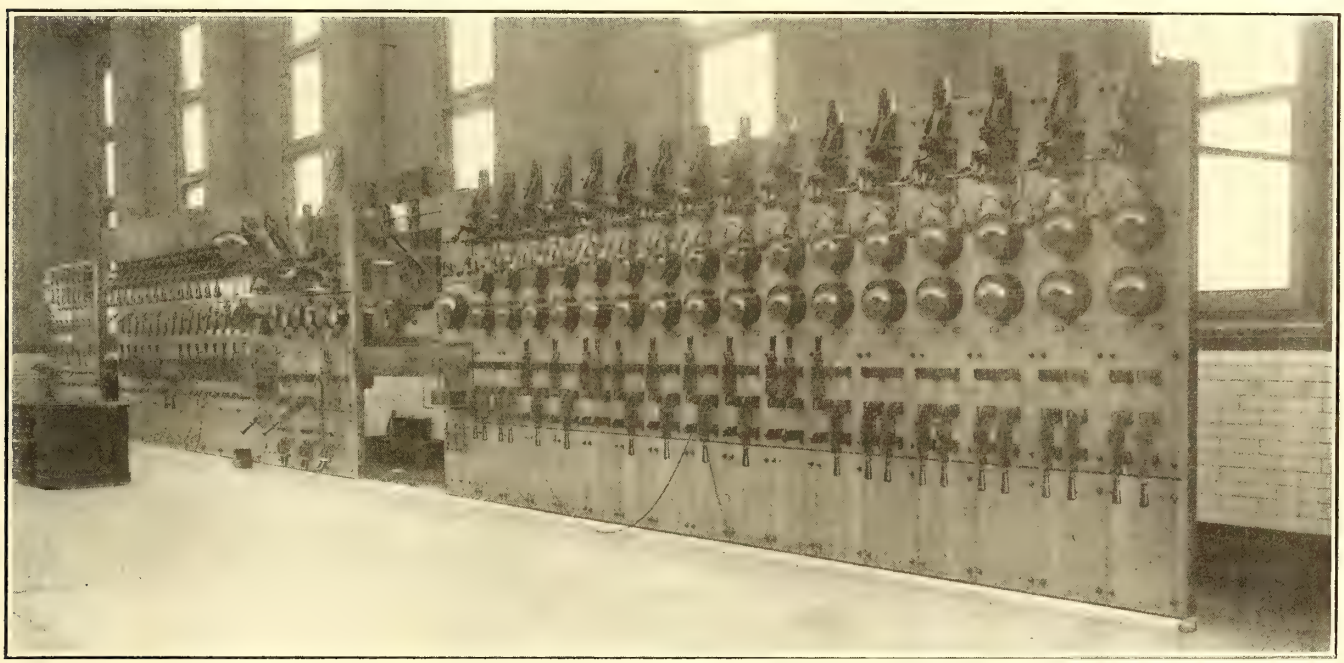
As the energy taken by the surface and elevated feeders is metered separately, a 10,000-amp Thomson integrating wattmeter and a 15,000-amp ammeter are provided for this purpose. These meters are mounted on the center section of each of the load panels. On the upper section of the load panels are mounted red and green feeder-indicating lamps. These lamps are connected in multiple with similar lamps on the high-tension feeder panels, previously noted as being picked up automatically by the selector switches. These lamps are located in this position for the convenience of the operator. The lower section of the load panels contains the switches for the station auxiliary circuits. Each surface feeder panel contains one Westinghouse type "C" circuit breaker, which controls two feeders, and a separate ammeter and separate switch for each feeder. The elevated railway feeder panels differ from those for the surface railways in having a separate circuit breaker for each feeder. Marble barriers are provided between the circuit breakers on the elevated railway feeder panels.

Two synchroscopes with synchronizing lamps on swinging brackets are mounted, one at each end of the rotary panels between a rotary panel and the load panel. A pilot lamp supplied from the battery circuit is placed over each synchroscope to facilitate the synchronizing of a rotary in cases when the regular source of light may have failed, due to possible interruption of service or low voltage. Between the rotary panel and the elevated load panel is also mounted, by means of a swinging bracket, the d.c. station voltmeter.

AUXILIARY EQUIPMENTS

Current for the operation of the oil switches, panel indicating lights and synchroscope lamps is furnished by a 55-cell, type E-7 chloride accumulator of the Electric Storage Battery Company and a Western Electric charging set. The basement contains a 10-hp National DD-4 air compressor, from which pipe lines with suitably located taps are led throughout the building to supply air for cleaning out transformers, rotary converters, oil-switch and high-tension bus compartments, etc.

The main transformers are cooled by two blower sets, each consisting of a 12-hp Northern variable-speed motor and a Sirocco fan having a capacity of 20,000 cu. ft. a minute. The blower installed at the rear of the air chamber under the transformers takes either air from the station or outside atmosphere, but the one at the front of the air chamber takes it only from the building interior. Entrance to the air chamber is facilitated by means of an air lock, each door of which is fitted with a sliding panel for equalizing the air pressure on each side before opening the door.



Brooklyn Substation—View of the Switchboard with the D.C. Feeder Panels in the Foreground

Three 75-kw oil-insulated, self-cooling transformers are used for the induction motor starting sets. The secondaries of these transformers are tied by disconnecting switches to the starting-motor bus located in the basement. Any rotary in the station can be started from this bus. However, in case a starting transformer is disabled, emergency connections are provided to start the rotaries from either of two main transformer sets. As there is no intermediate connection between the low-tension winding of the main transformers and the rotaries, it is necessary to raise the a.c. brushes of a rotary in case it happens to be idle when this emergency connection is required.

SOME OPERATING FEATURES

The following steps are carried out in starting and syn-

chronizing a rotary converter. After having closed the selector switches and thus connected the machine to the proper bus, the operator closes the oil switch of the starting set. Then the induction-motor starting switch on the d.c. rotary panel which sets the rotary converter in motion is closed. As the machine comes up to speed the resistance is cut out of the field circuit, and the potential is brought up to the approximate d.c. bus voltage. The synchronizing plug is then placed in its receptacle, and when the machine is in step, as indicated by the synchroscope, the oil switch of the main transformers is closed. The next step is to open the oil switch of the starting set, then the induction motor switch, and finally to close the negative switch, throw the circuit breaker and close the positive switch of the machine.

The rotary tenders are provided with two "hold-off" blocks and a stick, which are used to insure their protection when at work on an electrical circuit. One block is placed on the blades of the positive switch of the rotary and the other on the blades of the induction-motor starting switch. The stick, which is of 2½-in. hickory stock, is placed in the plunger of the high-tension oil switch. Thus the starting of the rotary is blocked at all points. The insertion and removal of the "hold-off" blocks and stick are done only by the man concerned. Instant dismissal is the punishment for any tampering with these safety devices.

Alarm bell circuits are provided for all circuit breakers, high-tension and low-tension feeder switches, etc., to notify the attendant of the opening of a line because of overloads or short-circuits.

ENGINEERING AND EQUIPMENT

The substation and the arrangement of all equipment, including the switchboard, were designed, erected and installed under the direction of the engineering staff of the Brooklyn Rapid Transit System. All of the electrical apparatus, with the exceptions noted in the article, was furnished by the Westinghouse Electric & Manufacturing Company.

T. E. MITTEN RESIGNS AS PRESIDENT AND DIRECTOR OF THE CHICAGO CITY RAILWAY

T. E. Mitten has resigned as president of the Chicago City Railway, the Calumet & South Chicago Railway and the Southern Street Railway, effective on Dec. 30, 1911. Mr. Mitten's resignation was announced in the following statement issued by Ira M. Cobe, chairman of the executive committee of the Chicago City Railway:

"Mr. Mitten takes this action because his activities in Buffalo and Philadelphia demand all of his time. He feels that, having carried the properties through their reorganization period and the period of rehabilitation having been passed, his work in Chicago is finished. His resignation was accepted only after every inducement had been held out to him to remain in the service. His successor has not yet been decided upon."

Mr. Mitten's letter to the board of directors of the company transmitting his resignation follows:

"At the request of the board of directors, I took charge of the affairs of the Chicago City Railway in March, 1905, since which time a settlement has been effected with the city and the rehabilitation of the property thereunder has been completed. The operation of the property is now being conducted with that due regard to the interest of the public and the welfare of the company's employees which, in my opinion, is essential to the continued success of a public service corporation.

"The character of service rendered to the public upon the lines of this company compares favorably with that of any other American city and is now limited during the rush hours only by the capacity of tracks entering the loop district.

"The wages of trainmen have been gradually increased from 24 cents an hour in 1905 to the present maximum wage of 30 cents an hour without any increase in the per cent of gross earnings paid for the service, this being accomplished by the use of larger cars and the fact that the operation of cars is more closely adjusted to the volume of traffic.

"The physical integrity of the company's property is fully protected by the maintenance and depreciation reserves established under the terms of the settlement ordinance.

"The earnings of the property applicable to its stockholders are now sufficient to justify the regular dividend of 10 per cent per annum upon the capital stock, in addition to which the city will receive as its 55 per cent of the net earnings for the current fiscal year an amount slightly in excess of $1,000,000.

"My undertaking having been accomplished with the aid of your wise counsels, the loyal support of the company's employees and the encouragement received from an appreciative public, I respectfully submit my resignation both as president and director of the company.

"Because of my time being so fully occupied with similar undertakings in connection with the street railway systems at Buffalo and Philadelphia, I shall be glad to have my resignation made effective as of Dec. 31, 1911."

Mr. Mitten was born in Brighton, Sussex, England, on March 31, 1865. His parents came to America in 1873 and settled on a farm in Newton County, Ind. Mr. Mitten studied telegraphy and obtained a position at the local freight office of the Chicago & Eastern Illinois Railroad at Goodland. He continued with this company for several years and in 1893 became connected with the Denver & Golden Railroad. He next served the Milwaukee Electric Railway & Light Company as assistant superintendent and as general superintendent. In 1901 he was appointed general superintendent of the International Railway Company, Buffalo, N. Y. Subsequently he was appointed general manager of the company and is now vice-president and a director of that company. Mr. Mitten was appointed president of the Chicago City Railway in 1905. He is a director of the Philadelphia Rapid Transit Company and chairman of the executive committee of the company.

PHILADELPHIA NEAR-SIDE CARS

Supplementing the announcement published in last week's issue regarding the authorization by the board of directors of the purchase of 500 near-side cars, the Philadelphia Rapid Transit Company states:

"In order to correct the erroneous impression that the near-side car is wider and heavier than the pay-within car now in use, the following comparative figures are given:

	Pay-Within Cars.	Near-Side Cars.
Weight	42,000 lb	37,000 lb.
Seating capacity	40	54
Standing capacity	36	36
Total capacity	76	90
Length over all	41 ft.	45 ft.
Width over all	8 ft. 6 in.	8 ft. 6 in.
Electric lights	12	30

"The length given for the pay-within car includes the projecting fender for which this car was designed. The added distance between the trucks on the near-side car as compared with that on the pay-within car almost entirely overcomes the additional overhang resulting from the added length of the car."

The scheme adopted by the municipality of Pretoria (South Africa) for extending the local tramway system at a cost of $235,000 will, it is stated, involve the placing of orders for passenger cars to the value of $20,000; freight cars, $30,000; coal bunkers, $15,000, and rails, $75,000.

Increases in Fares on Western Interurban Lines

Three Railways in Which Clement C. Smith Is Interested, Two in Wisconsin and One in Illinois, Have Advanced Their Passenger Rates on Account of Higher Costs of Operation

Among the railways which have found it necessary to increase their rates of fare on account of the higher costs of operation are the several companies in which Clement C. Smith, of Milwaukee, is actively interested. Mr. Smith is the president of the Eastern Wisconsin Railway & Light Company and the Wisconsin Electric Railway. He is also vice-president of the Sterling, Dixon & Eastern Electric Railway of Dixon, Ill.

Careful analysis of the operations of these three properties and of the territory which they serve was made before the decision to advance fares was reached. This analysis disclosed the inadequacy of revenue at the old rates of fare and also the fact that the territory served and the traffic already existing were of such character that little relief could be expected by any other means than through an increase in the unit rate of fare. It was revealed clearly that earnings had not been sufficient from the beginning of operation to provide for the depreciation of the properties if expenses and interest requirements were met. Experience had shown that the expectations of the management that greater density of traffic would be developed to meet all the financial requirements had not been realized.

The decision was therefore reached to make an advance. This was effected on all three of the properties by a change in the divisions of zones. The earnings of the properties before the change and the improvement in the average revenues per passenger are described in detail so that the full reasons for the action of the companies may be understood.

THE WISCONSIN PROPERTIES

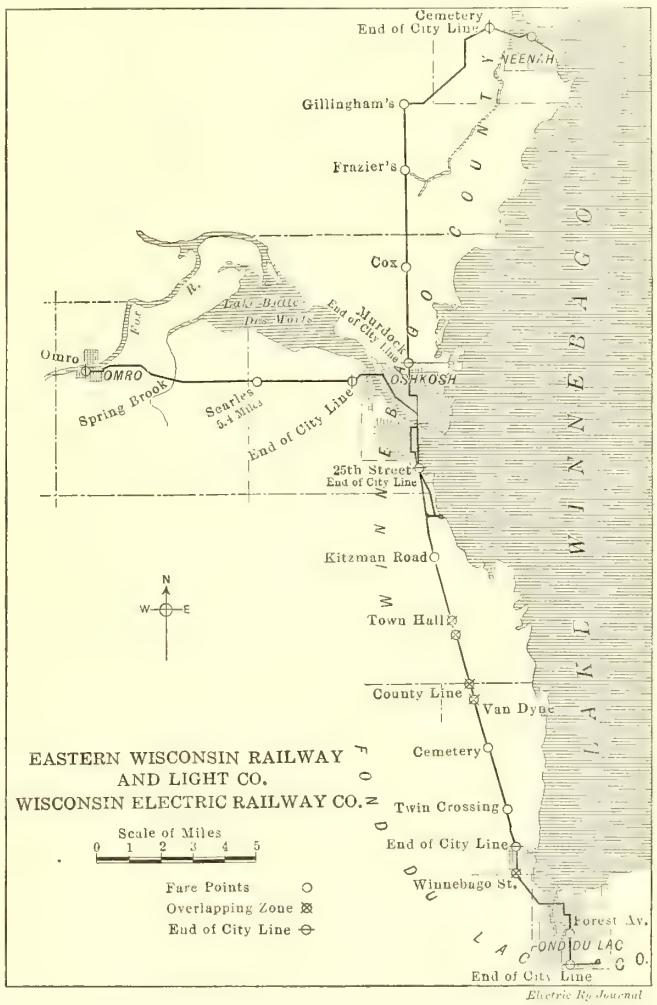
The Wisconsin Electric Railway, the largest company of the three named, operates 42.82 miles of track. It combines interurban lines with the city lines in Oshkosh and Neenah, Wis. Of the total mileage 22.88 is single-track interurban line and 19.94 miles consists of the city lines. The miles of single track operated in the city of Oshkosh aggregate 19.15, while in the city of Neenah only 0.79 mile is operated. The two interurban lines comprise the line from Oshkosh to Neenah, 13.79 miles, and from Oshkosh to Omro, 8.59 miles. At Oshkosh the lines of the Wisconsin Electric Railway connect with the lines of the Eastern Wisconsin Railway & Light Company, which, although a separate company, is owned and operated by the same interests. This company operates 24 miles of single track. Of this, 14.76 miles of track consists of the interurban line connecting Oshkosh and Fond du Lac, while 9.24 miles comprises the city system in Fond du Lac. The interurban mileage operated by the Wisconsin Electric Railway, with the addition of the city mileage over which the interurban lines are run, is as follows: From High Street, Oshkosh, to Commercial Street in Neenah, 15.58 miles; from High Street, Oshkosh, to the terminus at Omro, 11.17 miles. The interurban line operated by the Eastern Wisconsin Railway & Light Company extends from Forest Avenue, Fond du Lac, to High Street, Oshkosh, 18.17 miles.

INCREASES IN WAGES OF TRAINMEN

Added to the other factors which made necessary a careful consideration of the financial condition of the two companies was the increased schedule of wages paid to trainmen, which became effective on Dec. 1, 1909. Before that date there had not been uniformity in the rates paid to trainmen on the city and interurban lines of the two systems. The rates paid on the Wisconsin Electric Railway prior to Dec. 1, 1909, were as follows: City lines—first, second and third years, 16 cents per hour; fourth, fifth and sixth years, 17 cents; seventh and eighth years, 18 cents; subsequent years, 19 cents. Neenah interurban line—first and subsequent years, 20 cents. Omro interurban line—first, second and third years, 18 cents; fourth, fifth, sixth and subsequent years, 20 cents.

The new rates of wages for trainmen on the Wisconsin Electric Railway effective Dec. 1, 1909, were: City lines—first year, 16 cents per hour; second year, 17 cents; third year, 18 cents; fourth and fifth years, 19 cents; sixth and subsequent years, 20 cents. Interurban lines—first year, 18 cents; second year, 19 cents; third year, 20 cents; fourth and fifth years, 21 cents; sixth and subsequent years, 22 cents.

The old schedule of wages on the Eastern Wisconsin Railway & Light Company was as follows: City line—



Map Showing Lines of Wisconsin Electric Railway and Eastern Wisconsin Railway & Light Company

first year, 15 cents per hour; second year, 16 cents; third and subsequent years, 17 cents. Interurban line—20 cents per hour. The new rates of wages on the Eastern Wisconsin Railway & Light Company lines, effective Dec. 1, 1909, are identical with those adopted for the Wisconsin Electric Railway on the same date. In the consideration of the new schedule of wages information was secured from the various companies in the State as to the prevailing schedules. The schedules obtained in this way were averaged, and the new figures adopted for the companies are the average wages paid in the State for service of this character.

In connection with the change in wages certain changes were made in the abolition of tickets for employees and the establishment of the rule that employees may ride free on cars only when wearing their uniform or badge. It was also decided that trainmen on the city lines, if transferred to the interurban lines, should be held to be in the same class, so far as length of service is concerned, as if they had been employed from the beginning of their connection with the company on the interurban system.

Before the new schedules of fares were placed in effect on the various lines affected a lengthy statement to patrons was prepared by Mr. Smith and made public on behalf of both companies at the same time. In addition formal rate sheets were compiled in accordance with the requirements of the Railroad Commission of Wisconsin and were displayed conspicuously in stations of the companies and in all the cars. In this way full notice of the increase was given. The formal statement issued by the companies called particular attention to the financial condition of the properties, the higher expenses resulting from increased wages paid to trainmen and, as a convincing argument for the change, to the decision of the United States Supreme Court in the Knoxville waterworks case. An abstract of the decision in this case was published in the Electric Railway Journal of Feb. 13, 1909, page 280. This decision stated that it is the duty of companies to make good the effects of depreciation from earnings. The letter of the company said in part:

LETTER OF THE COMPANY

"The fare from Oshkosh to Neenah is now at an average rate of 1.28 cents per mile; the fare from Oshkosh to Fond du Lac at an average of 1.37 cents per mile, and the fare from Oshkosh to Omro at an average of 1.35 cents per mile.

"The necessity for increasing the fares became evident to the management of the Winnebago Traction Company in the spring of 1905, and the company at that time raised the fares from Oshkosh to Neenah from 20 cents to 25 cents, and from Oshkosh to Omro from 15 cents to 20 cents. The company's records show there was a considerable increase in earnings, and they also show the number of passengers carried did not decrease.

"In March, 1908, following the panic of 1907, which materially reduced all travel, the receiver of the traction company sought to build up earnings again by reducing the interurban fares to the rates charged formerly. There was an immediate decrease in gross earnings and this decrease has continued to the present time.

"The former bondholders of the Winnebago Traction Company still own the greater part of the bonds of the Wisconsin Electric Railway Company. They have suffered a heavy loss through the reduction in the amount of bonds on the property.

"The present management of the two properties was therefore fully aware of former conditions when it took charge of the properties. It was hoped, however, that by reducing the bonded debt, by bringing the two properties under the same management, by centralizing the work of repairs and maintenance of cars, by through operation of interurban cars from Fond du Lac through Oshkosh to Neenah, and by other economies due to one management, the increase in rates might possibly be avoided. The results of operation have now been so clearly shown that there is no excuse for the management to postpone an effort to obtain sufficient revenue to give good service and maintain the property as it should be maintained.

"The earnings of the companies have so far been entirely inadequate to provide for depreciation, and the management cannot longer neglect what has been prescribed by the Supreme Court of the United States to be 'its plain duty.'

"During the last few years there has been a steady increase in the price of everything going into electric railway construction and operation. Our taxes have been doubled, and other public burdens have fallen heavily on the companies.

"The cost of living has increased, and, while our trainmen have been patient and have not made any request for increase in wages, we feel it is only due to them to give them such advance as the companies can afford on account of increased rates, and we are putting this increase in wages into effect beginning Dec. 1.

"It is a common thought among persons not familiar with the operation of electric railways that electric railways ought to carry passengers for less fare than steam railroads. This idea originated in the early days of electric interurban railroads, when the managements themselves were unable to forecast the future and expected that lower rates would stimulate business to such an extent that low rates would be justified, but they have been disappointed.

"While the laws of Wisconsin permit a railroad fare of 2 cents per mile, our new schedule does not reach that average fare. The management is striving to obtain the necessary income without raising the rates to the limit fixed by law.

"No one has a deeper interest in the growth and prosperity of the communities served than the two companies themselves. Individuals and manufacturing plants may move from one community to another, but a public service company must continue to furnish the best service in its power. We earnestly desire and solicit the good will and friendship of all who do business with us, and we feel the public will respect us more if we establish our properties on a sound financial basis than if we allow them to run down and depreciate and plainly neglect what the highest court in the land has declared a duty to the public.

"In conclusion, we desire to say that the rates established by the new schedules are fully justified by the valuation of the property made by the Wisconsin Tax Commission for taxation purposes and do not depend upon, nor are they made necessary by any unfortunate financial operation or litigation in the past.

"The books of the companies will be open to the public for inspection at any seasonable time, and their examination will convince any of our patrons who care to see them that not only is the increase in rates well warranted now, but that it should have been made long ago."

No general public opposition followed the announcement of the company that an increase in rates would be necessary. In one or two cases where there was individual dissatisfaction proceedings have been instituted before the Railroad Commission of Wisconsin. In one of these cases the decision of the commission upheld the position of the company. An abstract of this decision was published in the Electric Railway Journal of July 29, 1911, page 193. An important paragraph of the decision is as follows:

"The zone system seems to be the only practicable system of interurban rates upon the line operated by the company. The petitioner suggested that a straight rate of 2 cents per mile, such as that charged by steam railroads, would be satisfactory and fair to everyone. It is certain that the respondent company does not come within the provisions of the 2-cent fare law of this State so as to make a rate of more than 2 cents per mile unlawful. Moreover, an interurban line differs greatly from a steam railroad line in the frequency of its stops. A system of rates under which the fare would be 2 cents per mile between any two points at which the respondent's interurban cars might stop would be exceedingly difficult to administer. Instead of collecting a uniform fare throughout the car as each zone point is passed, the conductor would have to keep track of each passenger's trip, in addition to the burden of remembering a large number of distances and fares. The duties of a conductor upon an interurban car are so numerous that any system of fares which would add to them so materially as the 2-cent-a-mile system might seriously overburden him

and interfere with the safety and regularity of operation. Then again, with the present fare in most of the zones averaging something over 2 cents a mile, the respondent company seems unable to earn a fair rate of return, so that a change to the 2-cent-a-mile system would be a reduction in rates which is entirely unwarranted at this time."

Another case is pending before the commission and no decision has been reached.

To represent the feeling of patrons of the company an editorial published by the *Fond du Lac Reporter* on Dec. 17, 1909, entitled, "Trolley Rates Follow Other Things," may be quoted as follows:

NEWSPAPER COMMENT

"The reasons given by the management of the trolley lines for increasing the interurban fares strike us as sound and entitled to credence. This is particularly true of the statement that the pay of the trainmen has not been increased for some time, despite the fact that the cost of living has steadily advanced. The patrons of the line can well afford to pay the extra nickel or dime if the men who run the cars are to derive some of the benefit.

"Under the present system of state supervision it would be a most difficult thing for any public corporation to raise its rates unless they were completely justified, and, therefore, it is practically certain that the increase in fares announced by the trolley companies Thursday is actually necessary to produce an income sufficient to run the business at a profit.

"No one will question that the price of almost everything else has gone up Why not interurban fares? Unless the fares have been altogether too high in the past, it does not seem unreasonable that they should climb the ladder with everything else. The fact that interurban fares have always been away below those of the steam roads makes the contention that they have been too high untenable."

CHANGES IN RATES

The form of the rate sheet issued by the Wisconsin Electric Railway for interurban lines operating between Oshkosh and Neenah is shown in an accompanying illustration. This states, as will be noted, that under the new fare arrangement no transfers are issued to or received from city lines. The former rates on the interurban lines in comparison with the new rates, may be shown as follows: Oshkosh-Omro line, old rates, three-fare zones of 5 cents each and the privilege of transfer in Oshkosh; new rates, four zones of 5 cents each with no transfers to or from city lines. Oshkosh-Neenah line, old rates, four zones of 5 cents each with privilege of transfer; in Oshkosh new rates, five zones of 5 cents each without transfer to or from city lines. Fond du Lac-Oshkosh interurban line, old rates, five zones of 5 cents each; new rates, seven zones of 5 cents each. Transfers were not given on the last-named line under either the old or the new schedule.

Other changes have been made which have had an effect on the operation of the Wisconsin Electric Railway. In the city of Oshkosh the plan of routing has been changed. All cars are now routed through the central business district and are run from one extreme end of the city to the other. This scheme of routing takes the place of the former plan, which involved the use of loops. The common transfer point formerly maintained at Main and High Streets in Oshkosh has been abandoned. It is found that the elimination of the loop system has avoided confusion which formerly existed at transfer points and has given greater satisfaction because of the elimination of delays on account of missed connections, which, under the former system, were unavoidable at times. The revised schedule of operation affecting the Oshkosh lines in this way was established on Sept. 19, 1909. Its effect may be shown in few figures. During the period from Sept. 19, 1908, to Dec. 31, 1908, the number of fare passengers handled on the Oshkosh city lines was 473,412; the number of transfer passengers was 92,948, or 19.6 per cent of the total fare passengers carried. During the corresponding period of 1909, with the new method of operation, the number of fare passengers handled was 523,685; the number of transfer passengers in this period was 90,160, or 17.2 per cent of the aggregate of fare passengers carried. Thus the traffic under the new system, although greater, was handled more satisfactorily than with the old scheme involving loops.

Nearly all of the revenues of the companies are derived from transportation of passengers. Very little express and mail are carried. Practically the only source, therefore, upon which the companies have had to rely is the passenger traffic. This, to an unusual extent, has been composed of through business on the various interurban divisions. An examination made by George Allison, the comptroller of the

Wisconsin Electric Railway Company

OSHKOSH--NEENAH INTERURBAN LINES

RATE SHEET

To Take Effect January 15th, 1910

	Murdock St.	Snell's	Cox's	Mear's	Frazier's	Gillingham's	Cemetery	Commercial St., Neenah.
25th Street, Oshkosh.		10	10	15	15	20	20	25
Murdock Street		5	5	10	10	15	20	25
Snell's Corners			5	10	10	15	20	20
Cox's Corners				5	5	10	15	20
Mear's					5	10	15	20
Frazier's						5	10	15
Gillingham's							5	10
Cemetery								
Commercial St., Neenah								

The line of the Eastern Wisconsin Railway & Light Company terminates at the corner of Main and High Streets in Oshkosh, and the line of the Wisconsin Electric Railway Company runs northward from that point. Arrangement has been made by the Eastern Wisconsin Railway & Light Company by which passengers traveling over the lines of the Eastern Wisconsin Railway & Light Company to or from Oshkosh will be transported to or from the northerly city limits over the lines of the Wisconsin Electric Railway Company, thus making the northerly fare point for the zone, which includes the City of Oshkosh, Murdock street, instead of High Street as heretofore.

By similar arrangement, the Eastern Wisconsin Railway & Light Company transports over its line to or from the south city limits passengers traveling on interurban cars over the lines of the Wisconsin Electric Railway Company to or from points north of Oshkosh.

J. P. PULLIAM,
Manager Railway Dept.

No transfers will be issued to or received from city lines.

New Rate Sheet of Wisconsin Electric Railway

companies, showed that on the division which connects Oshkosh and Omro 77 per cent of the passengers carried were those who traveled the entire distance from one terminal to the other. The remaining passengers, constituting 23 per cent of the total, traveled either to or from intermediate stations. An examination made at the same time regarding the results of operation on the Neenah-Oshkosh division showed that 67 per cent of the passengers traveled from one terminal to the other. About the same results are shown on the Fond du Lac-Oshkosh division.

FINANCIAL RESULTS OF CHANGES

Definite financial results have followed the establishment of the increased rates of fare. The totals of revenue passengers carried and gross earnings received therefrom in the calendar year 1909 and 1910 on the three principal interurban divisions of the company are shown in Table I.

TABLE I.—CHANGES IN EARNINGS ON INTERURBAN LINES.

Year Ended Dec. 31.	1910.	1909.
Eastern Wisconsin Railway & Light Company—Fond du Lac-Oshkosh Division.		
Revenue passengers	230,754	248,526
Passenger earnings	$56,154.43	$49,636.04
Wisconsin Electric Railway—Oshkosh-Neenah Division.		
Revenue passengers	245,465	278,884
Passenger earnings	$43,244.61	$37,923.92
Wisconsin Electric Railway—Oshkosh--Omro Division.		
Revenue passengers	155,292	160.684
Passenger earnings	$24,669.29	$19,943.60

These figures show forcibly not only the effect of the change but also the situation in which the company might have found itself on account of the decrease in traffic which has taken place. As a result of the previous experience with decreased fares, placed in effect with the idea that it might stimulate traffic in sufficient density to repay the company well for the unit decrease, Mr. Smith has concluded that slight changes of this nature do not, at least in this territory, affect the volume of business. On the Fond du Lac-Oshkosh line of the Eastern Wisconsin Railway & Light Company, the division which furnishes the highest gross earnings of all in the two Wisconsin companies, 248,526 revenue passengers affording an aggregate revenue of $49,646.04, were carried in the year 1909. In the year 1910, 230,754 revenue passengers were carried, yielding passenger earnings of $56,154.43. The average revenue per revenue passenger in 1909 was 19.97 cents; in 1910 it was 24.34 cents. With a decrease of 7.15 per cent in the total of revenue passengers carried the earnings of the company actually increased 13.13 per cent.

On the Wisconsin Electric Railway, the heavier interurban line of the two operated by that company, extending between Oshkosh and Neenah, 278,884 passengers were carried in 1909, yielding passenger earnings of $37,923.92, or an average of 13.6 cents per passenger. In 1910 245,465 passengers were carried, yielding gross earnings of $43,244.61, or an average of 17.62 cents. The result of the change in fares on this line was similar to that on the interurban line between Fond du Lac and Oshkosh. The company carried less passengers by 11.98 per cent in 1910 than in 1909, due to changes in business conditions, but the traffic yielded an increased revenue of 14.03 per cent. On the Oshkosh-Omro division, the lightest in traffic of the three interurban lines of the companies, somewhat similar results were shown. The number of revenue passengers carried in 1910 was 3.36 per cent smaller than in 1909, while the earnings were 23.7 per cent greater. The earnings per revenue passenger on this division were 12.41 cents in 1909 and 15.89 cents in 1910.

The total operating revenues on the interurban system of the Wisconsin Electric Railway in the year 1909, including earnings from other sources than passenger traffic, were $61,126.79, and in 1910 they amounted to $71,748.80, an increase of $10,622.01, or 17.4 per cent. The interurban car-mile revenues averaged 23.36 cents in 1909 and 27.53 cents in 1910, an increase of 17.9 per cent. On the city lines of this company the total operating revenues in 1909 were $93,658.49, and in 1910 they amounted to $98,316.62, an increase of $4,658.13 or 5 per cent. The car-mile earnings on the city lines averaged 13.61 cents in 1909 and 14.54 cents in 1910, an increase of 6.8 per cent. This showing of earnings is complicated by the fact that a change in average fares was made on Jan. 15, 1910. On that date the sale of twenty-five tickets for $1, good on the city lines of Oshkosh, was discontinued. As abundant preliminary notice of this change was given to regular passengers full supplies were purchased in advance of the withdrawal of the tickets. The value of the tickets collected on the city lines in Oshkosh in 1909 was $17,140.84; in 1910 the corresponding figure was $9,249.42, leaving a decrease of $7,891.42. This does not show alone the effect of the withdrawal of the regular city tickets at this rate as workingmen's tickets are sold in Oshkosh good at certain hours.

On the system of the Eastern Wisconsin Railway & Light Company no increase has been made in the fares on the lines in the city of Fond du Lac. On the interurban line operated between Fond du Lac and Oshkosh the total operating revenues in 1909 were $50,635.79. This includes the revenue from other sources than passenger traffic. The corresponding total operating revenues on the line in 1910 were $57,682.17. The increase was $7,046.38, or 13.9 per cent. The average car-mile earnings from all sources on this line in 1909 were 22.44 cents, and in 1910 they amounted to 25.25 cents, an increase of 12.52 per cent. Figures may also be given showing the results of operation by the lines at a later date than is covered in the other statistics. These figures relate to the gross earnings of the city and interurban divisions from Jan. 1 to Oct. 27, 1911, inclusive, as compared with the corresponding period of 1910. Earnings on city lines of the Wisconsin Electric Railway were $89,417.20 in 1911 as compared with $80,639.53 in the 1910 period. The increase was $8,777.67, or 10.9 per cent. On the interurban lines of the Wisconsin Electric Railway the gross earnings in the 1911 period were $61,990.58, an increase of $6,404.64 as compared with the corresponding period of the preceding year, or 11.5 per cent. The totals for this company were $151,407.78 in the 1911 period as compared with $136,225.47 in the 1910 period, a gain of 11.1 per cent. The total car mileage run on the lines of this company during this period was a little less in the 1911 period than in the period for 1910 for which the figures are given.

On the Eastern Wisconsin Railway & Light Company passenger earnings have been decreasing as a result of changes in business conditions affecting the territory served. On the city lines of this company gross earnings in the period from Jan 1 to Oct. 27, 1911, inclusive, were $42,205.76, a decrease of $578.89, or 0.1 per cent from the corresponding period of the preceding year. On the interurban line between Oshkosh and Fond du Lac the total revenues for the 1911 period mentioned were $44,794.08 as compared with $45,803.87, a decrease of $1,009.79, or 2.2 per cent. The total revenue amounted during the 1911 period to $86,999.84 as compared with $88,588.52 in the previous period, a decrease of $1,588.68, or 1.8 per cent.

OPERATIONS DURING THREE-YEAR PERIOD

Further details of the results of operation may be shown in Table II published herewith in reference to the complete results of operation of the Wisconsin Electric Railway Company in the years 1909, 1910 and 1911. These figures show a larger operating revenue in 1911 than in the preceding years. Operating expenses and taxes, excluding depreciation, for which no provision has yet been made by either company except as it is included in the surplus fund, were also greater in 1911 than in the two preceding years. The net income, however, was larger in the last year. It will also be noted, in reference to the traffic statistics shown at the bottom of Table II, that a decrease has been made in the car miles run. Another point to which attention should be called is the increase in the total number of fare passengers carried and a decrease in the transfer passengers in the fiscal year 1911 as compared with 1910. There has been a slight reduction each year in the proportion of fare passengers using transfers. In Table III, published here-

Table II.—Wisconsin Electric Railway—Results of Operation.

Year Ended June 30.	1911.	1910.	1909.
Total operating revenues	$179,362.56	$160,814.92	$153,977.60
Oper. exp. & taxes, excl. depreciation.	124,253.29	117,922.81	118,446.88
Net operating revenues	$55,109.27	$42,892.11	$35,530.72
Non-operating revenues	427.37	825.63	2,545.42
Gross income	$55,536.64	$43,717.74	$38,076.14
Interest	39,373.49	38,926.51	23,213.98
Net income	$16,163.15	$4,791.23	$14,862.16
Total passengers car miles run	956,269	933,088	983,969
Fare passengers carried	2,562,998	2,443,098	2,404,434
Transfer passengers carried	431,449	432,326	421,072
Free passengers carried	12,041	8,656	12,133
Total passengers carried	3,006,488	2,884,080	2,837,639
Per cent transfers issued	14.3	14.9	15

Table III.—Wisconsin Electric Railway—Earnings per Passenger Car Mile, Cents.

Year Ended June 30.	1911.	1910.	1909.
Total operating revenues	18.76	17.23	15.65
Operating expenses and taxes, excluding depreciation	12.99	12.64	12.04
Net operating revenues	5.77	4.59	3.61
Non-operating revenues	.04	.09	.26
Gross income	5.81	4.68	3.87
Interest	4.12	4.17	2.36
Net income	1.69	.51	1.51

with, the figures shown in Table II are reduced to a car-mile basis. Table IV gives for the railway department only

TABLE IV.—EASTERN WISCONSIN RAILWAY & LIGHT COMPANY—RAILWAY DEPARTMENT.

Year Ended June 30.	1911.	1910.	1909
Total operating revenues	$109,523.67	$104,616.14	$96,443.04
Oper. exp. (excl. of dep'n) incl. taxes	68,725.42	68,502.52	67,817.75
Net operating revenues	$40,798.25	$36,113.62	$28,625.29
Non-operating revenues	3,135.48	3,133.47	2,423.32
Total of gross income	$43,933.73	$39,247.09	$31,048.61
Passenger car miles run	485,498	479,129	523,834
Revenue passengers carried	1,337,793	1,296,810	1,192,074

of the Eastern Wisconsin Railway & Light Company the principal operating statistics. The effects of the changes are not shown as strongly for this company as for the Wisconsin Electric Railway. There has been, however, an increase in total operating revenues which, on account of a very slight change in total operating expenses, has been kept almost in its entirety as an addition to net operating revenue. The gross income applicable to fixed charges shows a material increase in both 1910 and 1911 as compared with the preceding years. The passenger car miles run were greater in amount in 1911 than in 1910, but smaller than in the preceding year of 1909. The total of revenue passengers carried shows an increase in both 1910 and 1911 as compared with the preceding year in each case. Table V

TABLE V.—EASTERN WISCONSIN RAILWAY & LIGHT COMPANY—EARNINGS PER PASSENGER CAR MILE.

Year Ended June 30.	1911.	1910.	1909
Total operating revenue	22.55	21.83	18.41
Operating expenses and taxes (exclusive of depreciation)	14.15	14.29	12.95
Net operating revenue	8.40	7.54	5.46
Non-operating revenue	.65	.65	.46
Gross income	9.05	8.19	5.92

shows the results of operation of the railway department of the Eastern Wisconsin Railway & Light Company reduced to a car-mile basis.

In addition to the changes indicated the Eastern Wisconsin Railway & Light Company has placed certain special rates in effect. One of these rates concerns a short local trip at a rate of 5 cents. The other rates are for commutation books. The commutation books are good only on the cars leaving Oshkosh or Fond du Lac at 6 or 7 a. m. or 5 or 6 p. m. They are used to a very small extent. The commutation book is made out for individual use only and a description of the owner is furnished by punches on the cover, indicating the sex, approximate size, height, age, color of the hair, etc. The contract governing the use of the book provides that the identity of the original purchaser of the book must be established by signature on each coupon.

INCREASES ON THE STERLING, DIXON & EASTERN ROAD

The increase in fares on the Sterling, Dixon & Eastern Electric Railway took effect on Sept. 15, 1910, the date on which a new schedule of wages for trainmen was established. This company operates in Dixon and Sterling, Ill., and connects those places. Wages of trainmen before the change was made were 16 cents per hour on the city lines and 18 cents per hour on the interurban line and no promises of higher rates were given, although a few of the older men received 2 cents per hour above these figures. The new schedule is uniform with that adopted on the Wisconsin lines controlled by Mr. Smith.

The new schedule of rates established a rate of fare between Sterling and Dixon of 30 cents instead of 25 cents. At the same time that the new tariff became effective all free transportation, except that issued to employees of the company, was withdrawn. An accompanying illustration shows the new rate sheet, which was displayed where it could be seen by patrons. In addition a statement issued by Mr. Smith as vice-president of the company was distributed to patrons. This statement is in part identical with that issued on behalf of the Wisconsin companies. A portion of it follows:

"Certain inequalities in the schedule of passenger fares heretofore established by the Sterling, Dixon & Eastern Electric Railway Company have been brought to the attention of the management, and as it is the earnest desire of the officers and directors of this company to treat all of its patrons on as nearly an equal basis as possible the passenger rate schedule has been carefully revised with this end in view, and also for the purpose of providing necessary additional revenue.

"The present schedule makes the rate 5 cents higher between Dixon and Gap Grove and Prairieville than between Sterling and these points, so that our patrons on the east end of the line are required to pay more fare than those on the west end. The present rate on the west end is so low that it is based on a distinct loss to the company and it will, therefore, be put on the same basis as the rate now in force on the east end, thus removing all discrimination.

"A new fare zone has been established at the county line so that passengers living within that zone will receive the

Sterling, Dixon & Eastern Electric Railway Company

INTERURBAN LINE

PASSENGER RATE SHEET

To Take Effect September 15, 1910

	River Road	Drews	Gap Grove	Electric Park	Prairieville	County Line	Powell's Corners	Sterling
Dixon	5	10	15	15	20	25	30	30
River Road		5	10	10	15	20	25	30
Drews			5	5	10	15	20	25
Gap Grove				5	5	10	15	20
Electric Park					5	10	15	15
Prairieville						5	10	15
County Line							5	10
Powell's Corners								5

Children in arms (under two years of age) will be carried free.

Children between two and ten years of age or under two years occupying seats will be charged one-half fare, computed as follows:

Where full fare is 5c - - - - Half Fare, 3c
Where full fare is 10c - - - - " 5c
Where full fare is 15c or 20c - - - " 10c
Where full fare is 25c or 30c - - - " 15c

In computing fares the zone system will be used as heretofore, and the rates given herein will apply only between points named.

Passengers getting on cars between fare points will be required to pay fare based on the last fare point passed.

Passengers leaving cars between fare points will be required to pay fare to the next fare point.

Transfers will be issued to and received from city cars without extra charge. Transfers will be good only for a continuous trip on the next car leaving the transfer point after the arrival of car from which transfer is issued. This rule will be strictly enforced and transfers must not be regarded as stop-over checks. Transfers are not transferable and will not be honored if presented by other than the original holder, nor if presented by persons entering the car at any point except regular transfer point.

Transfer Points in Dixon:—Galena and Fellows Streets; and Interurban Terminal at Waiting Room.

Transfer Points in Sterling:—Powell's Corners (for Mineral Springs Park only); and Interurban Terminal at Avenue B.

CLEMENT C. SMITH, *Vice-President.* DEAN TREAT, *Superintendent.*

New Passenger Rates of Sterling, Dixon & Eastern Electric Railway

same rate of fare as heretofore, to which they are entitled by distance.

"The financial situation of the company, also, makes it necessary to increase its earnings in every way possible so that the earnings may, at least partly, keep pace with the great increase in the cost of all materials and supplies which enter into the operation of an electric railway. The public is well informed concerning the rise in the price of everything within the last few years, and this has affected electric railways as much as any other form of business.

"When new city cars were put on in Dixon and Sterling and the service brought to that high state of efficiency which distinguished the administration of Edwin E. Downs as general manager, the earnings of the company made a marked increase over the previous earnings. The previous earnings were so low as to bring the company to the verge of financial disaster, and the improvements made at the beginning of Mr. Downs' administration were paid for by financial sacrifice on the part of the bondholders and not from earnings or surplus, as there were none. The

management hoped the increase in earnings might continue, so as to put the company on a sound financial basis and permit it to maintain that good service which is now given, but the revenue for the current year has shown no increase over last year, while depreciation and expenses have increased, and the net revenues are not now sufficient to keep this property in that good condition which will enable the management to comply with the reasonable demands of the public as to service.

"The new rate schedule will establish a through fare of 30 cents instead of 25 cents, as at present, and in making this plain statement of facts to the public the management believes our patrons will fully approve and commend its action as a necessary business proposition. The management has been slow to make even this slight change in rate, desiring to allow ample time to demonstrate whether or not the old rate could be continued. Electric railways in other parts of the United States have been forced to raise their fares. In Massachusetts even city fares have in some cases been made as high as 6 cents, and it has been found no more possible to establish arbitrary rates for electric railway fares than to establish a fixed price for any manufactured article or for the produce of the farm.

"The company's franchises in Dixon and Sterling authorize a 5-cent fare in both cities. The distance from the city limits of Dixon to the city limits of Sterling is 11.31 miles, so that the fare between these limits authorized by law is 23 cents, thus permitting a total fare of 33 cents. Transfers are given in both cities and the distance that may be traveled on a through fare from Dixon to Sterling is 15.8 miles, so that the new rate is below the rate authorized by law, both under the franchises and on a mileage basis.

"The management will endeavor to make every proper economy without impairing service and thus try to avoid any further change in passenger rates in the near future.

"In a further effort to place all the patrons of this company on an equal basis and to avoid any further changes in the fare schedule, no free transportation will hereafter be furnished to any person except those in the employment of the company. A large proportion of those now holding free transportation are undoubtedly entitled to receive it on account of services rendered to the company, but others have abused the privilege, and the demand for free transportation by persons who base their claims on even the smallest kind of service has become so pressing that it has become necessary to discontinue its use entirely by all except employees. This ruling is in accordance with the new laws regulating public utilities in New York, Massachusetts, Wisconsin and other states where it is held to be against public policy to furnish free transportation except to officers and employees, and either giving or accepting such transportation is punishable by fine or imprisonment. This subject has been discussed by the management with a number of the present holders of free transportation and they have not only cheerfully agreed with the new policy but have unhesitatingly advised a firm step in this direction.

"The officers and directors of this company desire to take this opportunity of expressing their deep appreciation of the very kindly feeling prevailing between the company and the citizens of Sterling, Dixon and the territory tributary to the company's lines."

Changes in business conditions in the territory served by this company have reduced the traffic. However, the decline in revenue, as a result of the advance in fares, has not been nearly so great as in the number of passengers carried. In the nine months ended Sept. 30, 1911, the total operating revenue was $29,823.50, as compared with $31,941.17 in the corresponding period of the previous year. This is a decrease of $2,117.67 or 6.6 per cent. The total number of fare passengers carried in the nine months ended Sept. 30, 1911, was 146,195 as compared with 177,725 in the corresponding period of 1910. The decrease is 31,530 or 17.7 per cent. Earnings per car mile were 22 cents in the 1911 period and 23 cents in the 1910 period. The decrease is equal to 4.3 per cent. There was a reduction of 1.8 per cent in the number of car miles run in the 1911 period as compared with 1910. The total of car miles in the nine months of this year was 135,762 as compared with 138,252.

CONVENTION OF THE PENNSYLVANIA STREET RAILWAY ASSOCIATION

Upward of a score of representatives of the forty-two companies holding membership in the Pennsylvania Street Railway Association attended the annual meeting held in the assembly room of the Harrisburg Club, Dec. 8. The meeting opened with a business session at 11 a. m., at which the various reports of President Charles O. Kruger, Secretary Henry M. Stine and Treasurer W. H. Lanius were read, showing the association to be in a healthy state in every respect.

These officers for 1912 were elected: President, H. R. Fehr, president Easton Transit Company; vice-president, W. A. Rigg, vice-president Reading Transit Company; secretary, Dr. Henry M. Stine, Harrisburg (re-election); treasurer, W. H. Lanius, president Hanover & McSherrystown Street Railway Company (re-election); executive committee, H. R. Fehr, W. A. Rigg, T. B. Donnelly, West Penn Traction Company; Edgar A. Titzel, general manager Conestoga Traction Company, Lancaster; R. P. Stevens, president Lehigh Valley Transit Company, Allentown; John F. Whitaker, president Lewistown, Milton & Watsontown Passenger Railway Company. Mr. Whitaker is a resident of Harrisburg.

Much interest was manifested in the presentation of a paper by S. R. Hipple, of Williamsport, general manager of the Simplex Surface Contact Company, on "The Value and Uses of the Surface Contact System." This paper was afterward generally discussed by those present. An abstract of this paper follows:

SIMPLEX SURFACE CONTACT SYSTEM

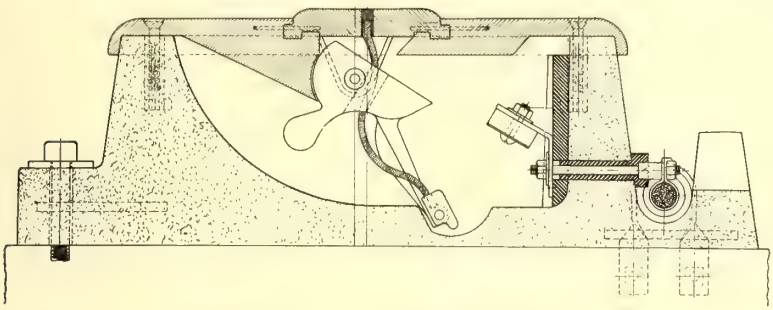
Mr. Hipple prefaced his description of the Simplex surface contact system with a brief summary of the early



Contact Boxes in Straight Track

attempts to design a satisfactory type of contact switching device. In the first experiments made by his company a section of the Lewisburg, Milton & Watsontown Passenger Railway was equipped with iron contact boxes containing two movable pole pieces and a rotating armature. This type of box was superseded by a solid brass box containing two fixed iron pole pieces and a rotating armature carry-

ing a brass contact piece which made contact with a fixed carbon brush connected to the feeder cable. The experimental car was equipped with two magnet bars made of Norway iron 20 ft. long, 2 in. wide and 1 in. thick suspended from the motor cases with wood insulators. Each of these bars carried three magnet coils each composed of 20 lb. of No. 19 cotton-covered wire inclosed in

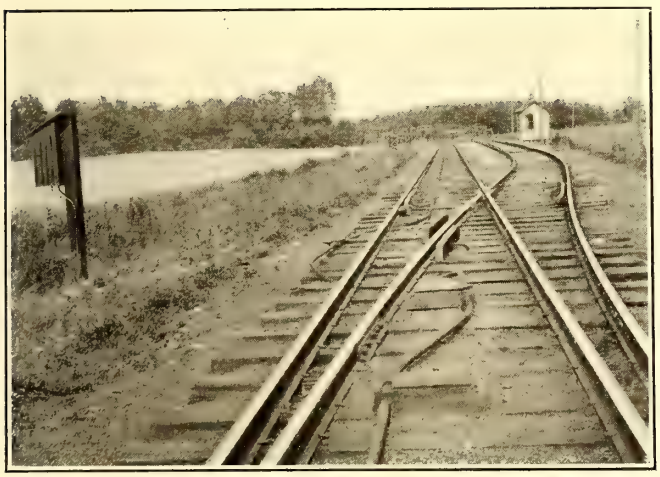


Cross-Section Through Contact Box

a sealed copper shell. The collector shoe was a long copper bar attached between the magnet bars and arranged to permit of a vertical movement of 3 in. The magnet coils were connected in series with the collector shoe.

This improved equipment was installed and put in service on April 7, 1909, and was in use until June, 1910. The experimental line was ¼ mile long and in one month as many as 1722 trips were made over the line. In the fourteen months of service the only failures were twenty broken carbon contacts caused by the impact of the armatures. After considerable experimenting "Le Carbone" brushes were adopted, as they were found in perfect condition after a test of more than 300,000 contacts.

As the result of this test the Lewisburg & Tyrone branch of the Pennsylvania Railroad, 10 miles long, was equipped with the system early in 1911 and has been in operation for the last six months. The contact boxes used in this installation are made of reinforced concrete molded under pressure. The lid is made of cast iron with a brass contact piece inserted on the top surface. The boxes can be made for less than $3 each. These boxes are bolted on top of the ties between the rails at intervals of 10 ft. and are connected to a copper strand, paper-insulated, lead-covered cable inclosed in a 1¼-in. iron pipe conduit. The car used on this branch is equipped with the type of magnet



Arrangement of Wooden Guard Rails at Switch

bars and collector shoe described above. It is a single-truck car weighing 8 tons and equipped with two GE-1000 motors. A ⅛-kw hand generator is mounted on each platform of the car to enable the motorman to energize an auxiliary magnet in order to operate the contact switches and pick up the current after it has been temporarily cut off at the power house.

The Lewisburg & Tyrone branch has six switches leading into sidings over which the car must pass. In order to prevent the loss of current while passing over the lead rail of a switch an auxiliary stud is placed in the center of the track between the adjacent contact boxes. This stud is energized automatically when the car passes over the switch by means of a solenoid switch mounted in a box on a short post at one side of the track. To prevent a short circuit between the collector shoe and the lead rail two wooden guard rails are used. This construction is shown in one of the accompanying engravings.

Tests of energy consumption on the Lewisburg & Tyrone branch show that the 8-ton car consumes 1 kw-hour per mile on a run of 10 miles, including eight stops.

CONCLUDING BUSINESS

A general discussion of the work of the association concluded the session. It was generally agreed that the change in the method of assessing the members of the association had proved beneficial. Companies holding membership now pay annual dues according to the amount of their gross receipts, instead of a certain equal amount per member.

The business session was followed by a luncheon at the Harrisburg Club, at which Mayor Royal spoke in the absence of Governor Tener, who was prevented from accepting the association's invitation because of pressure of public business. The Mayor, who has held office only a few days, stated that he was pleased to have the opportunity of getting somewhere where he was not pestered by office-seekers.

HEARING ON HEATING AND VENTILATING CARS IN NEW YORK CITY

The Public Service Commission of New York, First District, held a hearing on Dec. 8 on a proposed order to regulate heating and ventilation of surface, elevated and subway cars. This is a reopening of the former case which resulted in an order issued Nov. 24, 1910, requiring the temperature of closed cars to be maintained between 40 deg. and 65 deg. Fahr. whenever the outside temperature is less than 40 deg. Three witnesses complained that the surface cars were badly ventilated and that the previous order of the commission with regard to heating was not being obeyed. E. G. Connette, transportation engineer for the commission, described the methods of ventilating cars which had been tested in Chicago and read into the record the city ordinance of Chicago relating to standards of ventilation required in all cars operated in that city. He advocated a system of forced ventilation and heating of the fresh air as it is taken into the car.

James L. Quackenbush, counsel for the receivers of the Metropolitan Street Railway, said that on behalf of the receivers he was authorized to say that so far as the question of ventilation was concerned it was the desire of the receivers to continue the experiments they were now making, and it was their desire also to co-operate with the commission or its engineers for the purpose of finding a proper solution of the question. The Metropolitan Street Railway had received no complaints about the heating of its cars.

The hearing was adjourned to Dec. 15.

The electric railway in Rosario, Argentina, was placed in operation in 1906, and that year 2,173,358 passengers were carried. Since then traffic has increased considerably, 27,698,851 tickets being sold in 1910. The total number of tickets sold from 1906 to 1910, not including 5,400,000 passengers who were furnished with passes, amounted to 87,077,642.

Report of Committee on Passenger Traffic

An Abstract of the Report Presented at the Last Quarterly Meeting of the Street Railway Association of the State of New York—Sample Title Pages and Recommendations on Various Subjects

A report of the committee on passenger traffic was presented at the meeting of the Street Railway Association of the State of New York held at Syracuse on Dec. 6. It contains a set of sample forms for passenger tariffs for electric railways, showing various title pages and the arrangement of contents for fare schedules. These were compiled to meet the requirements of the public service commission's law of New York State and the supplementary regulations issued by the New York Public Service Commission, Second District, governing construction of passenger fare schedules and to meet also the requirements of the regulations of the Interstate Commerce Commission, as set forth in tariff circular No. 18A. The report also contains recommendations of the committee for unification of certain matters relating generally to the transportation of persons and property by electric railways.

The committee is composed of the following: J. M. Campbell, chairman; H. C. Allen, R. M. Colt, J. W. Nugent, C. H. Armatage, Charles R. Gowen and B. E. Wilson, secretary.

One page gives special instructions as to paper, type, etc., form and size of tariffs and the manner in which increases and reductions in or omission of fares, charges, rules or regulations should be indicated.

One title page is the proposed form for the first issue of a local tariff. One form shows the title page for the local passenger tariff canceling another tariff. The proposed forms of title page for local passenger tariffs issued on short notice under special permission from the commission or commissions are reproduced. The report also shows a title page for a special excursion tariff limited to a designated period of not more than three days and when the points of origin or destination do not exceed twelve in number. This form of tariff may be established on one day's notice. Typewritten tariffs may be accepted for this form. Similar pages are given for special tariffs limited to a designated period of more than three days and not more than thirty days and when the points of origin and destination do not exceed twelve in number. This form of tariff may be established on three days' notice. Typewritten sheets will also be accepted for this form of tariff.

A proposed form is shown for a title page of a tariff established in compliance with an order of the commission.

The proposed form for order of arrangement of the contents of a local tariff is divided into thirteen sections. These, together with references to recommendations of the committee under various sections, are as follows:

Section 1 is the table of contents which is to follow the order outlined by the commission.

Section 2 is the alphabetical index of points to and from which the tariff applies.

Section 3 is the explanation of reference marks and technical abbreviations.

Section 4 is the explanatory statement of fares and rules governing them.

Section 5 is the statement of rules and regulations governing the tariff. A number of recommendations by the committee are presented with this section. It is recommended that a provision be included stating that fares quoted do not allow stop-over privileges. Under general baggage regulations it is recommended that the railway companies assume no responsibility for the safety and care of baggage or other property when checks are not issued. Under baggage rules the following are recommended:

RECOMMENDED BAGGAGE RULES

"(a) Baggage will be carried only on baggage cars.

"(b) Baggage will not be checked on commutation tickets.

"(c) Baggage will only be accepted and delivered at stations on interurban lines where there is an agent in charge.

"(d) Baggage will not be checked to a point short of destination of ticket.

"(e) Baggage consists only of wearing apparel and such personal effects as may be necessary for the use and comfort of passengers while traveling; but sample or commercial baggage, tool chests and peddlers' packs may be checked subject to same conditions as ordinary baggage (see paragraph j).

"(f) No money, jewelry or other valuables, perishable property, furniture, machinery or articles of like nature will be received as baggage shipment.

"(g) Boxes, barrels, bundles of dry goods, castings, machinery and articles of like nature, which are not properly 'personal baggage,' must not be checked or carried in baggage cars, but sent by freight or express.

"(h) Parcels, umbrellas, clothing and other articles attached to baggage must be detached and delivered to owner before baggage is checked.

"(i) 150 lb. of personal baggage will be checked free on each whole ticket and 75 lb. on each half ticket.

"(j) No single piece of baggage weighing in excess of 250 lb. will be checked.

"(k) Baggage agents will require passengers to show their tickets before checking baggage and will not under any circumstances check to points beyond the destination of the ticket, or by any other route than that by which ticket reads. On passes, or combination of tickets and passes, baggage may be checked through to destination, except in cases where transfer is required at junction stations, then baggage should not be checked beyond such stations.

"(l) When checking a piece of baggage the strap and duplicate checks must match and the destination of same must correspond with that printed on ticket held by passenger."

Careful instructions as to collection for excess baggage are included and a full statement is made as to the baggage liability of the company and storage of unclaimed baggage. The committee advises a charge in all cases for parcel checking. A reference to the redemption of unused or partially used tickets is included.

This section also contains extracts from the law relating to the compilation of fare tables. It says that a joint fare may not be made which includes hotel accommodations or admissions to entertainments. Tariffs may contain such fares, but must show separately the carrier's portion of such fares and this portion of fares must be alike to all regardless of whether or not the passenger purchases a ticket including the other accommodations mentioned.

ONE-WAY FARES

Section 6 includes rules and regulations governing one-way fares. The recommendations of the committee relating to children are that not to exceed three children under five years of age when accompanied by an adult be carried free and that regular half fare be charged for each additional child. Children between five and twelve years of age should be charged one-half the one-way regular adult fare. No fare should be less than 5 cents unless there is a franchise restriction. The issue of transfers

should be governed by such regulations as are local to the issuing carrier. It is recommended that for all cash fares amounting to 11 cents or over a duplex ticket be issued by the conductor to each passenger with an excess of 5 cents, the excess to be refunded to the passenger at any ticket office upon surrender of the receipt within three months of the date of issue.

Section 7 contains rules and regulations governing round-trip fares. The recommendations are the same as under Section 6.

Section 8, relating to commutation ticket fares, contains the recommendations of the committee that a forty-six-trip school ticket be sold subject to certain protective conditions and with the provision that the tickets are not to be accepted on Saturdays, Sundays or legal holidays. The committee recommended that a fifty-four-trip, non-transferable regular commutation ticket book be sold good for thirty days from the date of sale.

P. S. C.—2 N. Y. No. 2 (Cancelling P S C.-2 N Y.-No. 1.) I. C. C. No. 2 (Cancelling I C C No 1.)

Only one supplement to this tariff may be in effect at any time.

NEW YORK AND MEXICO RAILWAY

LOCAL PASSENGER TARIFF

APPLYING IN BOTH DIRECTIONS

BETWEEN

POINTS LOCAL TO ISSUING CARRIER

AS SHOWN WITHIN

EFFECTIVE JANUARY 1, 1912.

Issued December 1, 1911

Approved: By J. L. SMITH

M. D. JONES, General Passenger Agent

General Manager Washington, N. Y.

New York Report—Title Page for Model Local Tariff, Second Issue

P. S. C.—2 N. Y. No. I. C. C. No

Only one supplement to this tariff may be in effect at any time.

(NAME OF COMPANY IN FULL)

IN CONNECTION WITH

PARTICIPATING CARRIERS AS SHOWN WITHIN

JOINT PASSENGER TARIFF

APPLYING FROM

STATIONS ON ..... (Name of Company)

TO

STATIONS ON . . . (Name of Company) . . . . .

STATIONS ON ..... (Name of Company). . . . . .

STATIONS ON . . . (Name of Company) . . . . . .

OR

DESCRIBE, BY STATE NAMES, THE TERRITORY IN WHICH DESTINATIONS ARE LOCATED AS SHOWN WITHIN

Effective . . . . . (Date) .

Issued.....(Date) .

Approved: By . . . . . (Name) .

. . . . (Name) . . . . . (Title) .

. . . (Title) . . . . . (Address)

New York Report—Title Page for Joint Tariff for More Than Two Companies

Section 9, relating to mileage books, includes a recommendation of the committee that such books be sold at all stations where ticket offices are maintained and that the rules and regulations governing such tickets be stated. In cases where interchangeable ticket books are accepted a statement to that effect should be shown.

CHARTERED CAR SERVICE

Section 10 states the rules and regulations, including recommendations of the committee, for chartered car rates. It is recommended by the committee that the statement be made that chartered car service is at all times subject to the convenience of the company and that orders of agents are not binding upon the company until accepted by the general passenger agent. Chartered car service should be limited to the time the car is in operation from the start to destination and should not include lay-over time or time between outbound and return trips. If the car is required for use during the lay-over time an additional charge of $5 per hour should be made. The cars should be chartered, the committee recommends, on the express condition that not more than a certain number of passengers be carried for the amount and that for any additional passengers a pro rata charge should be made.

Section 11 relates to the charge for transportation of dogs in baggage cars. It is recommended by the committee that this section state that, at the discretion of the company, dogs on chains, when the value does not exceed $25 and when accompanied by a caretaker, be transported in baggage cars at a minimum charge of 15 cents for a haul not to exceed 15 miles and of 25 cents for any greater distances.

Section 12, applying to the charge for the transportation of corpses, includes the recommendation of the committee that this charge be $2.50. A passenger should be in charge and a transfer permit from the Board of Health or other proper authority should be furnished. In case of death from contagious diseases the corpse should be accepted only when placed in a hermetically sealed casket.

Section 13 is devoted to the charge for the transportation of newspapers. The committee recommends that arrangements be made for transportation on passenger cars, for delivery at stations where agencies are maintained, of packages of daily newspapers at 25 cents per 100 lb. or fraction thereof. Advertising tracts, weekly newspapers, magazines and pamphlets and similar publications will be handled as express matter only.

A proposed form is shown for a local and joint tariff containing local fares and including arrangements which constitute joint rates. The committee also shows a proposed form for the order of arrangement of contents of such a tariff. Its recommendations are in general the same as those described for the local tariff. A sample

form for a joint tariff for two companies is shown, together with a proposed form for more than two companies. The title page of the latter is reproduced on page 1241. The form for the order of the arrangement of contents of such a tariff is also similar to that shown for the local tariff. The report also gives a proposed form for an interdivision tariff. It states that the use of such tariffs will be optional with carriers and states the order of arrangement of contents.

A complete model for the local tariff, second issue, is shown with a statement of the contents, together with recommendations of the committee. The title page is reproduced on page 1241.

OPINION OF COMMISSION ON WHICH NEW YORK TRANSFER ORDER WAS BASED

Reference has been made previously in the Electric Railway Journal to the order of the Public Service Commission, First District, New York, directing the surface railways which operate in the Borough of Manhattan to restore free transfers at 151 points at which transfers were issued prior to 1908. The history of the proceedings is reviewed in the printed opinion of the commission, just published. On July 11, 1911, the commission, after holding public hearings, adopted an order requiring connecting or intersecting street railways in Manhattan to establish through routes and joint rates either by transfer or the operation of through cars before Aug. 10, 1911. In this connection the commission says:

"The commission directed the companies to fix the rates and to notify the commission on or before Aug. 10, 1911, whether the routes and rates had been established, what the rates would be and what portion of such rate each company or its receiver would receive. At the adjourned hearing on Aug. 5, 1911, it appeared that the companies were willing to establish through routes and a joint rate of 8 cents for one transfer and 10 cents for two transfers, but did not wish to establish this rate and put it into effect if the commission was of the opinion that this rate when established would be unsatisfactory. The commission considered the companies' suggested rate, and the hearing was continued to determine what were just and reasonable rates for through transportation. * * * The suggested 8-cent and 10-cent joint rate was never established by the companies."

Continuing, the commission says in part: "This inquiry has been mainly directed to ascertaining the results of the transfer system in use prior to 1908, what the effect of the curtailment of the transfer privilege has been, and what will be the probable effect of a return to the free transfer system properly restricted. That the curtailment of the transfer privilege in 1908 worked a great hardship to many and was a great inconvenience to many more is shown by the testimony and is generally conceded. Industrially the city had become adjusted upon the basis of a 5-cent fare with free transfers. The failure of the public to use to any considerable extent the 8-cent and 10-cent joint rate now in operation on Fifty-ninth Street convinces us that if transfers are to be ordered between the several companies or systems at all they should be ordered in such a manner as to make possible transportation for a 5-cent fare.

"In 1907 and 1908 receivers were appointed for nearly all the surface lines in Manhattan and, as each line or system was severed from the unified system, transfers were abolished until finally there were 151 points at which passengers who had formerly received transfers were obliged to pay an additional fare. The dismemberment of the system was expected to place the companies upon a sounder financial basis and the curtailment of the transfer privilege was urged as a means of increasing the revenues of the companies.

"The withdrawal of transfer privileges occurred at various dates, the most important changes having taken place on April 11, 1908. The total number of free transfers reported by the combined Manhattan surface companies in each fiscal year from 1907 to 1910 follows: 1907, 194,820,920; 1908, 196,672,167; 1909, 139,607,266; 1910, 139,011,581. The discontinuance of transfers was effected too late in 1908 to reduce the aggregate number of transfers in that year below that of 1907, but its full effect appears in 1909, when the number of transfers was 55,000,000 smaller than in 1907.

"Direct comparison should be made between the fiscal year 1907, when universal transfers were issued, and 1909, during the greater portion of which the limited transfer system was in full operation. The figures in Table I, which was compiled from the sworn reports of the companies, afford the comparison:

Table I.—Results in 1909 as Compared with 1907.

	Year Ended June 30, 1907.	1909.		
Passenger car miles	57,676,104	55,255,497	Dec.	2,420,607
Free transfers	194,820,920	139,607,286	Dec.	35,213,654
Paying passengers	377,017,192	362,077,663	Dec.	14,939,527
Amount of fares	$18,810,457	$17,997,252	Dec.	$813,205
Operating expenses (total)	11,383,557	13,326,858	Inc.	1,943,301
Maintenance	$2,556,813	$4,098,627	Inc.	$1,541,814
Power supply	1,280,760	1,188,413	Dec.	92,347
Operation of cars	5,045,804	5,213,126	Inc.	167,322
General	2,500,180	2,826,692	Inc.	326,512

DECREASE IN FARE PASSENGERS

"From this comparison, it appears that any expectation which the receivers of the companies, or the court which authorized the abandonment of the transfers, may have entertained that the restriction of transfer privileges would transform millions of free passengers into paying passengers was not fulfilled. Instead of an increase of passenger revenue there was an actual decrease of $813,205 or approximately 15,000,000 pay passengers.

"If then the roads did not increase their revenue by the relinquishment of transfers, any financial improvement in their operations must be looked for in a reduction of expenses. The foregoing comparison between 1907 and 1909 shows, however, that there was no reduction in operating expenses, but an increase. The causes of such increase are numerous and involved and it is neither profitable nor necessary to enter into a detailed analysis thereof. The 'operation of cars,' however, is in very close direct relation to the amount of car service rendered as expressed in the number of car miles. But notwithstanding a reduction in the car service in 1909 to the extent of 2,420,607 car miles, as compared with 1907, there was no saving in this group of expenses.

"So far as the question of transfers is concerned, it is really unnecessary to discuss the causes of the increase in operating expenses, since there is a much simpler test of the financial consequences of changes in the transfer system. Such changes affect expenses only through the car mileage required to care for the traffic that offers itself. Changes in the volume of traffic will not ordinarily affect the cost per car or per car mile in any considerable degree. The cost per car mile is the same whether the passengers carried are transfer passengers or revenue passengers, and any change in the car-mile cost must be a change due to conditions that would have existed whether transfers were or were not given as before. If any gain in net revenue is to result from a change in the transfer system it must result from an increase in the *passenger receipts per passenger car mile*. The amount of fares remaining the same or increasing, there will be an increase in the passenger receipts per car or car mile with each reduction in the car mileage and a corresponding increase of the net revenue per car mile. No financial gain will be obtained in any other way; and if, therefore, the abolition of transfers benefited the street railway companies that benefit would appear in the ratio of the passenger receipts to passenger

car miles. Both of these items are absolutely definite and not a matter of opinion that could lead to any dispute.

"In 1907, when the free transfer system was in full effect, the companies gave 195,000,000 free transfers, collected $18,810,457 in fares, and ran 57,676,104 passenger car miles to carry the traffic. The passenger receipts therefore averaged 32.61 cents to the car mile. In 1909 the companies gave only 140,000,000 free transfers, collected less than $18,000,000 in fares, and operated 55,255,497 passenger car miles. The passenger receipts in 1909 averaged 32.57 cents per car mile, showing a small decrease over 1907.

"The net passenger revenue of the companies so far as it was affected by changes in the transfer system having been approximately the same per car mile in 1909 as in 1907, the total net returns from passenger traffic in 1909 would be reduced in the same proportion that the total car mileage was reduced. As 2,420,607 fewer car miles were operated in 1909, after the reduction in the volume of traffic effected by the restriction of transfer privileges, than in 1907, the total loss in net would amount to approximately $240,000. This figure is not exact, but is a sufficiently close estimate for all practical purposes.

"But the investment, which receives its return out of net revenue, would not be reduced in anything like the proportion in which car service was reduced. "Fixed charges" are incapable of such close control as wages, fuel and supplies. A large portion of the taxes and even of operating expenses likewise remain constant. This fact explains why the owners of these properties suffered an actual loss as a result of the decrease in net revenue that followed the reduction in the volume of traffic when passengers who had formerly ridden on transfers refused to pay two fares. The majority of such passengers either walked to their destination from the former transfer point, or took a more roundabout journey (making a longer haul for the street railways), or were driven to the subway or elevated lines.

"The economic principle upon which railroad traffic managers have erected the existing structure of freight rates in the United States is to the effect that all traffic is profitable which reimburses the carriers for the direct costs of movement and leaves a surplus to apply toward the heavy fixed charges of all classes, including maintenance and administration as well as interest. Essentially the same principle underlies the movement in the direction of consolidating the traction companies in New York County and promoting traffic by the establishment of a universal 5-cent fare for a single continuous trip in one general direction. The principle is still followed in Brooklyn, where the net revenues of the companies have steadily increased. It it still followed in the Borough of the Bronx and has brought to the carriers large increases in traffic that are admittedly profitable. The through trip for a single fare has become universal in Chicago quite recently and has contributed to the prosperity of the companies. It has been introduced on the Twenty-eighth & Twenty-ninth Street Crosstown Railroad in the Borough of Manhattan and other lines on which Third Avenue cars are operated, and in many cases has turned operating deficits into surpluses.

REGULATION TO REDUCE ABUSES

"No order of the commission should hamper the companies in their efforts to collect a fare for each separate journey. There is no valid reason whatever why a passenger should expect the establishment of such a loose and unrestricted system of transfers as will permit a round trip to be made for a single fare, and we are confident that the management of the several companies, by proper regulation, can greatly reduce the abuses which existed in 1907. We believe the convenience of the public will be served and that practically all parts of the borough can be reached if the passenger is allowed one transfer to a foreign system and a re-transfer to another line of that foreign system or to another line of the company or system from which he obtained his first transfer. A transfer privilege that will permit of a journey consisting of three separate rides and yet involve only two railroad systems in the division of the 5-cent fare will in our opinion serve the public convenience, facilitate an equitable division of the fare of 5 cents, and in some measure make it easier to prevent an abuse of the transfer privilege. Owing to the fact that transfers are now given from crosstown lines of one system to north and south lines of the same system at points of intersection, the addition of one foreign transfer, by which is meant a transfer to the lines of an independent system, will enable passengers for 5 cents to make a trip to almost any part of the borough. The lines of the same system under the limitation of the transfer privilege outlined above may be used for any two rides of a three-ride journey, and the passenger will be entitled to all transfers now required by law or by agreements of the companies.

"We believe that with this limitation transfers should be ordered at the 151 points shown in the schedules attached to the order of July 11, 1911, at the maximum rate of 5 cents for a continuous trip in one general direction. The order should take effect Jan. 1, 1912, and should remain in force one year from the time the said joint rate is actually in operation, and the companies should be directed to agree upon the division of the joint rate and to notify the commission of their agreement not later than Feb. 10, 1912."

The opinion of the commission contains a summary of operation of the street railways in Manhattan for 1907, 1908, 1909 and 1910, shown in Table II.

The Metropolitan Street Railway, Third Avenue Railroad, Second Avenue Railroad and Central Park, North & East River Railroad have all applied to the commission for a rehearing of the case on the grounds that the order is unjust and unwarranted and was made without having due regard to a reasonable return upon the value of the property or the necessity of keeping a reserve fund for renewals and contingencies; also, that enforcement of the order would make it impossible to earn an adequate return on the property or to provide a proper reserve.

On Dec. 13 the commission denied these applications of the companies for a rehearing.

TABLE II.—MANHATTAN STREET SURFACE RAILWAYS—OPERATIONS 1907-10.

Fiscal year ending June 30—	1907.	1908.	1909.	1910.
Passenger car miles	57,676,104	60,605,040	55,255,497	55,425,835
Revenue car miles	57,908,873	60,719,724	55,257,284	55,426,013
Transfers (free)	194,820,920	196,672,167	139,607,266	139,011,581
Revenue passengers	(a) 377,017,192	366,690,345	362,077,665	375,888,469
Amount of fares	$18,810,457.44	$18,228,979.04	$17,997,252.35	$18,677,788.07
Revenue from transportation	18,860,382.23	18,266,160.39	17,999,309.11	18,678,033.07
Operating expenses, exclusive of maintenance	8,826,744.60	9,468,620.20	9,228,231.50	8,876,933.67
Operating expenses (total)	11,383,557.28	13,817,673.34	13,326,858.06	12,840,596.65
Maintenance of way and street	$945,747.45	$1,476,035.89	$1,813,015.12	(b) $2,369,397.94
Maintenance of equipment	(c) 1,611,065.23	2,873,017.25	2,285,611.44	1,594,365.04
Operation of power plant	(d) 1,280,760.51	1,328,858.94	1,188,413.52	1,130,701.62
Operation of cars	5,045,803.68	5,591,127.36	5,213,125.74	(b) 5,300,073.81
General expenses	2,500,180.41	2,549,633.90	2,826,692.24	2,446,158.24

(a) Reports show "passengers carried, including transfers," of an aggregate number of 571,838,112.
(b) The items cleaning and sanding track and removal of snow and ice reported under maintenance of way and structures are here included in operation of cars as in former years (total amount $311,649).
(c) Includes renewal of horses; other power expenses, variously classified in the returns, are included in operation of power plant.
(d) Less power sold (see also preceding note).

Provisions of the New Detroit Ordinance

Details of the Pending Franchise Contract—Lower Rates of Fare and Relief from Costs of Maintenance of Paving and from Special Forms of Taxation

The new Detroit United Railway ordinance which is now under consideration by the committee on franchises of the Detroit City Council was submitted to the Council on Nov. 28, 1911. As explained in the Electric Railway Journal of Oct. 28, 1911, this ordinance is supplemental to the Detroit railway ordinance, which was approved on Dec. 4, 1894.

Section 1 of the new ordinance declares that the present measure is supplemental and subject to every provision of the ordinance of 1894 and the amendments thereto, except as modified by the new measure. Permission is granted to the Detroit United Railway to construct, own and operate street railways on the streets, avenues and public places in the city now occupied with street railway tracks and on such others as may from time to time be designated by the City Council, and to operate thereon street and interurban passenger and mercantile express cars.

Section 2 says that, except as modified by the new measure, the ordinance of 1894 and amendments continue in full force, and, as so modified, shall determine the rights and obligations of both the city and the grantee under the ordinance.

Section 3 provides that all franchise rights to construct, own and operate street railways within the limits of the city as of 1911, whether perpetual or claimed to be perpetual, indefinite as to termination or in any manner extending beyond 1924, whether held by the grantee or others, shall terminate at midnight on Dec. 4, 1924. All of the franchise rights are otherwise modified as provided in the ordinance. The grantee assumes and guarantees the fulfilment of the obligations of this section.

Section 4 provides that the fare for a single ride shall be 5 cents or a ticket which shall be sold on the cars in strips of six for 25 cents, or, between the hours of 5 a. m. and 8 p. m. or such time as may be adopted by the city, a ticket sold on the cars in strips of eight for 25 cents. A passenger, upon the presentation of a fare, may demand a non-transferable transfer good for a continuous ride over any other route if presented at the first intersecting or established transfer point for the other route within fifteen minutes. The grantee may enforce rules so that no transfer shall entitle the passenger to a return trip.

FARE AND TRANSFER LIMITS

Section 5 stipulates that the fare and transfer provisions are limited to the routes operated by the grantee within the city limits as of the year 1911; routes hereafter constructed and operated within the city limits; routes to and from the present log cabin entrance to Palmer Park, and so much of all routes extending beyond the limits as have now city service cars regularly operated thereon for a single city fare.

Section 6 states that the fare for a single ride over any route or part thereof on any car designated as an interurban car and operating for more than 5 miles beyond the city limits on any regular interurban route shall be 5 cents, and transfer slips to and from such cars shall be given.

In Section 7 it is stipulated that the city shall lay and maintain the pavement and foundations as specified in the ordinance to which this is supplemental, or annually contract therefor, or may require the grantee to lay and maintain the pavement and foundations at the actual cost of labor and material plus 10 per cent for the use of tools and equipment. Should the city neither do the work nor contract with another to do it nor require the grantee to do it, and the necessity for it be admitted by the Department of Public Works of the city, the grantee under certain conditions may proceed to do the work and its bill shall be paid at the actual cost of labor and material plus 10 per cent for the use of tools and equipment. The city shall from time to time specify the character of the materials and the design and supervise the construction. Should any emergency arise requiring the repair of a foundation and the necessity for it be admitted by the Department of Public Works, if the city does not do the work or require the grantee to do it, the grantee may proceed to do the work and its bill shall be paid at the same rate.

Right to the City Council is reserved under Section 8 to make by ordinance such reasonable rules as may from time to time be deemed necessary to protect the interests, safety, welfare or accommodation and running of cars for the public, provided that the cars on each route shall be run not farther apart than ten minutes except between 10 p. m. and 5 a. m., and provided also that such additional service may be required as the Common Council may ordain and the volume of traffic demand.

For the convenience of the public Section 9 gives the grantee the right to rearrange or change the existing routes, provided that the old routing shall be restored on demand of the Common Council.

CONDITIONS OF CITY PURCHASE

In Section 10 the conditions under which the city is given the right to purchase and the grantee binds itself to sell are set forth. Whenever the city shall be authorized to acquire, own and operate a street railway it shall, after six months' written notice, have the right to purchase as a single system all the railway property existing at the time of purchase necessarily required for the maintenance and operation of all the lines theretofore constructed within the city limits as of 1911, at a price and on terms which shall be agreed upon between the city and grantee or determined by appraisal. The grantee agrees to give a good and marketable title to the railway property. If an agreement upon the purchase price and way of payment has not been reached during the six months following the notice given by the city, a board of appraisal to determine the same shall be appointed, consisting of two members appointed by the grantee, two by the Common Council on the nomination of the Mayor, and one member by the four thus selected. In case of neglect or failure to secure these members, the appointments to the board shall be completed by the Circuit Court of Wayne County.

The conditions by which the board is to be bound in its determination of the purchase price are set forth in Section 11. The date taken for the determination of value shall coincide with the date upon which the purchase price is fixed. It shall not allow any value for any franchise right created by this ordinance. It shall not allow any value for foundations and pavements and change of grade work heretofore constructed or paid for by the grantee or its predecessor other than that value which shall have been fixed by the board of valuation. It shall not allow any value for foundations and pavements and change of grade work to be constructed or paid for by the grantee other than the value agreed upon in the ordinance. It shall value every valid and lawful franchise right obtained prior to and existing at the date of passage of this ordinance, but in no case to a date beyond Dec. 4, 1924. It shall allow for land included in the railway property its fair market value. It shall allow for all other property, including buildings, its fair value for street railway purposes, taking into consideration cost and natural depreciation.

The board shall require the city to pay the purchase price as follows: (a) In cash, or (b) partly by assuming mortgage lien less than purchase price and remainder in cash, or (c) by assuming a mortgage lien equal to purchase price, or (d) by assuming of a mortgage lien greater than purchase price so much as will equal the purchase price when the grantee assumes the remainder and gives security to the satisfaction of the board for the city's protection against the remainder. The grantee has the right to elect which of these ways of payment will be required. The purchase price and terms agreed upon shall be binding on both parties and shall be submitted to a referendum vote. If this vote disapproves the terms, the right to purchase shall continue as if no action had been taken. If the award is approved by the vote, the board shall reconvene and survey the property to adjust the price in accordance with changes made in the interval. If the grantee refuses to comply with these provisions or to proceed with the appraisal of the railway property it is agreed that the Circuit Court of Wayne County, sitting as appraisers upon application of the city, may determine the value and the way of payment. Certain conditions are named which will be effective in case the city should acquire and hold the property for a while and then restore it to the grantee. The grantee, within six months after approval of the ordinance, shall file with the city comptroller a bond to run until Dec. 4, 1924, to the city of Detroit in the sum of $1,000,000 on the condition that this sum shall be paid to the city as damages if, upon default in making tender, as provided, possession of the property is not given on demand to the city or if, the city being in possession either under terms of purchase or because of the failure of the grantee to make a tender, and the city not being in default on the terms of purchase, possession by the city shall be lost by reason of the failure of the grantee to protect the possession of the city from any mortgage lien on railway property not assumed by the city.

It is further stipulated that the grantee shall pay to the city $5,000 as damages for each day that the city, after payment, is prevented from possessing itself of the property.

In Section 12 it is stipulated that the right to purchase and the agreement to sell are continuing, and that if by Dec. 4, 1924, the city has not purchased the property, the right to do so shall continue so long as the city permits the grantee to operate its cars in the city.

Section 13 provides that the right to purchase shall not be construed as giving to the city any present right in the property.

PAVEMENT A CAPITAL INVESTMENT

In Section 14 it is stated that the pavements and foundations and change of grade work existing in 1911 and heretofore constructed or paid for by the grantee or its predecessors, and such as may be hereafter constructed or paid for by the grantee, shall be considered as a capital investment by the grantee, and if the railway property is purchased by the city the grantee shall be reimbursed for that investment. The city's obligation to maintain and repair foundations and pavements when this ordinance goes into effect immediately applies to all existing foundations and pavements.

Section 15 states that within one year after the adoption of the ordinance the city and the grantee shall determine by a board of valuation the present value of the foundations, pavements and change of grade work within the city limits heretofore constructed or paid for by the grantee or its predecessors. This value shall be the capital investment therefor.

In Section 16 the membership of this board of valuation is described. One member shall be appointed by the Common Council on the nomination of the Mayor, one by the grantee, and the third by the two thus chosen. Failure to make appointments or fill the place of the third member shall call for action by the Circuit Court of Wayne County.

Section 17 states that if the city purchases the property the purchase price shall, with interest, include the actual cost of labor and material, plus 10 per cent for the use of tools and equipment, for foundations and pavement hereafter constructed at the expense of the grantee under its legal obligation or under the terms of the ordinance to which this is supplemental, or under the terms of the agreement made for additional tracks in 1911.

Section 18 says that the grantee may construct all necessary switches or single track lines, cross-overs, etc., necessary or proper for the operation of its lines or to connect the tracks with carhouses, shops, etc. It may connect at points of intersection with suitable curves all tracks constructed, maintained and operated by it.

The terms on which interurban passenger and mercantile express cars from interurban lines of the grantee shall be permitted to enter and leave over the city lines, in case of city purchase, are given in Section 19. This right extends until Dec. 4, 1924. The city shall, while the interurban passenger cars are operated over its lines, man them, collect and retain the fares for passage on its lines and pay to the grantee a rental of 2½ cents per car mile for use of the cars. The grantee shall, at its own expense, man the express cars, conduct the express business and pay the city a rental of 15 cents a car mile for the right to operate over the city lines.

Section 20 provides that the grantee shall at its own expense change the grade of its right of way wherever the Common Council shall direct a separation of grades. It shall perform the work of removing tracks and trolley wires and of the reconstruction thereof, including pavement between the outer rails of the tracks, and shall also bear its equal proportion, based upon the number of railway companies engaged in the work, of the cost of subdrainage and sub-work and laying and relaying of any pipes made necessary by the change of grade. If the city purchases the railway property, the price shall, without interest, include the actual outlay therefor, if done by contract, or the actual cost of labor and material plus 10 per cent for the use of tools and equipment of all work hereafter occasioned by such change of grade, whether done under this ordinance or under the contract for a general separation of grades entered into between the parties on or about June 30, 1903.

Section 21 states that all work performed by the grantee in streets, avenues and public places shall be under the supervision of the Department of Public Works.

RESTRICTIONS AS TO TAXES

Section 22 says that the grantee shall pay taxes on its real estate and personal property, including rolling stock, tracks, wires, poles and motors, the same as an individual, provided, however, that in consideration of the reduced rate of fare fixed by the ordinance and the right to purchase and the agreement to sell and other valuable considerations the franchise granted by the ordinance or any existing franchise, earnings, foundations and pavements of the railway shall in no manner be subject to taxation by the city; nor shall any license fee, express car or interurban car fee, rental fee or other tax to which the real and personal property of individuals is not subjected be laid by the city.

Section 23 provides that the grantee shall complete in 1912 certain additions agreed upon in 1911 and construct certain other lines. Thereafter the grantee shall construct and operate within the limits of the city, as of the year 1911, such lines of railway on other streets and such extensions of or connections with existing lines as the Common Council may demand on a two-thirds vote, and which as to engineering practicability shall be certified by the city engineer, provided the demand in miles shall not exceed an average of 5 per cent per annum of the then existing city street railway system.

Section 24 provides that the grantee shall do the paving on certain streets in 1912 at its own expense. If the city purchases the property, the purchase price shall, without interest, include the actual cost of labor and material for this work plus 10 per cent for the use of tools and equipment.

Provision for street railway facilities to and from the new Michigan Central Railroad station is authorized by Section 25.

LITIGATION TO BE DISCONTINUED

By Section 26 all claims in dispute between the parties are, in consideration of the agreement, canceled. All litigation between the parties shall be discontinued and the grantee is obligated under the agreement to obtain discontinuance within ninety days of the suit instituted by the Guaranty Trust Company of New York against the city of Detroit and other defendants.

Section 27 states that the grantee shall have no property right in foundations and pavements hereafter constructed at the city's expense beyond that expressly stated.

It is stipulated in Section 28 that if the city acquires the railway in any manner other than as provided in the ordinance no value shall be placed on this grant, but the grantee shall be entitled to the value of any existing and previously obtained grant to the same extent as if this grant had not been made.

Sections 29 to 32 relate to the exercise of the powers and duties by city officers or boards substituted by law for those now existing, the right of the grantee to transfer privileges to successors, the protection of the rights of the city if any present disabilities shall be removed hereafter, and the right of either party to record the ordinance.

Section 33 makes punishable upon conviction by a fine of not to exceed $300 and costs any violation of the requirements of the ordinance.

In Section 34 it is stipulated that the agreement is indivisible.

The ordinance, according to Section 31, is to take effect thirty days after approval by a referendum vote, if the grantee, within ten days, files its written acceptance and delivers a bond of $100,000.

PROGRESS BULLETIN ON THE KEOKUK DAM

The Mississippi River Power Company, Keokuk, Ia., has just issued its Bulletin No. 4. It shows in a very comprehensive way the progress that has been made on the great undertaking of this company up to Nov. 15, 1911, and contains thirty-two pages of photographs and descriptive matter. One interesting fact noted is that the construction work on both the Illinois and Iowa divisions of the water-power is proceeding rapidly, although the river is higher at this time of year than it has been since October, 1881. This high stage of water was anticipated on the Iowa division, where the cofferdam surrounding the power house and lock site was built to withstand all ordinary floods. The cofferdams on the Illinois division are much smaller, with a full expectation that the ordinary rise in the river will overflow them and temporarily interrupt the progress of the work. The construction of the piers and arches of the dam is so far advanced that these interruptions cannot delay the completion of the entire plant. Already sixty-nine of the 119 arches have been completed. The construction of the power house substructure on the Iowa division is progressing up to expectation, and about one-half of the foundation is now complete.

Notwithstanding the strike, which is estimated to have entailed the loss of $15,000, the receipts of the municipal tramways of Johannesburg, S. A., for 1910-11 totaled $1,560,000. Passengers increased from 5,707,588 to 6,840,518, and the miles run from 582,687 to 711,120.

REPORT OF THE RAILROAD SECURITIES COMMISSION

The report of the Railroad Securities Commission, appointed in August, 1910, to investigate questions pertaining to the issuance of stocks and bonds by railroad corporations, was transmitted to Congress on Dec. 11. In his letter of transmittal to Congress President Taft states that he heartily concurs in the recommendations it contains and urges that appropriate action be taken to carry these recommendations into effect. The commission was composed of Arthur T. Hadley, chairman; Frederick N. Judson, Frederick Strauss, Walter L. Fisher, Balthasar H. Meyer and William E. S. Griswold, secretary.

In the letter transmitting the report to the President, Chairman Hadley states that the commission has not considered the comparative merits of governmental ownership of railroads and private ownership under governmental regulation, nor has it attempted to enter into the discussion regarding control of railroad rates, except as to their relation to the issue of securities. The report of the commission is brief. An abstract follows:

"While for brevity the language of the report is confined largely to railroads, the discussion and recommendations apply generally to the other agencies of communication and transportation enumerated in the act to regulate commerce.

"As far as concerns the immediate action of Congress, we believe that stringent provisions regarding publicity of stock and bond issues, which will show how far the laws are obeyed and will enable the federal government to hold the railroad officials responsible for the consequence of not obeying them, will be more salutary and more effective than any new statutory demands. We also believe, however, that the time is near when the difficulties of the present system of dual control by federal and state governments and the conflict of state laws will become so manifest that further legislation on the subject will be imperative.

"If the owner of stock, having a certain share in the ownership of the property, acted unwisely and fared badly, he has no claim that the public should indemnify him. If he did well, the public cannot either rightly or wisely fail to recognize and reward his foresight, so long as his road is managed with proper regard to the interest of the community and for the development of the traffic which it carries. The tendency to ignore the conditions under which stock is issued has led lawmakers to lay too much stress on keeping down the nominal amount of stock and too little upon getting the actual amount of capital needed and having it properly used.

"Evasion of the letter or spirit of the law regarding capital stock has been frequent where the strictness of the law has interfered with the construction of railroads in new communities. The liability of evasion of a federal law requiring full payment of all stock issues, without special machinery to enforce it, might be greater than in the past, because in some parts of the country a statutory requirement of this kind imposed by the federal government would be regarded as an interference with the rights of the several states; and local companies attempting to build new lines with stock not fully paid might have the support of local public sentiment in so doing.

"As a mere matter of expediency, the time is not ripe for any immediate or forcible transfer of jurisdiction from the several states to a national authority. In place of any added federal requirements concerning payment for capital stock, the commission recommends the adoption of provisions regarding publicity which will show the actual facts regarding stock and bond issues in the several states and the consideration received therefor. The companies must make it plain to the investor to-day and to the public to-morrow how much of their liability was represented by cash assets contributed and how much consisted of what is called in English balance sheets 'nominal additions to capital.'

"In an effort to secure publicity regarding railroad securities, two courses lie open: Either to require the express sanction of some administrative body, presumably the Interstate Commerce Commission, before such securities are issued, or to rely on general statutory provisions under which the directors may issue such securities and be held responsible for their proper use. Either alternative would involve the valuation of property and services whenever such valuation may become necessary in establishing the integrity of the financial transactions involved. Authorization in advance would tend to create an impression on the part of the investing public of a guarantee or official recognition of values which no administrative authority can safely give. The absence of such recommendation by this commission is intended to make it clear that no such guarantee should be given.

"If a valuation of railroads is made, an attempt to scale down old securities is clearly out of the question. Apart from the obvious constitutional difficulties of such a course, considerations of public expediency of themselves forbid it. The direct loss from the unsettlement of legal and equitable relations would be very great. The indirect loss from the withdrawal of confidence in American railroad investments would be immeasurable.

"One of the evils has been that bondholders were at times deluded into the belief that there was a security behind their bonds which did not exist and that the railroad company was mortgaging a piece of property when it was only capitalizing an expectation.

"It is essential that the stock should be what it purports to be. That is to say, if it purports to represent $100 paid in on every share, $100 should be actually paid in. If it purports only to be a participation certificate giving a proportionate interest in any profits that may be earned, it must be understood that this is its essential character, and that if it claims any further rights than this, it must prove them by specific evidence.

"The most important advantages arising from a permissive federal incorporation act would be: (1) The right to construct lines needed for interstate commerce, under proper regard for local needs, but without the agency of local corporate organizations; (2) the right to have rates supervised by a single authority which could pay proper regard to the mutual relations of local traffic and interstate traffic, instead of two separate authorities dealing with the two things independently; (3) an equitable system of taxation which would distribute to the several states their proportionate parts of taxes levied on both the tangible and intangible property of the railroad by a harmonious plan.

"We do not believe that the retention of the $100 mark, or any other dollar mark, upon the face of the share of stock is of essential importance. The issue of stock without par value offers special facilities for consolidation and reorganization.

"No attempt should be made by statute to limit railroad profits to a fixed percentage or to treat a high cash dividend as necessarily indicating extortion. Railroad charges must be reasonable; but to try to control rates by arbitrarily limiting profits is to put the manager who makes his profit by efficiency and economy on the same level as the one who tries to accomplish the same result through extortionate charges. Scrip, bond and stock dividends should be prohibited.

"The evils of fraudulent promotion are among those which publicity would do much to check. Where there is no fraud the promoter renders a service for which he is entitled to fair remuneration.

"It is possible that the building of additional railroad mileage will be far less rapid in the future than in the past, but the capital needed for the development and improvement of the mileage already existing is enormous. The thousands of millions of dollars needed for these purposes must be raised by the sale of securities.

"Neither the rate of return actually received on the par value of American railroad bonds and stocks to-day nor the security which can be offered for additional railroad investments in the future will make it easy to raise the needed amount of capital. The substitution of electricity for steam is but a type of the many changes which railroads may be compelled to make, any one of which might involve large additions to their cost without the assurance of corresponding additions to their return.

"A reasonable return is one which, under honest accounting and responsible management, will attract the amount of investors' money needed for the development of railroad facilities."

FRANCHISE SETTLEMENT PROPOSAL SUBMITTED TO CITY OF TOLEDO BY COMPANY

The Toledo Railways & Light Company, Toledo, Ohio, presented a plan for the settlement of the franchise question to the city of Toledo on Monday, Dec. 11. The company proposes a sliding scale of fares ranging from a cash fare of 5 cents, or six tickets for 25 cents, and universal transfers to a straight fare of 3 cents within the present city limits, depending upon the profits realized from operation. The valuation of the property is placed at $8,000,000, and the company is to be entitled to net earnings on this sum at the rate of 8 per cent a year. All surplus which exceeds the amount necessary to meet the operating expenses and the guaranteed return to the company is to be placed in a special fund, and when this fund amounts to $250,000 a reduction in fare is to be made to seven tickets for 25 cents and universal transfers. If after this reduction in fares the net earnings still exceed the operating expenses and the amount necessary to return 8 per cent on the $8,000,000 valuation, eight tickets are to be sold for 25 cents, with universal transfers. Whenever the net earnings are not sufficient to return 8 per cent on the valuation the special fund is to be reduced to $50,000 and the next higher rate of fare is to be put into force.

A feature of the valuation is that it includes only tracks, cars, trolley wires and poles, carhouses and shops. If the figures proposed by the company do not meet with the approval of the city officials it is suggested that the value be determined by a board of appraisers to consist of two members, the city to name one member and the company the other, with Judge John M. Killits as umpire. The finding of this board is to be binding upon both the city and the company. In this matter the company has yielded to the wishes of the city that Judge Killits act as a member of any board of appraisers. The Council will consider the communication from the company on Dec. 15.

The letter of the company to the city follows:

"Pursuant to the request of your special committee, that the Toledo Railways & Light Company make a proposition to the city relative to an extension or renewal of the street railway grants of the company, the company submits:

"(a) That it is for the great interest of the community that every person should be carried to his destination, within the city limits, at one fare, without extra charge for transfer, by one company owning and operating all street railway lines in the city, subject to the regulation and under the control of the city.

(b) That the street car riders, who really pay the cost of operation, should not be burdened with any obligation in addition to the ordinary cost of transportation, such as street improvements, maintenance and cleaning of streets, bridge tolls, etc.

"(c) That the company is entitled to net earnings, from the operation of its street railway within the city limits, equivalent to 8 per cent per annum on the cost of reproduction of such street railway.

"The company proposes as follows:

"(a) That the company put into effect a rate of fare, within the present city limits, of a 5-cent cash fare and six tickets for 25 cents, with universal transfers.

"(b) That the company, its successors and assigns, be granted the right, under the terms of this proposal, to operate its street railways for twenty-five years.

"(c) That the company will surrender all its present grants for the operation of its street railways within the city.

"(d) That the valuation of the property used for street railway operation be fixed at $8,000,000, such street railway property to consist of tracks, cars, trolley wires and poles, carhouses and shops, but shall not include any power house, substation, underground conduits, feeders, park property, etc.

"(e) That if said valuation of $8,000,000 is not acceptable to the city the grant shall contain a provision for determining the reproduction cost of such railway, to the effect that if the company and the city authorities do not agree upon such reproduction cost within ninety days from the time such grant goes into effect, then a board of appraisers shall be appointed to determine such reproduction cost, said board of appraisers to consist of one appraiser to be named by the city, one appraiser to be named by the company, and the third to be John M. Killits, judge of the United States District Court; the appraisal, in writing, of this board, or any two of them, to be binding upon the city and upon the company as determining the amount on which the company shall be entitled to net earnings at the rate of 8 per cent per annum.

"(f) That the city shall at all times have the right to inspect the books of the company. The items to be charged respectively to operation and to capital account shall be determined by standard systems now in use, subject to such modification as may be agreed upon from time to time by the city and the company.

"(g) That all net earnings of the company, derived from the operation of its street railways within the city limits, over and above an amount equal to 8 per cent per annum on $8,000,000, or on the valuation determined as above and such additional capital expenditures as may be made from time to time, as hereinafter provided, shall be held as a special fund to be used only as hereinafter provided, and when and if said fund shall reach the sum of $250,000 the company shall immediately put into effect a lower rate of fare of 5 cents cash fare and seven tickets for 25 cents, with universal transfers.

"If the net earnings, after such reduction in fares, shall still amount to more than 8 per cent per annum on the valuation and capital expenditures as above, then the company shall immediately put into effect a lower rate of fare of 5 cents cash fare and eight tickets for 25 cents, with universal transfers.

"If the net earnings, after such reduction in fare, still amount to more than 8 per cent per annum on the valuation and capital expenditures as above, then the company shall immediately put into effect a lower rate of fare of 5 cents cash fare and five tickets for 15 cents, with universal transfers.

"In the event that at any time any rate of fare (then in effect) does not produce net earnings equal to 8 per cent per annum on the valuation and capital expenditures as above, the deficiency shall be taken by the company out of said special fund until such special fund shall have been reduced to $50,000, when the company shall then have the right to put into effect forthwith the next highest rate of fare which will produce net earnings equal to 8 per cent per annum on the valuation and capital expenditures as aforesaid, and such fare may be increased from time to time when and if necessary to produce the net earnings as above provided; provided, however, that such rate of fare shall not in any event exceed a 5-cent cash fare and six tickets for 25 cents, with universal transfers.

"(h) That in and by the grant the company shall not be required to pay for bridge tolls, separation of grades at railroad intersections, paving or repaving of streets, street cleaning and sprinkling licenses or other special taxes.

"(i) The city shall at all times have the right to regulate the character of the service, provided, however, that no regulation shall be such as to cause the net earnings of the company with the maximum rate of fare in force allowed for herein to be reduced to an amount less than 8 per cent per annum on the valuation and capital expenditures as aforesaid.

"(j) That the city shall have the right at all times during the term of the grant, on six months' notice, to purchase the railway properties of the company as above defined, at the valuation as agreed upon or determined plus the capital expenditures as aforesaid.

"(k) That the company shall make such improvements and build such extensions, within the city limits, as may be required by the city, the cost thereof to be added to the valuation as herein provided; provided, however, that the company shall not be required to make such improvements or build such extensions within ten years of the expiration of the grant to operate its street railways, or if thereby the net earnings of the company will, with the maximum rate of fare allowed for herein, be reduced to less than 8 per cent per annum on the valuation and capital expenditures as aforesaid.

"(l) That the company shall make such arrangements as to re-routing as the city may authorize, tending to better the service and decrease operating expenses.

"(m) That capital expenditures required, ordered, authorized or approved by the city shall be capitalized to the extent of 80 per cent of their cost, the balance of such cost to be charged to current operating expenses.

"(n) That the company and the city agree as to the price to be paid for electric power for the operation of the railways, and in event of the city and the company not being able to agree as to such price, the price shall be fixed by the above-mentioned board of appraisers, subject to readjustment at the end of each five years.

"(o) That if the city shall not within fifteen years from the taking effect of the grant exercise its option to purchase the railway, the city may renew the grant or make a new grant to the company for a period of twenty-five years on the same terms, which the company shall agree to accept. In event that the grant to the company to operate such railway shall at any time have less than ten years to run, the company shall thereafter have the right to charge, until such renewal or new grant is made, or until the termination of its grant, a 5-cent fare, with universal transfers; provided, however, that during such time all net earnings of the company, over and above the 8 per cent of the valuation and capital expenditures aforesaid, shall be held and used as a sinking fund for the retirement of the bonded indebtedness and capital of the company; and the company shall, if it elects to purchase thereafter, have the right to purchase the railway properties at the valuation and capital expenditures as above, less the amount in which the bonded indebtedness and capital of the company shall have been reduced through the operation of such sinking fund.

"(p) That the Mayor of Toledo, or such other representative of the city as may be provided by the grant, shall at all times be a member of the board of directors of the company owning and operating the street railways under the grant."

The record of passenger train performances on the steam railroads of New York State for October, just issued, shows that during the month the number of trains run was 63,265. Of this number, 84 per cent were on time at the division terminal. The average delay for each late train was 23.8 minutes, and the average delay for each train run was 3.7 minutes.

NEW OFFICERS OF MANUFACTURERS' ASSOCIATION

A meeting of the executive committee of the American Electric Railway Manufacturers' Association was held at the offices of the association, 165 Broadway, New York, on Dec. 15. The principal action taken was the election of officers for the ensuing year. The following were elected: W. L. Conwell, president; James H. McGraw, vice-president in charge of relations with the parent association; C. S. Hawley, vice-president in charge of entertainments; A. H. Sisson, vice-president in charge of finance; E. H. Baker, vice-president in charge of exhibits, and George Keegan, secretary and treasurer.

HYDROELECTRIC POWER EXPANSION IN MASSACHUSETTS

Important changes in the electric power situation in central Massachusetts are foreshadowed by the developments now being carried forward in the Shelburne Falls district by the New England Power Company. The construction of four stations on the Deerfield River, the building of a 2,500,000,000-cu. ft. reservoir near the headwaters of the stream in Vermont and the establishment of a 66,000-volt tie line between the South Vernon plant of the Connecticut River Transmission Company and the affiliated New England system mark the inauguration later of a service extending from the New York line to within 40 miles of Boston. The operation of the Boston & Maine train service through the electrified Hoosac tunnel by current derived from the Deerfield plants and the readjustment of the present Zylonite turbine station as a steam auxiliary are also features of the development. Until within the last few years Massachusetts has had little opportunity to enjoy the benefits of transmitted water-power, but a decided change has lately come about in the central section of the State. For the most part the local lighting and small power service in this district have been handled by very moderate-sized steam plants, and the electric railways have in the main continued to produce their own electricity, chiefly on the ground of reliability. With the articulation of two large hydroelectric systems and increased opportunity for the energy supply of power from plants connected on reciprocal contractual arrangements the character and low cost of service are likely to attract a wider range of users, including central stations and railway plants of considerable capacity, in addition to the small installations.

PROPOSED ORDER TO STENCIL AND NUMBER POLES IN NEW YORK

As mentioned briefly in the issue of Dec. 2, a hearing on an order requiring street railroad and other corporations to stencil and number their poles and structures for carrying overhead wires was held at Albany before the New York Public Service Commission, Second District, on Nov. 23. The hearing was attended by a number of representatives of electric railways, electric lighting and power companies, steam railways and telegraph and telephone companies.

Porter Norton, counsel International Railway of Buffalo, thought that the proposed requirements might be called unreasonable with respect to the poles of the International system. He said that the company had over 21,000 trolley poles, all distinctive in character. It owns all the railroads in the community in which these poles are located except in one or two streets in Niagara Falls and Buffalo. For this reason there would be no difficulty in identifying the ownership of the poles. The poles were being changed constantly, and such changes would upset the entire system of numbering proposed by the commission.

C. R. Harte, New York, New Haven & Hartford Railroad, said that company believed that the structures should be marked and that, as a matter of fact, the large majority of its structures were marked in some way. The company, however, had systems that in its judgment were best adapted for the particular purposes for which they are used. What was wanted was a definite mark that would identify the pole in the minds of the employees of the company as to its location and a mark by which either the company or the public might distinguish poles readily.

C. L. Addison, Long Island Railroad and affiliated companies, was inclined to believe that it would be unnecessary to number every pole. The Long Island Railroad letters every third pole at present. To letter every fifth pole would afford sufficient information for identification purposes.

George E. Greene, New York & Stamford Railroad and Westchester Street Railroad, described the system by which those companies letter their poles. A letter is used to represent the line, and underneath is the number of the pole. The lines are numbered from the central point or head of the system, extending to the end of the line. If the system extends through several towns, the numbers are consecutive for the entire distance.

Chairman F. W. Stevens, of the commission, in closing the hearing, said that it was desired to have poles marked so that the mark would identify the poles clearly. The purpose was to get the simplest way possible, to occasion as little expense to the companies as possible, to have nothing done unless it was actually needed for some useful purpose and to allow reasonable time in which to do the work. The companies which had suggestions to make in reference to the matter were asked to file them before Jan. 1, 1912.

STATISTICS OF WATER POWER DEVELOPMENT

A brief prepared by the public policy committee of the American Institute of Electrical Engineers and presented at the public hearing before the United States National Waterways Commission, Washington, Nov. 21, contains among other statistics the following interesting data:

"The statistics of water power collected under the direction of Congress several years ago and embodied in the report of the National Conservation Commission of 1909 show that there is at present developed in the United States about 5,000,000 hp of water power.

"The amount of power produced by steam from coal is difficult to estimate, but is considered to be about 27,000,000 hp, and is rapidly increasing, with attendant depletion of coal reserves. A large part of this it is not only possible but easy for water power to replace if it were made freely available through development. Within range of development at a cost of investment that would make the cost of such power about equal to that of steam power, there is still undeveloped in the streams of the United States about 35,000,000 hp.

"Any action by Congress that would accelerate the release of this power would conserve enormous supplies of coal for such domestic and industrial purposes as only coal can supply."

NEXT INTERNATIONAL CONVENTION AT CHRISTIANIA

Secretary P. t'Serstevens, of the International Street & Interurban Railway Association, has just issued an announcement that the 1912 convention of that association is to be held in Christiania, Norway. A cordial invitation to meet in that city has been received from the local railway companies, Kristiania Sporveisselskab, Kristiania elektriske Sporvei, Holmenkollenbahnen, Bergens elektriske Sporvei and Trondhjems elektriske Sporvei.

The date of the convention has not yet been announced.

COMMITTEE ON ACCOUNTS IN NEW JERSEY

A committee representing the electric railway companies in New Jersey has been appointed to consider the tentative uniform system of accounts prepared by the Board of Public Utility Commissioners of that State. The committee was appointed in accordance with the decision of the commission announced at the hearing on Dec. 5, 1911, as reported in last week's issue of the Electric Railway Journal. It is as follows: C. L. S. Tingley, M. R. Boylan, Frank J. Pryor, Jr., Rankin Johnson and C. B. Cade.

COMPARATIVE COSTS OF TILE AND FIBER CONDUIT

William D. Ligon, engineer in the electrical department of the H. W. Johns-Manville Company, New York, has prepared the striking comparison of the costs of tile and fiber conduits presented in the three accompanying tables. These figures are based upon actual conditions in St. Louis, Chicago and other cities of the Central West, but it is declared that the percentages in favor of fiber conduit would not vary materially elsewhere. As shown in Tables I and II, the cost of constructing multiple duct tile is less than

Table I.—Cost to Construct Multiple Duct Tile Conduit in Streets Paved with Granite, or Equivalent Paving, Exclusive of Manholes.

Duct Sections.	1	2	3	4	8	12	16
Excavating, refilling, paving and disposal of dirt	$ .230	$ .361	$ .546	$ .397	$ .590	$ .637	$ .791
Concrete	.104	.131	.152	.160	.243	.269	.333
Cost tile delivered	.053	.106	.159	.212	.424	.636	.848
Laying tile	.030	.040	.060	.080	.160	.240	.320
Cleaning ducts	.005	.010	.015	.020	.040	.060	.080
Water, bridging and shoring	.005	.007	.010	.012	.025	.030	.040
Tool repairs and replacement	.010	.010	.010	.012	.025	.030	.040
Incidentals	.010	.010	.010	.010	.015	.018	.024
Supervision, inspection and timekeeping	.036	.052	.072	.072	.114	.192	.247
Total per trench foot	.483	.727	1.034	.975	1.636	2.112	2.723

Table II.—Cost to Construct Single Duct Tile Conduit in Streets Paved with Granite, or Equivalent Paving, Exclusive of Manholes.

Duct Sections.	1	2	3	4	8	12	16
Excavation, refilling, paving and removing surplus earth	$ .259	$ .353	$ .494	$ .430	$ .722	$ .788	$ .858
Concrete	.105	.145	.185	.192	.287	.348	.412
Cost tile delivered	.054	.108	.162	.216	.432	.648	.864
Laying tile	.030	.060	.090	.120	.240	.360	.480
Cleaning ducts	.005	.010	.015	.020	.040	.060	.080
Water, bridging and shoring	.005	.007	.010	.012	.025	.030	.040
Tool repairs and replacement	.010	.010	.010	.012	.025	.030	.040
Incidentals	.010	.010	.010	.010	.015	.018	.024
Supervision, inspection and timekeeping	.036	.053	.073	.076	.134	.171	.210
Total per trench foot	.514	.756	1.049	1.088	1.920	2.453	3.008

Table III.—Cost to Construct Fiber Pipe Conduit in Streets Paved with Granite, or Equivalent Paving, Exclusive of Manholes.

Duct Sections.	1	2	3	4	8	12	16
Excavation, refilling, paving and removing surplus earth	$ .230	$ .343	$ .431	$ .381	$ .601	$ .655	$ .716
Concrete	.090	.126	.163	.175	.273	.344	.417
Cost fiber pipe delivered	.051	.102	.153	.204	.408	.612	.816
Laying fiber pipe	.010	.020	.030	.040	.080	.120	.160
Proving ducts	.003	.005	.007	.010	.020	.030	.040
Water, bridging and shoring	.005	.007	.010	.012	.025	.030	.040
Tool repairs and replacement	.010	.010	.010	.012	.025	.030	.040
Incidentals	.010	.010	.010	.010	.015	.018	.024
Supervision, inspection and timekeeping	.031	.047	.061	.063	.101	.138	.169
Total per trench foot	.440	.670	.875	.907	1.548	1.977	2.422

that of constructing single duct tile, owing principally to the less amount of excavating, refilling, paving, dirt disposal and concreting. This saving ranges from $0.031 to $0.285 and even more per trench foot, according to the number of ducts. Table III, however, shows that much greater economy is possible by using fiber conduit, the cost per trench foot of one pipe to sixteen-pipe installations ranging from $0.44 to $2.422, as compared with $0.483 to $2.723 for the multiple duct tile. This saving is due to the lower cost of the fiber conduit as delivered, to its greater ease in installation, to the elimination of breakage losses and to the simpler connections.

The fiber conduit figured on in these tables is the Johns-Manville J-M type, which was described and illustrated in



Fiber Conduit Installation in Los Angeles.

the Electric Railway Journal for June 25, 1910. Conduit of this material has now been in use for some eight years. Inspections of the early installations show that this fiber conduit gives every promise that the material will maintain its original qualities for many years to come, as it has remained impervious to moisture, water, gases and other destructive elements.

The accompanying view of an installation in Los Angeles shows part of a 50,000-ft. job composed of sixteen pipes, each of 3-in. diameter.

SIGNALS ON THE FT. DODGE, DES MOINES & SOUTHERN

The Ft. Dodge, Des Moines & Southern Railroad (electric) has made arrangements with the Rock Island Railroad (steam) for the use of about 2 miles of the latter's double track and passenger station in Des Moines, thus securing an entrance into the city for its trains. The track, which is to be used jointly, is now completely equipped with three-position, upper quadrant, automatic block signals operated by primary battery with direct-current track circuits. The signal installation will be changed so as to work on alternating current throughout. Single-phase, 60-cycle current will be used; it will be transmitted at 550 volts and stepped down at the signals to 110 volts for signal operation and about 6 volts for track circuits. Such material as is needed to make the change will be furnished by the General Railway Signal Company and will be installed by the Rock Island Railroad with the regular signal forces. Very few changes will be needed, merely the substitution of a.c. apparatus for d.c.; for example, the signals now in service will be retained, but new mechanisms will be put in the old cases. Power will be supplied from a small power house to be erected by the Rock Island Railroad. Normally power will be taken from the city mains through a transformer, but there will be a generator and gasoline engine in reserve.

The Ft. Dodge, Des Moines & Southern Railroad will connect with the Kansas City Short Line at a point about 1 mile north of the northern city limits of Des Moines and will connect with the Rock Island where the Kansas City Short Line tracks cross the Rock Island at East Des Moines.

News of Electric Railways

Boston Subway Leases Signed

Leases covering the use of the proposed Dorchester tunnel, Boylston Street subway, East Boston tunnel extension and the Cambridge connection have been signed by President William A. Bancroft for the Boston Elevated Railway and by the members of the Boston Transit Commission for the city of Boston. The contracting parties have also signed the proposed extensions of the leases of the present Tremont Street subway, East Boston tunnel and Washington Street tunnel. These leases establish a new contract relation between the city and the Boston Elevated Railway. As provided by Chapter 741 of the Acts of 1911, they provide that the leases of the new subways and tunnels shall run until July 1, 1936. They provide also that the present lease of the Washington Street tunnel, which expires in 1933, shall be extended to 1936; that the lease of the East Boston tunnel, which expires in 1922, shall be extended to 1936, and that the lease of the Tremont Street subway, which is taken from the West End Street Railway, also shall be extended to 1936. Hence the signing of these instruments establishes a uniform lease of all tunnels and subways in Boston, causing them all to terminate conditionally in 1936. Their termination that year is not automatic, however, but is conditioned upon notice given either by the city of Boston or by the Boston Elevated Railway. So long as neither party gives notice of a purpose to have them terminated they will continue on the same terms, but always subject to the two years' notice which becomes operative after the first term. Unless the suit filed in the federal court by interests in the West End Street Railway to test the constitutionality of the merger act, which authorizes the merging of the West End Street Railway with the Boston Elevated Railway, results in a finding against the act there is nothing further to prevent the building of the tunnels and subways on the terms agreed upon.

Work Begun on Bronx Branch of Triborough Subway

Work on the Bronx branch of the triborough subway in New York was formally started on Dec. 4, 1911. Chairman Willcox, of the Public Service Commission of the First District of New York, said in a speech at a luncheon which followed the formal exercises that marked the starting of the work:

"Rapid transit has two purposes. One is to relieve congestion. The other is to find a place to which the congestion may go. If this city is to pledge its credit and advance its money for the sake of developing subways, I insist that its purpose in doing this should be to give its population homes within the city, so that the citizens may become home owners and taxpayers and not go outside the city limits and pay their taxes elsewhere. I believe in the Seventh Avenue subway project very strongly. I and my colleagues urged it on the Board of Estimate last July. We also urged the Board of Estimate to adopt the plans for Route 18, for the three-tracking of the elevated lines, and for the Steinway Tunnel. In spite of our urgings, however, these projects were not put through by the Board of Estimate.

"I think that the responsibility ought to be made clear in this matter. When our commission first came into office the city had no funds for subway building whatsoever. The commission did not have any funds till about a year and a half ago, when we had $47,000,000. That autumn the Interborough Rapid Transit Company started negotiations with us to build the Seventh Avenue and Bronx lines. All the company's proposals, however, were based on the theory that the money was to be furnished by the companies, leaving the city free to use its money for other enterprises. The company broke off these negotiations and then, in November, 1910, reopened them. This time it offered to put in one-half the money to complete the subway 'H' and other lines and to operate them under a reduced term of lease and to divide the profits with the city. The Public Service Commission believed and still believes that this offer was in favor of the city. It meant the three-tracking of the elevated and the opening of the Steinway tube. We recommended it to the Board of Estimate, and the committee of the board, composed of Messrs. McAneny, Cromwell and Miller, had many conferences with us which came to nothing.

"As for the Seventh Avenue line, I want it built. But I object to the argument that it ought to be built to benefit the Pennsylvania station. The Pennsylvania Railroad sold 2,000,000 tickets at its Seventh Avenue station last year. If every one of these purchasers of Pennsylvania Railroad tickets had also been a purchaser of a subway ticket, a subway station at the Pennsylvania station would be much less profitable and much less patronized than most of the subway stations in other parts of the city. At the subway station at the Grand Central last year, for example, 14,000,000 tickets were sold, or seven times as many tickets as would have been sold at a subway station at the Pennsylvania terminal, assuming that every purchaser of a ticket at the Pennsylvania station bought a subway ticket. I am merely trying to explain that the Pennsylvania Railroad is not entitled to more privileges than are the remote dwellers of this city."

Samuel Rea, vice-president of the Pennsylvania Railroad, in a letter to the Public Service Commission, has replied to the protest made by the Forty-second Street Association against the expenditure of any city money for a subway to the station of the Pennsylvania Railroad at Thirty-third Street and Seventh Avenue. A special point in that communication was made of the extra 10-cent fare which passengers using the Pennsylvania Railroad's new Thirty-third Street station must pay and the contention that the only effect that the business men of the district about the station had noticed through the building of the station was an increase of their assessments. Mr. Rea points out that the new station was built primarily to meet the needs of the long-distance passengers and the patrons of the Long Island Railroad. As for the complaints of the heavy assessments, Mr. Rea suggests that they apply to the city authorities for relief, and remarks that other merchants have made their shops more attractive, when such a burden has fallen upon them, and thus benefited by the new conditions.

The Public Service Commission of the First District of New York has awarded the contract for the construction of Section 9 of Route No. 5 of the Lexington Avenue subway to Patrick McGovern, Boston, Mass., the lowest bidder, at $1,961,997. The section for which the contract has just been awarded runs from Sixty-seventh Street under Lexington Avenue to Seventy-ninth Street, and includes two stations. The contract price is about $300,000 less than the estimate of the cost of construction which had been made by the engineer of the commission.

The Public Service Commission of the First District has sent to the Board of Estimate its estimate of the money it will require for its expenses in 1912. The total is placed at $1,367,000, as against the appropriation made last year of $1,087,000.

Illinois Central Terminal Changes in Chicago

An agreement whose ultimate effect is to hasten the electrification of the Illinois Central terminal in Chicago has been reached and executed by the railroad company and the South Park commissioners of Chicago. The railroad company surrenders all its riparian rights between Twelfth Street and Fifty-first Street, that portion of its present station site north of the south line of Twelfth Street and several tracts of land which it had filled in under its riparian rights and is now using for yard purposes. In return the city will allow the railroad company to use the additional land necessary to make its right-of-way 200 ft. wide between Twelfth and Fifty-first Streets. The city has also received the right to cover the tracks of the railroad company for a width of 50 ft. adjacent to the east and west right-of-way lines and use the covering for additional park

area. This latter privilege is granted only between Monroe and Twelfth Streets. The whole of the contract is to be fulfilled within five years.

This agreement is of general interest not only because it contemplates an extensive park improvement which will reach from Grant Park on the north to Jackson Park on the south, but because it indicates that the Illinois Central Railroad ultimately intends to electrify its Chicago terminals and has agreed to abandon its present terminal building and erect a new one on the south side of Twelfth Street. The executed contract has been submitted to the city for its approval and the commissioners also ask for certain grants from the city which will allow them to carry out their part of the agreement.

Franchise Application Before Portland Council Committee

The question of granting the Portland Railway, Light & Power Company, Portland, Ore., additional franchises in outlying sections of the city came before the street committee of the City Council of Portland on Dec. 5, 1911. These are the franchises which, as explained in the Electric Railway Journal of Nov. 4, 1911, page 1007, City Attorney Grant is seeking to load with onerous conditions, among them the right to fix fares and a common-user clause. B. S. Josselyn, president of the company, again explained that the application of the company for additional trackage is solely to improve the service and was made at the urgent request of the citizens of the various districts involved. Mr. Josselyn said at the meeting of the committee:

"We want to extend these lines because it is a duty we owe the public. The public is demanding the extensions. But to give the public the benefit of our service we do not intend to surrender any of our rights. We are willing to accept these franchises under the conditions imposed under the old grants, but we will not accept any franchise under the terms as recommended by Attorney Grant. If it was not for the public wanting these lines we would withdraw our application for all the new franchises. The construction of the proposed lines means the expenditure of $1,000.000 by us and we are not anxious to spend this amount under present conditions."

After trying to segregate the franchises by streets the committee resolved to take up separately the objections of the company to the franchises as drafted by Mr. Grant. Of the many objections all were adjusted except those referring to fares and private rights-of-way. These were to be considered at an adjourned meeting of the committee on Dec. 13, 1911.

Crosstown Railway Ordinance in Louisville

The ordinance which provided for the construction of a crosstown railway in Louisville, Ky., is before the General Council of Louisville for passage. It provides for the sale of a twenty-year franchise for a street railway through the southern residential section of the city, the work of construction to be begun within six months after the franchise goes into effect and to be completed within two years after work is commenced. The upset price of the franchise is placed at $15,000, and it is presumed that the Louisville Railway will purchase the grant. The ordinance contains several unusual features. A clause which provides for the regulation of service stipulates that the company must operate cars at intervals of not more than ten minutes between 5:30 a. m. and 11:30 p. m. Owl service is to be optional.

The fare is fixed at not more than 5 cents, power being reserved to the General Council to reduce the fare at a future date. Interurban railways which enter Louisville are to have the privilege of using the crosstown tracks upon the payment of a reasonable sum to the purchaser of the franchise, this sum to be fixed by an arbitration committee of traffic experts if the company applying for operating rights and the company which holds the franchise cannot come to terms.

The purchaser of the franchise is to pave between the tracks and 2 ft. on either side of the outside rail. Cars are to be operated from the termini of the line, at Greenwood Avenue and Twenty-eighth Street and in Cherokee Park, at intervals of not more than thirty minutes. The length of the line for which the franchise is to be offered is 6 miles.

Controversy Between Stockholders in Columbus Companies Averted

After conferences on Dec. 8 and 9 at Columbus, Ohio, between the special committee of stockholders of the Columbus Railway which consists of D. Meade Massie and John A. Poland, Chillicothe; C. L. Poston, Athens, and Prof. Edward Orton and Angus Dun, Columbus, and a special committee of stockholders of the Columbus Railway & Light Company, composed of E. A. Cole, Paul A. DeLong, Carl J. Hoster, J. B. Hanna, C. E. Wilcox, and C. M. Clarke, second vice-president of the Columbus Railway & Light Company, representing the management of that corporation an agreement is said to have been reached by which all controversy at the annual and adjourned special meetings of the stockholders of the Columbus Railway, Jan. 11, 1912, will be averted.

A call will be issued from the office of the Columbus Railway asking for proxies for the meetings in the names of a new proxy committee and these will be voted as a unit for the members of a new board of nine directors, as agreed upon at the final conference on Dec. 9. The board will be increased from five members to nine members and will include Judge William Worthington, Edward Johnson, W. K. Lanman, Charles D. Hinman, A. D. Heffner, F. R. Huntington, D. Meade Massie, and L. P. Matthews. The present board, which will retire at the annual meeting, consists of Butler Sheldon, president; Frank T. Stewart, first vice-president and treasurer; George Hardy, second vice-president; H. M. Burington, secretary, and W. K. Lanman.

The recommendations presented at the special meeting of the Columbus Railway held on Nov. 11, 1911, as noted in the Electric Railway Journal of Nov. 18, 1911, page 1077, provided for a board of nine members, but at that time action on this was deferred until the annual meeting in January, 1912.

Galveston-Houston Electric Railway Opened.—The Galveston-Houston Electric Railway was placed in operation on Dec. 5, 1911, between Galveston and Houston.

Prof. Droppers Again Nominated to Massachusetts Commission.—Governor Foss of Massachusetts has again nominated Prof. Garrett Droppers as a member of the Massachusetts Railroad Commission, vice Clinton White, the present incumbent. Professor Droppers' name was recently rejected by the Executive Council for membership on the board.

Tentative Employers' Liability Law Completed.—The Federal Employers' Liability and Workman's Compensation Commission, of which Senator Sutherland of Utah is chairman, completed on Dec 8, 1911, a tentative bill which it will recommend to Congress. The measure in effect abolishes the present common law and statutory liability for personal injury and death of employees in the service of interstate railroads and railroads in the District of Columbia and substitutes definite compensation in all such cases irrespective of negligence.

Authority of Chicago Subway Commission Extended.—Mayor Harrison of Chicago, Ill., has announced that he will name the members of his subway commission, City Engineer Ericson, J. J. Reynolds and E. C. Shankland, as the board of subway and harbor engineers created by the City Council recently. As stated in the Electric Railway Journal of Nov. 18, 1911, page 1074, the Mayor urged the City Council to authorize the present subway commission to draw plans for the proposed harbor improvements at Chicago instead of creating a separate commission for this work.

Line Between Vienna and Budapest Promoted by Americans.—An electric railway to extend from Vienna to Budapest, about 150 miles, is being promoted in the United States. Alonzo M. Snyder, of Ford, Snyder & Tilden, Williamson Building, Cleveland, Ohio, is the attorney representing the capital behind the project. Mr. Snyder says: "The project was first broached more than two years ago. At that time I obtained the right to build part of the dis-

tance. Later the Hungarian officials were asked for permission to build in Hungary, and that application is pending. The transaction is not closed and there is nothing more that can be said in regard to it at this time."

Crosstown Railway Franchises in Los Angeles.—The Council of Los Angeles, Cal., has unanimously resolved to grant the franchises for 8 miles of double-track crosstown railway lines in that city and has directed that bids for the lines shall be advertised without delay. The bids will be received not later than Dec. 19, 1911, and the Council on that date will pass the necessary ordinance. The Mayor has promised to sign the ordinance at once. The ordinance will provide that one-third of the 8 miles of track shall be completed within six months after construction work has been commenced. It is expected that the construction of these lines will assist in relieving traffic congestion by affording additional outlets for traffic.

Decision in Suit Over Signals in Indiana.—In an action by the Indiana Railroad Commission to recover $18,000 in penalties from the Grand Trunk Western Railway for failure to install an "approved" block signal system within the time set by the commission, Judge Reiter, of the Lake Circuit Court, has decided that it is impossible to determine what is an "approved" block signal system under the law under which the action was brought. The law was amended by the last Legislature so as to define more clearly the kind of signal that must be installed. The law also applies to the interurban electric railways. The subject of signals for electric railways is now being considered by a committee representing the interurban electric railways and the members of the commission.

Chicago Elevated Railway Valuation Committee Chosen.—The appointments have all been made to the committee of five which is to decide upon a basis for fixing the value of the elevated railways in Chicago in connection with the tentative proposal made to the city to merge the elevated railways and the surface railways. Charles V. Weston, formerly president of the South Side Elevated Railroad, and Prof. George F. Swain, of Harvard University and consulting engineer of the Massachusetts Railroad Commission, have been chosen to represent the companies, and City Engineer Ericson, J. J. Reynolds and E. C. Shankland, constituting the city's present subway commission, have been appointed to represent the city. The committee will confer with the railroad and financial interests represented by Samuel Insull, Henry A. Blair and Ira M. Cobe.

Proposed Public Service Commission for Washington, D. C.—There is a division of opinion in regard to the question of the provisions which should be included in the bill to provide a commission to supervise the affairs of the public service companies which operate in Washington, D. C. Senator Gallinger, of New Hampshire, favors the appointment of the members of the District Commission to the public utility commission. Senator La Follette, of Wisconsin, is said to favor a commission independent of the District Commissioners. Senator Pomerene, of Ohio, who is a member of the Senate committee on District matters, has expressed the opinion that the questions which will come before the commission will require expert consideration and that even if the members of the District Commission were qualified technically to pass upon these questions, their present duties require their undivided attention.

Underground Railway Inquiry in Montreal.—At a recent meeting of the Board of Control of Montreal, Que., F. L. Wanklyn, comptroller of the city, announced that the law department was conducting an inquiry into the right of the city to build an underground railway and lease the property for private operation. As a result of this investigation and on the recommendation of Mr. Wanklyn the Board of Control of Montreal has adopted a resolution authorizing the city attorney to draft an amendment to the city charter authorizing the city to construct underground railways. Mr. Wanklyn has also recommended that the city should secure power from the Legislature to build a double-track street railway along the aqueduct embankment from Montreal to Lachine, a distance of about 7 miles. The Board of Control also adopted a similar resolution in regard to applying to the Legislature for the necessary power to construct this line.

Statement of Policy by Connecticut Commission.—The Public Utility Commission of Connecticut has issued the following statement in regard to its policy with respect to records, transcripts of evidence, etc.: "Only the records or finding made by the commission of its examination into the cause of and circumstances connected with any accident is a public record and subject to public inspection, and not the detailed statements upon which such record or finding is predicated. Any notes, transcripts of evidence, statements, exhibits, photographs and other matters obtained by the commission in connection with any such examination shall be carefully preserved and kept on file, the same to be available at any and all times when necessarily connected with any matter pertaining to the enforcement of any orders issued by the commissioners in which the State or the commission is directly interested. Examination of witnesses may be made privately and separately if, in the opinion of the commission, such course is desirable."

Receiver Asked for Kansas City Viaduct & Terminal Company.—Application has been made for a receiver for the Kansas City Viaduct & Terminal Company. This company was incorporated in Missouri in 1905 and operates an elevated viaduct from Bluff and Sixth Streets, Kansas City, Mo., to Minnesota Avenue and Fourth Street, Kansas City, Kan., with a roadway from 30 ft. to 38 ft. wide equipped with tracks over which the Metropolitan Street Railway operated cars prior to Aug. 1, 1911, paying the Viaduct company 1 cent for each passenger carried. The application for a receiver was filed by Asa W. Farney, a stockholder, before Judge Pavell in the Circuit Court at Independence. Mr. Farney alleges that the control of the company has passed to interests outside of the state, contrary to the franchise; that the company has neglected to perform the obligation due to Kansas City, Mo., and Kansas City, Kan., and that by canceling the contract with the Metropolitan Street Railway the company has forfeited an income of $50,000 a year.

Opposition to Proposed Subway in Toronto.—On Jan. 1, 1912, the taxpayers of Toronto, Ont., will vote on by-laws to authorize an issue of $10,000,000 of bonds for civic improvements, including a short subway as part of a system to be completed by 1921 at a total cost of $23,000,000, as referred to in the ELECTRIC RAILWAY JOURNAL of Dec. 9, 1911, page 1215. Considerable opposition has developed to the subway proposal. The *Monetary Times*, Toronto, said recently in an article opposing the plan to appropriate funds for a subway: "It is an extravagant imagination which would allow tube railways to enter the transportation situation of a city of less than 400,000 population. It is well to note that the suggested expenditure of $5,000,000 on the 3 miles of subway is only the thin edge of the wedge and the beginning of a scheme for a system estimated to cost $23,000,000, and to be completed in 1921. The proposed tube system is an extravagant and unwise attempt to solve a complex transportation problem. The taxpayer who does not allow his civic pride to carry him beyond his business sense will vote against the tube scheme."

Utility Bill Introduced in California.—The public utility bill drawn by John M. Eshelman, of the California Railroad Commission, and Max Thelen, attorney for the Railroad Commission, has been introduced at the special session of the Legislature of California. The measure would create a new commission of five members to succeed the present Railroad Commission of three members, and is designed to include within its jurisdiction railroads, street railways, electric light and power companies, gas companies, water companies, etc. The new measure, if passed, would give the commission power to fix rates for service and to authorize issues of bonds by public service corporations. Any review of a decision by the commission before the courts would have to be asked for within thirty days by the special procedure provided by the bill, and would then have to be taken direct to the Supreme Court for a final decision. No grounds for a review would be permitted to exist except such as were named in the application to the commission for a rehearing. Under the clause of "public convenience and necessity," no utility except a railroad would be permitted to establish itself in any community without the consent of the commission.

Financial and Corporate

New York Stock and Money Markets

Dec. 13, 1911.

Substantial improvement has been made in prices on the New York Exchange, although trading has been irregular. Metropolitan trust receipts for the 5 per cent bonds reached 97 to-day, a record for the year. Interborough-Metropolitan common and preferred made slight gains and Third Avenue issues were strong. Call money rates have eased off from the 6 per cent level of the past few weeks and quotations to-day were 3¾@4 per cent; ninety days, 4 per cent.

Other Markets

Prices have been well sustained in the Chicago market since the early part of the week, and the volume of trading has been rather generally distributed throughout the list of securities.

Philadelphia Rapid Transit and Union Traction advanced fractionally on Monday, but have not figured prominently in the trading this week.

There has been fair activity in the Boston market in the past few days with the copper shares, as usual, the leader.

Trading in Baltimore is very quiet.

Quotations of traction and manufacturing securities as compared with last week follow:

	Dec. 5.	Dec. 12.
American Brake Shoe & Foundry (common)	a90	a90
American Brake Shoe & Foundry (preferred)	a131½	a131½
American Cities Company (common)	...	a27
American Cities Company (preferred)	...	a83
American Light & Traction Company (common)	a295	a295
American Light & Traction Company (preferred)	a107	a107
American Railways Company	a46	a45½
Aurora, Elgin & Chicago Railroad (common)	36	a39½
Aurora, Elgin & Chicago Railroad (preferred)	a84	a84
Boston Elevated Railway	a130	a130⅛
Boston Suburban Electric Companies (common)	a15	a15
Boston Suburban Electric Companies (preferred)	a74	a75
Boston & Worcester Electric Companies (common)	*12	a56
Boston & Worcester Electric Companies (preferred)	a55	a56
Brooklyn Rapid Transit Company	77	a76¾
Capital Traction Company, Washington	a127½	a127½
Chicago City Railway	180	a180
Chicago Elevated Railways (common)	a30¼	a30½
Chicago Elevated Railways (preferred)	a93	a93½
Chicago Railways, ptcptg., cft. 1	a97	a96½
Chicago Railways, ptcptg., ctf. 2	a35	a34¾
Chicago Railways, ptcptg., ctf. 3	a11½	a11½
Chicago Railways, ptcptg., ctf. 4	a7	a6¾
Cincinnati Street Railway	a130½	130½
Cleveland Railway	a104½	a106
Cleveland, Southwestern & Columbus Ry. (common)	*4⅞	*4⅞
Cleveland, Southwestern & Columbus Ry. (preferred)	*33¾	*33¾
Columbus Railway & Light Company	a37½	a37½
Columbus Railway (common)	a83	*83
Columbus Railway (preferred)	a90	*90
Dayton Street Railway (common)	a25	a25
Dayton Street Railway (preferred)	a101	a101
Denver & Northwestern Railway	*145	*145
Detroit United Railway	a85	85
General Electric Company	152¼	154¼
Georgia Railway & Electric Company (common)	a158½	a159
Georgia Railway & Electric Company (preferred)	a92	a91½
Interborough Metropolitan Company (common)	15	15¼
Interborough Metropolitan Company (preferred)	45½	48
International Traction Company, 4% notes, rcts	*70	69½
Indiana Union Traction Company	11	12
Kansas City Railway & Light Company (common)	a20½	a20½
Kansas City Railway & Light Company (preferred)	52	52
Lake Shore Electric Railway (common)	*7	7
Lake Shore Electric Railway (1st preferred)	*81½	83
Lake Shore Electric Railway (2d preferred)	*25	*25
Manhattan Railway	a137	136
Massachusetts Electric Companies (common)	a21⅞	a21⅞
Massachusetts Electric Companies (preferred)	a93¼	a94
Metropolitan Street Railway, New York	*8	*8
Milwaukee Electric Railway & Light (preferred)	*105	*105
Norfolk Railway & Light Company	...	26
North American Company	a73½	a73½
Northern Ohio Light & Traction Company (common)	a58½	a57½
Northern Ohio Light & Traction Company (preferred)	a105	105
Philadelphia Company, Pittsburgh (common)	53	52½
Philadelphia Company, Pittsburgh (preferred)	a43¾	a43¾
Philadelphia Rapid Transit Company	23¼	a23
Portland Railway, Light & Power Company	*99½	*99½
Public Service Corporation	a110	a110
Seattle Electric Company (common)	a107	a106½
Seattle Electric Company (preferred)	a101¾	a101
Third Avenue Railroad, New York	5	7
Toledo Railway & Light Company	4½	5½
Twin City Rapid Transit, Minneapolis (common)	a105¼	a104
United Ry. & Electric Company (Baltimore)	18½	18½
United Rys. Inv. Co. (common)	32	32
United Rys. Inv. Co. (preferred)	59	60
Virginia Railway & Power Company (common)	a41½	a44
Virginia Railway and Power Company (preferred)	81	a82
Washington Ry. & Electric Company (common)	a47	a46¼
Washington Ry. & Electric Company (preferred)	a88	a88
West End Street Railway, Boston (common)	a87½	a88
West End Street Railway, Boston (preferred)	a103½	a103½
Westinghouse Elec. & Mfg. Co.	a65¼	a66
Westinghouse Elec. & Mfg. Co. (1st pref.)	a118	a118

a Asked. *Last sale.

ANNUAL REPORTS

Aurora, Elgin & Chicago Railroad

The report of the Aurora, Elgin & Chicago Railroad for the year ended June 30, 1911, shows the following results:

Gross earnings and other income:		
Railroad department:		
Revenue from transportation		$1,514,052
Revenue from operations other than transportation		158,226
		$1,672,278
Light and power department:		
Gross earnings from operation		102,714
Interest		1,944
Income from sinking fund investment		11,751
Profit on work done for outside companies		1,796
Total gross earnings and other income		$1,790,483
Operating expenses:		
Railroad department:		
Ways and structures	$92,946	
Equipment	118,097	
Traffic	9,145	
Conducting transportation	550,718	
General and miscellaneous	244,908	
Total	$1,015,814	
Less undistributed operating credits	13,125	
Remainder—total railroad department		$1,002,689
Light and power department:		
Cost of current—operating	$21,320	
Cost of current—maintenance	576	
Cost of distribution—operating	10,909	
Cost of distribution—maintenance	6,107	
General expenses	11,746	
Total light department		50,658
Total operating expenses		$1,053,347
Gross income		$737,136
Deductions from income		423,373
Net income		$313,763
Profit and loss surplus at beginning of year		316,671
Other profit and loss credits		45,909
Profit and loss—gross surplus		$676,343
Profit and loss charges:		
Dividends	$279,000	
Other	42,619	
		321,619
Profit and loss surplus at end of year		$354,724
Percentage of operating expenses to gross earnings	59.35	

A note below the table says: "While it is the company's policy to charge against its operations the amounts expended in the current maintenance of its way and structures and equipment, no provision, other than such renewals as are included therein, is made in its operating accounts for depreciation. However, at June 30, 1911, a reserve for replacements and renewals of $24,063 was created by a charge to profit and loss."

L. J. Wolf, the president, says in part:

"Two industrial sidings for freight traffic have been added.

"A gasoline weed burner has been purchased and used with success in clearing our tracks of weeds.

"An autographic bond-testing apparatus has been purchased, which gives a complete record of the condition of our rail bonds. This has been of great service in testing bonds and showing where rebonding should be done. The welded type of bond has been applied, by means of the bonding car purchased last year, upon all of the Aurora city lines and the interurban line from Elgin to Aurora.

"An additional block of alternating-current signals is now being installed on the Elgin branch between Wheaton and Geneva Junction. Another block of these signals has been ordered for installation between Maywood and Bellwood. Several blocks of the United States type of signals have been installed on the Fox River division and a number of crossing alarm bells have been added.

"During the past year two 500-hp Edge Moor boilers with Green stokers and coal bunkers have been placed in the Batavia power house, making a total boiler equipment of 7300 hp. The installation of the new stack and the low-pressure turbine, mentioned in last year's report, was completed last winter and has brought about improved conditions and greater economy. All steam valves installed in connection with the turbine are remote-controlled, motor-driven valves to facilitate operation, and non-return stop valves have been placed on all boilers to give added safety. A 3000-hp open-type feed-water heater has been installed to utilize the waste heat from the steam-driven auxiliaries.

A turbine-driven centrifugal boiler-feed pump was installed with sufficient capacity to feed all the boilers.

"Four of the old stokers were replaced during the year with large modern Green stokers, which will result in increased capacity from the boilers and a lower cost of stoker maintenance. The coal bunkers over four boilers, capacity 10 tons each, were replaced with bunkers having a capacity of 50 tons each.

"The 1000-kw rotary installation at Lombard and the moving of the 500-kw rotary from Lombard to Ingalton substation, mentioned in last year's report, have been completed with great benefit to the Chicago division.

"To keep the machinery cool a supply of water has been piped to the Aurora and Clintonville substations and ventilators have been placed in the roofs of the Lombard and Maywood substations.

"The Aurora shop has been rearranged and several of the pits have been extended, thereby allowing the work to be handled to better advantage.

"A number of new tools and machines have been added to facilitate work at both the Aurora and Wheaton shops.

"All the steps on the Fox River interurban cars have been changed from a two-riser to a three-riser step, thus making the entrance to and exit from the cars much easier and safer.

"All Fox River interurban and many of the city cars have been re-wired and the wiring has been placed in iron conduits.

"During the year through service was inaugurated on the Chicago, Wheaton & Western Railway to St. Charles.

"Our express business has shown good growth over all divisions.

"We continued to feel the effect of the coal miners' strike of 1910, during the first part of the past fiscal year, and were obliged to purchase inferior coal at very high prices. The first coal from Illinois mines was received in the latter part of September, 1910, and then in quantities not sufficient for our needs."

Kansas City Railway & Light Company

Gross earnings of the Kansas City Railway & Light Company for the year ended May 31, 1911, were $7,727,680, an increase of $566,638 as compared with the preceding year. A comparative statement follows:

Year ended—	May 31, 1910.	May 31, 1911.
Gross earnings	$7,161,041	$7,727,680
Operating and maintenance expenses	4,153,249	4,450,534
Net earnings from operations	$3,007,792	$3,277,146
Other income (net)	17,399	45,491
Total net earnings	$3,025,191	$3,322,637
Deductions—Fixed and other charges:		
Taxes	477,109	585,865
Interest on bonded debt	1,356,588	1,475,435
Bond discount and commission (proportion written off)	170,734	236,391
Interest on floating debt (net)	77,230	15,760
Reserve for doubtful accounts receivable	20,693	30,423
Miscellaneous charges	608	15
Bond sinking fund provision (Corrigan issue)	55,000	55,000
	$2,157,962	$2,398,889
Net income	$867,229	$923,748

The net income for the year, added to the balance of $463,726 existing as of June 1, 1910, made a total of $1,387,474. From this there were paid three quarterly dividends of 1¼ per cent each on the preferred stock, or a total of $352,781, leaving a surplus as of May 31, 1911, of $1,034,693.

The balance sheet shows a depreciation and renewal reserve, less abandoned property and other expenditures written off, $1,239,65.

The certificate of Price, Warehouse & Company, chartered accountants, is as follows:

"We have audited the books and accounts of the Kansas City Railway & Light Company and its subsidiary companies for the year ended May 31, 1911, and, subject to the adequacy of the provision made toward accruing renewals and depreciation of the properties and equipment, we certify that, in our opinion, the annexed balance sheet is properly drawn up so as to show the true financial position of the company and its subsidiary companies on May 31, 1911, and that the relative income account is a correct statement of the results of the operations for the year ending on that date."

Traffic and operating statistics for the last three years compare as follows:

	1909.	1910.	1911.
Gross earnings	$6,629,195	$7,178,440	$7,773,171
Per cent of increase	7.34	8.29	8.28
Net earnings, all sources	$2,862,407	$3,025,191	$3,322,637
Per cent of increase	*2.09	5.69	9.83
Operating and maintenance expense—per cent of gross earnings	56.82	57.86	57.25
Street railway department:			
Passengers carried for revenue	104,950,526	111,171,548	117,364,925
Passengers carried on transfers	45,356,172	47,280,535	48,806,427
Gross earnings per car mile—cents	22.18	24.20	25.73
Operating and maintenance expenses per car mile—cents	12.75	14.38	15.17
Net earnings per car mile—cents	9.43	9.82	10.56
Gross earnings per car hour	$2.036	$2.208	$2.322
Operating and maintenance expenses per car hour	$1.171	$1.312	$1.369
Net earnings per car hour	$.865	$.896	$.953
Track mileage, between termini, all roads	129.832	130.432	136.133
Track mileage, single track, all roads	249.709	249.709	260.631
Electric light department:			
Connected load in 16-cp equivalents	706,884	854,296	1,092,312
Increase over previous year	123,613	147,412	238,016

*Decrease.

NOTE.—The above statistics for the street railway department, except as to track mileage, do not include the Kansas City & Westport Belt Railway.

New England Security & Investment Company Seeks to Dispose of Its Holdings

The trustees of the New England Investment & Security Company, Springfield, Mass., have decided to petition the Legislature of Massachusetts, which will convene early in 1912, for authority to sell to the New York, New Haven & Hartford Railroad all of its street railway investments instead of only the part of them represented by the Springfield Street Railway. The New England Investment & Security Company took over the street railway property in Massachusetts of which the New York, New Haven & Hartford Railroad had to divest itself a few years ago in consequence of the decision of the Supreme Court of Massachusetts. J. T. Harmer, president of the New England Investment & Security Company, has issued the following statement in this connection:

"While recognizing clearly the desirability of consolidating the Springfield Street Railway and the Berkshire Street Railway as a necessary preliminary to the construction of the extensions in the territory west of the Connecticut River, some of which are more properly extensions of the Springfield Street Railway than of the Berkshire Street Railway, the trustees of this association are convinced by their study of the situation that in a short time the same embarrassment would inevitably arise respecting the territory between Springfield and Worcester. The simplest solution seemed to the trustees, therefore, to lie in the direction of a petition for authority to sell to the New York, New Haven & Hartford Railroad the whole of its street railway investments instead of the important and valuable part of them represented in the Springfield Street Railway. If, however, the Legislature deems the formation of a Massachusetts corporation to take over the assets of the New England Investment & Security Company preferable to a direct sale of those assets to the New York, New Haven & Hartford Railroad, the petition is broad enough to permit legislation authorizing the formation of such a corporation."

T. E. Byrnes, vice-president of the New York, New Haven & Hartford Railroad, has issued a statement in part as follows:

"The trustees of the New England Investment & Security Company have intimated to the New York, New Haven & Hartford Railroad that they prefer to sell their entire street railway interests rather than to break up what they regard as a single and harmonious system by a sale of all that part of it now represented in the Springfield Street Railway. They have announced their intention, therefore, of asking for legislative authority to permit such a sale. Under these circumstances the New York, New Haven & Hartford Railroad has been asked for a statement of its position. The company has seen no reason to change the opinion formed several years ago that a development

of the territory in central and western Massachusetts served by the Berkshire Street Railway, the Springfield Street Railway and the Worcester Consolidated Street Railway is possible, and that such a development would add greatly to the prosperity of the farming and manufacturing communities in the territory, and would materially increase the importance of Springfield and Worcester as commercial and trading centers.

"The company has, however, seen no evidence of a likelihood that the necessary extensions will be built by newly organized companies, nor does it believe that the existing companies, under their present or any probable future independent ownership, will be disposed to risk additional capital in the construction of extensions which for some years at least are likely to be less remunerative than their existing lines, which are already paying a satisfactory return. The position of this company toward such a development is, however, quite different. It already has many railroad lines in the territory under consideration. Any increased prosperity in that territory, therefore, would at once benefit its railroad lines. Consequently, if legislation should be enacted authorizing the New York, New Haven & Hartford Railroad to purchase the interest of the New England Investment & Security Company in Massachusetts street railways, the New York, New Haven & Hartford Railroad would be glad to make such purchase, and to undertake to demonstrate the soundness of its belief that central and western Massachusetts are capable of a much greater development, of supporting a more numerous population and enjoying greater prosperity than at any time in the past."

Buffalo, Batavia & Rochester Railway

The Public Service Commission of the Second District of New York has received a petition for a proposed new electric railway to operate between Buffalo and Rochester. The plan involves the consolidation of the Buffalo & Williamsville Electric Railway, the Buffalo & Depew Railway and the Buffalo, Genesee & Rochester Railway as the Buffalo, Batavia & Rochester Railway.

The Buffalo & Depew Railway now runs from Buffalo to Depew. The Buffalo & Williamsville Railway extends from Buffalo to Williamsville. The Buffalo, Batavia & Rochester Electric Railway and the Buffalo, Genesee & Rochester Railway hold certificates of public convenience and necessity for roads between Buffalo and Rochester. The Buffalo, Batavia & Rochester Electric Railway also owns franchises from all the towns and villages through which the proposed railway will pass with the exception of Pembrook and Churchville, in which franchises have expired.

The proposed route of the Buffalo, Batavia & Rochester Electric Railway will form an extension of the Buffalo & Williamsville Railway and the proposed route of the Buffalo, Genesee & Rochester Railway will form a continuation of the Buffalo & Depew Railway. These proposed routes join near Batavia, and will form one continuous connected line of railway.

The commission is asked to allow the issue of first mortgage bonds to the amount of $3,000,000, preferred stock to the amount of $1,000,000 and common stock to the amount of $2,500,000. It is proposed to convert the stock of the present railway corporations into the stock of the present consolidated corporation upon the basis of one share of stock at the par value of $100 in exchange for each $100 of outstanding stock.

The petitioners have arranged with the Batavia & Genesee Construction Company to enter into a contract to build and equip the railway from Buffalo to Rochester, furnish the right-of-way, pay interest on the bonds for a period of two years and market the bonds abroad upon the basis of cost plus 10 per cent profit, and to receive in payment therefor $3,000,000 of bonds at 85 and $1,000,000 of preferred stock at par, the balance to be paid in cash or in the common stock of the railroad company at par. The proposed railroad will connect with the Rochester Railway in Rochester.

Augusta-Aiken Railway & Electric Corporation, Augusta, Ga.—The interests which control the Augusta-Aiken Railway & Electric Corporation have acquired the property and rights of the Georgia-Carolina Power Company and have announced that they will complete the proposed power development work of that company, which contemplates the construction of a water-power plant on the Savannah River at the mouth of Stevens Creek, a few miles above Augusta.

Boise & Interurban Railway, Boise, Idaho.—J. S. & W. S. Kuhn, Inc., Pittsburgh and New York, confirm the report of the sale by them of their interest in the Boise & Interurban Railway and the Swan Falls power development to a syndicate of Eastern capitalists.

Calumet & South Chicago Railway, Chicago, Ill.—The Calumet & South Chicago Railway, which is operated by the Chicago City Railway, has sold an additional $500,000 of 5 per cent bonds, making the total outstanding $4,000,000.

Cheyenne (Wyo.) Electric Railway.—The sale of the property of the Cheyenne Electric Railway is reported. The purchasers are said to be an Eastern syndicate headed by W. J. Barker, second vice-president of the Denver Gas & Electric Light Company and president of the Northern Colorado Power Company, which furnishes power in Cheyenne. Confirmation of the purchase could not be obtained at the office of Henry L. Doherty & Company in New York.

Chicago & Oak Park Elevated Railway, Chicago, Ill.—A judgment for $1,035,377 has been obtained in the Supreme Court against the Chicago & Oak Park Elevated Railway in favor of George H. Church on two notes made by the company on Sept. 5, 1911, to the order of Henry A. Blair, Samuel McRoberts and Frank A. Vanderlip, as trustee under a certain agreement dated June 30, 1911, establishing the Chicago Elevated Railways collateral trust. Both notes were indorsed by the trustee to the order of the plaintiff.

City Island Railroad, New York, N. Y.—Bion L. Burrows has been appointed receiver of the City Island Railroad as the result of a suit to foreclose a mortgage for $27,872, executed on Jan. 22, 1888, to the Pelham Park Railroad, and assigned to the Interborough Rapid Transit Company.

Columbus, Delaware & Marion Railway, Columbus, Ohio.—On the application of the holders of the preferred stock of the Columbus, Delaware & Marion Railway, Judge Daniel Babst has appointed George Whysall, the receiver of the company, special master in chancery and has directed him to advertise and sell the property.

Columbia Power, Light & Railways Company, Bloomsburg, Pa.—M. Milleisen and B. F. Meyers have been elected additional members of the board of directors of the Columbia Power, Light & Railways Company.

Columbus, Urbana & Western Electric Railway, Columbus, Ohio.—The Columbus, Urbana & Western Electric Railway has applied to the Public Utility Commission of Ohio for permission to issue $50,000 of additional capital stock and $5,500,000 of 6 per cent twenty-five-year bonds to provide funds for extensions and improvements.

Connecticut Company, New Haven, Conn.—The New York, New Haven & Hartford Railroad, acting with the Connecticut Company and the Housatonic Power Company, has in the form of a sub-lease practically divested itself of the large electric and gas companies acquired some years ago when the property of the Connecticut Railway & Lighting Company was leased. The new lease is made to the United Electric Light & Water Company, a corporation chartered by the Connecticut Legislature and understood to represent the United Gas Improvement Company, Philadelphia, and almost the same group of financiers who promoted the Connecticut Railway & Lighting Company. This sub-lease covers all properties except those used for railway purposes in Waterbury, Naugatuck, Watertown and Cheshire, not including power stations or substations used wholly or in part for railway purposes, also the same class of properties in Norwalk, Wilton, New Canaan and Greenwich. The sub-lease also covers the gas system in Norwalk and Naugatuck, and an uncompleted gas plant in Greenwich. The lease made to the United Electric Light & Water Company calls for the payment by the lessee of $365,000 a year in monthly pro rata amounts.

Denver (Col.) City Tramway.—The Denver Realty Company, a subsidiary of the Denver City Tramway, has sold $750,000 of two-year notes in order to reimburse the Denver City Tramway for advances. The International Trust Company, Denver, Col., is trustee of the issue of notes.

Du Bois Electric & Traction Company, Du Bois, Pa.—Wilson Weellper, of George B. Atlee & Company, Philadelphia, Pa., has been elected a director of the Du Bois Electric & Traction Company.

Georgia Railway & Electric Company, Atlanta, Ga.—The Georgia Railway & Electric Company has called for payment on Jan. 2, 1912, at 105 and interest twenty-five first consolidated mortgage 5 per cent bonds of the Atlanta Consolidated Street Railway dated Jan. 2, 1899. The bonds will be paid at the office of the Mercantile Trust & Deposit Company, Baltimore, Md., trustee.

Hagerstown (Md.) Railway.—C. W. Lynch, president of the Hagerstown Railway, and William Jennings, treasurer of the company, have disposed of their holdings in the company. Representatives of the new interests will be elected to the company at the annual meeting in January.

Metropolitan Street Railway, New York, N. Y.—Holders of the collateral trust 5 per cent bonds of the Metropolitan Street Railway will receive an unspecified amount shortly from the trustees of the mortgage in the shape of pro rata distribution of funds accumulated from dividends on the stocks held in the collateral trust. An address has been issued to the tort creditors of the New York City Railway and the Metropolitan Street Railway by the accident creditors' protective committee of the two companies, calling attention to the now existing situation. It is pointed out by the committee that legal proceedings in behalf of the accident creditors are now pending in the federal courts under the New York City Railway receivership and that there is a prospect that that company will pay its accident creditors in full with interest. Assignments of accident claims are required by the bondholders' committee to be made with the Windsor Trust Company, New York, N. Y., as depositary on or before noon of Dec. 23, 1911.

Michigan United Railways, Jackson, Mich.—The Michigan United Railways has applied to the Michigan Railroad Commission for permission to issue $1,237,000 of bonds to pay for work completed recently and to provide funds for the proposed line from Grand Rapids to Kalamazoo and to electrify the line to Benton Harbor. The engineer of the commission has been instructed to report on the work which the issue of securities is to cover.

New Hampshire Electric Railways, Haverhill, Mass.—Judge Edgar Aldrich of the United States Circuit Court has filed a decree ordering the sale of the property of the Portsmouth & Exeter Street Railway as a going concern or for junk. As stated in the ELECTRIC RAILWAY JOURNAL of Nov. 11, 1911, page 1042, masters appointed by the court found that the road could never be made to pay.

Ocean Shore Railroad, San Francisco, Cal.—The Ocean Shore Railroad plans to issue $700,000 of first mortgage bonds to be taken up pro rata by the stockholders to pay a note held by the Union Trust Company, San Francisco, Cal., and to buy new equipment.

Pelham Park Railroad, New York, N. Y.—Bion L. Burrows has been appointed receiver of the Pelham Park Railroad as the result of a suit to foreclose a mortgage for $27,500 executed by the company on Nov. 15, 1902, to Charles Stewart Davison and assigned on May 21, 1909, to the Interborough Rapid Transit Company.

Rio de Janeiro Tramway, Light & Power Company, Rio de Janeiro, Brazil.—The stockholders of the Rio de Janeiro Tramway, Light & Power Company have ratified an increase in the authorized capital of the company by $10,000,000, of which $5,000,000 will be offered for subscription at 105.

Tampa (Fla.) Electric Company.—The stockholders of the Tampa Electric Company will vote on Jan. 8, 1912, on the question of increasing the stock of the company from $1,700,000 to $1,870,000. The new stock is to be offered to stockholders at par in the proportion of one share of the new stock for each ten shares of stock now held. The proceeds of the new issue will be used to pay the floating debt and for extensions and improvements.

Third Avenue Railroad, New York, N. Y.—The Third Avenue Bridge Company, organized as a subsidiary of the Third Avenue Railroad, has applied to the Public Service Commission of the First District of New York for permission to issue stock to the amount of $20,000 to be used to purchase four cars which will be run over the Queensboro Bridge.

Twenty-eighth & Twenty-ninth Streets Crosstown Railroad, New York, N. Y.—The reorganization committee of the Twenty-eighth & Twenty-ninth Streets Crosstown Railroad has made public the plan of reorganization, which is substantially the same as the tentative plan filed with the Public Service Commission of the First District of New York on July 11, 1911, and noted in the ELECTRIC RAILWAY JOURNAL of July 15, 1911, page 135. The company has outstanding $1,500,000 of bonds, at least a majority of which are to be purchased by the Third Avenue Railroad at 30, in addition to which the Third Avenue Railroad will pay the receivership expenses and other claims against the corporation. It is provided that a new company shall be formed with a capital stock of $500,000 and $1,000,000 bonds, such stock and approximately $500,000 of the bonds to be exchanged for the existing bonds.

Vallejo & Northern Railway, Vallejo, Cal.—The Vallejo & Northern Railway has filed for record a certificate of increase in its bonded indebtedness from $2,500,000 to $10,000,000, the proceeds of the issue to be used to extend the line from Vallejo to Sacramento.

Virginia Railway & Power Company, Richmond, Va.—A sub-committee of the committee on streets of the City Council of Richmond has approved the sale of the Seven Pines line of the Virginia Railway & Power Company to the Richmond, Urbana & Peninsula Railway, which proposes to construct a railway from Richmond to Urbana. John C. Robertson, of the Richmond, Urbana & Peninsula Railway, states that contracts for the sale have been signed, subject to the approval of the Council.

Dividends Declared

Duluth-Superior Traction Company, Duluth, Minn., quarterly, 1 per cent, preferred; quarterly, 1¼ per cent, common.

Louisville (Ky.) Traction Company, quarterly, 1 per cent, common.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., quarterly, 1¼ per cent, preferred.

Tri-City Railway & Light Company, Davenport, Ia., quarterly, 1½ per cent, preferred.

Twin City Rapid Transit Company, Minneapolis, Minn., quarterly, 1¾ per cent, preferred; quarterly, 1½ per cent, common.

Union Traction Company, Philadelphia, Pa., 3 per cent.

West End Street Railway, Boston, Mass., $2, preferred.

West India Electric Company, Ltd., Kngston, Jamaica, quarterly, 1¼ per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

AMERICAN RAILWAYS.

Period.			Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1 m.,	Oct.,	'11	$397,964	.....	.....	.....	.....
1 "	"	'10	380,345	.....	.....	.....	.....
4 "	"	'11	1,685,683	.....	.....	.....	.....
4 "	"	'10	1,609,109	.....	.....	.....	.....
COMMONWEALTH POWER, RAILWAY & LIGHT COMPANY.							
1 m.,	Oct.,	'11	$482,351	*$275,977	$206,374	$106,599	$99,775
1 "	"	'10	438,242	*253,122	185,120	102,472	82,648
10 "	"	'11	4,462,809	*2,580,360	1,882,449	1,046,245	836,204
10 "	"	'10	4,134,020	*2,347,626	1,786,394	1,028,690	757,704
DETROIT UNITED RAILWAY.							
1 m.,	Oct.,	'11	$897,897	$578.662	$305,581	$177,438	$141,797
1 "	"	'10	809,456	523,059	286,397	178,429	120,417
10 "	"	'11	8,656,200	5,465,905	3,045,829	1,766,128	1,424,168
10 "	"	'10	7,963,091	5,008,484	2,828,950	1,689,550	1,265,058
EAST ST. LOUIS & SUBURBAN COMPANY.							
1 m.,	Oct.,	'11	$200,629	*$115,347	$85,282	$45,716	$39,566
1 "	"	'10	209,592	*110,887	98.705	45,240	53,465
10 "	"	'11	1,878,479	*1,074,478	804,001	455,851	348,150
10 "	"	'10	1,966,354	*1,082,576	883,778	450,997	432,781
LOUISVILLE RAILWAY.							
1 m.,	Oct.,	'11	$286,713	$154,064	$108,387	$70.250	$62,399
1 "	"	'10	280,927	158,131	105,062	67.667	55,130
10 "	"	'11	2,703,678	1,455,302	1,061,587	687,916	560,469
10 "	"	'10	2,589,970	1,405,001	1,040,720	648,316	536.653
UNION RAILWAY, GAS & ELECTRIC COMPANY.							
1 m.,	Oct.,	'11	$299,154	*$161.022	$138,132	$63,476	$74,656
1 "	"	'10	284,293	*148,472	135,821	58,025	77,796
10 "	"	'11	2,574,556	*1,483,713	1,090,843	616.248	474,595
10 "	"	'10	2,421,889	*1,415.167	1,006,722	581,955	424,767

*Includes taxes.

Traffic and Transportation

Report on Transfer System in St. Louis

A report on the transfer system of the United Railways, St. Louis, Mo., has been made by the St. Louis Public Service Commission to the House of Delegates. The report was made by the commission in accordance with a resolution adopted by the House of Delegates stating that the company was violating a provision of an ordinance granted by a former Assembly by its refusal to issue transfers on transfers.

In order to represent existing conditions, the commission has prepared tables, diagrams and maps of the various routes. The report is based, so far as the rules of the company are concerned, upon the books of instruction furnished to conductors for their guidance in the issue of transfers. In cases where the instructions appeared vague or inconsistent, the commission had investigations and reports made by its inspectors as to actual conditions. Tables are included showing the proportion of street mileage not accessible from any part or from certain parts of originating lines for one fare. A diagram is presented to show the least number of transfers required under the present route to enable a passenger to go from an originating line to his destination line for one fare. Such an arrangement of transfers as is shown in this diagram would require a passenger to reach his destination in many instances by a circuitous route. The commission says that it is only fair to call attention to the fact that in many cases where the length of a line is not accessible for one fare there may be many points at its intersection with other lines which are accessible for one fare under the present system. The report says: "An examination of the maps will show that while from some of the lines a close access to nearly all points on the system can be obtained for one fare, from other lines it appears that large sections of territory are not accessible without the payment of more than one fare."

One map is included in the report for each of the company's routes within the city. Each map considers this line and its relation to the balance of the whole system and shows just how much of the system can or cannot be reached for one fare by a passenger paying his fare on the line which gives title to the map.

The report says that the commission has no further recommendation than that in this, as in all other cases, those receiving franchise rights from the city should be required to meet the obligations which they have assumed as the consideration, in part at least, of the franchise grant. It seems to the commission that the duty of devising the detailed scheme of transfers, under which the company shall comply with its obligations in this regard, rests solely with the company.

Owl Service in Chattanooga.—The Chattanooga Railway & Light Company, Chattanooga, Tenn., has decided to establish an owl service on its Oak Street line as an experiment.

Toledo & Chicago Interurban Railway Reduces Fare.—The Toledo & Chicago Interurban Railway, Kendallville, Ind., has reduced the fare over its lines between Kendallville and Ft. Wayne from 65 cents to 60 cents.

Owl Service on Waterloo, Cedar Falls & Northern Railway.—C. D. Cass, general manager of the Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia., has announced that the company will establish an owl service on its lines in Waterloo.

Accident Reports Required in New Jersey.—The Board of Public Utility Commissioners of New Jersey has ordered all street railways which operate in New Jersey to report to the commission accidents which occur upon their properties or arise from the maintenance or operation of their properties.

Increase in Wages in Omaha and Council Bluffs.—The Omaha & Council Bluffs Street Railway, Omaha, Neb., has announced an increase in the wages of its trainmen of 1 cent an hour effective on Jan. 1, 1912. This makes the minimum wage 23 cents an hour and the maximum wage 28 cents an hour.

Terminal Facilities at Coney Island.—The Public Service Commission of the First District of New York has taken up with the management of the Brooklyn Rapid Transit Company the question of rearranging its terminal facilities at Coney Island for the purpose of increasing its station accommodations before the opening of the excursion season of 1912.

An Advertisement of Acknowledgment.—The Chattanooga Railway & Light Company, Chattanooga, Tenn., which has been advertising liberally during the last year, published recently in the Chattanooga *Sunday Times* a page advertisement describing the various departments of the company, concluding with an acknowledgment of the patronage received from the public.

Freight Service in Worcester.—The Aldermen of Worcester, Mass., have granted the request of the Worcester Consolidated Street Railway for permission to carry express and freight, and the Railroad Commission has approved the petition of the company. The service will be organized under the direction of C. V. Wood, traffic manager of the lines under the control of the New England Investment & Security Company.

Warning to Automobilists.—Charles L. Henry, president and general manager of the Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., is having warning signs placed at all highway crossings along the company's line and has addressed a letter to every owner of an automobile who resides in a county through which the company operates, warning him to exercise special precautions when crossing the company's line at highways in his machine.

Discussion on Rates and Fares at the Mid-Year Convention.—H. C. Donecker, secretary of the American Electric Railway Association, has sent to each member company a copy of the complete report of the committee on determining the proper basis for rates and fares. It is accompanied by a letter calling the attention of members of the association to the report and stating that it will be one of the topics for discussion at the January convention. The secretary urges all members to read the report carefully, to digest the conclusions and to come prepared to give others in attendance at the January convention the benefit of their ideas and personal experience.

Fare Changes on Catskill Electric Railway.—The Catskill (N. Y.) Electric Railway has announced a number of changes in its passenger tariff effective on Jan. 5, 1912. After that date commutation ticket books containing twenty-one tickets, each of face value of 5 cents for transportation between local stations, will be sold for $1 per book. This is a new rate. The sale of the following forms of commutation will be continued on the date mentioned; books of tickets good for twenty-one rides between Catskill and Leeds, price $2 per book; books containing detachable coupons of face value 5 cents for 1000 rides within 5-cent limit, price $30 per book; round-trip party fare (for thirty or more persons traveling together) between Catskill and Leeds, 12 cents per capita, conceded.

Decision in Milwaukee Car License Fee Case.—The Supreme Court of Wisconsin has affirmed the decision of Judge Turner in the lower court, holding that the city of Milwaukee is not entitled to recover $187,500 for licenses of $15 each on street cars from 1895 to 1910. The court held that the ordinance imposing such a license fee was repealed in 1897 when the Legislature passed a law stating that payments to the State were to be in lieu of all other licenses. Eight months ago a new ordinance was passed levying a car license of $15 per car. The licenses under this ordinance this year aggregate about $8,000. According to City Attorney Hoar, the legality of this new ordinance remains to be determined by the Supreme Court in a suit now pending.

Michigan United Railways Advertisement.—A full-page newspaper advertisement is being published which describes the rapid growth of the Michigan United Railways, Jackson, Mich., and presents four prime reasons "why the Michigan United Railways is a modern road for modern people." These reasons have to do with cleanliness, frequency of trains, economy and personal comfort, and the

arguments from each viewpoint are presented. "Midwinter third-rail travel features" include descriptions of the electric route, of the long-distance trains to and from Detroit, of package freight delivery, of theater schedules and of chartered-car service. A slogan at the bottom of the advertisement says, "You're on the right train when ticket reads 'M. U. R.'" The same newspaper in which the advertisement appeared contained a half-page article describing the improvements which the company has made at Jackson during the past year at a cost of $338,000 under the supervision of A. W. McLimont, vice-president and general manager.

Fare Changes on the Rochester, Syracuse & Eastern Railroad.—Effective on Jan. 1, 1912, the Rochester, Syracuse & Eastern Railroad, Syracuse, N. Y., has announced that the joint one-way and round-trip fares from Rochester, Rochester City Line, East Rochester, Fairport, Palmyra, Port Gibson, Newark, Lyons, Clyde, Savannah, Weedsport and Jordan to Auburn (on Auburn & Northern) will be advanced 5 cents in each instance; and that advances will be made in chartered car rates, one-way and round-trip, from above named stations to Auburn. The company has also announced numerous changes in the joint one-way and round-trip fares from Rochester, Rochester City Line, East Rochester, Fairport, Macedon, Palmyra, Port Gibson, Newark, Lyons, Clyde, Savannah, Port Byron, Weedsport, Jordan, Memphis and Warner to Baldwinsville, Phoenix, Fulton, Minetto and Oswego and from same stations, except Port Byron, Memphis and Warner, to Skaneateles and Marcellus.

Accident Prevention Campaign at Boston.—The Boston (Mass.) Elevated Railway has begun a campaign to reduce accidents. Special emphasis is laid on the problem of casualties to children and minors. A feature of the work is the publication of an advertisement in the newspapers calling attention to the importance of accident prevention work, the opportunities for the co-operation of the public and the dangers of urban life, particularly those associated with the use of thoroughfares for travel. In order to stimulate interest the company is offering 204 prizes in gold for the best verses in rhyme of not more than twenty-four lines concerning caution in the streets, and particularly in relation to street cars. A first prize of $50 is offered, with second, third and fourth prizes of $25, $15 and $10 respectively. The other prizes are for $2.50 each. The verses awarded first prize will be printed in attractive form for distribution among the pupils of the grammar, primary and kindergarten grades in the metropolitan district, and will also be issued for general circulation. The contest will close on Jan. 1, 1912.

Recent Work of Railroad Commission of Pennsylvania.—Much of the time of the State Railroad Commission of Pennsylvania has been taken up recently with complaints against electric railways. Chesinck Borough complained about the fares on the Allegheny Valley Street Railway. The Lewisburg, Milton & Watsontown Passenger Railway has answered the complaint regarding alleged inadequate passenger station facilities at Mifflinburg and unsatisfactory service between Watsontown and Milton. A complaint about ventilation and over-crowding of cars of the Valley Traction Company, operated between Lemoyne and New Cumberland, has been filed by Frank R. Leib. The Reading Transit Company has answered the complaint about the fenders which it uses. The company states that it is experimenting with the H-B fender, and will adopt any type of fender that the commission will recommend. The commission's accident figures for October show that on the street railways twenty-seven persons were killed and 310 injured. The fatalities included two employees and three passengers. It is announced that Charles N. Mann, Philadelphia, will be reappointed to the Railroad Commission for four years by Governor Tener.

Adjusting Accident Claims in Portland, Ore.—B. S. Josselyn, president of the Portland Railway, Light & Power Company, Portland, Ore., addressed the executive committee of the Pacific Coast Claim Agents' Association at a recent meeting of that body in Portland. In referring to the work of the claim department of the Portland Railway, Light & Power Company, Mr. Josselyn said in part: "Until the human race learns how to adjust its affairs and work out its problems according to a properly defined principle, there will be accidents, and the necessity for claim agents on transportation lines will continue. If the claim agent will adopt the golden rule of doing unto others as he would be done by, his principle of doing business will soon be understood by the public and lawsuits for the collection of damages for personal injury or property damage will disappear. Our claim agent is instructed to effect a speedy settlement of the case on its merits, based upon the accepted schedule of the old established accident insurance companies. Under this plan the only cases that reach the courts are those that we honestly believe are 'fakes,' or where responsibility is assumed by the company and the amount of the damage cannot be agreed upon. We are often able to keep the latter class out of the courts by leaving determination of the award to disinterested parties as arbitrators."

Re-routing Ordered in Milwaukee.—The Railroad Commission of Wisconsin has ordered The Milwaukee Electric Railway & Light Company to give crosstown service in Milwaukee. The order is for ninety days. At the hearing before the commission it was represented that there were a large number of mechanics residing on the north side of the city who were employed on the south side and at West Allis, who must transfer twice to get to their destinations, and that this traffic is during the rush hours of the day and subject to delays. The commission directs the company for three months to route a sufficient number of cars to care for the traffic, operating on its Eighth Street line from the northern terminus to State Street, west on State Street to Eleventh Street, thence south on Eleventh Street across the viaduct to Eleventh Avenue, thence south to Mukegee Avenue and to its present southern terminus. The company must also continue to route during the morning, noon and evening hours, when traffic is greatest, a sufficient number of cars to provide for the traffic over the Eighth Street line as at present routed to West Water Street. The commission says that the existing lines north of the river are so located that they cannot be transformed so as to serve adequately the needs of people who desire to travel with the least inconvenience between the north and south sections of the city, and that they were originally designed and constructed solely with a view of carrying traffic to downtown districts before any demand for crosstown service had arisen.

Service Order in Savannah.—The Railroad Commission of Georgia has rendered its decision upon the petition of a committee representing the patrons of the Savannah (Ga.) Electric Company for improved service on the city and suburban lines of the company. For the most part the report deals with car routing and other subjects of local interest only. There are a number of recommendations, however, of general interest. Among other things the commission has recommended that the company equip all of its double-truck cars with air brakes within ninety days; that the rule regarding the seating of passengers according to races be rigidly enforced; that all delays to cars be reported to the commission monthly, and that conductors be required to call street names or stations where stops are made. The commission has refused to grant the request to require the company to provide separate cars for the races on suburban lines on Saturday and to require the company to grant additional transfer privileges in the city proper. In reference to the petition for reduced fares on suburban lines and for a revision of the freight tariff, the commission says: "It is impossible for the commission to deal with these questions intelligently and fairly until it shall have ascertained accurately the earnings of the company. The financial statements submitted by respondent do not clearly segregate the general expenses of the railway department and the lighting department, and for the commission to attempt to pass upon the question of rates without more accurate information as to the earnings of the railway department might result in injustice. The commission, therefore, will pass a separate order directing an immediate audit of the earnings of the company, by an accountant employed by the commission, and will render its judgment upon the petition for a reduction or change in passenger fares and freight tariffs at the earliest possible date thereafter."

Personal Mention

Mr. Frank Burton has been elected secretary of the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., to succeed George M. Place, deceased.

Mr. E. M. Mills, formerly vice-president of the Seattle, Renton & Southern Railway, Seattle, Wash., has been elected president of the company to succeed Mr. W. H. Crawford, resigned.

Mr. C. B. Fulton has resigned as superintendent of the Philadelphia & West Chester Traction Company, Upper Darby, Pa. Mr. Fulton has been connected with the company for thirteen years.

Mr. L. A. Roehry, of the engineering department of the Illinois Traction System, Champaign, Ill., has been appointed combustion engineer of the company, reporting to the chief operating engineer.

Mr. Ernest J. Beach has been appointed assistant treasurer of the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., to succeed Mr. Lyman K. Brown, who has been elected treasurer of the company.

Mr. Lyman K. Brown has been elected treasurer of the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y., to succeed George M. Place, deceased. Mr. Brown was formerly assistant treasurer of the company.

Prof. Philip S. Biegler, of the University of Montana, Missoula, Mont., is delivering a series of lectures on applied electricity to the employees of the Northen Pacific Railroad at Missoula. These lectures are in connection with the extension work being done by the School of Engineering of the university.

Mr. R. F. Carley, operating engineer of the Illinois Traction System, Champaign, Ill., has been appointed chief operating engineer of the system to succeed Mr. W. E. Thompson, whose appointment as general superintendent of the Des Moines (Ia.) Electric Company is noted elsewhere in this column.

Mr. W. E. Thompson, chief operating engineer of the Illinois Traction System, Champaign, Ill., has been appointed general superintendent of the Des Moines (Ia.) Electric Company to succeed Mr. P. B. Sawyer, whose appointment as general manager of the Union Electric Company, Dubuque, Ia., was noted in the Electric Railway Journal of Dec. 2, 1911.

Mr. A. G. Moore, who has been connected with the office of the treasurer of the Louisville & Southern Indiana Traction Company and the Louisville & Northern Railway & Lighting Company, New Albany, Ind., has been appointed to take charge of the newly created publicity department of the companies in charge of the special campaign which is to be conducted to further industrial activity in the territory opposite Louisville on the Indiana side of the Ohio River.

Mr. C. G. Taylor, superintendent of the Cleveland, Southwestern & Columbus Railway, Norwalk, Ohio, has been elected president of the Norwalk Chamber of Commerce. Mr. Taylor was connected with the Cleveland Electric Railway for several years and with the auditor's office of the Cleveland, Southwestern & Columbus Railway for five years previous to his appointment as superintendent. He has been in charge of the affairs of the company at Norwalk since June, 1910. Mr. Taylor was mentioned as a candidate for Mayor at the last election in Norwalk, but he declined to be named for public office.

Mr. John J. Linden has resigned as general manager of the County Traction Company, Chicago, Ill., to become general manager of the Seattle, Renton & Southern Railway, Seattle, Wash., to succeed Mr. W. H. Crawford, who has resigned as president and general manager of the company. Mr. Linden has been connected with the Chicago (Ill.) Railways and allied properties for more than twenty years. He was formerly superintendent and then general manager of the Suburban Railroad, Chicago. Later he was general superintendent of the Chicago Consolidated Traction Company. He has been general manager of the County Traction Company since the organization of the company in January, 1911.

Mr. S. J. Ryder has resigned as superintendent of the Ft. Wayne lines of the Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind. Mr. Ryder began his career as a conductor in Ft. Wayne in 1896, when the line was owned by M. Stanley Robison. From conductor he was made night carhouse foreman and later day foreman and timekeeper. In 1907 he was appointed superintendent of the Logansport city lines which he managed for more than two years. He was later transferred to Lafayette in charge of that division and remained in that capacity until he was appointed superintendent at Ft. Wayne. Mr. Ryder will engage in business for himself.

Messrs. Lucien Tissier, engineer of rolling stock, Henri Collet, electrical engineer, Maurice Colin, technical engineer, and André Raynaud, engineer of traffic, Metropolitan Railway, Paris, returned to France on Dec. 14, 1911, after a trip of inspection which they have been making in this country, lasting about ten weeks. These gentlemen arrived in America in time to attend the Atlantic City convention. Later they visited Philadelphia, Baltimore, Washington, Boston, Niagara Falls, Chicago, Milwaukee, Rochester, New York and other cities to study the latest developments of electric traction with a view to their application on an extension that the Metropolitan Railway is building in Paris. This line has a length of 50 miles of subway, all double track, and the extension is to be 30 additional miles of double track, making 80 miles of double track in all. Engineers from the Metropolitan Railway have visited this country regularly at intervals of two to three years since the line was opened in 1900. The visitors this year speak of their trip as having been very instructive and profitable.

Mr. Frederick James Volney Skiff, M. A., LL.D., director of the Field Columbian Museum at Chicago for the last fourteen years, has accepted the appointment of director-in-chief of foreign and domestic participation in the Panama-Pacific International Exposition, which is to be held in San Francisco in 1915. Mr. Skiff is a member of the French Legion of Honor and has been decorated by the governments of Germany, Japan, Belgium, Austria, China, Italy, Turkey, Siam, Bulgaria and Portugal. He was national commissioner of the World's Columbian Exposition in 1893, and later chief of department of mining and metallurgy and deputy-general of that exposition. He organized the award system of the Nashville Exposition in 1897 and was director-in-chief of the United States Commission at the Paris Exposition in 1900, commissioner at the Turin Exposition in 1902, and director of exhibits at the Universal Exposition at St. Louis in 1904. He was also first vice-president of the superior jury of the St. Louis Exposition and a member of the board of administration of the International Congress of Arts and Sciences held in connection with that exposition.

OBITUARY

John P. Van Leuven, assistant superintendent of the Cincinnati (Ohio) Traction Company, is dead. Mr. Van Leuven had been in the employ of the company for twenty-five years.

E. C. Norton, vice-president and general manager of the Norton Logging Company and vice-president of the Northwestern Cedarmen's Association, died at his home in Escanaba, Mich., on Dec. 9, 1911. Mr. Norton was formerly connected with the Kellogg Switchboard & Supply Company.

A movement is under way to secure legislation in Kentucky for a commission of public utilities. It is said that the first definite action toward the institution of such a body will be taken in a recommendation along this line by Governor James B. McCreary in his first message to the State Legislature in January. The work of the State relative to the regulation and enfranchisement of public-utility corporations is at present performed by the auditor of public accounts, the state treasurer and the secretary of state acting as a special committee. It has become too onerous, however, and it is proposed to form a special commission, modeled along the lines of the State Railroad Commission, to handle the questions which arise in the regulation, taxation and adjustment of difficulties with electric railways, electric companies and other public-service bodies.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***North Macon Railway, Macon, Ga.**—Application for a charter has been made in Georgia by this company to build an electric railway in Macon from the Masonic Home beyond North Highlands through Macon and out to the Waterville Road.

***Keokuk Electric Company, Chicago, Ill.**—Chartered in Illinois to build electric and steam railways in Illinois. Capital stock, $650,000. Incorporators: George Higginson, Jr., Joseph L. Valentine and Robert H. Van Deusen.

***Decatur-Pana Southern Railway, Decatur, Ill.**—Chartered in Illinois to build an electric railway from Decatur to Pana, via Macon, Moweaqua and Assumption. Headquarters: Decatur. Capital stock, $25,000. Incorporators and first board of directors are: H. S. Ashcraft, J. W. Lockett, Howard G. Hodgkins and John H. Martin, all of Chicago.

***Johnston City Connecting Railway, Johnson City, Ill.**—Incorporated in Illinois to build an interurban railway in Williamson County. Principal office: East St. Louis. Capital stock, $5,000. The incorporators and first board of directors are: E. J. Pearson and T. L. Phillips, St. Louis, Mo.; L. O. Whitnel, H L. Browning and T. E. Gillespie, East St. Louis, Ill.

***Perry County Interurban Railway, Springfield, Ill.**—Incorporated in Illinois to build an interurban railway through Perry County between Pinkneyville and Duquoin Headquarters: Springfield. Capital stock, $2,500. Incorporators and first board of directors are: G. W. McIntyre and F. A. Spitznagel, Jr., of Springfield; Isaac Black, Duluth, Minn.; A. C. Sprague, Dubois, Ill., and William Roessler, St. Paul, Minn.

***St. Joseph (Mo.) Electric Railroad.**—Incorporated in Missouri as a subsidiary company of the Kansas City, Clay County & St. Joseph Railway, Kansas City, to build an electric railway in St. Joseph. Capital stock, $50,000. Incorporators: J. G. Schneider, W. W. Vansant and C. F. Enright.

Snow Shoe Electric & Street Railway Company, Snow Shoe, Pa.—Chartered in Pennsylvania to build a 2-mile electric railway from Snow Shoe to Clarence. Capital stock, $12,000. J. M. Shearer, president. [E. R. J., Sept. 9, '11.]

***Seattle & Eastern Railway, Seattle, Wash.**—Incorporated in Washington to build a 15-mile electric railway along the east shore of Lake Washington between Issaquah and Factoria. Right-of-way has been secured. Headquarters, Seattle. Capital stock, $1,500,000. Incorporators: R. S. Terhune, Olympia, president; George F. Aust, Arthur Schramm, Arthur Schramm, Jr., W. K. Keene, Oscar S. Springer and C. D. Folger.

FRANCHISES

Los Angeles, Cal.—The Pacific Electric Railway has received a thirty-year franchise from the Council to extend its Washington Street line from Lake Avenue and the east city limits. This extension will establish a line between Los Angeles and the new Nazarene University.

Waterville, Conn.—The Connecticut Company has received a franchise from the Board of Aldermen in Waterville.

Boise, Idaho.—The Boise Valley Railway has received from County Commissioners a fifty-year franchise for an extension from the Ninth Street bridge to connect with its line in South Boise. The company plans to build a bridge over the Boise River at Ninth Street.

Galesburg, Ill.—The Galesburg Railway & Light Company has asked the City Council for franchises to build several extensions in Galesburg.

Springfield, Ill.—The Springfield Consolidated Railway will ask the City Council for a franchise to double track South Eighth Street from Monroe Street to South Grand Avenue in Springfield.

Gary, Ind.—The Indianapolis, Chicago & Meriden Railway, Indianapolis, has received a franchise from the City Council over Seventh Avenue in Gary. The line will connect Indianapolis, Sheridan, Gary, Valparaiso, Hammond, Monticello and Warsaw. M. J. Mooreland, secretary. [E. R. J., Nov. 11, '11.]

South Bend, Ind.—The South Bend & Logansport Traction Company has received on its franchise an extension until Aug. 1, 1912, in which to build its line through St. Joseph County.

Des Moines, Ia.—The Des Moines Railway has asked the City Council for a franchise to extend its line from East Eighth Street to East First Street in Des Moines.

Reading, Mass.—The Bay State Street Railway will ask the Selectmen for a franchise to relocate its tracks on several sections of its lines in Reading.

St. Louis, Mo.—The Southern Traction Company of Illinois, East St. Louis, has asked the City Council for a franchise for municipal bridge privileges and for a loop in St. Louis.

Teaneck, N. J.—The Public Service Railway, Newark, will ask the Township Committee for a franchise to extend the Bergen Turnpike line through Teaneck from the Ridgefield Park line north to the Hudson River Traction Company's line. The company has received a fifty-year franchise to build through Ridgefield Park. It will also ask for a franchise in Bogota.

St. George, N. Y.—The Richmond Light & Railroad Company, New York, has received on its franchise a six months' extension of time within which to complete the construction of its line along Arrietta Street, the new viaduct leading from Jay Street to the Municipal Ferry at St. George, Staten Island.

Poland, Ohio.—G. E. Rose and John Harrington have received a franchise from the Village Council to build an electric railway in Poland. [E. R. J., Nov. 25, '11.]

Hamilton, Ont.—The Hamilton, Waterloo & Guelph Railway, Hamilton, will ask Parliament for an extension of its franchise in which to build its line in Hamilton.

***Coraopolis, Pa.**—The Coraopolis & Woodlawn Interurban Railway has asked the County Commissioners for a franchise over 1½ miles of the Stoop Ferry road for its railway between Coraopolis and Woodlawn.

Chattanooga, Tenn.—The Chattanooga Traction Company has asked the City Commissioners for franchises to build in Chattanooga to the city limits in four directions. C. E. James is interested. [E. R. J., Nov. 13, '11.]

Chattanooga, Tenn.—The Chattanooga, Rome & Atlanta Railway, Chattanooga, has asked the Board of City Commissioners for a franchise in Chattanooga. The company owns the right-of-way through Chickamauga Park and it expects to connect Chattanooga with Atlanta and other cities in northern Georgia. John H. Hill is interested. [E. R. J., Nov. 25, '11.]

Knoxville, Tenn.—The Knoxville Railway & Light Company has received permission from the Knox County Road Commission to build for a distance of 1½ miles along the Island Home pike.

Salt Lake City, Utah.—The Utah Light & Railway Company has received a franchise from the City Council on Main Street and Second North Street to West Capitol Street and the Capitol grounds in Salt Lake City.

Richmond, Va.—The Richmond & Henrico Railway has asked the Board of Supervisors for a franchise for a 2½-mile extension in the East End.

Seattle, Wash.—Plans for the municipal electric railway in Seattle from Third Avenue and Stewart Street to Salmon Bay have been approved by the Board of Public Works. Oliver J. Erickson, Seattle, is interested. [E. R. J., Oct. 7, '11.]

Racine, Wis.—The Milwaukee Electric Railway & Light Company has asked the City Council for franchises for three extensions in Racine.

TRACK AND ROADWAY

Edmonton (Alta.) Radial Railway.—This company will spend $596,000 in improvements during 1912. A double-

track extension will be built on Spruce Avenue; another will be made on the high level bridge and a line will be constructed on Twenty-fourth Street. Nearly $275,200 will be used for additional track equipment.

*Vancouver, B. C.—It is reported that McEvoy, Whiteside & Buddle, Vancouver, are advertising a formal application for the incorporation of a company to build and operate a line in Vancouver.

*Del Monte Heights, Cal.—H. R. O'Bryan, it is reported, plans to build an electric railway from Del Monte Heights, Pacific Grove, to the Hot Springs.

*Fresno, Cal.—J. C. Forkner, Fresno, and others plan to build an electric railway from Fresno, via the Bullard district, to the San Joaquin River.

Pacific Electric Railway, Los Angeles, Cal.—Work has been begun by this company on a 50-mile extension from the terminal of the Southern Pacific Railway in Pollasky to within a short distance of the summit of the Sierra Mountains. It is to extend to the Big Creek site of the San Joaquin Light & Power Company, where large hydroelectric construction is being carried on. It was announced that the 11-mile extension from Hollywood to Lankershim and Van Nuys would be opened on Dec. 16.

*Nevis, Cal.—It is reported that an electric railway will be built from a connection with the Western Pacific Railroad, near Virgilia, to Nevis, a distance of 27 miles. The Great Western Power Company is said to be interested.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—This company has recently extended its line to Lafayette.

*San Bernardino, Cal.—A bonus of $14,000 raised toward the cost of constructing an electric railway from the northwest section of San Bernardino to the business district will be offered to the Pacific Electric Railway.

*San Fernando, Cal.—E. D. Good, Glendale; C. P. Grogan and T. Miller, San Fernando, plan to build an electric railway from North Sherman Way in Van Nuys to Hubbard Avenue in San Fernando.

San Francisco, Oakland & San Jose Railway, Oakland, Cal.—Entire right-of-way over private property has been secured and as soon as the surveys are completed construction will be begun on this company's extension from Oakland to San Jose.

Southern Pacific Company, San Francisco, Cal.—This company has placed in operation its Seventh Street line in Oakland from the Oakland Pier to Melrose.

Peninsular Railway, San Jose, Cal.—Plans are being made by this company to build a new line to Alum Rock Park.

Norfolk & New Canaan Street Railway, Norfolk, Conn.—Plans and specifications are being made by this company preparatory to the construction in the spring of its proposed electric railway between Norwalk and New Canaan. [E. R. J., Sept. 16, '11.]

St. John's Light & Power Company, St. Augustine, Fla.—This company plan to build a 1-mile extension below South Beach.

Nampa & Caldwell Electric Railway, Nampa, Idaho.—Work has been begun by this company on its 10-mile railway between Nampa and Caldwell. A. B. Little, agent for the Cleveland Construction Company, will superintend the work. [E. R. J., Sept. 16, '11.]

Illinois Traction System, Peoria, Ill.—This company has placed in operation its northern extension from Morris to Joliet, a distance of 22 miles. It is reported that the company will build a line from Mackinaw, 20 miles northwest of Bloomington, to La Salle next year.

Quincy & Western Interurban Railway, Quincy, Ill.—This company has turned over to City Engineer Bushnell of Quincy, frontage permits for 7 miles in the city and after its approval will ask the City Council for a franchise. Power will be obtained from the dam at Keokuk. Henry Dayton, Quincy, president. [E. R. J., Oct. 7, '11.]

Manhattan City & Interurban Railway, Manhattan, Kan.—During the next six weeks this company will build 16 miles of new track. It will also built four new bridges. The company has about 7 miles graded and contracts let for about 1300 tons of rails and 10,000 ties. It is in the market for additional ties and rails.

Louisville (Ky.) Railway.—Plans are being considered by this company for an 8-mile extension of its Fern Creek line to Mt. Washington.

Owensboro (Ky.) City Railway.—This company plans to build an extension on Fourth Street and Wing Avenue in Owensboro.

New Orleans Railway & Light Company, New Orleans, La.—This company plans to build an extension of its Villere line to Milneburg.

Rockland, South Thomaston & St. George Railway, Rockland, Maine.—This company has petitioned Rockland for a right-of-way to take its traffic over its own tracks to the Maine Central Railroad and the shopping section of Rockland. It now turns its cars over to the Rockland, Thomaston & Camden Street Railway, to be taken into Rockland. If permission is secured, a petition will be filed with the Maine Railroad Commissioners for the right to build.

*Albion, Mich.—Frank A. Young, Jackson, and others are considering plans to build an electric railway from Albion to Charlotte, via Duck Lake.

Thumb District Improvement Association, Port Huron, Mich.—This company has been organized to secure the construction of an electric railway through the Thumb District to connect Detroit and Bad Axe, via Mt. Clemens, Capac, Brown City, Snover, Argyle and Ubly, with the ultimate destination at Port Austin. A. E. Riopelle, 808 Chamber of Commerce Building, Detroit, general manager. [E. R. J., Dec. 9, '11.]

*Saginaw Bay Southwestern Railway, Saginaw, Mich.—This company has been organized to build an electric railway from Owosso to Saginaw. Alva I. Jacobs, Detroit, is interested.

Twentieth Century Transportation Company, Winona, Minn.—Work will be begun by this company early in March on its electric railway to connect Chicago, Elgin, Rockford and Warren, Ill., Shullsburg, Platteville and Lancaster, Wis., Decorah, Ia., Rochester, Minneapolis and St. Paul, Minn. The company will do the construction and will not award any contracts. The company will furnish power for lighting purposes. Capital stock, authorized, $1,000,000. Officers: Ernest Norwood, Lancaster, president and general manager; Robert Bailie, Sr., Lancaster, vice-president; A. Long, Lancaster, secretary; H. E. Eastman, treasurer, and A. G. Leisch, chief engineer. [E. R. J., Dec. 9, '11.]

Missoula (Mont.) Railway.—This company plans to build a 1-mile extension of its line with 60-lb. A. S. C. E. T-rails and 2½ miles of paving with vitrified brick paving and 80-lb. high T-rails.

Mount Beacon Incline Railway, Matteawan, N. Y.—This company will build 2 miles of roadbed and track with 30-lb. rails and a new trestle in the spring.

Rochester, Corning & Elmira Traction Company, Rochester, N. Y.—It is understood that plans are being considered to revive and complete the Rochester, Corning & Elmira Electric Railway between Rochester and Elmira, N. Y., by way of Corning and Hornell. This road was originally promoted by F. Augustus Heinz and Charles W. Morse prior to the year 1907. W. C. Gray was the engineer of the company.

Westchester Street Railroad, White Plains, N. Y.—Plans are being considered by this company to extend its line to North Tarrytown and thence to the Sleepy Hollow Cemetery.

Ohio Electric Railway, Cincinnati, Ohio.—A committee from the Hamilton Chamber of Commerce conferred in Cincinnati recently with officials of this company in regard to the conditions under which the company will agree to construct extensions to cover East Hamilton, Prospect Hill and Grand View subdivisions and on East High Street, Hamilton.

Columbus, Urbana & Western Electric Railway, Columbus, Ohio.—A new line from Columbus, through Delaware, Union, Hardin and Hancock Counties to Findlay, connecting there to make a direct route to Toledo, is being planned by this company. An extension from Wapakoneta to Kenton, a distance of 35 miles, is also being contemplated by the company, which has asked the Public Utilities Commission

for permission to issue $1,500,000 in bonds and $50,000 in additional common stock, to finance these projects.

Springfield & Washington Railway, South Charleston, Ohio.—This company has secured the necessary capital to build an extension to Washington C. H.

Portland, Eugene & Eastern Railway, Portland, Ore.—It is reported that this company has begun grading for its line between Eugene and Monroe.

Oregon Electric Railway, Portland, Ore.—This company has awarded a contract for 5000 ties to the Aldrich Lumber Company.

Oregon Electric Railway, Portland, Ore.—Grading has been begun by this company on its extension between Eugene and Albany, a distance of about 26 miles.

***Coraopolis & Woodlawn Interurban Railway, Coraopolis, Pa.**—This company plans to build a 10-mile electric railway between Coraopolis and Woodland, via Stoops Ferry, Glenwillard, Wireton, Scottsville. Application for a charter will be made on Jan. 1. Officers: E. C. Dithrich, president; A. C. Purdy, secretary; Harry G. Graham, treasurer, and J. H. Barrett and Charles Gibson, Jr., engineers, all of Coraopolis.

Slate Belt Electric Street Railway, Pen Argyl, Pa.—This company is in the market for track material. L. H. Mountney, Pen Argyl, general manager.

West Penn Railways, Pittsburgh, Pa.—In the spring this company will build a 10-mile line between Hunker and West Newton. The preliminary surveys have been made.

Montreal & Southern Counties Railway, Montreal, Que.—Among the improvements to be made by this company in the spring will be an extension from Longueuil east to Boucherville and thence to the Richelieu River, where it will touch St. Charles and St. Denis. Ultimately it is proposed to extend this portion of the line down along the St. Lawrence through Varennes and Vercheres to Sorel and back along the Richelieu River to St. Charles, making a loop in that district. Work is in progress on a bridge to span the Richelieu River at Chambly and the line will be extended on the far side of the river to Belœil and St. Hilaire. A branch to Laprairie will also be built.

Chattanooga Railway & Light Company, Chattanooga, Tenn.—This company is completing the reconstruction of its Mission Ridge line. It is expected that the line will be extended to McFarland Gap in the near future.

Corpus Christi Street & Interurban Railway, Corpus Christi, Tex.—This company will build 2 miles of new track and has purchased all material except overhead material, which will be No. 00 round wire span construction.

Trinity Valley Traction Company, Dallas, Tex.—It is reported that plans are being made by this company to organize and incorporate within the next few weeks. It will construct a line between Marlin, Temple, Austin, and San Antonio. J. V. Watkins, Dallas, president. [E. R. J., April 8, 11.]

***Van Alstyne, Tex.**—A. R. Nicholson, Greenville, and associates plan to build an electric railway from Greenville to Van Alstyne, via Merit, Blue Ridge and Westminster.

Virginia Railway & Power Company, Richmond, Va.—Plans are being considered by this company to build an extension of its Moran Avenue line to the Maury High School and North Ghent.

***Cle Elum, Wash.**—Plans are being made to build a 41-mile electric railway to extend from the coal camps to Cle Elum. The plans include the development of 10,000-hp in a site near Copper Lake.

Edmonds (Wash.) Electric Company.—This company advises that during the next sixty days it will begin the construction of its 4-mile electric railway between Edmonds and Seattle Heights. The power house will be located at Edmonds. Capital stock, authorized, $50,000. Bonds, authorized, $30,000. Headquarters: Room 105, Cobb Building, Edmonds. John Appleton, Seattle, president. [E. R. J., Nov. 25, '11.]

Seattle, Wash.—The Board of Public Works has approved the plans for the extension of the municipal railway from Third Avenue and Stewart Street to Salmon Bay. [E. R. J., Oct. 7, '11.]

Fairmont & Clarksburg Traction Company, Fairmont, W. Va.—Plans are being considered by this company to build a 2-mile extension from Haywood to Lumberport.

Merrill Railway & Lighting Company, Merrill, Wis.—During the next four weeks this company will award contracts to build 2 miles of double track and overhead work.

SHOPS AND BUILDINGS

Edmonton (Alta.) Radial Railway.—This company will build a new carhouse in Edmonton. The cost is estimated to be $125,000.

Pacific Electric Railway, Los Angeles, Cal.—It is reported that this company will build a depot in Pasadena.

Pacific Gas & Electric Company, Sacramento, Cal.—This company has awarded a contract for the construction of an office building on Eleventh Street and K Street in Sacramento to E. C. Hemmings, Sacramento. The structure will be 80 ft. x 800 ft. of concrete construction, and four stories high. Construction will be begun at once.

Illinois Traction System, Peoria, Ill.—This company has opened its new temporary passenger terminal at the intersection of Lucas Avenue and High Street in St. Louis.

Manhattan City & Interurban Railway, Manhattan, Kan.—During the next few weeks this company will award contracts to build a carhouse and eight depots.

Louisville (Ky.) Railway.—This company has begun the improvement of the 10-acre tract of ground at Thirtieth Street and Broadway, in Louisville, which was secured some time ago and on which will finally stand the main repair shops of the company. The structure will be 100 ft. x 400 ft. An office building for the superintendent and quarters for employees will also be provided. Work on the building has been begun.

Berkshire Street Railway, Pittsfield, Mass.—The City Council of North Adams has granted the application of this company for permission to build a new freight house of wood and corrugated iron on Pearl Street, North Adams, to be 16 ft. x 40 ft. [E. R. J., Oct. 28, '11.]

Twentieth Century Transportation Company, Winona, Minn.—This company's repair shops for its proposed road will be located in Bloomington, Wis. Ernest Norwood, Lancaster, general manager.

Montreal & Southern Counties Railway, Montreal, Que.—This company has awarded the contract for a new carhouse in St. Lambert.

Rutland Railway, Light & Power Company, Rutland, Vt.—This company has purchased 10 acres of land in Fair Haven on which it will build a new carhouse to contain a paint shop and a machine shop. The company's present carhouses on South Main Street will be maintained and used for the belt line cars. A one-story building to be 60 ft. x 20 ft. will be erected at once on the new land for the purpose of storing construction machinery.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis.—This company will open for occupancy on Jan. 1 its new carhouses and repair shops on Thirty-eighth Street and Cold Spring Avenue in Milwaukee.

POWER HOUSES AND SUBSTATIONS

Edmonton (Alta.) Radial Railway.—This company plans to purchase two rotary converters in the near future.

Illinois Traction System, Peoria, Ill.—This company has completed its new hydroelectric station at Marseilles, which will furnish power for the Ottawa, Morris and Joliet lines.

Manhattan City & Interurban Railway, Manhattan, Kan.—During the next few weeks this company will place contracts to build a new power house. It expects to purchase an oil or steam engine, two or three large boilers, a 200-kw direct-current belted or direct-connected generator, and a 75-kw, 125-volt direct-current belted generator.

Gulfport & Mississippi Coast Traction Company, Gulfport, Miss.—This company will soon purchase a 2500-kva turbo-generator for its power house in Gulfport.

Spokane & Inland Empire Railroad, Spokane, Wash.—This company will soon purchase one 500-kw motor generator set for its power plant in Spokane.

Manufactures & Supplies

ROLLING STOCK

T. J. Bailey, St. Petersburg, Fla., is asking for prices on gasoline motor cars.

J. C. Brackenridge, New York, N. Y., is asking for prices on twenty closed cars.

Edmonton (Alta.) Street Railway will probably purchase fifteen cars during 1912.

San Diego (Cal.) Electric Railway has ordered forty-eight Brill 39-E trucks from The J. G. Brill Company.

Manhattan City & Interurban Railway, Manhattan, Kan., expects to purchase three interurban and seven open cars.

Georgia Railway & Electric Company, Atlanta, Ga., expects to build twenty-seven pay-as-you-enter cars in its own shops.

Wilkesbarre & Hazleton Railway, Hazleton, Pa., has ordered one 60-ton electric locomotive from the General Electric Company.

Hudson Valley Railway, Glens Falls, N. Y., has ordered three 28-ft. 1½-in. closed motor car bodies from the Wason Manufacturing Company.

British Columbia Electric Railway, Vancouver, B. C., has ordered twenty-five 30-ft. 1-in. semi-convertible closed motor car bodies from The J. G. Brill Company.

Savannah (Ga.) Electric Company has been ordered by the Railroad Commission of Georgia to equip all of its double-truck cars with air brakes within ninety days.

Bellingham-Skagit Railway, Bellingham, Wash., has ordered four combination interurban car bodies from the St. Louis Car Company, through Stone & Webster, Boston, Mass.

Peekskill Lighting & Railroad Company, Peekskill, N. Y., has ordered three 20-ft. 8-in. semi-convertible motor car bodies with Brill 21-E trucks without wheels and axles from The J. G. Brill Company.

Third Avenue Bridge Company, New York, N. Y., a subsidiary of the Third Avenue Railway has applied to the Public Service Commission of the First District for permission to issue stock to the amount of $20,000 to purchase four cars to be operated over the Queensboro Bridge.

TRADE NOTES

General Electric Company, Schenectady, N. Y., has appointed C. W. Stone manager of the lighting department to succeed C. D. Haskins, deceased.

American Rolling Mill Company, Middletown, Ohio, on Dec. 8 entertained the members of the National Corrugated Culvert Association at its works in Middletown following the annual convention of that body in Chicago.

Joseph G. Gettrust, who for sixteen years was mechanical inspector of the Galena-Signal Oil Company, has been appointed Southern railway representative of the Ashton Valve Company, Boston, Mass., with office in Chicago.

Edward P. Burch, Minneapolis, Minn., consulting engineer, with C. L. Pillsbury and ten assistants, is making a physical examination and valuation of the Duluth-Superior Traction Company's electric railway properties in and near Duluth, Minn.

Galena Signal Oil Company, Franklin, Pa., has appointed W. H. Pope chief of the mechanical expert department of the company. Mr. Pope was for five years general manager of the Pittsburgh & Butler Street Railway and the Butler Passenger Railway.

Ralph Birchard, formerly manager of the *Railway Electrical Engineer,* Chicago, has entered the employ of the Edison Storage Battery Company, Orange, N. J. Mr. Birchard is in the sales department, where his duties will include the preparation of bulletins covering the uses of the Edison battery. The change became effective Dec. 1.

Allis-Chalmers Company, Milwaukee, Wis., will be reorganized. In connection with the reorganization a protective committee of the holders of the company's 5 per cent bonds has been formed. The committee consists of James N. Wallace, president Central Trust Company of New York, chairman; R. Walter Leigh, Charles W. Cox, Fred. Vogel, Jr., and John H. McClement. The Central Trust Company is to be the depositary of the bonds.

National Brake & Electric Company, Milwaukee, Wis., will erect an iron foundry in Milwaukee during the coming year. Plans will soon be drawn, and work will be begun next spring. To finance this improvement and also to pay for several additions made to the plants of the company during the past year the capital stock of the company has been increased from $1,000,000 to $2,000,000. The business of the company for the present year will amount to about $2,000,000, an increase of about 25 per cent over the previous year.

International Steam Pump Company, New York, N. Y., at the annual meeting of the stockholders on Dec. 12 elected H. B. Hollins, Walter Kutzleb and A. W. Kenworthy directors to succeed William Barber, Charles S. Hirsch and Charles K. Allen. The report of the company for the eighteen months ended Sept. 30, 1911, showed net profits from combined operations of associated companies of $2,676,449; interest on bonds and discount of bonds, $800,176; dividends on preferred stock, $1,289,700; total interest and dividends, $2,169,876; balance added to surplus of undivided profits of associate companies, $506,573.

Dorner Railway Equipment Company, Chicago, Ill., announces that it recently has made the following sales: Three double-truck trail cars to the Chicago & Southern Traction Company, one double-truck car with four GE-1000 motors and Westinghouse air brakes to the North Kankakee Electric Light & Railway Company, one double-truck car with Westinghouse air brakes to the Lake Erie, Bowling Green & Napoleon Railway, six double-truck cars equipped with GE-57 motors and National air brakes to the Cleveland, Southwestern & Columbus Railway, one double-truck car equipped with GE-57 motors and National air brakes to the Nebraska Traction & Power Company, Omaha, Neb.

S. George Freund, New York, N. Y., has opened an office as a consulting engineer for foreign trade at 100 Broadway, New York. His purpose is to act as a connecting link between American and foreign, especially German, industries in the mutual extension of their technical-commercial relations and the introduction in one country of enterprises and products which have been successful in the other. He is also prepared to assist American and German manufacturers in matters relating to import, export and manufacture and the exploitation of patents. Mr. Freund was connected with the electrical engineering department of the Interborough Rapid Transit Company during the construction of the subway. He has also engaged in other engineering work in this country and since 1901 has been American correspondent for the German *Elektrotechnische Zeitschrift.* He has just returned from Europe, where he opened a European office at Grunewaldstrasse 99, Berlin.

ADVERTISING LITERATURE

Bridgeport Brass Company, Bridgeport, Conn., is mailing a card which calls attention to the wearing qualities of its phono-electric trolley wire.

Rostand Manufacturing Company, Milford, Conn., has issued a fifty-page catalogue which lists and illustrates its complete line of fittings for electric and steam cars.

Joseph T. Ryerson & Sons, Chicago, Ill., are distributing a sixteen-page pamphlet in which Rockford planers are described and illustrated. The chief mechanical features of these shop tools are shown by halftone views, the specifications for the different sizes are printed and special details are emphasized by line engravings.

Railway Improvement Company, New York, N. Y., has issued a 24-page catalog which describes the coasting time recorder system as devised and perfected by the company. The catalog is divided into three sections. The first section fully describes and illustrates the type H coasting time recorder, a description of which was printed in the Electric Railway Journal of Dec. 9, 1911. The second section describes the terminal clock. The third section is devoted to a discussion of the economies effected by the use of the company's coasting time recorder. Numerous charts showing the results of tests are included in this section.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVIII NEW YORK, SATURDAY, DECEMBER 23, 1911 No. 26

PUBLISHED WEEKLY BY

McGraw Publishing Company

JAMES H. MCGRAW, President; C. E. WHITTLESEY, Sec'y and Treas.

239 WEST THIRTY-NINTH STREET, NEW YORK

TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1021 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Wednesday, 9 a. m., of the week of issue.

Copyright, 1911, by MCGRAW PUBLISHING COMPANY.

Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL, 8500 *copies are printed.*

The Association of American Advertisers has examined and certified to the circulation of this publication. The figures of circulation contained in the Association's report only are guaranteed.

ASSOCIATION OF AMERICAN ADVERTISERS.

No. A—82. *Whitehall Bldg., N. Y. City.*

NEW YORK, SATURDAY, DECEMBER 23, 1911.

CONTENTS.

Pay-As-You-Leave 1265
New Jersey Low Fare Case..... 1265
Association Alliance in the Central West..... 1266
The Complaint Department..... 1266
The Railroad Securities Report..... 1267
Efficiency in Handling Equipment in Brooklyn..... 1268
Interstate Commerce Commission Report..... 1271
Advance in Price of Copper..... 1271
New Complaint Department in Rochester..... 1272
Popularity of Near-Side Car..... 1275
Meeting of Central Electric Railway Accountants' Association..... 1276
Transportation of Mail Carriers Abandoned at Little Rock..... 1279
New Station for the Aurora, Elgin & Chicago Railroad at Wheaton, Ill. 1280
Plan for Model Franchise Presented to Municipal League..... 1281
Berkshire Street Railway Sustained in Ejectment Case..... 1282
Special Uses of Fiber Conduit..... 1282
Forced Draft System in Hudson & Manhattan Power Station..... 1283
Effect of Collision Between Two Steel Cars..... 1283
Flat-Arch Prepayment Cars for Savannah..... 1284
New Developments in Railway Telephone Apparatus..... 1284
Gasoline Motor Cars for the Victorian Railways, Australia..... 1285
Romapac Rail Installation in Chicago and Elsewhere..... 1286
Automatic Block Signals on Illinois Traction System..... 1287
News of Electric Railways..... 1288
Financial and Corporate..... 1291
Traffic and Transportation..... 1295
Personal Mention 1297
Construction News 1299
Manufactures and Supplies..... 1301

Pay-As-You-Leave

The Hudson & Manhattan Railroad has announced its plan of collecting a 7-cent fare from passengers from Jersey City to uptown New York. It will collect 5 cents when the passenger enters the train and 2 cents when he leaves. Although uncommon, the collection of a fare when a passenger leaves a train is not unprecedented. It is followed at certain of the Coney Island terminals of the Brooklyn lines, and on certain of the underground roads in London and on the underground and elevated line in Berlin the passenger has to surrender his ticket at the station at which he leaves the train. This plan is also followed on many steamboat lines in this country. There does not seem to be any serious objection to it, provided the means of collecting the tickets are such as not to delay the departure of passengers from the station. On the trip from New York to New Jersey a different plan is followed, because most of the passengers leave the train at one or two points in New Jersey. Here the passenger from an uptown New York station will be required to purchase a 7-cent ticket, but if he should leave the train before it crosses under the river, 2 cents is refunded, so that the fare within the city of New York will remain 5 cents.

The New Jersey Low Fare Case

In a decision denying a request for lower rates of fare on a suburban line operated by the Trenton & Mercer County Corporation, an abstract of which was published in the issue of the ELECTRIC RAILWAY JOURNAL for Nov. 25, 1911, page 1117, the Board of Public Utility Commissioners of New Jersey referred to the charge that dividends were paid in the past on some of the properties of the present system, but expressed the opinion that the payment of such dividends was possible because the property was not maintained in proper physical condition. If this was the case, the board acted both conservatively and wisely in withholding its judgment on the request for lower rates of fare until at least the actual earning power of the property under present conditions can be demonstrated. If dividends are paid by established companies under the circumstances charged they are paid at the expense of the property. In this instance the railway has been undergoing financial and physical rehabilitation and it does not appear that present practices are the subject of complaint. A one-fare city system depends for its profit upon the average haul. Many hauls on suburban or outlying lines of city properties are excessive in length and cannot be considered profitable if judged on the basis of cost alone. Their justification is that sometimes they increase the number of people carried into the business districts of cities, and thus add to the probable amount of short-haul traffic.

Association Alliance in the Central West

The final steps necessary in the new relationship between the Central Electric Railway Association and the Accounting Conference, which has done good work in the Central West for several years, were taken last week. The conference takes the new name of the Central Electric Railway Accountants' Association and becomes an auxiliary of the older and larger Central Electric Railway Association. As there is also an allied Central Electric Traffic Association, the activities of the parent body and its smaller co-operating organizations are departmentalized and placed in a more satisfactory condition for united movement than ever before. It is interesting to note that the papers read before the accountants at their final meeting as an independent body dealt largely with the subject of co-operation, the spirit of which is manifest in the step just taken. The Accounting Conference was established first in 1907. The chairman at that time was M. W. Glover, now auditor of the Mobile (Ala.) Light & Railroad Company. The membership has increased steadily and from the beginning the conference has accomplished results that have been of much value to interurban lines. The accounting problems of these lines differ in some ways from those of the older types of electric railways. They therefore require some changes in methods and a consideration which can be given effectively in an association like that existing in the Central States, the membership of which is composed largely of companies of this character.

Overhead Line Maintenance

Engineers have found that simplicity in the design of overhead line material is a factor increasing its life. This is true for two reasons: first, there are fewer parts to corrode, and, second, it is more easy to protect those parts against corrosion. The importance of simplicity is particularly shown in the type of bracket or mast arm that is giving the most satisfactory service. In catenary trolley construction the I-beam and T-beam brackets are being purchased almost exclusively by the companies which give careful attention to the life of overhead lines. We find, however, that some of the smaller roads that buy intelligently do not pay the attention which they should to the maintenance of their overhead material. The protective covering which these brackets often receive at the shops is lusterine or coal-tar paint. It gives a good appearance to the arm when it reaches the purchaser because it stands the rough handling in shipment, but it has very little value as a permanent protection against corrosion. We believe that if a shop coat of mineral paint, such as red lead, iron oxide or graphite, was specified, and a second coat of the same paint was applied at the destination, just before the bracket was put on the pole, an economy worth while would result. If this method of painting is used the necessity for another coat would be postponed at least five years, and the life of the arm would be extended at least eight years if it received another coat of paint. The brackets, however, should receive the same attention from the paint standpoint as steel bridges, if they are to remain in good condition, and if a little thought is given to the preparation for painting it could be done at a surprisingly low cost per bracket.

THE COMPLAINT DEPARTMENT

It has been well said that the duty of the modern claim agent is not so much to adjust accidents after they have taken place as to prevent their occurrence, just as the principal function of the physician of to-day is to prevent the spread of disease rather than to cure it. In the same way the duty of the railway manager may be said to be to forestall complaints rather than to discourage them. The experience on practically every road, we believe, is that the proportion of complaints which are really justified amounts to a very small percentage of the total number received, and the number received is undoubtedly an even smaller percentage of those expressed verbally to conductors and in private conversation. Now, if it is true that the railway company can satisfactorily explain a very large proportion of the complaints, is it not to its advantage to do so, because it thereby can correct an erroneous impression in the mind of the aggrieved person? But if it cannot satisfactorily answer the complaint—that is, if the dissatisfied passenger or citizen calls attention to some bad practice which the company is able easily to correct—the complaint is even more valuable. It is expert advice on the proper conduct of the road, because it conduces to good service in matters which hitherto have escaped the attention of the officials in charge. Another and still more important reason for paying attention to a complaint, whether legitimate or not, is that the company will thereby please the public. The self-esteem of the man whose complaint has received attention is gratified, and the chances are that he will be just as ready to praise the company to his acquaintances in the future as he was formerly to make it the object of his criticism.

With these thoughts in mind, the New York State Railways of Rochester began about eleven months ago the new policy of treating complaints from patrons, described elsewhere in this issue. Up to that time the plan had been followed, as on many other roads, of having all complaints answered by the transportation department, as that is the department which is usually most concerned with the cause of the complaint and its remedy. A moment's thought, however, will show that such a plan is illogical. It is like asking a man to audit his own accounts. He might be able to explain the reasons which led him to adopt one method of accounting or another, but for this reason he would be less able to recognize mistakes of judgment than an outsider. Hence the complaint department in Rochester was made entirely independent of the transportation department and an adjunct of the work of the vice-president and general manager.

Another feature of the Rochester plan is that criticisms are cordially invited. Such a policy will probably at first greatly increase the number received, but it should decrease the number of unintelligent complaints, and all others are welcome. It also has this advantage. Many persons are accustomed to express general dissatisfaction with the service of a public utility company whenever they think that they are being inconvenienced by that service in any way, but these same persons will often find that their criticism is groundless if they are asked to analyze and give formal expression to it in a letter to the company. On

the whole, therefore, the results obtained in Rochester have proved very successful from every point of view. The company has been benefited and the public has a better realization of the practical problems and physical limitations of city railway service.

THE RAILROAD SECURITIES REPORT

The study of the subject of railroad securities by the commission appointed by President Taft, an abstract of which was given in our issue of last week, is a valuable, comprehensive treatment of the issues concerned and, considering the magnitude and controversial nature of the subject, is remarkable for its conciseness. It offers recommendations designed to separate certain good and bad practices in railway finance, and it should receive widespread and effective consideration. It is an attempt, approved by high governmental authority, to point out a way for the settlement of a serious misunderstanding. Several of the points discussed are of fundamental importance to all utilities, because the tendencies of federal regulation will probably in time become the tendencies of regulation generally throughout the country, and special attention is therefore called to these matters.

It appears, for instance, that the members of the commission dissent from some of the aims and results of state regulation. Thus, the commission lays stress upon the importance of publicity as a protection to investors, and it believes that a more definite government policy in the direction of publicity would be more effective as an immediate remedy for existing conditions than the strict restrictions on the issue of securities which are laid down in various state laws. That is to say, the commission would compel railways to make public all the facts regarding the purposes to which proceeds of their issues of securities are to be put, and this information would be available for investors. The policy thus suggested is much more moderate than the tendency of regulation in states where strong commission laws have been passed and the commissions, by approving new issues of securities, give what is construed by the public as a guarantee. It is the opinion of the Railroad Securities Commission that such a guarantee should never be given.

Looking into the future, the commission believes that some further legislation will be imperative, and the discussion is evidently intended in large part to lay down a set of principles to guide the country when this time shall arrive.

The theory of railway stock issues is discussed in one way or another in various sections of the report. It is true that stock represents a share in the ownership of the property and that in many instances the par value on the face of the certificate is nominal and the stock represents an investment that is less than the par value named. In many other instances the stock represents an investment of 100 per cent; but in both cases the market value is fluctuating and does not bear a permanent parity with either the par value or the investment. The remedy to which the commission turns in order that the shares may purport to represent only this pro rata interest in the ownership is the elimination of the dollar mark from the face of certificates. It is, of course, impracticable to apply this plan to the great bulk of securities now outstanding. A holder of stock who pays par has an investment in a company that should have values equal to that sum, and the earnings should permit a reasonable return. With good management and protection of the capital, there should be a surplus in good years as a safeguard against poor years. Under such circumstances there is no reason why a holder should unwillingly surrender a certificate of this nature for one bearing no par value. But, if legally feasible, the plan might be applied to properties whose stock represents nothing but admitted expectations and, as the commission suggests, it offers excellent facilities for reorganizations and consolidations where there is a duplication of capital. This plan was carried out in the rearrangement of capital in the Chicago Union Traction reorganization. It was adopted in the distribution of certificates of interest in ore lands to shareholders in the Great Northern Railway and by holding associations like the Boston & Worcester Electric Companies and Boston Suburban Electric Companies.

No language indicates more strongly the attitude of the commission toward publicity than its declaration that the companies must indicate fully the condition of their capital and operating accounts and must not attract bondholders by representing that there has been a payment of 100 cents when there has been a payment of only 50 cents. There has been marked progress in the protective features of mortgages securing bond issues, and it would be well if the higher standards recommended could be exacted in all trust deeds of this character. Some forms of mortgage have practically permitted the capitalization of expenditures that should properly be charged to operating expenses. The higher standards of corporate management and integrity in the accounts have contributed to the revision of such practices.

The commission says that an attempt to scale down old securities is clearly out of the question and that conditions of public expediency forbid it. If these clear statements are read in connection with the ensuing words in which the report approves physical valuations, is it to be inferred that the commission, notwithstanding the results of valuation, would leave outstanding capitalization alone? This is desirable wherever possible and it is the policy that should prevail, although in cases of unfortunate or heinous mismanagement it is doubtful if governmental sanction could or should prevent a collapse. Enforced and complete publicity respecting the accounts will do much to prevent mismanagement of either character in public utilities. But, if the government is to put its hands on securities at all, it should protect values in all cases possible, not destroy them.

In their attitude toward securities the policy of regulating commissions should not be reactionary in the sense that it would condone a return to the loose ways of the past, but it should be conservative in the sense that it realizes the dangers to the public welfare of the adoption of a plan by which initiative and economy will go unrewarded and security holders will be so fearful of a lack of protection and a return equal to the risk that they will be unwilling to advance additional capital.

Efficiency in Handling Equipment in Brooklyn

A Description of the Methods by Which the Mechanical and Transportation Departments Secure the Maximum Service and Economical Use of Cars

Following a general policy outlined a few years ago by the management of the Brooklyn Rapid Transit System, beneficial results, sought through the co-operative methods of the mechanical and transportation departments, have been secured and are evidenced by the increased efficiency with which equipment is handled.

As described in previous articles in the Electric Railway Journal, standardization of equipment has been carried to completion, partially on a maintenance basis and partially on an overhauling basis. This work has been carried into the various departments. For instance, all types of control apparatus on elevated cars have been made inter-operative so that the yard crews are able to make up trains regardless of the types of control on the different cars. This has facilitated the make-up of trains materially and has lessened the number of yard employees required for this work.

With the standardization of equipment finished, the next step in the policy has been to standardize methods of inspection, repair and overhauling in the various shops, so that the output of each might be turned over to the transportation department ready to give uniform service on the various lines of the company.

Efficiency and economy have been the guides in the prosecution of this work. These two principles have been held constantly before superintendent and foreman alike, who have been invited and encouraged to devise new methods whereby the forces under their direction might render better accounts of time expended and material consumed. At recurrent meetings these innovations have been discussed and their operation has been tested from shop to shop, until the practical results obtained justified adoption throughout the system. Old methods have been discarded as fast as improvements rendered them obsolete; work of a like nature has been segregated whenever possible and profitable, and, while the spirit of rivalry between shops has been maintained as a constant incentive to good work, efforts in the main have been directed so as to secure a uniform output of high order.

A strict adherence to schedules in summer providing for the overhauling of winter equipment, and *vice versa,* has contributed to the policy of "readiness" which characterizes the work of this branch of maintenance. Particular stress has been laid on the economical use of material and the necessity of exhausting available supplies before the withdrawal of new supplies from the storerooms. This plan, while robbing the scrap heap, is cultivating in each workman the spirit of economy and is reflected by reduced requisitions.

Like principles have applied to the renewal or exchange of parts as equipment is passed through the shops for inspection, repair or overhauling. Waste mileage for these latter purposes has been reduced to a minimum by the policy of localizing repair facilities for many details. Cars are sent to the main shops only when overhauling or extensive repairs are necessary. Promptness in the handling and return of equipment is noticed, and this is accompanied by equal promptness in delivery. The shops are thus freed from surplus storage and the transportation department is permitted to operate available equipment in the most advantageous manner.

Supplementing the increased efficiency which has been effected through improvement in shop methods, radical departures are likewise noticeable in the transportation department. Some of these have arisen through physical changes in traffic conditions; others have resulted from better adjustment and distribution of equipment to meet conditions of travel, which vary for the different lines of the system; all reflect more minute attention to operating detail and a more careful study of the changing requirements which develop within a community as extensive as that served by the Brooklyn Rapid Transit System..

The success obtainable by these combined efforts is apparent in the accompanying table, which indicates clearly that each unit of equipment has been made to bear its share of the increased business, without unnecessary additions to the item of fixed charges.

Table Showing Increased Mileage per Day per Unit of Equipment of the Brooklyn Rapid Transit System.

	Surface Division.			Elevated Division.		
	March (typical winter month).					
Year.	Cars Available.	Car Mileage.	Average Miles per Car.	Cars Available.	Car Mileage.	Average Miles per Car.
1908...	1624	3,561,662	70.7	927	2,395,394	83.4
1909...	1624	3,672,469	72.9	928	2,567,190	89.2
1910...	1624	3,909,178	77.6	928	2,760,125	95.9
1911...	*1644	4,082,414	80.1	928	2,706,202	94.1
	August (typical summer month).					
1908...	1953	3,901,334	64.4	927	2,860,222	99.2
1909...	1953	4,115,610	68.0	928	3,344,060	116.2
1910...	1953	4,207,354	69.5	928	3,163,218	110.0
1911...	*1965	4,451,035	73.1	928	3,183,090	110.6

*Additional cars secured through reconstruction of obsolete equipment.

From this table it will be seen that with the same equipment, under improved methods, the average daily car mileage has been increased on the surface division 13.3 per cent for typical winter months and 13.5 per cent for typical summer months; the corresponding increases for the elevated division are respectively 12.8 per cent and 11.5 per cent.

The difference between the average daily mileage for the typical winter and summer months on the surface division is due to the greater number of units and the fact that for the summer business this additional equipment is required during only a few hours of the day. On the elevated division the excursion business with express service accounts for the greater mileage per unit in the summer as compared with the winter months.

Changes in Routes

During the period in which these results have been secured extensive changes in routes have been made to meet service requirements. The extension of the Interborough Rapid Transit subway to Brooklyn necessitated a readjustment of all the surface lines which had previously crossed the Brooklyn Bridge. At the subway stations between Borough Hall, Brooklyn, and Atlantic Avenue, the subway terminal station in Brooklyn, trolley loops were constructed by the Brooklyn Rapid Transit System, and short-line service was installed to care for business centralized at these points. Not only was congestion on the bridge materially reduced, but headways and running time were shortened on the loop service and patrons were carried to their homes with increased rapidity and comfort.

This removal of a portion of the through service to the Manhattan side of Brooklyn Bridge improved, by reason of reduced congestion, the remaining service over the bridge, while greater attention to detail permitted a gradual increase in the quantity of through service to meet the growing needs of such routes. This does not mean that the number of cars operated across the Brooklyn Bridge was reduced, but that the relief of passenger congestion at the terminals permitted more rapid loading and freer movement of the cars entering and departing therefrom. As a matter of fact, by increased attention to the detailed requirements of this operation and freedom of movement resulting therefrom the number of cars was gradually in-

creased until at the present time more units pass over this structure per hour than ever before.

In addition to the service at the surface loops at subway stations, short-line service has also been inaugurated at other points wherever the characteristics of travel permitted, so that cars which previously had made but one or two trips during rush hours have been returned three and even four times to reduce the congestion at peak hours. The diversion of fully loaded cars from congested downtown streets to parallel routes, which re-enter the main line farther away from the congested district, has also facilitated the handling of heavy business on trunk lines. Every practicable means is employed by the transportation department to keep the lines clear and the line headways uniform. Time points are located, to which crews run on schedule at the maximum speed consistent with safety, while running time is changed as congested districts are reached or passed.

DISTRIBUTION OF CARS

The cars are so distributed at the different terminals as to meet the requirements of travel in the best possible manner. In this distribution adjustment is made of the different types of equipment in order that the varying needs of the extensive area served may be met with discrimination against none and justice to all. The higher geared motors are reserved largely for districts where physical conditions permit their use; cars of different seating capacities are operated in different localities or in the same locality at different hours of the twenty-four, the object being to serve each community according to its needs.

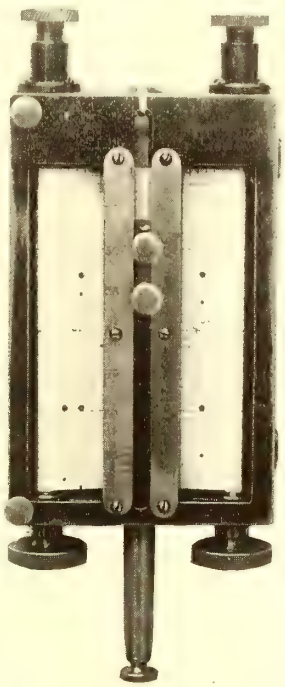
On lines where double-truck cars on a normal headway furnished more seats than the business offered the character of service has been improved by reduction in the headway and the use of a smaller car; the increase in platform cost in such cases has been made up by the saving incident to the operation of lighter equipment.

On the elevated division similar improvements are noticeable not only in the character of service but also in the more judicious use of equipment. Certain lines are operated as express lines between given points where the combined headways of all lines using the same tracks furnish reasonable service to the stations thus passed by some lines. During rush hours certain trains in the reverse direction to that of the heavy travel are operated light so as to permit a more prompt use of such trains in the direction of the heavy movement. Short-line service has been installed wherever practicable, with increased comfort to the great majority of patrons served.

Travel conditions are kept under constant supervision in order that increasing needs or changing requirements may be met with modified schedules.

TABULATING DEVICE USED

In this latter work on the surface division considerable assistance is derived from the use of a patented tabulating device which furnishes graphic records showing the relation between seats and passengers and thus permitting the chief dispatcher to concentrate his attention solely on those portions where modifications are necessary. This device, which is illustrated herewith, consists essentially of a metal case, beneath the open face of which is passed, by means of tangent screws, a continuous strip of cross-section paper 4 in. wide, upon which the record is made. Directly above the open face is a double-graduated scale carrying two sliding circular punches of different diameters.

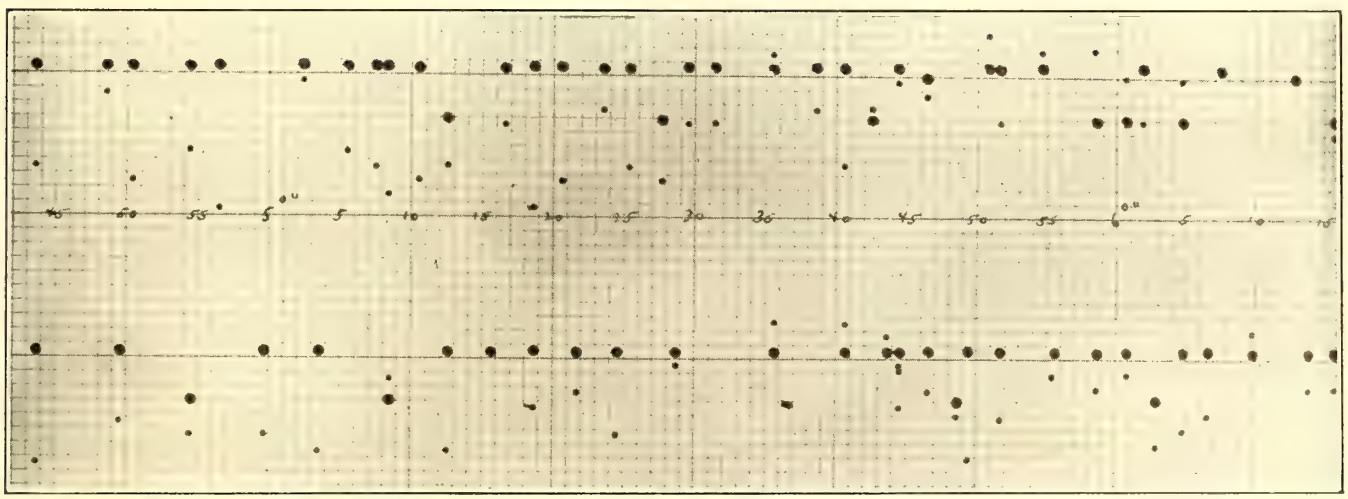


Efficiency in Brooklyn—Tabulating Device Used in Counts of Passengers

Holding the instrument in one hand, the observer moves the paper so that the time units appearing along the media line of the record pass the edge of the graduated scale to correspond with the actual line as shown by a watch carried on the wrist. As a car approaches the known seating capacity is recorded by moving the larger diameter punch to proper position on the graduated scale and depressing for perforation. As the car passes the observer the load carried is recorded in a similar manner by setting and depressing the smaller punch.

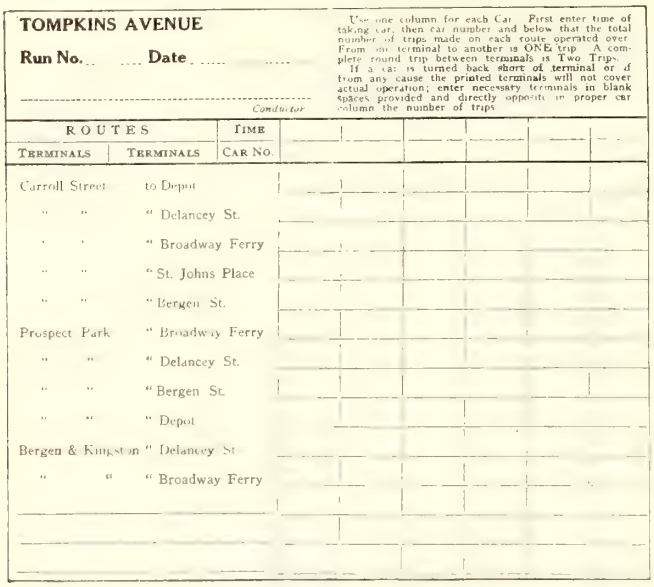
The section of the record published herewith is a typical one taken from the records furnished by an observer to the chief dispatcher. Above the media line, reading from this line up, is the record of east-bound service, while the corresponding west-bound service, read from the bottom of the sheet, appears below. The vertical intervals on the record correspond to five seats or passengers and agree with the graduation on the scale. The horizontal intervals correspond to two minutes of time, each ten-minute interval being represented by the heavier line.

The perforations are read in pairs, an overload being indicated when the smaller circle appears above the larger, and an underload when the converse appears. The amount of overload or underload is the vertical distance between



Efficiency in Brooklyn—Actual Record of Passengers Made by Tabulating Device

the larger and the smaller circle, commuted into passengers by the equivalent of five passengers for each vertical interval of the record paper. Aside from indicating whether insufficient or excess service is being operated, the record shows clearly all irregular headways arising from blocks or other causes. When operating deficiencies are apparent blueprints may be made directly from the original record



TOMPKINS AVENUE

Run No. .... **Date** ....

Conductor

Use one column for each Car. First enter time of taking car, then car number and below that the total number of trips made on each route operated over. From one terminal to another is ONE trip. A complete round trip between terminals is Two Trips. If a car is turned back short of terminal or if from any cause the printed terminals will not cover actual operation, enter necessary terminals in blank spaces provided and directly opposite in proper car column the number of trips

ROUTES		TIME
TERMINALS	TERMINALS	CAR NO.
Carroll Street	to Depot	
" "	" Delancey St.	
" "	" Broadway Ferry	
" "	" St. Johns Place	
" "	" Bergen St.	
Prospect Park	" Broadway Ferry	
" "	" Delancey St.	
" "	" Bergen St.	
" "	" Depot	
Bergen & Kingston	" Delancey St.	
" "	" Broadway Ferry	

Efficiency in Brooklyn—Route Card Used by Conductors for Record of Trips

and forwarded for attention to the assistant superintendent concerned.

Before the introduction of this instrument like data were obtained in the form of a numerical equivalent. Not only were the compilations laborious, but the mass of resultant figures tended to confuse and had the additional objection that they represented so much wasted energy when they were indicative of satisfactory service on the line.

With the graphic record minute analysis of a dozen lines consumes less time than a single line did under the old form, which is quite an item on a system comprising more than seventy lines. The chief value of the present record lies in the fact that it enables the chief dispatcher to cover all lines more frequently and thus keep in closer touch with changing conditions and their corresponding requirements.

For the elevated division a modification of the above device is in use, overload and underload being blocked out in different colors at horizontal intervals corresponding to headway. A similar record of service is kept on the elevated lines by clerks in the signal towers, who make a tabulated record as the cars pass. Employees assigned to the preparation of these two types of records become very expert, not only in the manipulation of the instruments, but also in determining loads. The basis of the latter calculations is the known seating capacities of the various types of cars.

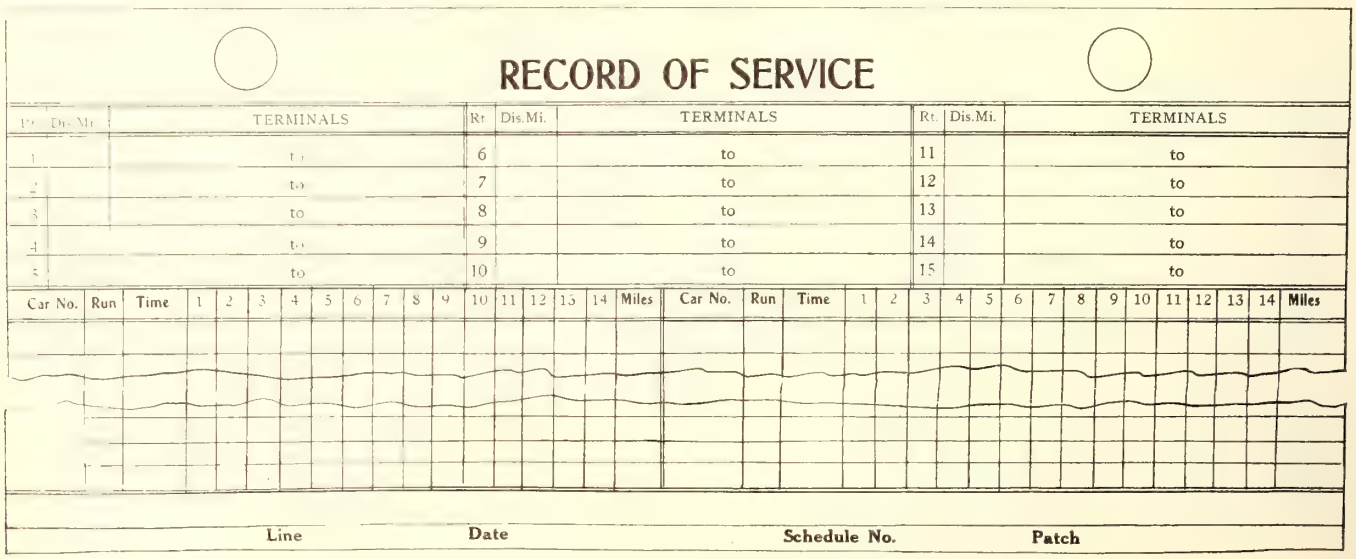
No difficulty has been experienced in the calculation by employees of load conditions of cars. The men who make the records know the seating capacity of the various types of cars operated and are able to determine quickly the approximate number of passengers standing in case of a standing load and the number of vacant seats in cars in which all the seats are not occupied. All employees engaged in this work are from the transportation department. Six or eight are required to record the loads of the surface cars.

MILEAGE RECORDS

As an adjunct to this minute supervision of operation, great attention is paid to the mileage records which furnish for different lines the measure of relative productiveness. These records are kept under three separate headings to show car miles, seat miles and ton miles, each item having a distinctive meaning in the analysis of operation. The work of every car is recorded each day and a segregation of these unit compilations is made to cover car series of like weights and like seating capacities.

On the surface division each conductor is furnished with a route card, a sample of which is reproduced herewith headed "Tompkins Avenue." On this the conductor enters the number of single trips performed by each car under his charge during the day. At the close of the day's work these are turned in to the dispatchers at the various terminals, who check them against the records of scheduled operation, reconcile departures therefrom, and when approved transmit them to the mileage computor for the terminal. The latter segregates opposite the car number on a sheet headed "record of service," which is reproduced herewith, the various trips made by this car while in charge of the several conductors who have operated it during the day.

The work of all cars on a given line is then brought together on a sheet headed "surface division," which is reproduced on page 1271, cars of like series and seating capacities being segregated. The latter compilations are then transmitted to the comptroller's office, where the final computation is made to determine the resultant car miles and seat miles. From car mileage, by series, the corresponding ton miles are determined.



RECORD OF SERVICE

Rt.	Dis. Mi.	TERMINALS	Rt.	Dis. Mi.	TERMINALS	Rt.	Dis. Mi.	TERMINALS
1		to	6		to	11		to
2		to	7		to	12		to
3		to	8		to	13		to
4		to	9		to	14		to
5		to	10		to	15		to

Car No.	Run	Time	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Miles	Car No.	Run	Time	1	2	3	4	5	6	7	8	9	10	11	12	13	14	Miles

Line Date Schedule No. Patch

Efficiency in Brooklyn—Sheet Used for Computation of Miles Made by Each Car

The care exercised in building up the data described

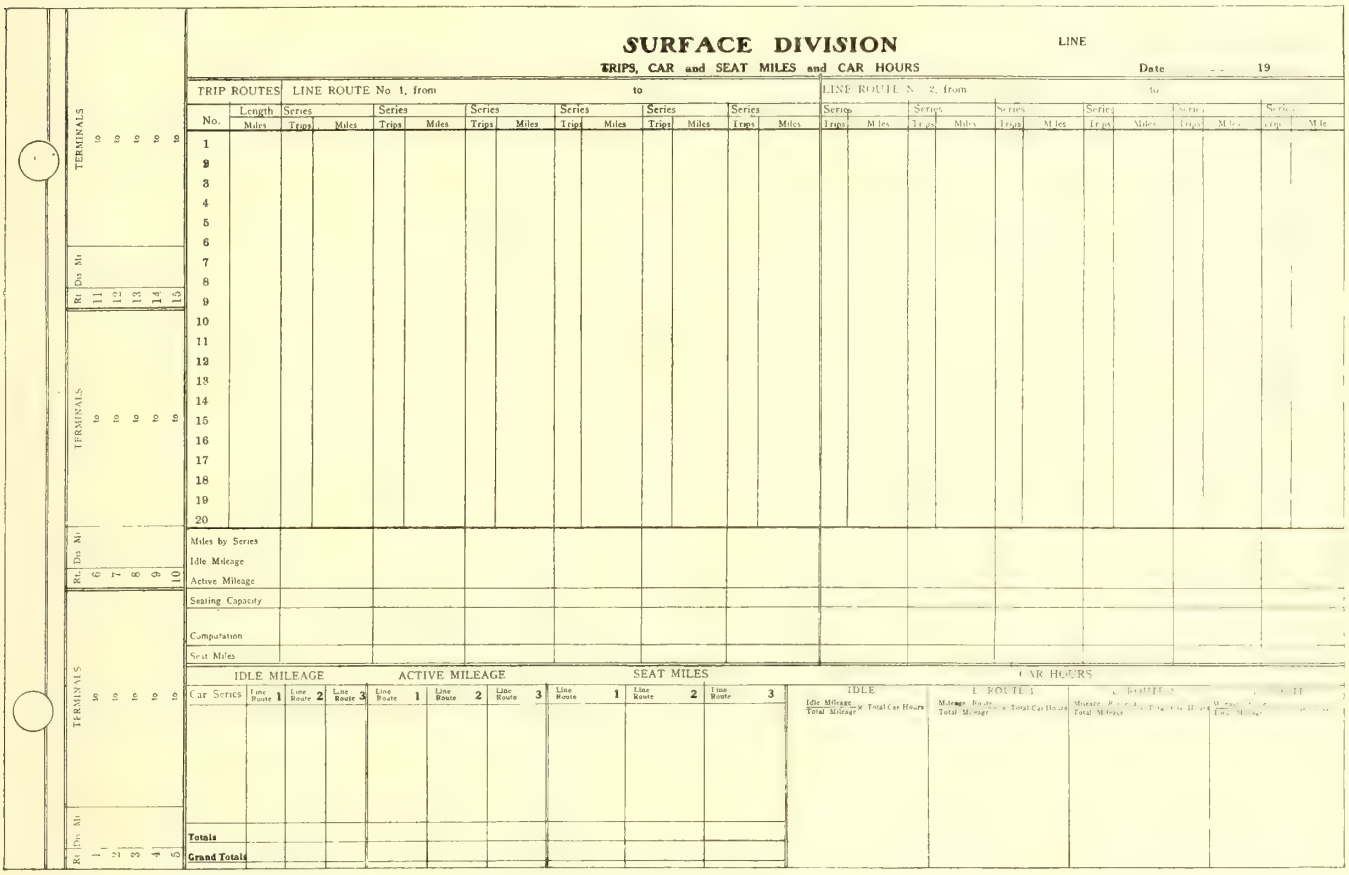
above measures the importance attached thereto by the management of the company. It serves to check current consumption, waste mileage, and the maladjustment, distribution and operation of equipment.

A substantial reduction in miscellaneous mileage on the system has been effected by a systematic elimination of the indiscriminate use of service cars. All material carried is handled as freight and a charge for the transportation is made against the department concerned.

ADVANCE IN PRICE OF COPPER

The efforts which selling and producing interests have been making for the last few months to advance the price of copper were rewarded this week by sales of electrolytic copper at 14½ cents per pound. This is an increase of nearly 2 cents over the price asked two months ago.

In spite of the advance the consuming element continues to purchase in small amounts for present needs, adhering


SURFACE DIVISION

TRIPS, CAR and SEAT MILES and CAR HOURS

LINE

Date -- 19

TRIP ROUTES LINE ROUTE No 1, from to LINE ROUTE No 2, from to

TERMINALS

No. Length Miles Series Trips Miles

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

Miles by Series

Idle Mileage

Active Mileage

Seating Capacity

Computation

Seat Miles

IDLE MILEAGE ACTIVE MILEAGE SEAT MILES CAR HOURS

Car Series Line Route 1 Line Route 2 Line Route 3

Totals

Grand Totals

IDLE

Idle Mileage × Total Car Hours / Total Mileage

Efficiency in Brooklyn—Sheet Used for Segregation of Cars of Like Series and Seating Capacities on Each Line

Such scrutiny is held to be essential to success in the operation of a system like that of the Brooklyn Rapid Transit System, whose abnormal rush-hour business, compared with normal riding, is equaled by that of few companies. Most of the passengers are bound to Manhattan in the morning and are carried therefrom in the evening through a mile or more of congestion, and then distributed on rapidly diverging lines over an area of 80 square miles.

INTERSTATE COMMERCE COMMISSION REPORT

The twenty-fifth annual report of the Interstate Commerce Commission criticises the position taken by the Commerce Court on orders of the commission. Recommendations for additional legislation made by the commission include the following:

That Section 6 be amended to require telephone, telegraph and cable companies to publish, file and post tariffs.

That the adoption of a uniform classification be required.

To provide additional safeguards: (a) By standardization of operating rules; (b) by the adoption of steel cars; (c) by amending the hours-of-service law; (d) by requiring the use of the block signal system.

That the commission be relieved of jurisdiction of street railways in the District of Columbia.

To provide for the regulation and control of capitalization and suitable provisions for the valuation of railway property.

to the policy prevailing during the greater part of the year. This attitude has been due partly to industrial depression and partly to the fact that on account of excessive production little concern has been felt regarding future prices.

Producers have based the present rise on the decrease reported recently in foreign stocks, upon the large reduction in stocks in this country shown in the last two reports of the Copper Producers' Association, and upon their belief that supplies held by consumers are low. The October statement showed a decrease of nearly 6,000,000 lb. in stocks, whereas an increase of nearly an equal amount had been expected, and a decrease of over 23,000,000 lb. was reported in November, a figure largely in excess of general expectation.

Fractional advances in price followed the October statement, quotations ranging from 12½ cents to 12¾ cents per pound and this figure was advanced 13 cents by the leading selling agency by the end of November. Since the publication of the November report the market has been forced steadily upward.

It is well known that many of the producing companies must operate at full capacity in order to make a profit at present market prices and that the present demand is not sufficient to absorb the entire output of the various mines at full capacity, or even the amount now produced.

A loan of $2,000,000 has been authorized by the Germiston (South Africa) municipality for the construction of tramways, a sewerage system and other public works.

New Complaint Department in Rochester

Organization and Work of the Independent Department Established to Make Careful Investigation of All Complaints and Satisfying Reports to Patrons Who Find Fault

A new department created for the purpose of giving systematic and careful attention to all complaints received by the company has been established by the New York State Railways, Rochester lines. This department was established on Feb. 1, 1911, by E. J. Cook, vice-president and general manager, with the idea that it would afford satisfaction both to the public and the company. The department has therefore been in operation nearly a year and, by satisfying those who have made complaints, has proved to be of distinct value in the organization.

The primary idea which was responsible for the establishment of the department was that under the old practice, when complaints were made for instance against anyone in the transportation department, the investigation was conducted by that department. To avoid a condition where a department was, in effect, investigating itself, it was the plan of Mr. Cook that complaints should be investigated by a separate department. The complaint department as organized reports directly to the vice-president. The principle underlying the work of the department is that there shall be a thorough investigation of every complaint received and that a careful, responsible employee shall make a verbal report of the circumstances and facts in each case to the person who made the complaint. The thoroughness with which the work is done is indicated by the statement that it costs the company on an average between $3 and $5 to investigate and report on each complaint received. No complaint is considered settled until the complainant expresses himself as satisfied.

Before the establishment of the present complaint department complaints that were received by the company were usually referred to the transportation department. No one in the general office, however, was specifically assigned to receive complaints over the telephone. Written complaints were sometimes assigned to officials or employees who knew the complainant. It was found by contact with people at different meeting places that they were not satisfied about the consideration given to complaints. If a detailed investigation was made of a complaint, it was found that, owing to the fact that no one person was directly responsible for an answer, the complainant was not always properly notified of the results of the inquiry. If, under the plan of having no one person responsible, a complaint was received over the telephone, it happened frequently that insufficient details were secured to enable the company to make a proper investigation. Under the previous system, if a conductor gave a wrong transfer the complaining passenger was told to go to the office of the company and the proper refund would be made.

Many of the complaints made were legitimate and it was believed that if investigated properly they would lead to changes that would improve the service. It was therefore decided in January of the present year to establish the complaint department with the hope that it would also bring the company and the public into closer touch. It was also planned to have the company assume the entire cost of investigation and to keep in mind at all times the definite object of not letting the public go to any expense in making or following complaints. The complaint department was placed in the charge of F. F. Janes, clerk to the vice-president, and he prepared the following preliminary outline of the plan that would be followed:

OUTLINE OF PLAN FOR DEPARTMENT

"Complaints will be received by telephone, personally or by letter at my office daily from 8 a. m. to 5 p. m., except Saturday afternoons, Sundays and holidays; after 5 p. m. daily, Saturday afternoons, Sundays and holidays complaints will be received over the telephone by the telephone operator on proper blank furnished and the operator will notify complainants that same will receive attention by the complaint department, but no decision is to be given by the telephone operator.

"As soon as complaints are received proper blank containing complaint will be sent to the head of the department against whose employee complaint has been made, requesting a thorough investigation and statements from employee or employees against whom complaint is made, and statement from any witness or witnesses that the employee may have. At the same time the complaint will be acknowledged to the complainant, the letter stating that a thorough investigation has been started and that upon completion of the same the complainant will be advised of our decision in the matter and the action taken, either by call by a representative of the complaint department or by letter. After the papers are returned with statements, etc., they will be gone over very carefully and a decision given as to the party at fault. If the complainant is at fault, this will be explained by a personal interview or by letter; if the employee is at fault, demerit marks, according to the merit and demerit system, will be recommended. After demerits have been given and entered on the record, the papers are to be returned to the complaint department to be marked complete and filed, and a record kept for future reference.

"If the head of the department does not agree with the

NEW YORK STATE RAILWAYS.
ROCHESTER LINES

COMPLAINT DEPARTMENT.

RECEIVED { PERSONAL / TELEPHONE / LETTER } DATE RECEIVED _____ 19__

COMPLAINT TAKEN BY _____ DATE OF COMPLAINT _____ 191__

AGAINST BADGE _____ CAR _____ LINE _____ TIME _____

WITNESS
NAME _____
ADDRESS _____

COMPLAINANT
NAME _____
ADDRESS _____

PHONE NO. { _____ HOME / _____ BELL }

Rochester Complaints—Form Used for Record When Complaint Is Received

decision of the complaint department as to who was at fault, the papers in the complaint will be sent to the vice-president for final decision; his decision to be recorded on the papers and returned to the complaint department, which will consider the decision final and investigation closed.

"A monthly report will be prepared and sent to the vice-president giving a full account of the work done by the complaint department.

"To carry on the work satisfactorily it will be necessary to employ one woman stenographer, who will not only do work in this new department, but have other duties in the office of the vice-president.

"I recommend, on account of long conversations over telephone, that an extra Home telephone be placed in the office, to be known on switchboard as the complaint department telephone, also one Bell telephone, which can be an extension of the present Bell telephones in the building.

"I would recommend that cards be placed in the cars inviting the public to call the new department when they have any grievance against the company."

Mr. Janes has been made assistant claim adjuster of the company recently, but is also overseeing the work of the complaint department.

RECORD OF COMPLAINTS

The plan outlined has been followed generally in the ensuing months. Two men, taken from the transportation department, act as assistants in the department.

The form shown in an accompanying illustration is used for a record of complaints when they are received. As indicated in the preliminary letter of Mr. Janes, when a person telephones that he wants to make a complaint the switchboard operator connects the wire with a telephone in the complaint department. The date on which the complaint is received is placed at the head of the form. The date on which the act complained of took place is added on another line. If the person complaining cannot furnish the badge number of the trainman concerning whom complaint is made, the car number is asked for, or, if that cannot be supplied, the line and approximate time are asked. Frequently it is possible to locate crews or cars if the line and approximate time are given. The complainant is then asked to give his name, address and also telephone number, if he is accessible by telephone. The name of a witness is also requested. If the complainant declines to give his name, the company will not investigate the complaint. It has taken the position that if a complaint is made seriously and is worth an investigation, the complainant ought to be willing to show his good faith by giving his name and address. That also enables the company to furnish a report to the complainant.

The statement regarding the complaint is sent by the complaint department to the superintendent of transportation, who sends the statement to the division superintendent affected. Statements are then secured from the trainmen concerned. These statements are sent by the superintendent of transportation to the head of the complaint department. The superintendent of transportation, in transmitting the papers, adds his interpretation of the results of the investigation.

When the complete papers are thus returned to the head of the complaint department, they are analyzed carefully. If all the necessary facts are furnished, a decision is made by the head of the complaint department as to whether the complainant, the company or the trainman was at fault. In case the record should show inconsistent statements further investigation is required. For instance, if the statement of the complainant is denied by the trainman, the complainant is asked if he is willing to meet the trainman in order to discuss the matter and see whether some mistake has been made. If this suggestion meets with approval a representative of the complaint department goes with the trainman to the office or home of the complainant.

LOCATION OF RESPONSIBILITY

The head of the complaint department in reaching a decision as to who was at fault in a particular case considers whether the rules of the company were violated, and if so, whether the complainant or the trainman was at fault. If it is the judgment of the complaint department that an employee of the company was at fault, he writes to the head of the transportation department stating what the facts appear to show and recommending that the trainman at fault receive demerit marks. In his letter he states: "If this meets your approval, kindly let me know. If not, kindly let me know the reason."

When the superintendent of transportation disagrees with this recommendation he explains his reason therefor in his answer to the complaint department. The reason for disagreement may be a valid one, as, for instance, in case of a breach of minor importance where a new employee, who is giving satisfaction otherwise, overlooked a rule. If, however, the reason advanced is not satisfactory to the complaint department, the entire matter is referred to the

NEW YORK STATE RAILWAYS

ROCHESTER LINES

No.....

COMPLAINT REPORT — TRANSPORTATION DEPT.

.....LINE — DATE.....191....

MADE BY..... — RECEIVED BY.....

RESIDENCE..... — TIME.....

COMPLAINT { TELEPHONE / LETTER / PERSONAL }

RESULT OF INVESTIGATION

PARTY AT FAULT.....

ACTION TAKEN.....

INVESTIGATED BY.....

REPLY MADE..... 191 .

SIGNED

Rochester Complaints—Form for Complete Record of History of Complaint

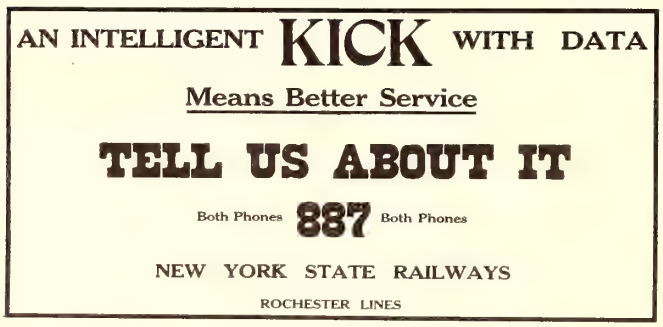
vice-president, who makes a final decision. When action has been taken on the decision a record of the case in brief is made on the form which is published herewith.

This form shows a record of the course of the complaint in both the complaint and transportation departments, the result of the investigation, the name of the party at fault, the action taken, the name of the person who made the investigation and the date on which the reply was made.

Whenever a complaint is made against a trainman, whether or not he was proved to be at fault, the circumstances are entered on the card record kept regarding each employee. An effort is made to investigate complaints as rapidly as possible and to make reports to the complainants without delay.

All papers in the case are taken by the representative of

the complaint department to the complainant in order that it may be apparent that an effort was made to bring out all the facts in the matter. While ordinarily the representative of the complaint department calls on men at their offices and women at their homes, sometimes men prefer to have the call made at their homes in the evening and this is done. If the inquiry showed that the complainant,



Rochester Complaints—Card Advertisement in Car

and not the company or its employees, was at fault, this is explained carefully to the complainant. The company enforces the rule that when transfers are used the passenger must be at the proper stop and, when complaints arise from this condition, the necessity for adherence to this rule in justice to the company is explained.

Other complaints are made at times that trainmen fail to stop the cars at other than the proper stopping places. When such complaints are made the company, through its representative in the complaint department, tries to show the complainant the necessity for adherence to rules. For instance, it is shown that if two or three times the stops required by regular stopping places should be made there would be delay of many cars and congestion that would not be overcome for a long time. A rule of the company provides that if a following car of the same line is within the same block no stop for passengers shall be made. The necessity for this rule in order that the proper headway may be maintained is explained to complainants in cases involving this point. It is kept in mind by the representatives of the department that one of the objects of their work is to try to educate people how to use transfers and the cars



Rochester Complaints—Sample Newspaper Advertisement

properly. If money is to be returned on account of wrong transfers issued, it is taken to the person who complained.

Sometimes it has happened that persons have complained against certain conductors and have stated after the investigation that they would try to avoid riding again on the car with the conductor who was said to have been at fault. In such cases the department has asked the complainants especially to ride with the same trainman again, notwithstanding the dispute, and to let the company know if they were not properly treated. As a precaution, however, they have been asked to give the proper signal well in advance. The trainmen, on the other hand, have sometimes been cautioned that they should not bear any grudge against the person who complained. Trainmen are not told the name of a complainant except in the unusual cases where a personal meeting is brought about in order to settle a question, but of course the fact that a complaint is made may enable them to remember the appearance of an individual.

It will be noted in the letter outlining the plan for the department that complaints received before or after office hours, on Saturday afternoons, Sundays and holidays are taken directly by the switchboard operator at the general office. This operator has proper blanks and, if time permits, he writes all the necessary details. If he is so busy as to be unable to do this, he asks the complainant to give him the principal fact and says that a representative of the company will call at his office during the day to secure full details.

NEW DEPARTMENT ADVERTISED

At the time the department was started a card was placed in all the cars of the company asking for complaints. Similar advertisements were placed in the newspapers. Samples of the card and the advertisements are published herewith. The daily newspapers were much interested in the establishment of the department and published articles regarding this departure.

One effect of the inauguration of this policy has been that conductors frequently secure names of witnesses in cases of disagreement. These names are secured on the regular form of blanks used for the names of witnesses of accidents. It has been found in various cases that witnesses have supported the statement of the conductor rather than that of the passenger. If the conductor was responsible for the beginning of the trouble, he of course finds it difficult to secure names of witnesses. On the other hand, if the passenger started the difficulty, the conductor, not being at fault, is frequently able to get a number of names.

No particular instruction regarding the new department has been given to old employees. New trainmen are directed particularly regarding the work of the department, and are told to be careful about their manner in dealing



Rochester Complaints—Sample Newspaper Advertisement

with the public and to give advice freely as to location, changing of cars, etc. This work is conducted by the chief inspector, who gives verbal instructions on the subject.

A complaint which may be used for purposes of illustration was that the motorman failed to stop for a passenger who was waiting at the corner. This complaint said in part: "Some time ago you were asking the traveling public to send in any complaints they had to make instead of

standing on the outside and growling. Well, it takes valuable time to enter a complaint even when you do so by letter, but here is something that should be looked into. Don't you see that in doing this way the motormen are educating people to jump on the cars when they are in motion? It is a temptation to try to get on."

This complaint was acknowledged, with the statement that the matter would receive a thorough investigation and that the writer would be advised of the result when the investigation was completed. The complaint was then sent to the superintendent of transportation and referred by him to the superintendent of the division concerned. A statement was secured from the conductor, who did not remember seeing a passenger or that the car slowed down as stated in the complaint. The motorman said in his statement that he did not make a practice of running by passengers, but that if persons stood on the curve he reduced the speed of the car so as to be prepared to stop if they signaled. If no signal was given, he took it for granted that the person was waiting for a car of another line using the same street.

In sending the statement of the trainmen to the complaint department the superintendent of transportation said in this case that he thought there was some doubt as to whether the complainant gave the signal to the motorman. In his letter directing one of his assistants to call on the complainant the head of the complaint department said that it should be explained that unless the passengers were at the proper stop and signaled the motorman the latter was apt to think that another car was wanted. If, however, the complainant said that the motorman's statement was not true, the investigator was directed to find out if the complainant would be willing to meet the employee. The report of the investigator showed that the complainant said the reports of the trainmen were practically true, but that he stood ready to take the car although he did not make any direct motion to the motorman.

RESULTS OF THE POLICY

Since the department was established 859 complaints have been received and action taken thereon. Not over a dozen people have made a second complaint. An analysis of the complaints has been made and the accompanying table shows the result. The total number received in each month from February to July, inclusive, is given in the first column. In the second column the number not investigated refers to those complaints in which no name was given and which the company therefore did not think worthy of investigation. The column headed "Claim Department" relates to cases which were referred to that department. The column headed "Against Complainant" refers to cases in which the complainant violated the rule of the company and was at fault. The column "Against Company or Employees" refers to cases in which either the company, because of some condition that caused the complaint, or the employee was directly responsible.

CLASSIFICATION OF COMPLAINTS.

	Total.	Not Investigated.	Claim Department.	Against Complainant.	Against Company or Employees.
February	112	5	3	59	40
March	91	7	1	48	35
April	60	1	1	33	25
May	80	2	0	42	36
June	67	0	2	37	28
July	93	0	4	54	35

It is the general conclusion of the management that the result of the establishment of the complaint department will be to increase the number of complaints of conditions about which the company should be informed, and that by the painstaking method of personal investigation and sending an employee directly to the complainant a familiarity with rules on the part of the public will develop which will decrease the number of unnecessary complaints. Such results are directly desirable to the company and to the public.

STATUS OF NEAR-SIDE CARS IN PHILADELPHIA

A letter written on Dec. 12 to Charles O. Kruger, president of the Philadelphia Rapid Transit Company, by the secretary of the Pennsylvania State Railroad Commission, contained some interesting comments on the commission's attitude toward the rolling stock question in Philadelphia with particular reference to the near-side cars. The commission inspected these cars on Nov. 28, but in order that its favorable personal views should not be confused with its official attitude, it stated in this letter that the cars would be satisfactory to the commission only if the company could prove that the cars met the approbation of the patrons of the lines. Furthermore, the commission wished to be advised whether or not the near-side cars ordered were to be in addition to the equipment already in service or whether they would simply supplant old cars. In the former case there would be a distinct addition which would more than meet the requirements set forth in the report of Ford, Bacon & Davis; in the latter case there would not be such an addition. The commission thought that the Philadelphia Rapid Transit Company would not be complying with that recommendation unless the new cars were to be used in addition to the old, until such time, at least, as all of the old cars could be replaced.

On Dec. 21 T. E. Mitten, chairman of the executive committee, Philadelphia Rapid Transit Company, made the following reply to these questions:

LETTER OF T. E. MITTEN

"Acknowledging receipt of your favor of the 12th instant, we respectfully disclaim any intention of assuming a formal approval by your commission of the "near-side" car in advance of its having proved satisfactory to the Philadelphia public.

"We fully appreciated the general expressions of approval made by the members of your commission at the time of your inspection of the car in service, Nov. 28, and in view of the public commendation which had already been received and the pressing need of additional cars, we took immediate steps preparatory to the ordering of 500 additional cars, making public report of that fact to your commission.

"This management is fully as anxious as is your commission to adopt as standard a type of car which as nearly as possible meets with universal approbation. It, therefore, asked the riders on the "near-side" cars to vote for or against this type of car, using the following form:

"'VOTE FOR OR AGAINST 'NEAR-SIDE' CAR

"'The Pennsylvania State Railroad Commission has signified that before giving formal approval of the 'near-side' car it would like to be assured that the 'near-side' type of car upon which you are now riding meets with the approval of the Philadelphia public.

"'The company being equally desirous of assuring itself that the 'near-side' car is acceptable before purchasing the large number for which bids are now being secured, requests that passengers riding upon the 'near-side' cars during Tuesday, Dec. 19, 1911, will signify their preference either for or against the 'near-side' car by signing their names in the column "For" or "Against."'

"The result of this vote was that 30,221 persons voted 'For' and 567 voted 'Against.'

"The interest shown by our passengers was remarkable, as evidenced by the fact that in nearly every instance the voters have, in addition to signing their names, given their full address, and while it is our intention to keep the sheets containing these signatures as a permanent record, we shall nevertheless be glad to submit them for your inspection at any time. In conclusion we desire to state that it is not the intention of the Stotesbury management to withdraw any of the present cars from service until a sufficient number of new and additional cars are provided to care properly for the traffic."

Meeting of the Central Electric Railway Accountants' Association

At the Annual Meeting, Held at Toledo, the Plan for Affiliation with the Central Electric Railway Association Was Adopted—Election of Officers and Other Features of the Proceedings

The annual and nineteenth regular meeting of the Central Electric Railway Accountants' Association was held at the Boody House, Toledo, Ohio, on Dec. 16, 1911. More than thirty accountants, representing member companies of the Central Electric Railway Association, were present. In view of the fact that the Railway Association voted to admit the Accountants' Association as an auxiliary to the parent body upon a basis which would permit all present members of the Accountants' Association to affiliate with the parent association, much interest was manifested in the meeting.

The meeting of the executive committee was held on Dec. 15 in the Boody House. The report of the committee, which was read at the session of the association on the following day, recommended favorable action upon fifteen new applications for membership previously reported to the committee by the membership committee. The committee also recommended favorable action upon the resolutions for affiliation with the Central Electric Railway Association.

After the minutes of the previous meeting were read on Dec. 16 it was moved by F. K. Young, Scioto Valley Traction Company, that the resolutions accepted by the Central Electric Railway Association be ratified. The motion was carried unanimously.

The annual address of the president, A. F. Elkins, Columbus, Delaware & Marion Railway, was then presented. Mr. Elkins said in part:

ADDRESS OF PRESIDENT ELKINS

"One of the objects of our conference is the interchange of ideas. I wish we might amend this to read 'the interchange of ideas and ideals.' This conference has stood firmly since its organization upon the principles of right and a square deal for all. Our personal associations have been such that we do not hesitate to call upon another member of the craft for anything which he might have. That good old maxim, 'A chain is just as strong as its weakest link,' applies to us especially well. We must stand together, each doing his part in the upbuilding of the conference, to the end that we may keep abreast of the rapid advance in electric railway accounting.

"It is simply marvelous to contemplate the advance in electric railways during the last decade. The old bookkeeper of yesterday has awakened suddenly to find himself an integral part of the organization. In the new order of things we are expected to keep in close touch with the auditor's part in this advancing field of endeavor.

"The question of affiliation with the Central Electric Railway Association has been one of the most important matters before us in a long time. I am glad to know that this question has finally been adjusted to the satisfaction of all concerned. I consider this as a real beginning of our great work in the accounting field, now that we are a part of the association which represents in this territory what the national association represents in the United States.

"The Central Electric Railway Association at its meeting in Louisville, Ky., on Nov. 23 voted unanimously to accept our resolutions for affiliation and these resolutions are ratified by you to-day.

"Another step in the right direction has been the appointment of two standing committees, one on passenger accounts and one on freight accounts.

"In order that we may have something tangible as a result of our labors I recommend the appointment of a compiling committee whose duty it will be to assemble all of the forms and recommendations which have been acted upon heretofore, together with other data bearing upon subjects of vital importance, and then to issue a pamphlet containing a synopsis covering the entire work of the conference to date. I believe such a work would prove of inestimable value to our members. Heretofore the questions concerning interline passenger and freight accounts have been frequent. Mr. Neereamer advised me recently that almost every week he received letters of inquiry from member lines covering these various questions."

The annual report of the secretary-treasurer was then presented. The funds on hand will be turned over to the new treasurer under the plan for affiliation.

Mr. Hawley, of the committee on resolutions, presented resolutions regarding the death of A. J. Lamb, chief clerk of the Toledo Railways & Light Company.

E. B. Peck, president of the Central Electric Railway Association and vice-president of the Terre Haute, Indianapolis & Eastern Traction Company, was next introduced by Chairman Elkins. Mr. Peck read a paper on "Department Co-operation." An abstract follows:

MR. PECK'S PAPER ON "DEPARTMENTAL CO-OPERATION"

"Before proceeding with the subject of my paper I wish to call your attention to the fact that the first railroad built west of New York, called the Erie & Kalamazoo Railway, was constructed between Toledo and Adrian, Mich., a distance of 33 miles. At that time the city of Toledo was called Port Lawrence. This was in 1836 and the types of construction and motive power were somewhat different from those in use to-day.

"The first rails were strips of wood which were covered later with iron straps. The first motive power was horses driven tandem, and the time required was from sun to sun to make the trip of 33 miles. This motive power, however, was superseded in 1837 by the Stephenson type of locomotive, drawing a single carriage seating eighteen people. The railway was built by departmental co-operation, its capitalization being $1,000,000, and such records as have been discovered do not disclose any criticism for watered stock, nor do they give the actual cost of construction; neither has there ever been, so far as is known, a report as to the physical valuation. The road paid from 20 per cent to 30 per cent dividends the first year, which was gradually reduced until 1840, when it passed into a receivership, and later was leased to the Michigan Southern Railway Company. A comparison of the type of construction and the equipment of this road with the electric road of to-day need not be made by me to you who are engaged in the most modern method of transportation.

"The success of this road in its beginning, as well as its ultimate success as a part of the great New York Central system of to-day, was due to the co-operation of the officials. This is true of any great organization such as has been required for the development of the steam railroads and electric transportation companies of to-day, for 'A house divided against itself cannot stand.'

"It is necessary and is one of the laws of business that every corporation must have a single head, usually the president, to whom the heads of all departments are subordinate, and through these heads of departments the different branches of the business report to the president. The presidents and managers recognize this, and for that reason the systems which we have adopted have been installed.

"The accounting department is one of the most important of the departments of any great corporation, for by it the operating officials are kept in close touch with the business and the net results to the company from operation. Through the operating official these results are obtained by the president at such periods and in such forms as he may desire. True harmony and co-operation must prevail between the different departments to obtain the best results.

"This harmony and departmental co-operation are exemplified in all of the mechanical branches of our business. The many different parts of the equipment of the cars must be perfectly adjusted, so carefully and accurately constructed as to be interwoven with each other, and each part must do its full duty harmoniously with every other part of the mechanism. The trolley wheel and the trolley pole must be adjusted so carefully that the transmission of the power from the trolley wire to the motors attains its fullest efficiency. The motors must be so installed upon the trucks, the gears so carefully adjusted that the propulsion of the car reaches its highest efficiency. If the adjustment of any one of these parts becomes disarranged it disrupts the whole organization of the car. This comparison could be drawn as to every other part of the car, as to every part of the power station, and it extends throughout all mechanical branches of the business. The adjustment, harmony and co-operation in the many elements of the operating, financial and complete management of the corporation are just as necessary for its success as those within the mechanical departments.

"About sixty-five years ago the steam railways of our country began their first operation. The first methods of accounting were, in the light of the present day, extremely crude and were of such a nature that the managing official was unable to determine in what particular branch of his business he might be able to reduce his expenses, or in what particular branch of revenue he might be able to increase his earnings. This brought about accounting in more detailed form, the evolution of which has reached our present stage. The operating official of to-day may, upon examination of his daily or monthly statements, place his finger upon any weak spot in his operating expenses, and he is thus enabled to manage the property better and reach the results most satisfactory to his stockholders. This evolution of accounting by the steam railroads was brought about very largely through their own efforts—I might say entirely, as but few changes in classifications have been required by the Interstate Commerce Commission, since organized.

"At first it was assumed that the classifications adopted by the steam roads and the Interstate Commerce Commission could and should be applied to the electric railways, and great credit is due to the associations of accountants whose representatives were selected to present to the commission the classifications which were finally adopted and which upon careful and detailed explanation the commission very readily acknowledged as most desirable for it as well as for the electric railways. The classifications have been adopted almost universally by the various state railroad commissions, and as a consequence our system of accounting is now placed upon a universal standard. This standard system of accounting has been evolved from the organization of such associations as yours, as well as of the great corporations which have built and are now operating the electric railways of this country.

"This departmental co-operation extends through your association, and you well know and appreciate its necessity. The broad field of this association has, to my mind, been widely extended within the past year, and I am very sure that the benefits to be derived by your association, as well as the Central Electric Railway Association and its departments, will be realized fully as this co-operation is extended within the coming years, and more particularly in the ensuing year.

"I wish at this time to express to the members of your association and your officers my thanks for the hearty co-operation they have given in establishing this relation, and I would suggest that, inasmuch as the relations between the Central Electric Traffic Association and the Accountants' Association are so close, one or more members of your association should be selected to attend the meetings of the Traffic Association, as many questions come up at these meetings that relate to the accounting department.

"The rapid and extensive development of the electric railways, particularly in the territory embraced by your association, which has involved 'interline business,' has brought the accountants of these various companies into closer touch with each other. The many actions taken by your association have contributed very largely to the development of this interline business, and in many instances problems that have presented themselves have appeared like mountains until, having been tried out, they were found to be merely molehills. I do not mean to discount in any way the intricate and vexing problems which have come before you, but the results which have been achieved are evidences of the ability which you have displayed.

"Differences of opinion as to the best methods to be pursued have arisen and will always confront you, but this would be a strange world indeed if every one thought alike, and it would appear that when a majority of your association, after careful and serious consideration, have approved a certain method or change in methods the consensus of opinion should be conclusive. There can be no doubt that the older your association grows and the more of these questions are taken up and decided you will find your efforts to obtain uniform systems in all branches of the accounting department will meet with more satisfactory results than they have in the past, and that the member whose opinions may differ from yours will become more easily reconciled to the judgment of a majority of your members.

"We believe that your association will from this time on take an active part in the affairs of the Central Electric Railway Association, its committees and the work in which we are all interested, and thus departmental co-operation will be carried out more fully and completely."

The next order of business was the report of the standing committee on freight accounting. This was read by E. L. Kasemeier, chairman of the committee. No new changes were made in the various interline freight forms, and the report was accepted. An abstract of this report was published in the issue of the ELECTRIC RAILWAY JOURNAL for Sept. 30, 1911.

The full report of the standing committee on passenger accounts was presented. This committee is composed of the following: C. M. Witt, chairman; F. T. Loftus, E. O. Reed, C. B. Kleinhans and E. J. Skehan. An abstract of the report follows:

REPORT OF COMMITTEE ON PASSENGER ACCOUNTS

"Your committee was appointed on Nov. 10, 1911, and the chairman called a meeting, which was held at Ft. Wayne, Ind., on Nov. 25.

"At this meeting we discussed the mode of settlement in effect at the present time, and from this discussion your committee outlined a policy of interline passenger accounts which is submitted herewith with a recommendation for adoption.

"FORM C. E. A. C. 1—STATEMENT OF INTERLINE TICKET SALES

"This form is practically what all roads are using at the present time. The line numbers should be used, as they act as a key to the report, should any correspondence be necessary. This report should be made by the selling road and forwarded on or before the fifteenth of the following month.

"FORM C. E. A. C. 2—INTERLINE TICKET OR BAGGAGE CORRECTION

"The interline correction blank has been so arranged that it can be used in correcting either ticket or baggage

reports. This report should be made prior to the close of the month following that on which the correction is made in order that the difference can be taken into account.

"FORM C. E. A. C. 3—STATEMENT OF INTERCHANGEABLE MILEAGE. C. E. T. A.

"This form covers mileage coupons lifted of another company's issue. It eliminates the invoice that we are now using and condenses the two forms into a good record. It should be rendered by the fifth of each month.

"FORM C. E. A. C. 4—STATEMENT OF INTERLINE REVENUE BAGGAGE CHECKS

"This form covers revenue baggage checks that have been issued over a foreign line and a report should be made by the forwarding line and rendered by the fifteenth of the following month for which it covers.

"FORM C. E. A. C. 5—STATEMENT OF ACCOUNTS

"This report is an acknowledgment of reports that have been made by both companies and should be issued by the company in whose favor the balance is due. This report will eliminate the issuance of other forms of acknowledgments and the stamp we are now using on ticket reports. Attention has been called to the fact that reports are not received from some companies in time to use the stamp. This also carries with it the idea of settling by balances, which seems to be the most satisfactory way of settling. This can be done by either check or draft, whichever suits the companies interested.

"We have outlined our forms to be as nearly uniform in size as possible, so that they may be filed in a systematic manner.

"We suggest that all forms be 8½ in. by 13 in., except form C. E. A. C. 5, which should be 5½ by 8½ in.

"PREPAID TICKET ORDERS

"As the volume of this class of traffic is very small and the majority of agents employed by traction lines do not have enough of this class of work to enable them to handle it intelligently, we would recommend that for the present all such orders be handled between interested lines by letter."

Mr. Peck stated that it was evident from the manner in which the Accountants' Association was going into the question of interline accounts that much good would result. A uniform system of interline accounting was a necessary step in the advance of electric railways.

A. L. Neereamer, chairman of the Central Electric Traffic Association, suggested the advisability of having the Accountants' Association represented at the monthly meetings of the Traffic Association, as many questions of common interest came up for discussion. W. H. Forse, Jr., said that this would bring about a better understanding between the two associations, and moved the appointment of a committee of three, to be known as the standing conference committee. This committee would be empowered to name one or more members of the committee or association to attend each meeting of the Traffic Association. The motion being carried, the president appointed E. L. Kasemeier, J. B. Hooper and C. M. Witt.

Upon motion of H. B. Cavanaugh, the standing committees on passenger and freight accounting were instructed to continue their work covering local forms and accounts, and to report at the next regular meeting.

All of the various forms covering interline passenger and freight accounting were taken up in detail, and after considerable discussion were adopted as official forms of the association.

It was moved by Mr. Forse that the incoming president appoint a committee of five members, to be known as the compiling committee, for the purpose of assembling all of the forms and recommendations of the association, from the first to the nineteenth meetings inclusive, and to include these forms together with other data in a synopsis for distribution to the members. Authorization for the necessary expenditure was given to the committee.

A. L. Neereamer, chairman of the Traffic Association, was next introduced by the president. Mr. Neereamer read a paper on the "Relations Between the Traffic and Accounting Departments." An abstract of this paper follows:

MR. NEEREAMER'S PAPER ON "RELATIONS BETWEEN TRAFFIC AND ACCOUNTING DEPARTMENTS"

"In the edition of the Street Railway Journal of July 2, 1904, W. B. Brockway presents an article the caption of which is 'The Accounting Department Is Not a Revenue-Producing Department.' I quote the following from his article:

"'At the beginning of the steam railroad it is easy to believe, judging by the experience of the electric railways in their infancy, that in the small way in which they had their rise, various duties which are now carried on by different departments could be and were performed by one person, the general manager, no doubt, being held responsible for the active and detail work of the office as well as the operation of the road. In time the freight and passenger departments were added, or, rather, their work was taken from the active duties of the manager, and the accounting department also received an official head and became a definite department. These results are most natural, because there is a limit to the amount of detail work a man can do, and as the size of the roads increased it had to follow that the work should be specialized. It is very common to-day for the executive officer to understand the detail of all departments, but he certainly cannot have the time or the strength to be in contact with all of the details. His duties are large and he deals with principles and results.

"'As the steam roads grew the natural result was competition, which meant that greater efforts had to be put forth to obtain what was considered by each road to be its full share, or more, of the business tributary to it.

"'In the course of events, with competition becoming stronger yearly, there came the time of reconstruction. Many of the roads were not provided for this additional strain. Whether their unprepared condition was caused by lax accounting methods or by high operating cost would make a very interesting study. Be the cause what it may, the roads had to meet the problem, in part, by rigid economy. The line of reasoning followed at that time gave the basis that whatever department produced revenue should not be restricted in its efforts, for upon those efforts everything was supposed to depend. However, as the accounting department did not only not produce revenue, but seemed to be expense only, it at that time and since has felt the effects first of reducing expenses.'

"After making the above statement Mr. Brockway comments upon the work in general and the evolution of the ordinary bookkeeping department into the present accounting department, and then makes the following statement:

"'In view of the analysis that is possible when statements are intelligently prepared, there is much evidence that electric, if not steam, railway interests are recognizing the truth of the substitute axiom, "The accounting department is a revenue saving department," which is more fair to the department and not easily misunderstood.'

SAVING AND EARNING

"I disagree with Mr. Brockway. There is an old saying that is very true, that 'a penny saved is a penny earned.' Now, if the accounting department can through its efforts save any money for its company or point out to its managing officers a mode of saving money or a leak that should be stopped and the stopping of which would save a loss of revenue, then, under the old saying that 'a penny saved is a penny earned,' the accounting department becomes an earning department. For it is true that if this department shows to a managing officer an opportunity to save in the operation of the road, then the cost of the operation is reduced that much and the reduction so made becomes a net earning.

"There are no departments in interurban operation that should work closer together than the accounting and traffic departments. The traffic department originates the business; the accounting department checks the result, and to do this intelligently a close relation with the business-securing department should exist.

"It is well said that friendship and business do not go together. Therefore, the accounting department in some companies has been considered unfriendly by other departments, because of its strict adherence to business. The auditor, to carry out his work properly, should have been reared in the Ozarks and should carry out the childhood teaching of that locality—that he must be shown in order to believe. It is here that conflict between his department and other departments sometimes arises, especially if the other department is sensitive. Having had experience in both the traffic and accounting departments, I am well aware of the opportunities that arise for a conflict of opinion, and the solution of the problem, I think, is when you open your office door to forget everything but business, and when you close your office door in the evening to forget all unpleasant things that have arisen in your business, because in any business unpleasant things arise daily.

"The work of an energetic traffic man has to a great extent been responsible for the accounting department, or a great deal of the work of the accounting department. Where friction exists the work of the traffic department is greatly handicapped by the accounting department, and vice versa, and where unity exists each department is backing the other up. There may be union without unity, but there cannot be unity without union. The merger of the Central Electric Accounting Conference, as an auxiliary of the Central Electric Railway Association, is a step toward unity. I expect in the future to see the Accounting Conference and the Traffic Association working as harmoniously together as though they were one single body, for with these two departments attuned to each other and working in perfect harmony the success of the properties that each member represents is assured."

ELECTION OF OFFICERS

The following officers were elected for the ensuing year: President, Walter Shroyer, auditor Indiana Union Traction Company; first vice-president, F. K. Young, auditor Scioto Valley Traction Company; second vice-president, H. B. Cavanaugh, auditor Cleveland, Southwestern & Columbus Railway; secretary, C. M. Witt, auditor Indianapolis, Newcastle & Toledo Traction Company; executive committee, the officers and A. F. Elkins, auditor Columbus, Delaware & Marion Railway; L. T. Hixson, auditor Terre Haute, Indianapolis & Eastern Traction Company; E. L. Kasemeier, auditor Ohio Electric Railway; E. O. Reed, auditor Western Ohio Railway.

The constitution and by-laws, as revised, were read by W. H. Forse, Jr. Among the changes made is that in the time of meeting, which is changed from quarterly to semi-annual.

The name of the association is to be the Central Electric Railway Accountants' Association.

The object "shall be to bring together those engaged in the accounting departments of electric railway companies and the electrified sections of steam railways for the interchange of ideas, to promote the adoption of uniform systems of accounting and to encourage closer and more intimate personal relations."

The membership of the association shall consist of (a) the authorized representatives of the accounting department of railway company members of the Central Electric Railway Association, and (b) the authorized representatives of the accounting department of the following companies: Chicago & Milwaukee Electric Railroad, Cleveland Railway, Illinois Traction System, Scioto Valley Traction Company and Toledo Railways & Light Company.

The annual dues shall be $5, payable in advance for companies not members of the Central Electric Railway Association. Dues paid by railway company members of the Central Electric Railway Association to that association include the privileges of the Accountants' Association for the authorized representatives of the accounting department. All expenses of the association in excess of $5 per member are to be prorated to roads on the basis of all members.

The association then adjourned, to meet in June at the call of the executive committee.

TRANSPORTATION OF MAIL CARRIERS ABANDONED AT LITTLE ROCK

Under a decision of the Supreme Court of Arkansas, rendered Dec. 10, the Little Rock Railway & Electric Company is no longer obliged to transport mail carriers free. The custom began in 1901 when the company made a contract with the city which provided, among other things, that the railway company would carry free of charge United States mail carriers in uniform. The company complied with the agreement of this contract up to Dec. 12, 1910. It then received permission from the city to discontinue this service. The company declared at that time that the privilege was being abused and that the carriers disregarded the rules of the company while on the cars.

When the Common Council repealed the ordinance, the mail carriers, through the postmaster of Little Rock, filed a suit in Chancery Court asking for an injunction to restrain the company from collecting fares. This injunction was granted temporarily, but the carriers were required to furnish a bond of $1500 to idemnify the company in case the injunction was dissolved. On Jan. 15, 1911, the injunction was made permanent by the Chancellor, but an appeal was taken by the company to the Supreme Court, which required the carriers to file an additional bond of $1,000, making a total bond of $2,500, pending the decision of the court on the merits of the case.

The decision of the Supreme Court, which was rendered Dec. 12, 1911, sustains the company. As the latter issued books of tickets to the mail carriers so that an accounting of fares might be made if the suit was ultimately decided against the carriers, the company can now collect this amount from the bonds which have been filed.

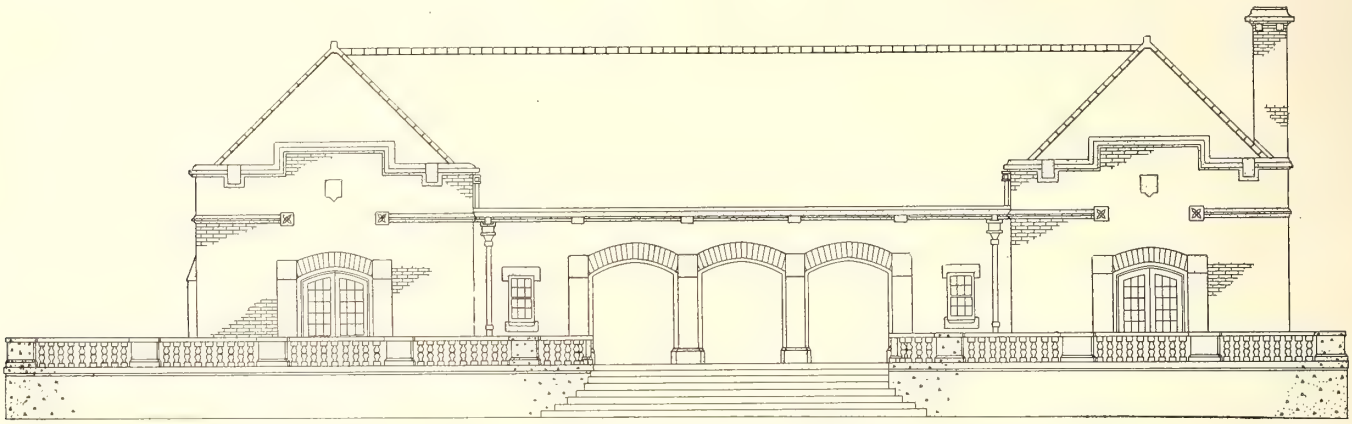
The mail carriers argued that the original provision in the ordinance which gave free transportation to them was conducive to better mail service in the city and for this reason was a valuable consideration which induced the City Council to grant the original franchise and the citizens of the city to approve this act. The court, however, took the ground that the only parties to the contract were the railway company and the city authorities, and that the provision was "merely a transaction which could be recalled at any time, and the continuance of which they cannot demand. * * * It did not constitute a contract between the railway company and the mail carriers, for they were not parties to the contract and the provision was for the benefit of the public and not for the individuals."

It was claimed by the railway company that Little Rock and Oklahoma were the only cities in the United States where free transportation was provided for mail carriers.

The building of two electric street railways in Pisa, Italy, was commenced in March, 1911, and cars are expected to be in operation by Jan. 1, 1912. Two distinct branches are being constructed, both starting at the local railway station, one going to Porta Nuova and the other to Porta a Piaggie. The total trackage is 3⅔ miles. The fare is to be less than 2 cents per person. The lines are being built and will be operated by the Società Anonima Elettrica Toscana.

NEW STATION FOR THE AURORA, ELGIN & CHICAGO RAILROAD AT WHEATON, ILL.

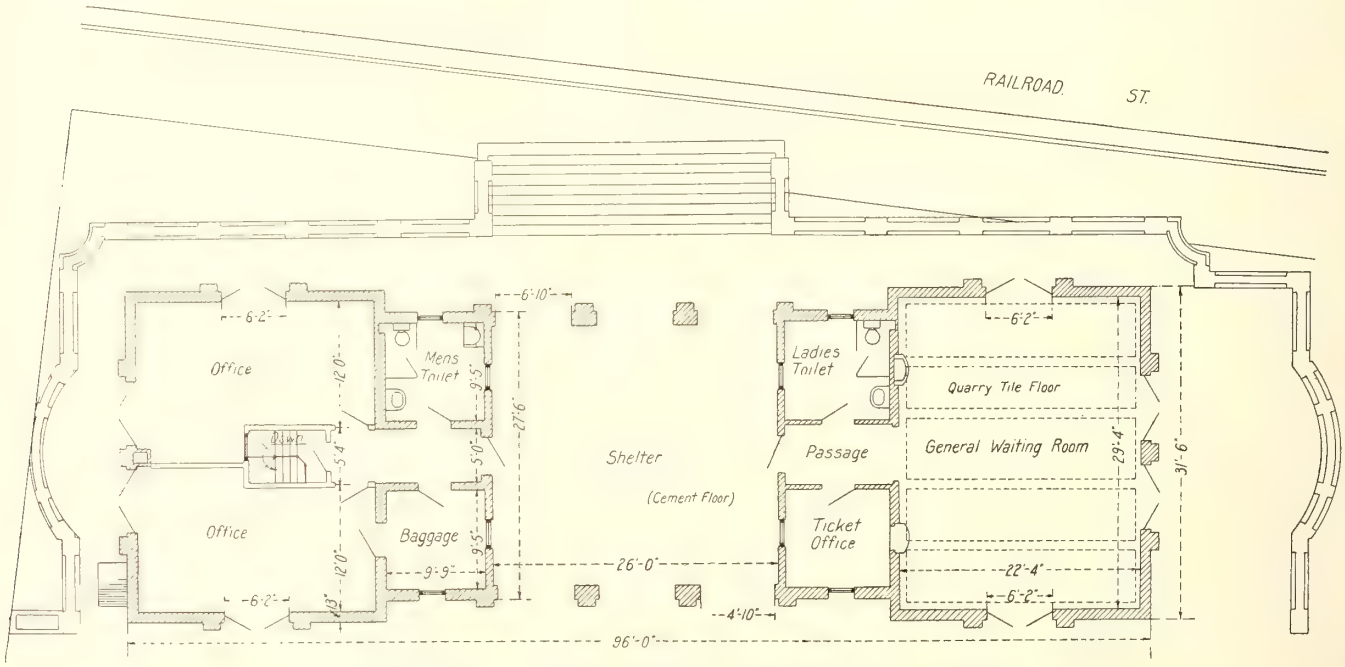
Contracts have just been let and construction started on a passenger station for the Aurora, Elgin & Chicago Railroad, at the northwest corner of Main and Railroad Streets, Wheaton, Ill. The building conforms in a general way to the character of other stations along this company's line, which have been designed with a view to making them attractive architecturally and providing necessary facilities for passengers. Attention has been given to making the building fireproof, thus reducing station-building maintenance and insurance rates. Future requirements have been carefully considered, so that there will be no immediate necessity for enlarging the building to take care of increased traffic. The details of construction are shown by the accompanying drawings.



Railroad Street Elevation of Aurora, Elgin & Chicago Station at Wheaton, Ill.

with the track. An open arched shelter occupies the central portion of the building. This shelter will be a part of the general waiting-room space. The general waiting room, the ticket office and ladies' toilet occupy the west end of the station building. The east section of the station is made up of two spacious, well-lighted office rooms, a baggage room and the men's toilet. The basement, which will be under the entire building, will be used for the heating plant and storage purposes.

The architectural design of the building is enhanced by the careful selection of building materials. The face bricks are mottled dark buff of the homespun or tapestry type. They show a rough, wire-cut face and are laid in blue-gray mortar. The stone moldings, sills, lintels and copings are of rubbed-finish, buff Bedford limestone, and the caps over the brick columns are of the same material, but have a tooled finish. The gabled roof is covered with green glazed tile shingles, with plain ridge-roll and terminals.



Ground Floor Plan of Aurora, Elgin & Chicago Station at Wheaton, Ill.

The new Wheaton station is a handsome building of the modified Elizabethan type and is particularly well located, as it is on corner property and the ground floor is about 5 ft. above the street level. A concrete terrace inclosed in a cast-concrete balustrade of artistic design surrounds the station on three sides. Wide concrete steps of easy ascent lead from Railroad Street to the main entrance. On the track side a concrete platform extends from the north wall to within 2 ft. of the nearest track rail. The building is 31 ft. 6 in. x 96 ft. in plan, and its longest side is parallel

All the metal work, window and door frames will be painted a dark olive green and the sashes and doors will be painted cream white. The entire building will be finished inside with plain oak, stained medium dark English, and the walls and ceiling, which are a rough-cast plaster, will be tinted a light brown.

The floors in the arched shelter and baggage room are cement with sidewalk finish; those in the ticket office, two toilets and passageways are mosaic tile of handsome design, and in the general waiting room the floor is covered with

quarry tile of a dark cherry-red color laid in black cement mortar. The office floors are of hard maple. The hardware, including the light fixtures, will be bronze finish, and the ornamental iron grills and radiators will be glazed out in Verde antique bronze.

The electric lighting system has been carefully designed to furnish an equal diffusion of light throughout the building. The lamps in the shelter, ticket office and waiting rooms will be controlled from a central switch placed in a cabinet in the ticket office, and those in the two offices will be controlled by local switches. The entire lighting system will be controlled through a master switch and panelboard located in the basement. The wiring will conform to the city of Chicago electric department specifications.

The heating system is of the low-pressure, direct-radiation type with a sectional boiler located in the basement. All piping below the ground-floor level is to be covered with 1-in. molded asbestos insulation canvas-bound. The heating-plant guarantee calls for a temperature throughout the rooms to be heated to 75 deg. when the outside temperature is 10 deg. below zero.

This station was designed by H. R. Wilson & Company, Chicago, Ill., under the supervision of Edwin C. Faber, general manager Aurora, Elgin & Chicago Railroad.

PLAN FOR MODEL FRANCHISE PRESENTED TO MUNICIPAL LEAGUE

A report containing "Suggestions for a Model Street Railway Franchise," prepared by a sub-committee of the committee on franchises of the National Municipal League, was presented at a conference held at Richmond, Va., on Nov. 16. The report was prepared by James W. S. Peters, president of the City Club of Kansas City, Mo., and Delos F. Wilcox, chief of the bureau of franchises of the New York Public Service Commission, First District. It says in part:

"Given a properly constituted state or local commission, with sufficient authority to regulate a street railway company's stock and bond issues and to compel it to render safe and adequate service at reasonable rates, to extend its lines so as to keep pace with the needs of the community, to readjust its routes as public exigencies require, to keep accounts and make financial reports with scientific honesty, and to refrain from expending moneys and conferring favors for political purposes, and with ample funds to employ and train experts for this supervisory service, a local franchise may be reduced practically to a simple permit to occupy the streets, subject to the right of the city to terminate the grant and upon equitable terms take over the property or transfer it to another grantee whenever public policy shall so dictate. This may be called the minimum requirement for a model franchise. The maximum is quite different, including as it does all of the points which must be covered by a complex contract between the city and its grantee where the relation between the parties is purely contractual, no continuing right of regulation being vested in the public authorities or no machinery for the exercise of such right being available.

"While we do not favor the granting of a street railway franchise that is exclusive in legal form, we do believe it to be for the best interest of all concerned that the entire street railway system of a given community should be operated as a unit under one comprehensive franchise. In other words, we favor a practical though not a strictly contractual monopoly.

"We would even go so far as to suggest the advisability, under certain conditions, of a practical consolidation of the street railway and the electric light, heat and power systems, because of the economies to be effected by joint management.

"It is our opinion that one of the necessary corollaries of monopoly in street railway service is the obligation on the part of the franchise holder to extend its lines from time to time when required by the city, subject to review as to the reasonableness of the requirement. It should not be necessary to show that a particular proposed extension will be an immediate source of profit.

"We are of the opinion that all franchises should be indeterminate within the maximum limits permitted by law, and that when the indeterminate principle is accepted as the policy of the state such maximum limitations should be eliminated by a change in the law, revocation in any case to be conditional upon the city's taking over the physical plant at a fair price or designating another grantee to do so.

"An essential element in the purchase clause is the fixing of the price at which the property may be taken over, or the exact description of the method by which such price is to be determined in the future.

"The fixing of the purchase price and capital value in the contract itself releases the city from any necessity of providing for the supervision of stock issues. As to bonds, it is desirable to provide in the franchise that they shall be sold at the fair market price and shall be callable for amortization purposes at a small premium over the price at which they are sold.

"We believe that, in order to make the city's control of its streets effective, a practicable method of substituting municipal for private ownership should be available to the city at all times.

"We therefore suggest that either the city should set aside all or a sufficient portion of the revenues received by it from the street railway company as an amortization or sinking fund for the purchase of the company's bonds from time to time, and ultimately to offset the company's entire equity in the property, or that the company itself be required as one of the conditions of its franchise to set aside annually in the hands of trustees a certain percentage on its investment sufficient, with the normal accumulations, to amortize the capital within thirty to fifty years.

"A street railway should be regarded as a public necessity, to be maintained at all times at the highest practicable standard of efficiency irrespective of the expiration or termination of the franchises and irrespective of changes in ownership or in management. While this policy is necessary in any case, it becomes doubly necessary when the city enters into a contract reserving the right to take over the property at a fixed price at some future time. The franchise should, therefore, contain specific provisions in regard to the disposition of earnings, to the extent of requiring certain percentages of gross receipts to be set apart from year to year for maintenance and depreciation, including obsolescence.

"In our opinion the first consideration in the operation of a street railway should be the rendering of sufficient first-class service.

"The second consideration, in our judgment, should be the protection of the capital legitimately invested in this public service.

"We consider that while the question of street railway fares is of great importance it is after all secondary to the furnishing of adequate service, to the honest protection of necessary investment and to the gradual amortization of the capital for the benefit of the city. We think that the franchise should prescribe an initial rate of fare, but should provide for an occasional readjustment either through regulation or by means of an automatic schedule of rates specified in the grant itself.

"We have considered with care the question of compensation for franchises. In our judgment the car riders should not be taxed for the relief of the general tax rate. While there are strong arguments for the policy of requiring a franchise holder to pay taxes at the regular rate on the value of its property outside of the streets, we think

that at least all compensation in excess of this requirement, whether in the form of general city taxes, car license fees, a percentage of gross receipts or a division of net profits, should be applied either to the construction of extensions on the city's account, or to the amortization fund, or should be remitted for the benefit of service or for the reduction of rates."

An appendix to the report gives an outline of the sections for a franchise.

BERKSHIRE STREET RAILWAY SUSTAINED IN EJECTMENT CASE

The full bench of the Supreme Court of Massachusetts has handed down an opinion sustaining the Berkshire Street Railway Company in a damage suit against it by Nora A. Liversidge, whose husband met his death as a result of being ejected from the defendant's car by a conductor in the company's employ. The facts as developed at the trial were briefly as follows: Liversidge boarded the car at the rear platform and, finding the car was crowded, remained standing in the vestibule. The conductor told him he must go into the car or get off, and he replied that if the conductor would find him a place he would go in. The conductor then repeated his direction to go into the car or get off, once or twice, and then stopped the car and again told Liversidge to go in. As Liversidge again replied that there was not room, the conductor ejected him by pushing him backward off the steps of the car, thereby causing the injuries complained of. The jury found that Liversidge was not a passenger and was not in the exercise of due care.

The plaintiff offered to show, as bearing upon the question of her husband's due care and the negligence of the defendant, that at the time of the alleged assault there was a custom which had existed for a long time for passengers to ride in the vestibules of the defendant's cars; that this custom was known to the defendant, and no objection was made to passengers so riding. The court says:

"The custom, however, even if it existed, did not compel the defendant to permit passengers to ride in the vestibule. The only effect of it was to justify passengers in riding in the vestibule in the absence of any objection thereto on the part of the person or persons in charge of the running of the car. Uncontradicted evidence on both sides shows that the plaintiff's intestate was told by the conductor to go inside the car or to get off. We do not see, therefore, how the existence of the custom was material, and we think that the evidence was rightly excluded. The fact that plaintiff's intestate was directed by the conductor to go inside or get off distinguishes this case from those relied on by the plaintiff to show that evidence of a custom on the part of passengers to ride in the vestibule was admissible.

"What we have said disposes, we think, of the first two requests. The first of those was that it was for the jury to say whether a rule of the company which had been introduced in evidence requiring conductors to keep the rear platform and steps clear of passengers when there was room inside was intended to be enforced by the company. The second was that in passing upon the question whether the rule was intended to be enforced evidence of the custom for passengers to ride upon the rear platform without objection was competent for the consideration of the jury. There was nothing to show except the alleged custom that the company had waived the rule. As we have said, the alleged custom did not compel the company to allow passengers to ride in the vestibule or on the rear platform, and when passengers were notified to go inside or to get off the car the custom ceased to be of any consequence. We think that these requests were rightfully refused.

"The third request was given in substance and effect so far as it properly could be given. We do not think that under the rule of the company, or otherwise, it could be said as a matter of law that the plaintiff's intestate, having paid his fare and been received as a passenger, had a right to ride in the vestibule until he could with a reasonable degree of diligence gain admission inside said car. He was subject to the direction of the conductor even after he had paid his fare and been received as a passenger, and if he was requested by the conductor to go inside or get off the car he was bound to do so, leaving the question, if there was any, of the rightfulness of the conductor's action for future settlement. The result is that we think that the exceptions [of the plaintiff] should be overruled."

SPECIAL USES OF FIBER CONDUIT

It is usual to think of fiber conduit as applicable mainly to underground conduit work, but it also lends itself admirably to many other forms of buried or open electrical



Fiber Conduit Installed on a Pole in Los Angeles.

transmission. For inside work such conduit is of special value for protecting the high-tension wires between the transformers and busbars in power houses and substations; for outside work it is used widely for signal wires, underground feeder connections to third-rails and for pole connections between subway and aerial lines. An example of the last kind is presented in the accompanying view of a pole in Los Angeles, which carries several lines of J-M fiber conduit to the first cross-arm. Fiber conduit appears to be highly desirable for outside work of this character, as the conduit is much lighter than iron pipe and is claimed to be more durable under weathering and far less dangerous in case of leakage from the high-tension cables.

MASTER CAR BUILDERS' ASSOCIATION CONVENTION

J. W. Taylor, secretary of the Master Car Builders' Association and the American Railway Master Mechanics' Association, has issued a circular announcing the time and place of the 1912 conventions of these associations. Both conventions will be held in Atlantic City, N. J. The Master Car Builders' Association will meet June 12, 13 and 14 and the Master Mechanics' Association on June 17, 18 and 19. The sessions will be held in the Greek Temple on the Million Dollar Pier, where the exhibit of railway appliances will be placed. Reservations should be made at once.

FORCED DRAFT SYSTEM IN HUDSON & MANHATTAN POWER STATION

Electrical energy for the operation of the trains of the Hudson & Manhattan Railroad is supplied from a central power station in Jersey City, N. J. Owing to the heavy rush-hour traffic at night and in the morning, and the comparatively light traffic during the remainder of the day, the station operates over a wide range of load. The average monthly output is 3,500,000 kw-hours, while the maximum one-hour load is about 13,000 kw. The generating equipment in the station consists of two 3000-kw and two 6000-kw Curtis turbo-generators, or a total of 18,000 kw. Steam is supplied by eight Babcock & Wilcox boilers rated at 900 hp each. All boilers are equipped with Green economizers and the boilers are connected in groups of four to two steel stacks 11 ft. in diameter inside and rising 180 ft. above the street.

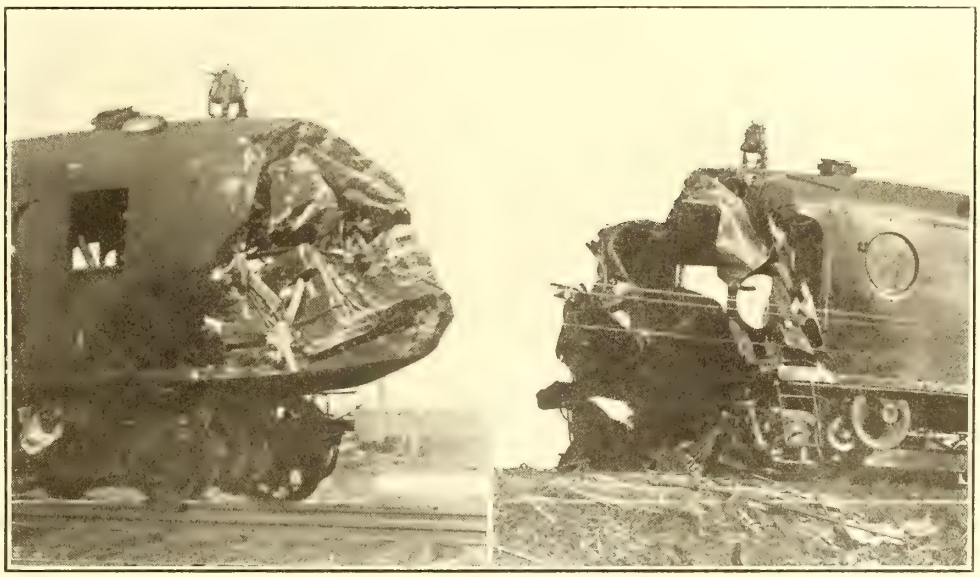
When the station was first put into operation the forced draft was furnished by four engine-driven fans, which gave a static pressure of about 2 in. of water. It was found that this system did not provide sufficient draft to develop the full overload capacity of the boilers and it was necessary to dump the fires under each boiler four times in twenty-four hours in order to avoid too deep an accumulation of ashes. During the past year a forced draft system, designed by Hugh Hazelton, electrical engineer of the Hudson & Manhattan Railroad, was installed by the American Blower Company to supply air to the boiler ash pits at a static pressure of nearly 5 in. of water. The boilers now have a capacity of nearly double their normal rating and the rate of combustion exceeds 30 lb. of coal per square foot of grate area. The coal burned in this station is No. 3 buckwheat anthracite, which requires for economical combustion a much higher air pressure in the ash pit than ordinary grades of coal.

A double-inlet, double-width Sirocco fan is installed in the boiler room basement and is completely inclosed by terra cotta tile walls forming an air chamber. Air is taken into this room through three windows. The fan shaft is supported in bearings which are outside of the walls of this room. This permits the bearings to be oiled without going into the fan room. The fan wheel is 72 in. wide and 72 in. in diameter. It has sixty-four blades and this large number of blades reduces the eddy currents within the fan to a minimum. The blades are narrow and concave and they are so mounted that the distance between the edges of the blades on the outside surface of the fan is less than the distance between blades on the inside surface. This increases the velocity of the air as it passes between the blades.

The fan wheel is mounted on a shaft 16 ft. long, 6 in. in diameter at the bearings and 9 in. in diameter at the center. The enlarged diameter at the center insures rigidity. At one end the shaft is coupled to a 500-hp, 25-cycle, 450-volt, three-phase induction motor which operates at a speed of 480 r.p.m. At this speed the fan has a capacity of 209,000 cu. ft. of free air per minute and gives a static pressure of 4.9 in. of water and a dynamic pressure of 7.5 in. of water. The fan discharges through two dampers into a horizontal sheet-iron duct running under the boilers. From this duct the air is passed into the ash pit under each boiler through four branch pipes in each of which is a damper. This arrangement of dampers provides means for controlling the supply of air to each boiler. The fires are now dumped on an average only three times in each twenty-four hours and this is done at periods off the peak load when the temporary shutting down of one or two boilers does not affect the supply of steam to the turbines.

EFFECT OF COLLISION BETWEEN TWO STEEL CARS

The accompanying illustration from a photograph shows the damage to two 70-ft. McKeen steel motor car bodies which collided on a sharp curve with an impact velocity of between 75 and 85 m.p.h. No loss of life resulted from this collision as both motormen jumped before the cars came together and none of the passengers in the rear compartments of both cars was badly injured. Some of the passengers sustained bruises and slight injuries, but no bones were broken. The cars did not telescope and were not damaged except for the crushing of the pointed front ends. The gasoline engines in the front ends of both cars were uninjured and not a wheel under either car left the rails.



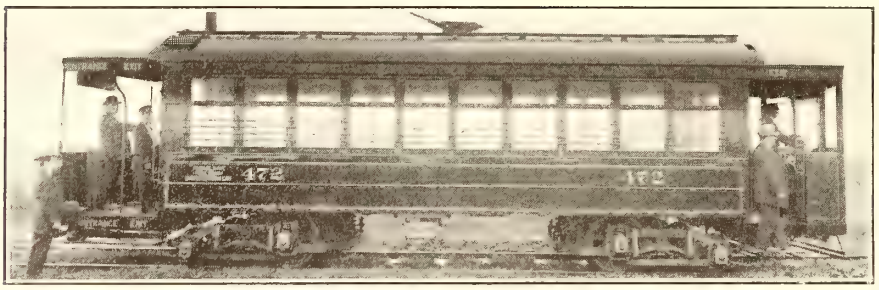
Steel Cars After Head-On Collision

The comparatively small damage to the cars and the prevention of serious injuries to any of the passengers are claimed to be due to the type of steel construction employed in these cars. A single I-beam center sill connects the forward end and the rear end of the car and the steel channel side sills are continuous around the entire car. The depressed side sill in the middle of the car enables a combination plate and truss girder to be worked out of the side of the car so that the sides of the car are utilized for carrying the weight, resisting the major portion of the stresses set up in case of collision. The use of the round windows enables the diagonal braces to run up to the requisite height. No posts are used in these cars, but ribs and stays similar to those in a ship extend from one side sill to the other, forming in one piece the posts and carlines, and tying the superstructure to both side sills. The rigid rectangular bracing in the center and over the body bolster at the end of the car affords great strength. The rigid triangular braces connecting the depressed side sills with the center sill of the car also are a very efficient feature.

In a collision a car with this type of framing has the whole metal cross-section brought into play to resist the shock.

FLAT-ARCH PREPAYMENT CARS FOR SAVANNAH

The Savannah (Ga.) Electric Company has recently placed in service three flat-arch, semi-steel prepayment cars which were built by the St. Louis Car Company in accordance with the Stone & Webster Engineering Corporation's standard design for city service on Stone & Webster properties. So far as the body construction is concerned, this car is the same as that used in Houston, Tex., except for some differences in the platform arrangement. The motorman's platform is partly vestibuled in cold weather and has a gate instead of a door for the exit; the conductor's platform is also doorless, but is inclosed on the left by a continuation of the dasher and a screen



One of Three Arch-Roof Cars for Savannah, Ga.

Length over the corner posts	26 ft. 6 in.
Length over the dashers	37 ft. 6 in.
Length over the front dasher from body corner post	6 ft.
Length over the dasher, rear end, from body corner post	6 ft.
Length over the buffers	38 ft. ½ in.
Width inside below the windows	8 ft. 3½ in.
Width over the sheathing	8 ft. 4 in.
Width over the drip rails	8 ft. 3½ in.
Distance from top of floor to point of arch	6 ft. 3 in.
Distance from top of rail to top of body floor	37½ in.
Distance from top of rail to top of the platform	28 in.
Distance from top of rail to top of step	15 in.
Cross-seat spacing	2 ft. 5 in.
Length over ends of cross-seats	35 in.



Interior of Savannah Car

24 in. high. The rear bulkhead has double sliding doors which give a clear opening of 40 in., while the front bulkhead has a single sliding door with a 26-in. opening for exit only. These cars have been built for single-end operation, but an extra controller and brake staff have been installed for emergencies. The platform steps are stationary. There are two longitudinal and eight cross-seats on each side of the car. The principal car dimensions are as follows:

The 5-in. x 3-in. x ⅜-in. side sill steel angles extend around the 4-in. x 6¾-in. oak end sills in one continuous piece, all fastened together with riveted steel plates. The end sills are tenoned to the side sill fillers. The 2¼-in. x 5-in. oak cross sills are reinforced by angle irons and 3/16-in. x 5-in. steel plate. These angles and plates are bolted to the side sill angles. The outside platform knees are of 7-in. x 3½-in. x ½-in. angle iron with ½-in. x 6-in. x 48-in. reinforcing plates; the step knees are of 1¾-in. x 7-in. oak; the center platform knees are 2½-in. x 6-in. oak and the platform knee braces of ½-in. x 3-in. steel. The cast-steel body bolsters weigh 420 lb. each. A rather interesting feature of the side construction is that the outside lower panel is a continuous piece of 3/16-in. x 15-in. steel plate extending to the center of the end sills, while the upper outside panels consist of sections of No. 16 sheet steel lined with 3/16-in. agasote.

The side posts, which are of 2-in. x 2-in. x ¼-in. T-iron, extend from side sill to side sill to form both the roof rafters and posts. The post fillers above the window rests are of ⅜-in. x 2½-in. oak. The letterboard is of 1¼-in. poplar and the roof of ¼-in. agasote. The general finish of the cars is in mahogany. The bodies are olive green and lettered and numbered with gold. The equipment of these cars includes Sterling-Meaker brakes, Hale & Kilburn reversible seats with pressed steel leg and ends, Curtain Supply Company's and O. H. Edwards window fixtures, H-B wheel guards, Consolidated Car Heating Company's push-button system, Hunter destination signs, Crouse-Hinds headlights and Knutson retrievers.

NEW DEVELOPMENTS IN RAILWAY TELEPHONE APPARATUS

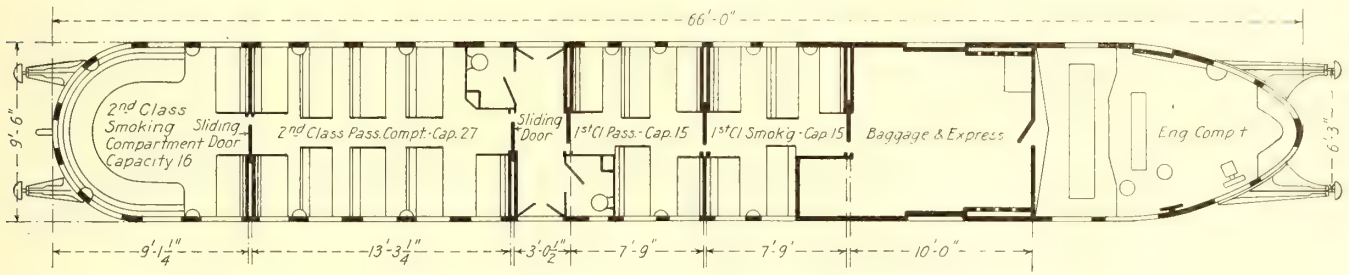
During the past year the Western Electric Company has perfected and introduced several new telephone devices designed especially to meet the peculiarly severe conditions encountered in railway train dispatching. Among these are the loud-speaking receiver which is adapted for use in stations and block towers. Tests of this type of telephone receiver made under the most severe conditions show that the articulation is very distinct and the tone is of sufficient volume to enable the operator to hear clearly even when the noise of passing trains is very loud. Another device is a "group" selector which has been adopted by a number of railways. The dispatcher, by operating a selector key, first picks out automatically a group of five selectors and then a particular selector of the group. A new type of vacuum lightning arrester for railway telephone circuits also has been perfected. Low maintenance cost and high efficiency are claimed for it.

A selective operated dispatcher's semaphore signal is another new development. The semaphore blade and spectacle casting are of the standard type and are mounted on the top of an iron mast. At a convenient height on the mast is mounted a weatherproof iron box containing the selector set and telephone equipment. The dispatcher can set the signal to the stop position by operating a selector key and the train crew can call the dispatcher for orders when the train stops at the signal. An answer-back signal informs the dispatcher positively that the signal has been set to the stop position.

A concession has been granted to a syndicate presided over by M. A. Barras for a narrow-gage electric railway from Fribourg to Bulle, by way of Pérolles, Marly, La Roche, Thusy and Riaz, Switzerland. The cost is estimated at about £260,000.

GASOLINE MOTOR CARS FOR THE VICTORIAN RAILWAYS, AUSTRALIA

The Victorian Railways, Melbourne, Australia, have recently purchased two 70-ft., 200-hp gasoline motor cars from the McKeen Motor Car Company, Omaha, Neb. These motor cars were shipped on five flat cars from Omaha to Tacoma, Wash., where they were transferred to a steamship of the Frank Waterhouse Line running to Melbourne. The two boxes containing the car bodies were 70 ft. long, 11 ft. wide, and 10 ft. high, and are said to be the largest boxes ever shipped in the history of rail or water transportation.



Floor Plan of Motor Car for Victorian Railways

These cars are of the standard McKeen type adapted to the special requirements of the Victorian Railways. The general dimensions and appearance of the cars are shown by the accompanying illustrations. They are built for 5-ft. 3-in. track gage and are equipped with British standard coupling and buffing gear at the front and rear. The center side-door entrance is especially designed for handling passengers on elevated depot platforms, which are commonly used in Australia. The cars are built to accommodate thirty first-class passengers and forty-three second-class passengers. Each class of passengers is provided with smoking and non-smoking compartments, which are divided by bulkheads fitted with sliding doors. The second-class passengers are placed in the two rear sections and the first-class passengers are accommodated in the two sections between the center side entrance and the baggage room at the front end of the car.

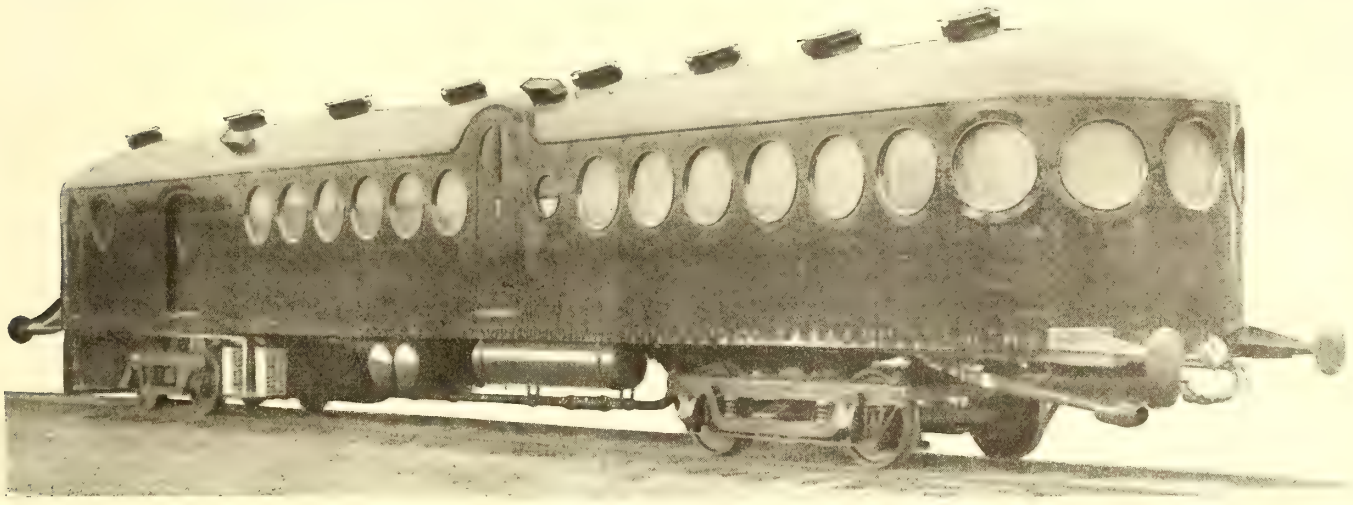
The cars are built of standard rolled-steel sections and plates. The center sills are 8-in. I-beams, and the two lower side sills are 6-in. channels. The side sheets are of No. 12 gage Bessemer steel and the roof sheets are No. 16 gage Bessemer steel. Light channels are used to form the combined posts and carlines, which are continuous from side sill to side sill, thus giving the greatest possible strength with the least possible weight. The circular windows in the sides are constructed like ship portholes and are wind, dust and water-proof.

The cars are ventilated automatically by the motion of the car. Fresh air is admitted through an intake and passes over the car heating coils. The foul air is exhausted by suction ventilators in the roof. The lighting is by the Commercial acetylene system using compressed gas stored in a tank.

The cars are propelled by 200-hp air-starting, reversible gasoline engines. The engines are of the four-cycle, six-cylinder type with cylinders 10 in. in diameter by 12-in. stroke. The valves are nickel steel, 4 in. in diameter and are mechanically operated. The ignition of the engine is by both magneto and coil; the coil is supplied with duplicate sets of accumulators.

The engine is mounted on the front truck and is independent of the car body. The drive is direct from the engine by a 5-in. Morse silent chain, the driving sprocket uniting the two halves of the crank shaft. The driving half of the friction clutch, together with the driven sprocket, are mounted directly on the main axle. The drive from the friction clutch to the axle is transmitted by means of a sliding clutch. Steel-tired driving wheels, 42 in. in diameter, are used. The wheels on the rear axle of the motor truck and both axles of the rear truck are rolled steel 33 in. in diameter.

The engine is water-jacketed, the jacket consisting of ⅛-in. copper sheet. The cooling water is circulated by a gear pump through the pilot radiators, the two rear radiators and the car-heating coils. The heating coils in the body of the car are cut out of the cooling water circulation system in warm weather.



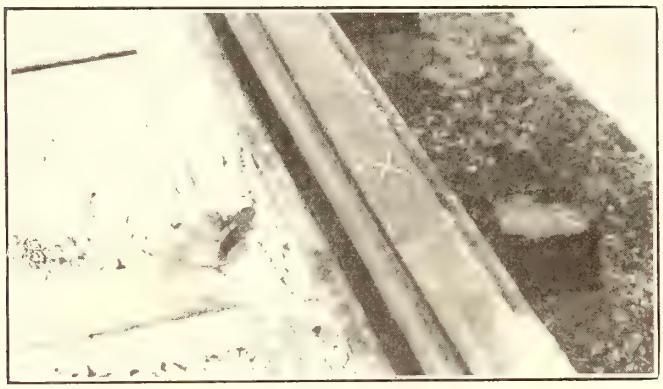
Gasoline Motor Car for Victorian Railways, Australia

The general dimensions of these cars are given in the following table:

Gage	5 ft. 3 in.
Length over all	70 ft.
Length of baggage compartment	10 ft.
Length of first-class compartment	15 ft. 6 in.
Length of second-class compartment	21 ft. ¼ in.
Width over all	10 ft.
Height over all	11 ft. 9 3/16 in.
Weight	68,000 lb.

ROMAPAC RAIL INSTALLATIONS IN CHICAGO AND ELSEWHERE

Following the authorization in September, 1911, by the Board of Supervising Engineers, Chicago Traction, of the installation of Romapac rail on the South Halsted Street line of the Chicago City Railway, the machine for laying the rail was shipped from England to Chicago, where about a mile of track has since been laid with it. Another



Romapac Rail—Cross Showing Joint of Head Rail After Being Crimped

mile is under order from the same company and 2 miles from the Chicago Railways. The composite rail and the machine have been referred to in former issues of the Electric Railway Journal (March 3, 1906, and Sept. 23, 1911). These rails have been laid abroad, but Chicago is the first city in America to have them.

DESCRIPTION OF RAIL AND PROCESS OF APPLICATION

The composite rail consists of a lower or base rail and an upper head with flanges for crimping it on the top of the base section. The machine for doing this work carries



Romapac Rail—Machine on South Halsted Street, Chicago

rollers which bend the flanges of the head securely into place by cold rolling. This machine also possesses means whereby the flanges can be cut and the head torn off to prepare the base for a new head. When wear makes renewal necessary the head of the rail only is removed, and a new head is crimped on.

A special feature in the working of the machine is that in both the operation of crimping on and of cutting off all of the strains are confined to the head rail. There are no strains or leverage on the lower or base rail, between the two rails, or on the ties or concrete, other than those that are due to carrying the weight of the machine, which is not more than the weight of the ordinary cars. In the crimping operation the rollers engage on both of the head-rail flanges, and they are drawn together by means of powerful gearing as they revolve backward and forward. In the meantime, the machine is traveling backward and forward on the track which is being crimped. This is continued until the flanges firmly clip the base rail. From six to ten passes are generally required for this purpose.

THE PROCESS OF REMOVAL

The cutting operation is performed in a manner very similar to the crimping, by fitting a cutter disk in the place of one of the crimping rollers. A cut is made into the top of the outside flange of the head rail to a depth equal to about two-thirds of its thickness, which weakens the flange in a true line along its entire length.

The breaking machine is then placed in position on the rail. This machine has two hook-shaped tools which engage with the lower and inner edge of the head-rail flanges. These tools are fixed into rocking levers which are caused to open and close by means of cams and toggles as the machine travels along the track. These hook tools give about 500 outward pulls a minute, with the result that the cut and thereby weakened flange is torn off in a strip the full length of the rail. The head rail has now no grip on to the base rail and is easily thrown off.

ACTION OF ROLLERS IN CRIMPING

The action of the rollers upon the flanges of the head rail, it is claimed, not only closes them tightly into the grooves in the head of the lower or base rail, but it rolls them in such a manner as to impart to these flanges a latent force which acts in an inward direction. In other words, these flanges are converted into cold-rolled springs of great power, which grip the base rail the full length with a spring grip. This is due to the hardening, cold tempering and drawing of the flanges by the roller action,



Romapac Rail—Ends of Head Rails Held by Jacks to Prevent Slipping During Crimping

which produces in them a far greater elastic limit than that possessed by the other parts of the rail. This explains the fact that in the test for adhesion almost the same pressure had to be applied each time to start a movement between the two sections of the compound rail.

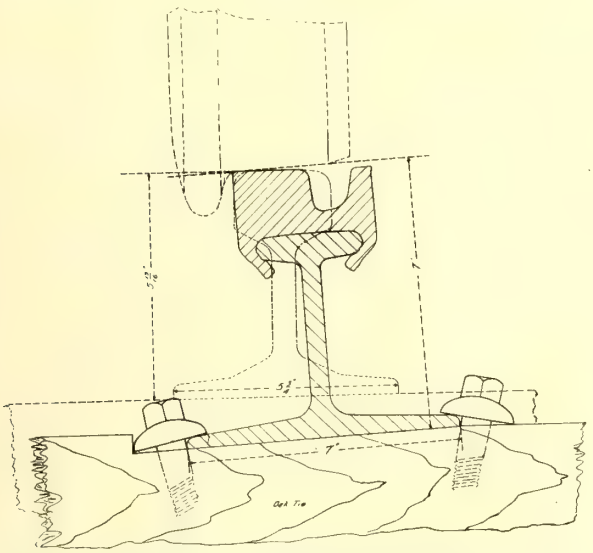
COMPARISON OF CHICAGO AND LEEDS CONDITIONS

The machine which during November, 1911, laid about a mile of single track in Chicago on South Halsted Street, between Thirty-first and Thirty-ninth Streets, also laid the test track in Leeds, England, in September, 1906. The

base section of the Leeds rail weighed about 65 lb. and the head section about 56 lb. These sections when crimped together formed a grooved rail which complied with the standard British section No. 4, which should weigh 105 lb. per yard. The Chicago rails weighed about 158 lb., the base about 77 lb. and the head about 81 lb., forming together a trilby rail which complied with the Lorain Standard No. 403, which should weigh 129 lb. to the yard. The whole Romapac rail installation was laid in pavement on Carnegie steel ties and fastenings with 8 in. of rolled crushed rock ballast under the ties.

On Sept. 5, 1911, contracts with the Continuous Rail Company, New York, were approved, and between this date and Oct. 20 the machine was adapted to crimp the heavier Chicago rails, shipped by express from Leeds to Chicago and set up ready for work. As this machine was not built for the heavy Chicago section, the Continuous Rail Company has in hand designs for heavier machines.

The head section of the Chicago rail had flanges of over 31/64 in. at ¾ in. from their tips, increasing to over 17/32 in. at the highest point of bending. The Leeds flanges measured respectively 25/64 in. and 13/32 in. The specifications for the latter gave the limits for carbon as 0.40 per cent to 0.50 per cent, and for the Chicago rails



Romapac Rail—Diagram Showing How Rail Was Laid for Test on Metropolitan Railway, Paris

as 0.50 per cent to 0.60 per cent. In both cases the crimping was done in unfavorable weather, but the variations of temperature during the track laying in Chicago were abnormal, as extremes of 74 deg. Fahr. and 13 deg. Fahr. were registered in 24 hours.

RESULTS OF MECHANICAL TESTS

None of the Chicago section was specially crimped for testing purposes, but a short length of track on Halsted Street was cut out immediately north of the crossing at Thirty-fifth Street, and one rail was obtained from which tests were made. This rail had been crimped in the usual course of work without any plan that it would afterward be taken up. The crimping was done during a night when the temperature never rose above 27 deg. Fahr., so that it should represent work rather below the average.

A piece 12 in. long cut from the rail was delivered to R. W. Hunt & Company for testing. They reported that it required a pressure of 72,330 lb., or over 36 tons, to start a slipping movement of the head section over the base, and that when this pressure had been removed it required almost the same pressure again to start a movement, proving that the flanges have an elastic or spring grip. A similar test made of a piece of the Leeds rail at the engineering laboratory of the Leeds University required a pressure of about 28 tons to get an initial slip. The difference of about 8 tons per foot, or 27½ per cent, represents the additional grip of the average Chicago crimping over the Leeds rail which had been specially crimped for testing purposes.

COPY OF REPORT BY R. W. HUNT & COMPANY

"The following is a report of our longitudinal shearing test of the 12-in. length of Romapac rail section submitted:

"The specimen was set with the direction of rolling vertical between the crushing heads of our Riehle testing machine, which operates vertically. The base section was supported on the bed of the testing machine and the load applied upon the head section alone. The center of bearing on the head section was made as close as possible to a position directly above the center of bearing on the base section.

"The loads were increased slowly in the conduct of the test. The measurement of the slip was measured between center punch marks upon the web of the base section and the flange of the head section. The results follow:

Loads Applied, Lb.	Distance Between Center Punch Marks.	Slippage, Inches.	Remarks.
0	6.01	0	
10,000	6.01	0	
20,000	6.01	0	
30,000	6.01	0	
40,000	6.01	0	
50,000	6.01	0	
60,000	6.01	0	
70,000	6.01	0	
72,330	5.98	0.03	Accompanied by a loud report.
66,440	5.97	0.04	
59,320	5.94	0.07	Accompanied by a second loud report.
55,000 to 57,000	5.88	0.13	
48,000 to 52,000	5.79	0.22	Accompanied by six repeated reports.
49,000 to 50,000	5.60	0.41	Accompanied by twelve repeated reports.
49,000 to 50,000	5.43	0.58	Accompanied by continuous or intermittent reports.

USE OF ROMAPAC RAIL IN PARIS

A practical test has meanwhile been made on the Gambetta loop of the Metropolitan Underground Railway, Paris. When it was proposed to make this test the contractor had rolled only the British Standard No. 4 (7-in. x 7-in.) grooved steel rail, but to avoid delay this rail was used as shown in the accompanying sketch. The rails were placed with their grooves to the outside, and by means of specially shaped ties were set over at an angle from the vertical sufficient to show the reverse angle on the head, true and in running line with the ordinary T-rails. They were then fished up with joggled fishplates on a curve of 164-ft. radius. This arrangement brought the full load of the wheels upon the extreme inner edge of the head. The Romapac rail has already stood this severe test with satisfaction for over sixteen months.

BLOCK SIGNALS ON THE ILLINOIS TRACTION

The installation program for the protection of about 125 miles of track with automatic block signals, as announced last January, has now been completed. The last section of block signaling to be put into service is between Granite City and Edwardsville. With this equipment practically all of the hazardous districts on the main line of the Illinois Traction System are now operated under signal protection. The details of the installation were described on page 1105 of the ELECTRIC RAILWAY JOURNAL for June 24, 1911, in an article by John Leisenring, signal engineer of the Illinois Traction System. The signal equipment was manufactured by the Union Switch & Signal Company, and consists of the Style B mechanism, 15-ft. steel masts, 4-ft. 6-in. semaphore blades operated in the upper left-hand quadrant and continuous track circuit control, the energy for the signal system being supplied by a separate single-phase line fed from rotary-converter substations. The records show an average of but two signal failures per 1000 train movements.

News of Electric Railways

Proposal of Toledo Company Considered by Council

The representatives of the Toledo Railways & Light Company and the officers of the city of Toledo, Ohio, conferred on Dec. 15, 1911, in regard to the proposal from the company published in the Electric Railway Journal of Dec. 16, 1911, page 1247. Mayor Whitlock stated that if the company would agree to operate the lines at the rate of seven tickets for 25 cents and universal transfers pending a final agreement he felt that a settlement could be reached within six weeks. The Mayor said that the principal objection on the part of the officials of the city to the proposal made by the company on Dec. 11, 1911, related to the valuation of $8,000,000 placed by the company on the property, exclusive of the power plants. This was too high, and a valuation of the property should be made to establish a basis upon which income could be estimated.

The Mayor stated that he favored an ordinance similar to the Cleveland or Detroit ordinances and that he would agree to have a valuation made under proper conditions.

F. R. Coates, president of the company, replied that he was willing to make a rate of six tickets for 25 cents with universal transfers, but that the directors would have to be consulted before this rate could be adopted. They will meet on Dec. 28, and Mayor Whitlock asked Mr. Coates to communicate with them so as to arrive at a conclusion as soon as possible.

Cornell Schreiber, city solicitor, said that the present basis of operation was preferable to the proposition made by the company. The company should pay for paving, because the pavements were damaged by the cars. He was opposed to any allowance for intangible values. He had been elected to office on a 3-cent-fare platform and he could not consistently consider any other rate of fare. He asked for a temporary reduction in the fare pending a settlement, and was opposed to proceeding with the negotiations until a temporary reduction had been granted.

Mayor Whitlock stated that, in so far as it could be done legally, he was willing that the city should be bound by any finding that a board of appraisers might make as to the value of the property and would ask the City Council to consider the matter in this light. He believed that by a vote prior to the making of such valuation the Council could indicate its willingness to ratify the action of the board. With this understanding it was agreed that the work of valuing the property should be started at once.

On Dec. 16 it was announced that Frank R. Ford, New York, and Prof. E. W. Bemis, Cleveland, with Federal Judge Killits, of Toledo, as arbitrator, would compose the board of appraisers. Mr. Ford will represent the company and Professor Bemis the city. Judge Killits was selected by agreement between the city and the company.

At the conference it was stipulated by Mr. Coates that if the company granted seven tickets for 25 cents with universal transfers, and after a period of perhaps six months the fare was demonstrated to be unreasonable from the company's standpoint, the next higher rate of fare could be put into force, the city to have supervision of the company's books. Mayor Whitlock agreed to have this condition put into the franchise.

Mr. Coates stated that the power houses could not be included in the proposal of the company because they were used for the operation of the railway lines and for lighting purposes. A separate company will probably be formed to own and operate these plants and the gas system. The railway will purchase its power from this company.

The Toledo Railways & Light Company has arranged with Blair & Company, New York, N. Y., for an extension of the time of payment of the consolidated first mortgage bonds of the Toledo Traction Company, due Jan. 1, 1912, to Jan. 1, 1913, with interest at 6 per cent per annum, payable semi-annually, subject to redemption at the option of the Toledo Railways & Light Company on July 1, 1912, on thirty days' notice. The company has also arranged for an exchange of the bonds of the Toledo Consolidated Street Railway and the Toledo Electric Street Railway for extended bonds of the Toledo Traction Company. Holders of the bonds of the Toledo Consolidated Street Railway and of the Toledo Traction Company who do not desire to avail themselves of the exchange privileges will receive par for their bonds upon delivery of their holdings on or after Jan. 1, 1912, to Blair & Company, as will also the holders of the bonds of the Toledo Electric Street Railway who do not desire to avail themselves of the exchange privileges.

It is stated unofficially that plans tentatively agreed upon for the reorganization of the Toledo Railways & Light Company provide for the sale of $5,000,000 of first mortgage bonds and first preferred 6 per cent cumulative stock to care for about $8,000,000 of indebtedness of the company. The purpose is said to be to retire the $6,000,000 of first mortgage bonds of the company at par during the year, exchange the 4 per cent consolidated mortgage bonds represented by the protective committee for 4 per cent cumulative preferred stock at par and require the common stockholders to pay an assessment of $7 a share in return for full participation in the new common stock.

Four Years of the Public Service Commission in New York City

"Four years of the Public Service Commission, First District," was the topic which was discussed at a luncheon of the City Club, New York, on Dec. 16, 1911. Commissioners Malthie, Eustis and McCarroll, of the First District, were guests. Edward M. Bassett, former member of the commission for the First District, and John N. Carlisle, former member of the commission for the Second District, were at the luncheon. Paul D. Cravath presided. He said he had prepared himself for the luncheon the night before by looking over the minutes of certain meetings of corporation attorneys held while the Public Service Commission law was before the Legislature. He said:

"The doubts and fears that were then expressed now seem ludicrous, and it is hard to believe that such opinions were entertained by intelligent men of affairs. Many of us now think the corporations would be better off if the commission were endowed with wider powers. One reason for this feeling is that we are relieved of our annual struggle with the Legislature, which was a perfect nightmare. The year before the commissions came into existence more than 200 bills were introduced affecting the railroads. A large part of our time was devoted to useless hearings on useless bills. Since then the average has been thirty-five or forty bills, mostly unimportant. Instead of busy and untrained legislators to deal with we have trained men who give their entire time and thought to the subject. No one not familiar with the affairs of public service corporations can realize the enormous difficulties and complications there were to be met when the commission came into office. The surface railways in the boroughs of Manhattan and the Bronx were on the point of insolvency, the laws of the State on the subject were in the worst condition they had ever reached, principally because of the Elsberg law, the principal operating railway was unpopular, there was a constant agitation by associations in every borough that knew exactly what ought to be done, and there was incessant and frequently thoughtless newspaper agitation. A commission of archangels could not in four years have solved all the problems. In my opinion, all things considered, the commission has done exceedingly well, and no commission, in the face of such enormous difficulties as have confronted it, could have accomplished real, final, sweeping results or gained the popular approval that every public official desires."

Mr. Carlisle said:

"We have come to consider certain functions as necessary monopolies, and since the people grant these monopolies they ought to have the power of regulating them. The essential thing the commissions are established to procure is adequate and safe service at a reasonable rate. I think the law ought to be strengthened materially and that when the constitutional convention meets the commissioners should be made constitutional officers, so that their tenure

would be independent of the Legislature. When I was investigating the work of the commission for the First District at the request of Governor Dix I went all over the subway, and I was never so impressed in my life as I was by the mechanical ability that had been exercised, with much expense, largely at the instance of the commission, with the result that the subway is carrying nearly three times the number of people it was built to accommodate. Yet people complain because it will not carry six times as many."

Public Utility Bill for Washington, D. C.

On Dec. 14, 1911, Senator Gallinger, of New Hampshire, introduced in the Senate a bill to provide a public service commission to supervise the affairs of the public service companies which operate in Washington, D. C. The bill was prepared by Corporation Counsel Thomas of Washington, under the direction of the Senator. The primary basis for the measure was the Wisconsin law. The Wisconsin law was modified, however, in subsequent legislation in Michigan, and the changes applicable to the situation in Michigan were embodied in the Gallinger measure in one or two instances. Practically all provisions of the Wisconsin law applicable in Washington have been put in the Gallinger bill. Provisions for the regulation of gas and electric corporations were copied from the New York State law.

There are a number of provisions not found in any other law. One of these considers the extension of street railways and another has to do with changes of facilities and equipments of all public service corporations and public carriers. Other laws consulted were those enacted by Texas, Connecticut, Pennsylvania and New Jersey. A provision requiring all street railways to comply with all laws, regulations and charter provisions is an adaptation of a provision in the New Jersey law. There is a provision in the Gallinger bill requiring that when any bill affecting a public utility is introduced into Congress it shall also be presented to the public utilities commission, which shall report upon it to Congress. A part of the procedure and some of the provisions of the Interstate Commerce Law are also to be found in the Gallinger bill. The provision of the Wisconsin law in regard to physical valuations of properties is changed in the Gallinger bill by the substitution of Section 30 of the Maryland act. This provision gives power to the proposed public utilities commission to make a fair valuation by any means which it may deem proper.

The procedure before the commission embraces features making its action in the first instance *prima facie* valid, and providing for review of its findings by the Supreme Court of the District of Columbia, on appeal to the Court of Appeals, and thence to the Supreme Court of the United States. The public utility corporations and the commission are both given the privilege to apply to the courts. For instance, in the determination of valuations the commission is authorized whenever in doubt as to the elements of property of any public utility to apply to the court for instructions. The bill further provides that the Commissioners of the District of Columbia shall constitute the public service commission.

Steinway Tunnel Rights to Be Determined

At the request of the Public Service Commission of the First District of New York Attorney-General Carmody has begun an action to establish the rights of the city to the Steinway tunnel. The tunnel was not completed within the time stated in the franchise, and the city of New York brought suit against the New York & Long Island Railroad, which held the franchise, to establish the contention that the franchise had been invalidated. It was finally decided that the city had no right to bring the suit, as the State had granted the franchise. As the city would not give any franchise for the operation of the tunnel, it has been lying idle. Some time ago August Belmont, Andrew Freedman, H. Van Rensselaer, Walter Luttgen, Walter G. Oakman, William Barclay Parsons, John Pierce and George W. Young, trustees who represent the Interborough Rapid Transit Company, were appointed to hold the property. After the Interborough Rapid Transit Company failed to sell the tunnel to the city it included with its subway offer a plan to operate the line. The tunnel, which runs under the East River from Forty-second Street to Astoria, would serve the Borough of Queens. By extending the tunnel to the Grand Central terminal passengers could transfer to the present subway. The Public Service Commission agreed to expend $1,500,000 to connect the tunnel with the present subway if the Interborough Rapid Transit Company would operate it in connection with improvements of its present service. Since the city refused the subway proposition of the Interborough Rapid Transit Company the company has made no further overtures to place the tunnel in operation.

Collapse of an Old Highway Bridge Under an Electric Car

On Dec. 19, 1911, a 132-ft. 8-in. span of a highway bridge across Assiscunk Creek, at East Pearl Street, Burlington, N. J., collapsed under a 19-ton double-truck closed car operated by the Riverside Traction Company. The car carried ten passengers, none of whom was seriously injured.

A heavily loaded car from the opposite direction had just crossed the bridge at ordinary speed when the car which caused the collapse entered from the expansion end, going very slowly. The motorman noticed the movement of the bridge and stopped his car when the forward truck was about 8 ft. past the abutment. Both ends of the span were pulled off the abutments and the entire superstructure fell on the creek bottom. The bridge belonged to Burlington County and was built in 1881. When the track was laid across the bridge the floor was reinforced by 15-in. I-beam stringers under the rails.

The bridge had two light through eight-panel Pratt trusses, 20 ft. high and 20 ft. apart on centers, carrying a roadway and one electric railway track between trusses and one cantilever sidewalk. The upper chords and end posts were four-segment Phœnix C columns, the end posts were four-segment Phœnix B columns, all with cast-iron connection blocks. The main ties and lower chords were eyebars 2½ in. and 3 in. wide and from ⅝ in. to 1⅜ in. thick. The floor beams were 5-in. I-beams weighing 200 lb. per yard. Floor joists were originally wooden beams. All metal was double-refined iron. The bridge was proportioned for a general live load of 1800 lb. per lineal foot, or for a panel live load of 2400 lb. per lineal foot.

Need for Increased Service in Cleveland

The need of increased street railway facilities is becoming noticeable in Cleveland again. The Cleveland *Leader* published the following editorial on Dec. 13, 1911:

"One thing which the people of Cleveland certainly did not mean to do when they voted for the street railroad settlement was to bring on the community such conditions of service as are now being endured. There was never any intention to cause such crowding as the passengers of the street railway system of Cleveland are subjected to, day after day.

"The situation is worse than ever. The passengers have increased by millions, but the cars are not more numerous than they were when Cleveland was much smaller. There has been practically no expansion in the facilities for traffic in the last two years, though the business of the street car lines has grown fast and steadily.

"The traction company appears not to be the offender in this discreditable situation. Its officials have professed entire readiness to buy more cars and provide more power to operate the lines as soon as permission to do so shall be granted by the Council. That body has been reluctant to act, apparently for the reason that the rate of fare may have to be raised some time in the near future, and there is fear of the political consequences of authorizing expenditures which might affect the price of tickets.

"This is folly. The public wants the lowest fare consistent with tolerable service, but it certainly does not want the conditions now existing to continue indefinitely. There are worse things for the car riders than the possibility of paying a cent for a transfer."

Decision in Seattle Fare Case

Ruling upon demurrers in the criminal cases against employees of the Seattle, Renton & Southern Railway, Seattle, Wash., Judges John F. Main and J. T. Ronald have rendered a joint decision declaring the criminal section of the Washington Public Service Commission Law unconstitutional. Five cases against railway employees for collecting a fare in excess of 5 cents within the city limits were filed in the Superior Court, one on appeal from a justice court, where conviction was had. Under the provisions of the Public Service Commission Law the corporation is subject to a fine of $1,000 and the agent or employee to punishment by fine or imprisonment. The court holds that the criminal feature of the law, contained in Section 95, is not embraced in the title of the act, and is therefore unconstitutional. The law provides that actions are to be commenced by the Attorney-General of the State, provides for the regulation of rates by the Public Service Commission and the fixing of reasonable compensation for railway, gas, electrical and other companies, and indicates that in all cases under the act the procedure shall be the same as in ordinary civil cases. Section 95 provides that every employee who violates the act shall be guilty of a gross misdemeanor.

Proposed General Traction Consolidation in Chicago

The negotiations for the consolidation of the elevated and surface railways in Chicago are proceeding slowly. A commission is at work to determine the valuation of the properties of the elevated railways, the valuation of the surface railways having been determined in the traction settlement ordinances of 1907. The present commission consists of John Ericson, city engineer; E. C. Shankland and J. J. Reynolds, members of the subway commission of the city of Chicago; George Weston, the city representative on the Board of Supervising Engineers, Chicago Traction, and Prof. George F. Swain, of Harvard University, who represents the companies. Prof. Swain is the engineer of the Massachusetts Board of Railroad Commissioners and a member of the Boston Transit Commission. It is interesting to note that the valuation commission is instructed to consider the following elements of cost:

(1) The cost of reproducing the tangible physical property new at the present time.

(2) The present depreciated value of the tangible physical property.

(3) The value of the franchises, leases, contracts, etc.

(4) The loss of interest in the past below what would be a fair return on the capital invested.

(5) The treatment of obsolete or abandoned property.

The suggestion that the commission report on all these elements of cost came from the companies, and the city agreed to make these valuations without, however, binding itself to take into consideration any other items than the actual physical value of the present tangible physical property. In a communication dated Dec. 18, 1911, the representatives of the companies made it clear that on their part this stipulation was understood and agreed to—that is, that the report of the valuation commission, while going into all the details mentioned, was not to be considered binding either on the city or the companies. This communication was signed by Henry A. Blair, representing the Chicago Railways; Ira M. Cobe, representing the Chicago City Railway, Southern Street Railroad and Calumet & South Chicago Railway, and Samuel Insull, representing the Chicago elevated railways.

The plan to combine all the elevated and surface railways of Chicago is intimately connected with the construction of the proposed subway. Very likely the subway will be built by the city and leased to the companies for operation, but no conclusion has been reached on the subject. The interests involved are very large and important, and it will be some time before a plan of settlement can be worked out in all its details.

Morris-Joliet Extension of Chicago, Ottawa & Peoria Railway Opened.—A trial run was made on Dec. 16, 1911, on the Joliet extension of the Chicago, Ottawa & Peoria Railway, between Morris and Joliet, 22 miles distant. The party consisted of officials of the company and the run was made from Morris to Joliet in order to test the track, clearance and running time. Two-hour local service was made effective Dec. 17, 1911.

Suit to Forfeit Franchise in San Francisco.—Attorney-General Webb of California brought suit in the Superior Court on Dec. 6, 1911, against the United Railroads, San Francisco, Cal., to forfeit its franchise covering the line from Market Street along California Street to Kearney Street. The suit is based on the ground that the line has not been operated since April 18, 1906. The court is asked to impose a fine of $5,000 for failure to operate under the franchise.

Conference with Union Officers in Philadelphia.—A conference between the officers of the Philadelphia (Pa.) Rapid Transit Company and officers of the Amalgamated Association of Street & Electric Railway Employees, for the discussion of matters relating to the status of the union, as a result of the vote on the co-operative wage plan and arbitration scheme, referred to in the Electric Railway Journal of Sept. 2, 1911, page 393, has been tentatively arranged for some time after the first of the year, at a date to be later determined.

Roadbed Condition Prizes.—The Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind., has announced the names of the winners during 1911 of the cash prizes awarded by the company each year among its roadway section employees. For the best alignment of track, best level and surface, D. Welch, Rockfield, was awarded the first prize of $50; J. Beeks, Andrews, the second prize of $40, and J. Akers, Bucker, the third prize of $25. For the greatest improvement shown in track and roadbed during the year a premium of $50 was given to O. S. Henniger, Ft. Wayne.

Report of the Ohio Public Service Commission.—The Public Service Commission of Ohio reports that 80 miles of electric railway were built during the last year at a cost of $3,800,000. The dividends paid by all companies totaled $1,007,692, a decrease of $92,105 over 1910. Both receipts from operation and operating expenses increased. The increase in the number of employees was 802. The wages paid were slightly higher in 1911 than in 1910. The number of persons killed and injured in 1911 was 999, a decrease of 130 over 1910. Of the number killed twelve were passengers and eight employees.

"Tangent."—This is the title of a monthly magazine published by the Galveston-Houston Electric Railway, the Houston Electric Company and the Galveston Electric Company. Its principal purpose, as outlined in the introductory editorial by L. C. Bradley, vice-president, is to "build and boost" everything pertaining to the development of the Galveston-Houston district. The magazine contains illustrations of the Galveston-Houston Electric Railway, an account of the development of Galveston since the storm of 1900 and some views in League City. The front cover contains a bird's-eye view of the Galveston-Houston Electric Railway.

Appropriation for Chicago's Subway Bureau.—The finance committee of the Chicago City Council on Dec. 16, 1911, approved an appropriation of $2,202,200 requested by the subway bureau recently appointed by Mayor Harrison. Before $2,000,000 of this money can be expended the action of the finance committee must be confirmed by the City Council, and then opportunity will be afforded for a petition for a referendum vote at the April election, if 25 per cent of the voters of the city request the referendum. Of the sum approved by the finance committee $2,000,000 was specified to pay expenses of subway construction. The $202,200 provides for the salaries of three engineers at $12,000 a year each, for assistant engineers and clerks, and for office equipment and supplies. It is understood that the present appropriation will provide funds to make additional subway plans and designs which the Council will consider.

Subway Report in Pittsburgh.—The report of the committee on municipal affairs of the Chamber of Commerce of Pittsburgh, Pa., on the comparative merits of a high and low-level route for a tunnel to connect Pittsburgh and the South Hills country has been completed. Two reports are to be made, one relative to each route, but the recommendation will favor what is termed a "compromise elevation" of about 1035 ft. In addition, the recommendations will advocate two tubes, instead of one; that is, a tube for street railways and one for use of the general public. This plan is suggested both for "economy in construction and safety."

Finally, the committee will recommend that "a sufficient toll be paid to the county by the street railways for the use of the bridge and the tunnel to be set apart to help in maintenance and provide a sinking fund for the payment of bonds, issued by the county to cover the cost of construction." In addition to the tunnel report the chamber as a whole will consider the subway ordinance.

PROGRAM OF ASSOCIATION MEETINGS

New England Street Railway Club

The regular monthly meeting of the New England Street Railway Club will be held at the American House, Boston, on Thursday evening, Dec. 28, 1911. After the regular business meeting at 8 o'clock Frank M. Clarke, assistant to the superintendent of the Providence division of the New York, New Haven & Hartford Railroad, will present a paper, "The Development of the Steam Roads of New England and Their Relation to the Electric Railways." Dinner will be served at 6:30 o'cock.

International Street & Interurban Railway Association

As announced last week, the convention of the International Street & Interurban Railway Association will be held this year at Christiania, Norway. This association meets every other year. The convention of 1910 was held in Brussels and that of 1908 in Milan. The 1912 convention will be the seventeenth in the history of the association. The date for the meeting has not yet been set. The following is a list of the papers or reports to be read at the meeting:

1. "Influence of New Methods of Urban Transportation on the Development of Large Cities and on Social Customs." Report to be presented by L. Dausset, municipal councilor and formerly president of the Municipal Council of Paris.

2. "Organization Problems in Connection with the Transportation of Large Crowds in Cities." Report to be presented by M. Hradetzky, superintendent of transportation of the Vienna municipal tramways.

3. "The Use of Independent Motor Cars on Steam Railway Lines and on Interurban Lines." Report to be presented by E. A. Ziffer, Edler von Teschenbruck, president of the Bukowina Railways, Vienna.

4. "Interpole Motors." Joint report to be presented by Messrs. Bacqueyrisse, chief engineer of tramway construction of the General Omnibus Company, Paris, and by some other author to be announced later.

5. "Electrolysis and Means Actually Employed for Preventing It." Speaker to be announced later.

6. "Overhead Trolley and Feeder Line Maintenance," by E. d'Hoop, technical manager Brussels Tramway Company, and Mr. Otto, chief engineer Grosse Berliner Strassenbahn.

7. "The Most Advantageous Location of Carhouses and the Organization of Carhouse Work." Report to be presented by J. H. Neiszen, manager of the municipal tramways of Amsterdam.

8. "Rail Corrugation." Report to be presented by A. Busse, chief engineer of the Grosse Berliner Strassenbahn, Berlin.

9. "Snow Removal." Report to be presented by Mr. Poppe, manager of the Christiania Tramways.

10. "The Relation Between Local Railways (Interurban Lines, Branch Lines, Light Railways, Suburban Railways and Even City Railways) and Trunk Lines as Regards Combined Service and the Interchange of Freight and Rolling Stock." Report to be presented by Mr. Campiglio, president of the Italian Street & Interurban Railway Association, Milan.

11. "Different Methods of Collecting Fares on Interurban Lines." Report to be presented by G. Lembourg, engineer to the general manager of the Société nationale des Chemins de fer vicinaux, Brussels.

12. "Recent Improvements in Heating and Lighting of Railway Cars; Advantages and Disadvantages of the Systems in Use," by F. de La Hoye, engineer of rolling stock and material of the Société nationale des Chemins de fer vicinaux, Brussels.

Financial and Corporate

New York Stock and Money Markets.

Dec. 20, 1911.

Rather decided curtailment has taken place this week in the volume of transactions on the New York exchange, and the movement of prices has been very uncertain. In the late trading yesterday some improvement was made in prices, and in to-day's market net changes were unimportant. Rates on the money market to-day were: Call, 3½@4 per cent; ninety days, 3¾@4 per cent.

Other Markets

Chicago Railways issues were active in the Chicago market to-day, and gains were made in both series 1 and series 2. These issues have led the market this week. Trading in other offerings has not been heavy, but fair in volume.

Trading in Philadelphia during the week has been dull, though prices have been firm.

Georgia Railway & Electric declined over two points in yesterday's trading in Boston, and Massachusetts Electric preferred went up to 96 to-day. The general list was quiet, and transactions were in limited volume.

A gain of nearly two points in Augusta & Aiken Electric preferred was the only feature of the Baltimore market to-day.

Quotations of traction and manufacturing securities as compared with last week follow:

	Dec. 12.	Dec. 19.
American Brake Shoe & Foundry (common)	a90	a90¼
American Brake Shoe & Foundry (preferred)	a131½	a129¾
American Cities Company (common)	a27	a25
American Cities Company (preferred)	a83	a81
American Light & Traction Company (common)	a295	a295
American Light & Traction Company (preferred)	a107	a108
American Railways Company	a45½	a45¼
Aurora, Elgin & Chicago Railroad (common)	a39½	a40¼
Aurora, Elgin & Chicago Railroad (preferred)	a84	a83½
Boston Elevated Railway	a130⅞	a130¼
Boston Suburban Electric Companies (common)	a15	a14
Boston Suburban Electric Companies (preferred)	a75	a76
Boston & Worcester Electric Companies (common)	*12	*12
Boston & Worcester Electric Companies (preferred)	a56	a56
Brooklyn Rapid Transit Company	a76¾	a77¼
Capital Traction Company, Washington	a127½	a124½
Chicago City Railway	a180	a180
Chicago Elevated Railways (common)	a30½	a31
Chicago Elevated Railways (preferred)	a93½	a92¼
Chicago Railways, ptcptg., ctf. 1	a96½	a99
Chicago Railways, ptcptg., ctf. 2	a34¾	a37¾
Chicago Railways, ptcptg., ctf. 3	a11½	a11½
Chicago Railways, ptcptg., ctf. 4	a6¾	a6½
Cincinnati Street Railway	130½	130½
Cleveland Railway	a106	a103⅞
Cleveland, Southwestern & Columbus Ry. (common)	*47⅞	*47⅞
Cleveland, Southwestern & Columbus Ry. (preferred)	*33¾	a33¾
Columbus Railway & Light Company	a37½	*37½
Columbus Railway (common)	*83	*83
Columbus Railway (preferred)	*90	*90
Dayton Street Railway (common)	a25	a25
Dayton Street Railway (preferred)	a101	a101
Denver & Northwestern Railway	*145	*145
Detroit United Railway	85	*85
General Electric Company	154¼	155
Georgia Railway & Electric Company (common)	a159	a150
Georgia Railway & Electric Company (preferred)	a91½	a90½
Interborough Metropolitan Company (common)	15¼	15⅜
Interborough Metropolitan Company (preferred)	48	48¾
International Traction Company, 4% notes, rcts.	69½	69½
Indiana Union Traction Company	12	12
Kansas City Railway & Light Company (common)	a20½	*20½
Kansas City Railway & Light Company (preferred)	52	*52
Lake Shore Electric Railway (common)	7	*7
Lake Shore Electric Railway (1st preferred)	83	*83
Lake Shore Electric Railway (2d preferred)	*25	*25
Manhattan Railway	136	134
Massachusetts Electric Companies (common)	a21⅞	a22⅞
Massachusetts Electric Companies (preferred)	a94	a96
Metropolitan Street Railway, New York	*8	*8
Milwaukee Electric Railway & Light (preferred)	*105	*105
Norfolk Railway & Light Company	26	26
North American Company	a73½	a73⅞
Northern Ohio Light & Traction Company (common)	a57½	*57½
Northern Ohio Light & Traction Company (preferred)	105	a105
Philadelphia Company, Pittsburgh (common)	52½	a52¼
Philadelphia Company, Pittsburgh (preferred)	a43¾	a43¾
Philadelphia Rapid Transit Company	a23	a23½
Portland Railway, Light & Power Company	*99½	*99½
Public Service Corporation	a110	a110
Seattle Electric Company (common)	a106½	a115
Seattle Electric Company (preferred)	a101	a101
Third Avenue Railroad, New York	7	5⅞
Toledo Railway & Light Company	5½	a4
Twin City Rapid Transit, Minneapolis (common)	a104	a108
United Ry. & Electric Company (Baltimore)	18½	18½
United Rys. Inv. Co. (common)	32	32½
United Rys. Inv. Co. (preferred)	60	60
Virginia Railway & Power Company (common)	a44	a39½
Virginia Railway & Power Company (preferred)	a82	82
Washington Ry. & Electric Company (common)	a46¼	a49½
Washington Ry. & Electric Company (preferred)	a88	a89
West End Street Railway, Boston (common)	a88	a87½
West End Street Railway, Boston (preferred)	a103½	a103½
Westinghouse Elec. & Mfg. Co.	a66	a68¾
Westinghouse Elec. & Mfg. Co. (1st pref.)	a118	a117½

a Asked. *Last sale.

ANNUAL REPORT

Massachusetts Electric Companies

A statement of earnings of the operating street railway and light companies controlled by the Massachusetts Electric Companies, covering the year ended June 30, 1911, is as follows:

Gross income		$8,881,520
Operating expenses		5,557,303
Gross income, less operating expenses		$3,324,217
Interest, rentals and taxes		1,838,579
Net income		$1,485,638
Dividends:		
Common stock	$1,043,774	
Preferred stock	125,316	
		1,169,090
Surplus for the year		$316,548
Surplus, June 30, 1910		216,706
Total		$533,254
Credits:		
Accumulated profit on sales of scrap	$33,549	
Adjustment of accounts	2,827	
Total credits		36,376
		$569,630
Debits:		
Premium on bonds called for redemption	$2,796	
Reconstruction	173,001	
Replacement	159,112	
Depreciation of Hyde Park Electric Light Company property	7,000	
Total debits		341,909
Surplus, June 30, 1911		$227,721

A statement of profit and loss of the Massachusetts Electric Companies for the year ended Sept. 30, 1911, is as follows:

Dividends on stocks owned	$481,244	
Interest on notes and bank balances	162,084	
Total income		$643,328
Expenses:		
Salaries—general officers and executive committee	$12,875	
Printing and stationery	1,001	
Legal and miscellaneous expenses	6,133	
Federal income tax	158	
Total expenses		20,167
Net income for the year		$623,161
Interest on coupon notes		166,500
Balance for the year		$456,661
Surplus, Sept. 30, 1910		3,015,925
		$3,472,586
Dividends:		
Jan. 1, 1911—2 per cent	$411,148	
July 1, 1911—2 per cent	411,148	
		822,296
Surplus, Sept. 30, 1911		$2,650,290

Gordon Abbott, the president, says in his remarks to shareholders:

"It was pointed out in the annual report of last year that there would necessarily be a repetition in this year's annual report of three months' earnings of the operating companies, in consequence of a change in the law relating to the fiscal year for street railways. Last year's report included the earnings for July, August and September. This year's report contains those months again, and the year of the operating companies ends on June 30 instead of Sept. 30 as heretofore.

"The results of operation during the past year may fairly be considered satisfactory, in view of the unsettled condition of general business in the territory under consideration. Gross earnings increased $434,458, or 5.14 per cent, fixed charges increased $81,466, and net divisible income showed a gain of $12,248.

"Dividends on the common stocks of the Boston & Northern and Old Colony Street Railways were continued at the same rates as last year—that is, 5 per cent and 6 per cent respectively—but the change in the fiscal year has resulted in their paying one dividend instead of two into the treasury of the Massachusetts Electric Companies during the past fiscal year of those companies.

"No additional preferred shares of the operating companies were sold during the year, but 2919 shares of the common stock of the Old Colony Street Railway were issued and were bought at par by the Massachusetts Electric Companies. Bonds of the Boston & Northern amounting to $2,270,000 par value and bonds of the Old Colony amounting to $485,000 par value have been sold during the year and the proceeds used to pay off the floating debt of $500,000 not held by the Massachusetts Electric Companies and to pay for further work on improvements and additional facilities required by increasing business.

"During the year which ended on June 30 last $1,507,107 has been spent on the property, divided as follows: Track construction, $397,113; track reconstruction, $584,244; cars and electrical equipment, $104,380; overhead lines and feeders, $100,484; power stations, $23,723; land and buildings, $206,896; sundry equipment, $15,669; total, $1,432,509; changes in Hyde Park power station, $74,598; total, $1,597,107.

"During the year 9.694 miles of new track have been constructed, 32.569 miles reconstructed, and work on 2.081 miles of track reconstruction was in progress at the close of the year; 170.83 miles of overhead and 10.36 miles of underground feeder and transmission cable have been constructed, and also 10.78 miles of underground conduit.

"Four express cars, four work cars, four vacuum cleaning cars and thirteen snow plows have been equipped and put into service.

"Buildings for express terminals at Quincy and at Neponset have been completed.

"The reconstruction of the Hyde Park station—providing 600 kw of modern generating machinery with additional boiler capacity—has been completed, as well as all other work mentioned in the last annual report as being in progress.

"A 1200-kw generator for East Woburn and additional boilers for East Woburn, Salem, Lynn and Chelsea have been contracted for.

"In addition to the foregoing expenditures, the high level of maintenance heretofore established has been maintained, and your trustees are able, as a result of all this, to report once more that the physical condition of the property has continued to improve during the past year.

"Acting under authority granted in Chapter 323 of the acts of the Legislature of 1911, the Boston & Northern and Old Colony companies were consolidated as of July 1 last. On Aug. 8 the name of the consolidated company was changed to Bay State Street Railway Company.

"In last year's report your trustees called attention to the desirability of making some provision for the arrears of dividends on the preferred shares and pointed out that before any plan could be considered it would be necessary to be reasonably sure of sufficient net earnings to pay dividends on any securities that might be issued in liquidation of such arrears. It is the opinion of your trustees that the time has come when the probable future earnings justify the adoption of such a plan, and they now recommend the issue as of July 1 next of preferred shares to be offered at par to the present preferred shareholders in purchasing and paying for the arrears of dividends on the preferred shares, which now amount to $3,648,938. Under the provisions of the deed of trust this can be done if a sufficient number of shares will authorize it, and your trustees are of opinion that the interests of all persons concerned will be served thereby. The preferred shareholders are, of course, entitled to their accumulated dividends in cash, but only from net earnings and only when the financial condition of the trust will permit net earnings to be so appropriated. Thus they can realize their claims in cash only at some indefinite future time and without interest. To undertake to pay them in cash now or in the near future is impracticable because it would involve the creation of a floating debt which might seriously impair the credit and resources of the association. It is therefore for the interest of the preferred shareholders to accept shares now for their dividend arrears instead of waiting until they can receive cash. On the other hand, the issue of preferred shares for such arrears will be of advantage to the common shareholders, who can receive no dividends until the accumulations due the preferred shares have been liquidated.

"Your trustees, therefore, recommend that the powers given the shareholders by the trust instrument by way of amendment or otherwise be so exercised as to authorize the trustees to issue as of July 1 next $3,649,000 par value of additional preferred shares and to offer these at par in payment of the claims for arrears of dividends on the outstanding preferred shares. They believe that the adoption

of this method will better serve the interests of all shareholders than an attempt to liquidate these dividends in cash during the continuance of the trust. At its expiration all preferred shares, old and new, will be entitled to payment in cash at par.

"To issue preferred shares in payment of the accrued dividends amounts, therefore, to this: The preferred shareholders will receive next July a security on which they will be entitled to receive dividends until the termination of the trust, when they will be entitled to receive cash in full for their claims. Obviously, they will be better off by exactly the amount of the dividends they receive from next July until the time they would have received cash for their claims. The common shares will be better off by having the claims of the preferred shares out of the way, so that if the earnings should prove more than sufficient to provide for dividends on the preferred shares, they will be entitled to the benefit.

"In conclusion, the trustees desire to congratulate you on the improved condition of your property which has made the consideration of such a plan possible; they hope that it will commend itself to you."

Georgia Railway & Power Company, Atlanta, Ga.

The State Railroad Commission of Georgia issued an order on Dec. 16, 1911, authorizing the Georgia Railway & Power Company to issue $17,000,000 capital stock and $30,000,000 of bonds. The company asked for authority to issue $27,000,000 capital stock and $30,000,000 bonds. In addition the commission provided that only $12,400,000 of the bonds could be issued immediately, and the remainder not until the company had reappeared before the commission and had submitted satisfactory evidence of development. The company asked the commission to approve the lease of the property of the Georgia Railway & Electric Company. The commission held that it was without authority in this matter. The Atlanta *Journal* says: "J. J. Spalding, Atlanta, one of the directors of the company, is not prepared to state whether or not the proposed plans will be carried out under this partial granting of the company's petition. None of the officers who could be reached was willing to talk, but there seems to be a strong probability that the developments contemplated will not be carried out." As previously stated in the ELECTRIC RAILWAY JOURNAL, the Georgia Railway & Power Company was incorporated to lease the property of the Georgia Railway & Electric Company and merge the Interstate Power Company, the Georgia Power Company, the South Carolina Power Company, the Savannah River Power Company, the Atlanta Hydroelectric Company and the Atlanta Water & Electric Power Company.

Interborough Rapid Transit Company Authorized to Issue Bonds

The Public Service Commission of the First District of New York has issued an order granting the Interborough Rapid Transit Company permission to issue bonds to the amount of $12,755,000, face value, payable Nov. 1, 1952, to bear interest at 5 per cent, payable semi-annually, and to be secured by a mortgage on the property of the company aggregating $55,000,000, authorization for which was granted on April 23, 1908. The company applied for permission to issue bonds to the amount of $17,123,611.

The order of the commission authorizing the issue states that the bonds will be redeemable in accordance with the terms of the mortgage at 105 and accrued interest. The commission finds that the money to be procured by the proposed issue is reasonably required by the company for acquisition of property, or for the construction, completion, extension or improvement of its facilities, or for the discharge or lawful refunding of its obligations, or for reimbursement of moneys actually expended from income or from other moneys in the treasury of the corporation not secured by the issue of stocks, bonds, notes or other evidence of indebtedness. It is also found that the purposes for which the proceeds of the bond issue are to be used are not in whole or in part reasonably chargeable to operating expenses or to income.

The proposed issue is authorized only upon certain conditions. Among these is that bonds to the amount of $5,500,800, which have been already surrendered, shall be forthwith delivered to the Morton Trust Company, trustee, under the mortgage and by it be canceled in accordance with Section 5 of Article 2 of such mortgage. Among the other conditions which are imposed by the Public Service Commission are the following:

"That no bonds authorized hereunder shall be sold by the said Interborough Rapid Transit Company for less than par with interest accrued thereon, and that the proceeds thereof shall be applied only to the following purposes, that is to say:

"(1) Toward discharging or refunding of previous issues, $4,584,000, and for construction, completion, extension or improvement of its facilities, $3,000,000	$7,584,000
"(2) To or toward discharge of indebtedness of Interborough Rapid Transit Company to the Rapid Transit Subway Construction Company for cost of construction of the Brooklyn-Manhattan Rapid Transit Railroad	3,500,000
"(3) For acquisition of property and for the construction, completion, extension or improvement of the company's facilities during the year beginning July 1, 1911	996,332
"(4) Reserved in accordance made with the provisions of the mortgage to pay or discharge mortgages upon real property acquired or paid for with moneys to be repaid out of proceeds of the issue hereby authorized, said mortgage being in amounts and upon property described as follows, namely: (1) Property at Two Hundred and Eighteenth Street and Harlem River, $500,000; (2) South Vernon Park property, $174,600	674,600
"Total	$12,754.932

"That the Interborough Rapid Transit Company shall increase the annual sinking fund payment provided for in Article 11 of the said mortgage and shall, as of Nov. 1, 1911, and on the first day of November of each and every year thereafter, pay to the trustee as and for such sinking fund an amount equal to 1 per cent of the total amount of the principal of bonds at the time of such payment outstanding secured by the said mortgage."

Albany Southern Railroad, Hudson, N. Y.—Richard Sutro, of Sutro Brothers & Company, New York, N. Y., has been elected a director of the Albany Southern Railroad to succeed Charles H. Werner.

Boston & Worcester Electric Companies, Boston, Mass.—The trustees of the Boston & Worcester Electric Companies have declared a dividend of $1 per share on the 33,936 4 per cent cumulative preferred shares, payable on Jan. 1, 1912, to holders of record on Dec. 23, 1910. This is the first distribution since January, 1910.

Central Park, North & East River Railroad, New York, N. Y.—The United States Circuit Court of Appeals has affirmed the decree of foreclosure and sale obtained by the Farmers' Loan & Trust Company, New York, N. Y., against the Central Park, North & East River Railroad, Morton Trust Company and others. The action was on a mortgage made by the Central Park, North & East River Railroad on Dec. 1, 1872, to the Farmers' Loan & Trust Company, to secure payment of bonds aggregating $12.000,000 and maturing Dec. 1, 1902. The Central Park, North & East River Railroad leased its property on Oct. 14, 1892, to the Metropolitan Street Railway.

Chicago (Ill.) City Railway.—In addition to the regular quarterly dividend of 2½ per cent, the directors of the Chicago Railway have declared an extra dividend of 1½ per cent, both payable on Dec. 30, 1911, to stockholders of record on Dec. 19, 1911. This is the only extra dividend this year. The ordinance before the City Council providing that the Chicago City Railway acquire the property of the Chicago & Southern Traction Company inside the city limits and carry passengers for a single fare was defeated by the Council on Dec. 18, 1911. The ordinance, with some

amendments which had been accepted, has been reintroduced and sent to the committee on local transportation, so that it may be reported again at the next meeting of the Council.

Chicago (Ill.) Railways.—Harris, Forbes & Company, New York, N. Y., and the National City Bank, New York, N. Y., are offering for subscription at 96½ and interest $6,000,000 of consolidated mortgage series "A" 5 per cent gold bonds of the Chicago Railways, due Feb. 1, 1927.

Chicago & Milwaukee Electric Railroad, Chicago, Ill.—John R. Thompson, owner of $1,034,000 of the first mortgage bonds of the Chicago & Milwaukee Electric Railroad, has filed two suits in the Superior Court at Chicago, one directed against a committee of bondholders and the Chicago Title & Trust Company, and the other against the National Trust Company, Ltd., of Canada. Mr. Thompson asks that the defendants be restrained from transferring, pledging or disposing of the bonds or using the same in any reorganization plan and urges the court to require the committee and the depositaries to return the bonds to him.

Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio.—The Cleveland, Painesville & Eastern Railroad has petitioned the Public Service Commission for permission to issue $211,000 of forty-year 5 per cent bonds to pay for extensions and betterments.

Forty-second Street, Manhattanville & St. Nicholas Avenue Railway, New York, N. Y.—Judge Lacombe in the United States Circuit Court has signed an order adjourning the sale of the property of the Forty-second Street, Manhattanville & St. Nicholas Avenue Railway under foreclosure, which was set for Dec. 18, 1911, until Jan. 18, 1912.

Kansas City Railway & Light Company, Kansas City, Mo.—The Kansas City Railway & Light Company has called for payment $50,000 of first-mortgage 5 per cent bonds of the Corrigan Consolidated Street Railway dated 1886. The bonds will be redeemed on Jan. 1, 1912, at 110 at the office of the Central Trust Company, New York, N. Y., trustee.

Kansas City Viaduct & Terminal Company, Kansas City, Mo.—Ira G. Herrick, formerly president of the Kansas City Viaduct & Terminal Company and at present a director of the company, has been appointed temporary receiver of the company by Judge Walter A. Powell in the Independence division of the Jackson County Circuit Court. The application for a receiver was noted in the Electric Railway Journal of Dec. 16, 1911, page 1253.

Keokuk (Ia.) Electric Company.—This company, the incorporation of which was noted in the Electric Railway Journal of Dec. 16, 1911, was organized by Stone & Webster, Boston, Mass., and has taken over all the local utilities at Keokuk, including the Keokuk Gas & Electric Company, the Keokuk Electric Railway & Power Company and the Keokuk & Western Illinois Electric Company.

Manila Electric Railroad & Light Company, Manila, P. I.—The quarterly dividend of the Manila Electric Railroad & Light Company has been increased to 1½ per cent, or at the rate of 1 per cent per annum additional.

Metropolitan Street Railway, New York, N. Y.—It is reported in financial circles in New York that Theodore P. Shonts, president of the Interborough-Metropolitan Company and the Interborough Rapid Transit Company, will be elected president of the Metropolitan Street Railway following the sale of the property of that company under foreclosure.

New York Central & Hudson River Railroad, New York, N. Y.—Application for permission to acquire stock of the New York & Harlem Railroad has been filed with the Public Service Commission of the Second District of New York by the New York Central & Hudson River Railroad. The New York & Harlem Railroad owns a steam railroad running from Forty-second Street, New York, to Chatham, N. Y., a distance of 127.45 miles, with branch lines 9.03 miles long, and also owns a street railway in New York 10.22 miles in length. The capital stock issued and outstanding consists of 173,121 shares of common stock and 26,879 shares of preferred stock, each share of the par value of $50, none of which is owned by the New York Central & Hudson River Railroad. It has outstanding $12,000,000 of 3½ per cent mortgage bonds due May 1, 2000. In April, 1873, the railroad was leased to the New York Central & Hudson River Railroad for a term ending on April 1, 2274, at an annual rental of interest on bonded debt and 10 per cent on preferred and common stock. Its street railway line is leased to the Metropolitan Street Railway for 999 years at a rental of $400,000 a year.

Salem (Ohio) Electric Railway.—The operation of the Salem Electric Railway has been suspended because the road could not be made to pay. The company has about 2 miles of standard-gage track and six motor cars.

Twenty-eighth & Twenty-ninth Streets Crosstown Railroad, New York, N. Y.—Joseph P. Day has been instructed by Referee Newell Martin to dispose of the Twenty-eighth & Twenty-ninth Streets Crosstown Railroad at public auction on Jan. 4, 1912. The sale is the result of foreclosure proceedings brought by the Central Trust Company, New York, N. Y.

Dividends Declared

American Cities Company, New York, N. Y., 3 per cent, preferred.

Boston & Worcester Electric Companies, Boston, Mass., $1, preferred.

Capital Traction Company, Washington, D. C., quarterly, 1½ per cent.

Chattanooga Railway & Light Company, quarterly, 1¼ per cent, preferred.

Columbus (Ga.) Electric Company, $3 preferred.

Frankford & Southwark Passenger Railway, Philadelphia, Pa., quarterly, $4.50.

Germantown Passenger Railway, Philadelphia, Pa., quarterly, $1.31¼.

Lake Shore Electric Railway, Cleveland, Ohio, quarterly, 1½ per cent, first preferred.

Memphis (Tenn.) Street Railway, quarterly, 1¼ per cent, preferred.

New York State Railways, Rochester, N. Y., quarterly, 1¼ per cent, preferred; quarterly, 1½ per cent, common.

Porto Rico Railways, Ltd., Ponce, P. R., quarterly, 1¾ per cent, preferred; quarterly, 1 per cent, common.

Stark Electric Railroad, Alliance, Ohio, quarterly, ¾ of 1 per cent.

Toronto (Ont.) Street Railway, quarterly, 2 per cent.

Union Passenger Railway, Philadelphia, Pa., $4.75.

United Traction & Electric Company, Providence, R. I., quarterly, 1¼ per cent.

West Philadelphia Passenger Railway, Philadelphia, Pa., $5.

ELECTRIC RAILWAY MONTHLY EARNINGS

ATLANTIC SHORE RAILWAY.

Period.			Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net. Income.
1m.,	Nov.,	'11	$21,363	$20,428	$936	$582	$354
1 "	"	'10	21,023	18,136	2,887	606	2,280

AURORA, ELGIN & CHICAGO RAILROAD.

1m.,	Nov.,	'11	$140,050	$82,652	$57,199	$36,788	$20,411
1 "	"	'10	132,508	74,422	58,086	34,603	23,483
5 "	"	'11	839,767	437,033	402,734	182,515	220,219
5 "	"	'10	809,582	418,471	391,111	167,044	224,068

BROOKLYN RAPID TRANSIT.

1m.,	Sept.,	'11	$2,027,273	$1,254,764	$772,509	.....	.....

CENTRAL PARK NORTH & EAST RIVER RAILROAD.

1m.,	Sept.,	'11	$54,492	$49,088	$5,404	.....	.....

CONEY ISLAND & BROOKLYN RAILROAD.

1m.,	Sept.,	'11	$115,427	$87,566	$27,860	.....	.....

HUDSON & MANHATTAN RAILROAD.

1m.,	Sept.,	'11	$242,332	$107,272	$135,061	.....	.....

INTERBOROUGH RAPID TRANSIT COMPANY, NEW YORK.

1m.,	Sept.,	'11	$2,373,478	$1,209,590	$1,163,888	.....	.....

METROPOLITAN STREET RAILWAY, NEW YORK.

1m.,	Sept.,	'11	$1,183,291	$795,924	$387,367	.....	.....

NEW YORK & QUEENS COUNTY RAILWAY.

1m.,	Sept.,	'11	$117,303	$115,722	$1,581	.....	.....

NORTH CAROLINA PUBLIC SERVICE COMPANY.

1m.,	Oct.,	'11	$24,536	*$14,502	$10,034	$5,500	$4,534
1 "	"	'10	20,987	*12,795	8,192	4,167	4,025
12 "	"	'11	247,753	*149,623	98,130	59,333	38,797

THIRD AVENUE RAILROAD, NEW YORK.

1m.,	Sept.,	'11	$315,410	$157,709	$157,701	.....	.....

*Includes taxes.

Traffic and Transportation

Collecting Increase in Fare on Hudson & Manhattan Railroad

The Hudson & Manhattan Railroad, New York, N. Y., has issued the following statement to the public in regard to the method which it will adopt on Dec. 24, 1911, for collecting the increase in fare on its line which was referred to in the ELECTRIC RAILWAY JOURNAL of Nov. 25, 1911, page 1113:

"Beginning at 12:01 a. m., Sunday, Dec. 24, 1911, the rate will be 7 cents instead of 5 cents for a ride from tube stations in Jersey City or Hoboken to any of the uptown New York tube stations (Christopher Street to Thirty-third Street inclusive) or vice versa.

"The rate will remain 5 cents between any tube stations in New Jersey, between the Hudson Terminal and any station in Jersey City or Hoboken, or vice versa, and between any tube stations on the uptown line in New York (Christopher Street to Thirty-third Street inclusive).

"(1) A passenger from New Jersey for uptown New York will deposit a 5-cent ticket in canceling box as he enters train platform in Jersey City or Hoboken. Upon arrival at uptown New York station passenger will buy a 2-cent supplementary ticket, which he will deposit in chopping box as he leaves the station.

"(2) From uptown New York stations (Thirty-third Street to Christopher Street inclusive) a passenger for tube stations in Jersey City or Hoboken will deposit a 5-cent and a 2-cent ticket in canceling box as he enters the station platform.

"(3) A northbound passenger starting from Christopher, Ninth, Fourteenth, Nineteenth, Twenty-third or Twenty-eighth Street for a Sixth Avenue station pays 5 cents as he enters train platform and receives an exit coupon. As he leaves any uptown station (Ninth Street to Thirty-third Street inclusive) he surrenders the exit coupon.

"(4) A southbound passenger from any Sixth Avenue station pays 7 cents as he enters train platform (see paragraph 2). If passenger does not ride beyond Christopher Street he will be handed a 2-cent refund coupon on the platform as he leaves the train, for which he will receive 2 cents if he hands the coupon to agent as he leaves the station.

"(5) A passenger from a tube station in Jersey City or Hoboken to another tube station in Jersey City or Hoboken will deposit a 5-cent ticket as he enters train platform (same arrangement as is now in effect).

"(6) A passenger from a tube station in Jersey City or Hoboken for downtown New York (Hudson Terminal), or from the Hudson Terminal for a tube station in Jersey City or Hoboken, will deposit a 5-cent ticket as he enters train platform (same arrangement as is now in effect).

"Until passengers become familiar with the new ticketing arrangements at uptown exits and entrances it is thought advisable to sell the 2-cent supplementary tickets only at uptown New York tube stations.

"The 2-cent coupons must be deposited in chopping boxes only at uptown New York stations, both entrance and exit."

Co-operation of Public Requested in New York

In discussing the problem of handling traffic on the lines of the Interborough Rapid Transit Company, New York, N. Y., on Dec. 18, 1911, Theodore P. Shonts, president of the company, said:

"The Interborough Rapid Transit Company on its subway and elevated lines, at this season of the year especially, is carrying very large numbers of people, and it requires the greatest care on the part of all its employees to handle so many people with facility and in safety. As a matter of fact, there is more or less discomfort to the passengers during the rush hours morning and night because more people desire to be transported than the present subway or elevated system can comfortably accommodate. The company therefore requests the co-operation of all its passengers in helping the employees, so that we may run the greatest number of cars and trains and render the public the greatest possible convenience. In order that the public may have some idea as to the enormous business being conducted safely every day, the following figures are of interest: On Dec. 11 the elevated lines carried 1,019,166 passengers safely, and operated in excess of 194,000 car miles. On the same day, Dec. 11, the subway carried 1,090,382 passengers safely and operated in excess of 189,000 car miles. The figures for the subway before mentioned show an increase in passengers over the same Monday of 1910 of 80,611, and an increase over the same day of 1910 of 73,000 car miles. On Dec. 11 the subway carried more passengers than on any other day in its history except during the Hudson-Fulton celebration. For the first sixteen days of December the traffic on the elevated lines has increased more than 20,000 passengers per day, while for the same days the subway showed an increase over the previous year of 77,000 passengers per day."

Action Postponed in Regard to Fare Inquiry in Los Angeles.—The Council of Los Angeles, Cal., has deferred action until the new Council is seated, after Jan. 1, 1912, on the proposed ordinance to authorize the Board of Public Utilities to conduct an inquiry into the reasonableness of the 5-cent fare charged by the street railways which operate in Los Angeles.

Extension of Express Territory on McKinley System.—The Chicago, Ottawa & Peoria Railway, the northern division of the McKinley System in Illinois, is arranging with the Wells-Fargo Express Company to establish agencies along its line and handle both a local and general express business. This contract will be effective after Jan. 1, 1912, and will add about 125 miles to the territory of the Wells-Fargo Express Company in Illinois.

Near-Side Stops in Jacksonville.—At a meeting of the public service committee of the Council of Jacksonville, Fla., on Dec. 15, 1911, Hardy Croom, general manager of the Jacksonville (Fla.) Electric Company, stated that circulars announcing that the company proposed to stop its cars on the near side of the street had been printed and placed on all cars. He said that patrons would soon become accustomed to the change. The committee has approved the plan of the company and has requested the public to assist the company in making the new rule a success.

Interurbans and Shippers in Indianapolis.—"What the Interurbans Have to Offer the Shippers" and "What the Shippers Have to Offer the Interurbans" were subjects discussed at a recent joint meeting of members of the Traffic Club of the Indianapolis Trade Association and officials of the interurban railways which operate out of Indianapolis. The shippers stated that they were giving practically all of their local shipments to the interurban electric railways on account of their prompt and careful handling of goods. At the next meeting the subject "Claims" will be taken up.

York Railway Numbers Suburban Stops.—J. E. Wayne, superintendent of the York (Pa.) Railways, has adopted the plan of numbering the stopping places along the suburban lines to assist the conductors in their work. Every stop will be given a number. On the Wrightsville line there are fifty-six stops, on the York Haven line forty-six, on the Dallastown line sixty-seven, and on the Dover line twenty-six. No change has been made in the Hanover line, nor is it expected that there will be any change there. Signboards bearing the respective station numbers have already been put in place.

Increase in Wages in Omaha and Council Bluffs.—The increase of 1 cent an hour in the wages of the employees of the Omaha & Council Bluffs Street Railway, Omaha, Neb., referred to briefly in the ELECTRIC RAILWAY JOURNAL of Dec. 16, 1911, page 1258, was authorized by the board of directors on Nov. 29, 1911, on recommendation of the management. The increase is effective on Jan. 1, 1912. The new scale follows: First year, 23 cents an hour; second year, 24 cents an hour; third year, 25 cents an hour; fourth year, 26 cents an hour; fifth, sixth, seventh, eighth and ninth years, 27 cents an hour; thereafter, 28 cents an hour.

Commutation Rates on the Galveston-Houston Electric Railway.—L. C. Bradley, vice-president and general manager of the Galveston-Houston Electric Railway, which was placed in operation between Galveston and Houston,

Tex., on Dec. 5, 1911, has announced the establishment of commutation rates on the line. Mr. Bradley says: "Commutation rates will apply on thirty-two tickets between any two stations where the fare is 10 cents or more. These tickets will be sold for one-half the one-way fare, and are limited to twenty-one days after date of purchase. This means that the interurban patrons can purchase a book of sixteen round trips, each round trip costing only the regular one-way fare."

Winter Folder of South Shore Route.—The Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., of which C. N. Wilcoxon is general manager and W. O. Woodward traffic manager, is distributing a vest-pocket size timetable printed on a single sheet 15½ in. x 10½ in. One side of the sheet is devoted to timetables and the other side to a map of the route, 7 in. x 4½ in., and illustrations showing a six-car train on a single-track section of the road and two two-car trains on a double-track section of the road. This high-speed, single-phase road operates a week-day schedule of twenty-four westbound and twenty-six eastbound trains, which connect at Pullman, Ill., with the suburban trains of the Illinois Central Railroad. The limited trains make the run of 76 miles between South Bend and Pullman in two hours and fifteen minutes.

Plans of Savannah Company to Meet Service Order.—The Savannah (Ga.) Electric Company has replied to the Railroad Commission of Georgia in regard to the recommendation of the commission noted in the Electric Railway Journal of Dec. 16, 1911, page 1259. The company says that heaters have been ordered for its suburban cars and will be installed as soon as they are received; that delays on the Liberty Street line are being reported; that engineers are investigating the feasibility of equipping double-truck cars with air brakes; that its light single-truck cars are beng rebuilt and made heavier as they go to the repair shops; that conductors have been cautioned to enforce as rigidly as possible the rule which requires passengers to be seated according to race, and that an order has been issued to its employees to call street names and station stops whenever it is possible to do so.

Employees of Interborough Rapid Transit Company Rewarded.—Every employee of the Interborough Rapid Transit Company, New York, N. Y., who has been in the service of the company continuously since Dec. 31, 1910, will receive a five-dollar gold piece for Christmas. The announcement of the company to this effect is concluded as follows: "The management desires to express its high appreciation of the efficient and faithful manner in which the employees of this company perform their work, individually and collectively. The unparalleled accomplishment in the transportation of passengers on the subway and elevated divisions is due very largely to the unanimous and earnest desire among all classes to improve the service and add to the comfort and convenience of passengers without other thought than the efficient performance of their duties, and this under the most trying circumstances."

Increase in Wages on Public Service Railway.—On Dec. 22, 1911, the Public Service Railway, Newark, N. J., announced an increase in the wages of its platform employees effective on Jan. 1, 1912. Hereafter new employees and those who have been working less than one year will recive 23 cents an hour; those employed more than one year and less than two years will receive 24 cents an hour, and all who have been employed by the company more than two years will receive 25 cents an hour. This is the third increase in wages for motormen and conductors made by the company within two years. In December, 1909, the first-year men were receiving 20 cents an hour. A continuous service of five years was necessary before this rate was raised to 22 cents, and not until after ten years had passed was the pay made 23 cents an hour under the old schedule. Beginning Jan. 1, 1912, the one-year men will get what used to be paid only to the ten-year veterans, and the maximum pay of 25 cents will be given to every platform man upon the completion of two instead of ten years' service.

Reduction in Fare Denied by New Jersey Commission.—The Board of Public Utility Commissioners of New Jersey has denied the petition of the South Englewood Improvement Association for a reduction of the fare on the Hudson River division of the Public Service Railway from 10 cents to 5 cents between the ferry at Edgewater and South Englewood. In dismissing the petition the board made the following significant reference to the general fare question: "While the immediate introduction of a radical departure from the present system is not before the board, we incline to believe that eventually the entire zone system, together with the flat 5-cent fare, will have to be replaced by a more rational and equitable system of charges. The rational system would seem to be a uniform basic charge alike for all passengers, plus a charge varying roughly with the length of the actual ride."

New Transfers in Denver.—In describing the new transfers which the Denver (Col.) City Tramway proposes to adopt in 1912 the *Tramway Bulletin* of Denver for December says: "They will be printed on the same paper as heretofore, the same width, but a trifle longer, which will afford a larger space for the indication of the day and month. The names of the lines will not have to be printed so closely together, which will make the indication of the line easier to punch and more readily discerned by the person receiving the transfer. The conditions under which they are issued and accepted will be printed in larger and clearer type, and the name of the line instead of being printed in red on top of the black type will be in clear, bold-faced type at the top of the transfer, making it much easier for patrons to read and understand the conditions governing the use of transfers. On account of the larger space, the transfer points on back of transfer will be given in larger and clearer type. It is expected that this larger transfer will not only materially assist in the elimination of mistakes, but also provide for ready issuance and acceptance, and it is believed that our many patrons will find them easier to read and understand than those which have been heretofore issued."

Pennsylvania Commission Adjourns Until 1912.—The State Railroad Commission of Pennsylvania has adjourned until Jan. 3, 1912, when the annual reports will be presented. Later in January hearings will be held concerning rates of fare on the Allegheny Valley Street Railway in Cheswick. On Jan. 22 the commission will meet in Philadelphia to hear a number of complaints regarding suburban passenger rates. The complaint filed by Frank R. Leib against the Valley Traction Company, which operates between Lemoyne and New Cumberland, concerning the ventilation of its cars and congestion of traffic has been sent by the commission to that company with the request that the employees be instructed to see that the cars are properly ventilated. The company was also requested to give the matter of overcrowding attention at once. In the matter of complaints about miners using regular cars on the Eastern Pennsylvania Railways, Pottsville, arrangements have been made to provide special cars and compartments for the miners. Three protests have been filed with the commission against the near-side cars in Philadelphia. It is contended that the steps of these cars are too high and that inconvenience is encountered in the aisles when the cars are crowded.

Re-routing Suggested in Los Angeles.—C. A. Henderson, assistant general manager of the Los Angeles (Cal.) Railway Corporation, has submitted to the Public Utilities Commission of Los Angeles a plan to re-route the lines of the company through the business section of the city. The plan is proposed to relieve the congestion in the shopping district except Main Street, where, according to the company, congested conditions cannot be corrected until the red, or broad-gage, cars are removed to another thoroughfare. The Utilities Commission has under consideration a plan to allow the red cars to use San Pedro Street. The transfer system will be extended and congested places, such as the Plaza, Temple Block, Second and Spring and Third and Main Streets, will be relieved greatly. The three lines of cars that now loop the Temple Block will be eliminated, and the eleven lines that now run along Spring Street between Second and Fourth Streets will be reduced to six. Mr. Henderson said: "I firmly believe that the proposed changes will relieve much of the congestion now prevalent during the rush hours morning and evening and that the public in general will be pleased and benefited by the greatly improved service on all the lines affected."

Personal Mention

Mr. P. Dineen has succeeded Mr. J. Burke as roadmaster of the Pacific Coast Railway, with offices at San Luis Obispo, Cal.

Mr. James S. Harlan has been reappointed to the Interstate Commerce Commission by President Taft for a term of seven years.

Mr. P. O. McCarthy has succeeded Mr. B. A. Hoog as superintendent of the Ft. Smith Light & Traction Company, Ft. Smith, Ark.

Mr. R. S. Godwin has been appointed master mechanic of the Texarkana Gas & Electric Company, Texarkana, Ark., to succeed Mr. B. N. McCulley.

Mr. F. E. Fitzpatrick has been elected secretary and treasurer of the Nevada County Traction Company, Grass Valley, Cal., to succeed Mr. C. A. Grow.

Mr. Jesse Yoakum has succeeded Mr. Ralph L. Caldwell as superintendent and general freight and passenger agent of the Warren-Bisbee Railway, Warren, Ariz.

Mr. Frank Farrel, who was formerly employed at the power station of the Boston & Worcester Street Railway, South Framingham, Mass., has been appointed assistant to Mr. Francis L. O'Bryan, who has been appointed electrical engineer of the company.

Mr. Frank R. Coates, whose election as president and a director of the Toledo Railways & Light Company, Toledo, Ohio, was noted in the ELECTRIC RAILWAY JOURNAL of Dec. 9, 1911, assumed the office of president immediately after his election. One of his first important official acts was to place before the Council of Toledo a proposal on behalf of the company for a settlement of the franchise question. This proposal was published in the ELECTRIC RAILWAY JOURNAL of Dec. 16, 1911, page 1247. As previously stated in the ELECTRIC RAILWAY JOURNAL, Mr. Coates was graduated from Lehigh University in 1890 and took a post-graduate course in 1891. He then served successively the Baltimore & Ohio Railroad and the New York, New Haven & Hartford Railroad. He next engaged in engineering construction work, and then became connected with Stone & Webster, Boston, Mass. Since December, 1910, he has been vice-president of the Inter-Ocean Steel Company at Chicago. He is forty-two years old. Mr. Coates is a member of the American Railway Engineering Association, an associate member of the American Electric Railway Association and American Society of Civil Engineers, and a member of the Western Society of Engineers, New York Railroad Club, and Alumni Association of Lehigh University. He was welcomed to Toledo by a number of prominent business men with a dinner at the Commerce Club on the evening of Dec. 11, 1911. Albion E. Lang, whom Mr. Coates succeeded as president, sketched the record of the growth of Toledo in the time that he has been a resident of that city.



F. R. Coates

Mr. Robert McIntyre has been appointed superintendent and master mechanic of the Eureka Traction Company, Eureka Springs, Ark. Mr. McIntyre succeeds Mr. Charles B. Gaw as master mechanic. The position of superintendent is a new one with the company.

Mr. Ernest H. Davis, who has been secretary and treasurer of the Jersey Shore Electric Street Railway, Jersey Shore, Pa., and the Vallamont Traction Company, Williamsport, Pa., has been elected president of the companies to succeed J. Henry Cochran, deceased.

Mr. Joseph W. Cochran, Jr., has been elected secretary and treasurer of the Jersey Shore Electric Street Railway, Jersey Shore, Pa., and the Vallamont Traction Company, Williamsport, Pa., to succeed Mr. Ernest H. Davis, who has been elected president of the companies.

Mr. Francis L. O'Bryan has been appointed electrical engineer of the Boston & Worcester Street Railway, South Framingham, Mass., to succeed Mr. M. V. Ayers, who resigned some time ago. Mr. O'Bryan was assistant to Mr. Ayers with the company for seven years. Prior to becoming connected with the Boston & Worcester Street Railway he served the Readsville Telephone Company, Readsville, N. C., which manufactures telephones and telephone switchboards. He was employed as electrician for three years with the Fries Manufacturing Company, Winston-Salem, N. C. Mr. O'Bryan was also employed at the Niagara Falls hydro-electric power station on construction and installation work for a period extending over more than two years.



F. L. O'Bryan

Mr. George W. Phelps, who has been vice-president of the Monterey & Del Monte Heights Railway, Seaside, Cal., has been elected president and general manager of the company. He succeeds Mr. H. R. O'Bryan as president of the company. The title of general manager is a new one with the company.

Mr. R. D. Wynn has resigned as general manager of the Waukegan, Rockford & Elgin Traction Company, Waukegan, Ill., but retains his office as vice-president and a director of the company. Mr. Wynn is general manager of construction of the South Bend & Logansport Traction Company, which is constructing a line between South Bend and Logansport, which are 70 miles apart.

Mr. Robert Ridgway has been appointed engineer of subway construction by the Public Service Commission of the First District of New York. Mr. Ridgway has been at work on the Catskill water system under the Board of Water Supply since 1905. For two years prior to that he served as an engineer under the old Rapid Transit Commission. He previously had charge of the work on the Jerome Park reservoir for the Aqueduct Commission of New York. Mr. Ridgway is president of the Municipal Engineers of the City of New York and is a member of the board of directors of the American Society of Civil Engineers.

Mr. Harrison R. Fehr, president and general manager of the Easton (Pa.) Transit Company, was elected president of the Pennsylvania Street Railway Association at the annual meeting of the association, which was held in Harrisburg on Dec. 8, 1911. Mr. Fehr was born near Nazareth, Pa., in 1863, and was educated at the Moravian parochial schools in that city. For three years he taught in the public schools in Pennsylvania. In the spring of 1883 Mr. Fehr accepted a position with the engineering corps of the Lehigh Valley Railroad and later became assistant engineer. In the fall of 1891 he was elected to the office of city engineer of Easton, Pa., and occupied this position for eight years. He next engaged in engineering construction work on electric railways and in general contracting. In May, 1904, he was appointed general manager of the Easton Transit Company, and the following year was elected president of the company in addition to general manager. Mr. Fehr is a member of the American Society of Civil Engineers.



H. R. Fehr

Mr. F. B. Hottell, who has been instructor of the school for motormen and conductors maintained by the Cincinnati (Ohio) Traction Company, has been appointed division superintendent of the company in charge of the Vine Street division to succeed Mr. Joseph Ostendorf, who has been appointed assistant general superintendent of the company.

Mr. Joseph Ostendorf has been appointed assistant general superintendent of the Cincinnati (Ohio) Traction Company to succeed J. P. Van Leuven, deceased. Mr. Ostendorf was formerly a division superintendent of the company in charge of the Vise Street division. He has been with the company twenty-eight years, serving twelve years as a conductor, twelve years as clerk and four years as division superintendent.

OBITUARY

Henry F. Lord, treasurer of the Lord & Burnham Company, Irvington-on-the-Hudson, N. Y., is dead.

Daniel C. Hemingray, secretary and treasurer of the Hemingray Glass Company, Covington, Ky., is dead.

F. E. Snow, who was president of the Union Street Railway, Saginaw, Mich., previous to its consolidation with the Inter-Urban Railway in 1899 as the Saginaw Valley Traction Company, is dead. Mr. Snow was born in Bangor, Maine, in 1847. During his early career he was connected with the Great Western, Wabash and Canada Southern railroads. He was also connected with the Hamtramck & Grosse Pointe Railway and the Highland Park Railway, Detroit, Mich., which were taken over in 1891 by the Detroit Citizens' Street Railway, of which the late Tom L. Johnson was president.

J. F. Shanley, of the J. F. Shanley Company, Newark, N. J., died at his home in Newark on Dec. 18, 1911. Mr. Shanley was born in Newark in June, 1855. He was educated at Fordham College, New York, and at Seton Hall College, South Orange, N. J. He entered the contracting firm of M. Shanley & Sons with his father and brother, the late B. M. Shanley, who at the time of his death in March, 1900, was president of the Consolidated Traction Company of New Jersey. Following the death of the elder Shanley, the firm was changed to B. M. & J. F. Shanley, with B. M. Shanley in charge of the finances and J. F. Shanley in charge of the engineering forces. J. F. Shanley became interested with his brother in the Consolidated Traction Company of New Jersey and the North Jersey Street Railway, but unlike his brother he did not serve actively as an officer of any of the companies. At the time of his death J. F. Shanley was a director of the Public Service Corporation of New Jersey and the Public Service Railway.

Hugh J. McGowan, president of the Indianapolis Traction & Terminal Company, Indianapolis, Ind., and president of the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., died at his home in that city on Dec. 19. For some time past Mr. McGowan had not been well and had not devoted himself actively to the affairs of the companies with which he was connected. During 1908 and 1909 he spent fourteen months in Europe. Mr. McGowan was fifty-one years old. He was born in Missouri and left the farm on which he was reared when he was eighteen years old to go to work in Kansas City. During his early career he was in turn a laborer, a stableman, a mule car driver, a coachman, a section hand, a furniture packer and a policeman, and until he was thirty years old he had never earned more than $100 a month. He began his street railway career when he left the employ of the Wabash Railroad to accept a position with the Corrigan Consolidated Street Railway, Kansas City, under Mr. Bernard Corrigan, who was later president of the Kansas City Railway & Light Company. Mr. McGowan subsequently studied at a business college in Kansas City, and when twenty-two years old he became a car accountant for the Missouri Pacific Railroad. He was next appointed to the Kansas City police force and soon afterward he became acting captain of police. He was nominated for marshal of the county by the Democratic party and held that office for two terms. When General Francis V. Greene, then head of the Barber Asphalt Paving Company, went to Kansas City from New York to find an agent to take control of the company's business in Kansas City Mr. McGowan's name was brought to his notice, and in 1890 Mr. McGowan was appointed to represent the Barber Asphalt Paving Company. In 1893 Mr. McGowan was appointed commissioner from Missouri to the World's Fair. Subsequently Mr. McGowan's territory with the Barber Asphalt Company was extended and he was made Western agent with headquarters in Chicago. Among the stockholders of the Barber Asphalt Company were members of the Elkins-Widener Syndicate, Philadelphia, and interests connected with the United Gas Improvement Company, Philadelphia. Mr. McGowan was placed by them in control of the Kansas City Gas Company, and in 1895 a consolidation was effected of the Kansas City Gas Company and the Missouri Gas Company. The same interests later placed the destinies of the Citizens' Street Railway, Indianapolis, in the hands of Mr. McGowan, and as a result of his work in Indianapolis he was made general manager of the entire street railway system there. Soon afterward he was elected president of the Kansas City-Missouri Gas Company. In 1900 he was elected director of the Telephone, Telegraph & Cable Company of America and at that time was the only Western director of the company. In February, 1901, he was elected president of the Cincinnati Traction Company and for several years was chairman of the executive committee of the company. Besides being president of the Indianapolis Traction & Terminal Company and the Terre Haute, Indianapolis & Eastern Traction Company, Mr. McGowan was, at the time of his death, vice-president of the Ft. Wayne & Northern Indiana Traction Company and president of the Indianapolis & Martinsville Rapid Transit Company.

Policy of Pennsylvania Railroad with Regard to News of Accidents

The Pennsylvania Railroad has sent to the newspapers in the territory it traverses a notice relative to its method of making public details of accidents. The first edition of this notice was sent to newspapers in May, 1909. The company says: "It is the policy of the Pennsylvania Railroad system to give to the public, through the newspapers, prompt and accurate information concerning any accidents which may occur on its lines." Continuing, the notice calls attention to the impracticability of miscellaneous employees giving out information. After stating that "whenever an accident happens a statement giving all essential facts will be made public by the company," the notice says:

"They [miscellaneous employees] have specific duties to perform in caring for the passengers and in reopening the line to traffic. As their duties are concerned only with certain features of the situation, they are not in a position to know the full facts. They are required, however, to report to their superior officers all the facts which may come under their immediate observation. All the information is then assembled and reported to the company immediately and by the company made public.

"The management of this company realizes that upon occasions of accident it is of the greatest importance that the number and names of any who may be injured should be made known immediately. This is all the more urgent as a means of relieving the anxiety of the families and friends of passengers who may be on the train. The railroad company is, of course, in the best position to obtain this information, and the newspapers may be assured that the company will make public such information as it can obtain, freely and fully."

As to giving the causes of accidents, the company says:

"It should be understood that there are many phases of accidents, especially regarding their causes, the facts of which cannot be ascertained even by the railroad until after considerable investigation and inquiry. The company will, however, give prompt publicity to all known facts."

The last paragraph of the notice follows:

"The support of the newspapers is necessary in order to secure accuracy in the published reports of accidents. The end to be achieved is so eminently desirable, from the points of view of the public, the press and the company, that it is believed that the papers may be relied upon to instruct their representatives to co-operate with the railroad in seeing to it that facts only are printed."

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Twin Falls, Artesian City & Oakley Interurban Railway, Twin Falls, Idaho.**—Incorporated in Idaho to build an interurban railway in Twin Falls and adjoining counties. Capital stock, $180,000. Henry T. West, Twin Falls, president.

***Grandview Railroad, St. Louis, Mo.**—Chartered in Missouri to build a 19-mile electric railway from the city limits of St. Louis to a cement mill in St. Louis County. Capital stock, $200,000. Frederick Herbert, St. Louis, is interested.

***Goldsboro, Seven Springs & Swansboro Railroad, Goldsboro, N. C.**—Incorporated in North Carolina to build a 70-mile interurban railway between Goldsboro and Swansboro. Incorporators, R. C. Griffin and William A. Robertson.

***Terminal Railway, Marshfield, Ore.**—Incorporated in Oregon to build an electric railway from Taylors and Siglin's Landing, via Marshfield, North Bend and Empire City, to Sunset Bay. Capital stock, $200,000. Officers: Arno Moreen, president; L. J. Simpson, vice-president; J. W. Bennett, treasurer; J. H. Flanagan, secretary; W. S. Chandler, general manager, and P. A. Sandberg, chief engineer.

***Skagit Valley Railroad, Olympic, Wash.**—Application for a charter has been made in Washington by this company to build a monorail railroad from La Conner to Sedro-Woolley, in Skagit County. Capital stock, $500,000. Incorporators: W. D. Cody, J. C. Foster and W. E. Borland.

Steer Creek Railroad, Wire Bridge, W. Va.—Incorporated in West Virginia to build an interurban railway from Wire Bridge in Braxton County to Grantsville, Calhoun County. Capital stock, $10,000. Incorporators: Cecil Gross, Elkins; G. W. Vanhorn, Wire Bridge; E. Bryan Templeman, Charles E. Peddicord and Osman E. Swartz, Clarksburg.

FRANCHISES

Edmonton, Alta.—The Edmonton Radial Railway will ask the City Council for franchises to build several extensions north of the river and two important extensions on the south side; also to connect Whyte Avenue with Jasper, via Fifth Street west and the high level bridge in Edmonton.

Phoenix, Ariz.—The Salt River Valley Electric Railway has received a franchise from the Common Council in Phoenix.

Los Angeles, Cal.—The Pacific Electric Railway, Los Angeles, has received the approval of the Board of Public Utilities to electrify the old Santa Monica steam road and it will ask the Council for a franchise.

Berwyn, Ill.—The County Traction Company, Chicago, has received a franchise from the City Council in Berwyn. The company has also obtained a similar franchise in Cicero.

Indianapolis, Ind.—The Indianapolis Traction & Terminal Company will ask the Board of Public Works for an extension of time of its franchise in which to complete the East Michigan Street line extension from Tacoma Avenue to Emerson Avenue in Indianapolis.

***Louisville, Ky.**—The General Council has been asked to grant a franchise to construct a cross-town line in Louisville, extending from the eastern to the western limits of the city.

Mandeville, La.—W. J. Tracy, Cleveland, Ohio, has received a franchise from the City Council in Mandeville. This is part of a plan to build an electric railway between Slidell, Houstonville, Mandeville and Baton Rouge. [E. R. J., Dec. 1, 11.]

Minneapolis, Minn.—The Twin City Rapid Transit Company will ask the Board of Aldermen for a franchise on Eleventh Street in Minneapolis.

Elizabeth, N. J.—The Public Service Railway, Newark, has received a franchise from the City Council to lay tracks to connect the South Broad Street line with the terminus of the Trenton short line in Elizabeth.

Cleveland, Ohio.—The North Randall Railway has asked permission of the Cuyahoga County Commissioners to build its line across Lee Road, Warrensville Center Road and Miles Avenue.

Corpus Christi, Tex.—The Corpus Christi Street & Interurban Railway has received a franchise to extend its lines in Corpus Christi.

***Corpus Christi, Tex.**—W. E. Pope will ask the City Council for a franchise in Corpus Christi on behalf of a syndicate formed in Minneapolis. About 14 miles of track will be built.

Richmond, Va.—The Virginia Railway & Power Company has received a franchise from the City Council to extend its lines on Halifax Street and on South Sycamore Street in Richmond.

Weston, W. Va.—The Clarksburg & Weston Electric Railway, Clarksburg, has received a franchise from the City Council in Weston.

Milwaukee, Wis.—The Milwaukee Light, Heat & Traction Company has asked the City Council for a thirty-year franchise to build four extensions in Milwaukee.

TRACK AND ROADWAY

Birmingham & Edgewood Electric Railway, Birmingham, Ala.—This company will soon build 2 miles of new track for which it will need 80-lb. rails.

Argenta (Ark.) Railway.—Plans are being made by this company to construct an extension of the Main Street line in Argenta north from its present terminus to Twenty-second Street and thence west to the Ft. Smith branch of the Iron Mountain Railroad.

San Joaquin Light & Power Company, Fresno, Cal.—The Stone & Webster Engineering Corporation, Boston, Mass., is constructing for this company a railroad from Friant to the site of the company's proposed power development at Big Creek. The cost of construction is estimated at $1,000,000. J. M. Thebo is in charge for Stone & Webster as chief engineer.

Pacific Electric Railway, Los Angeles, Cal.—This company placed in operation on Dec. 16 its 10.9-mile railway between Hollywood and Van Nuys. The company has begun the construction of a 50-mile line from the terminal of the Southern Pacific Company at Pollaskyk, 12 miles from Fresno, to within a short distance of the summit of the Sierra Nevada Mountains. This line is to extend to the Big Creek site of the San Joaquin Light & Power Company, where large hydroelectric construction is being carried on.

Marysville-Colusa Railway, San Francisco, Cal.—This company has filed a deed of trust to the Mercantile Trust Company, San Francisco, to secure a bonded indebtedness of $1,000,000. It is reported that the contract for grading will be awarded soon. The proposed line will connect Marysville, Meridan, Sutter City and Colusa. Samuel Lilienthal, San Francisco, is interested. [E. R. J., Dec. 1, '11.]

Stockton Terminal & Eastern Railroad, Stockton, Cal.—Work has been begun by this company on the Miner Avenue extension of its line in Stockton.

***Sunnyvale, Cal.**—Plans are being considered by the Chamber of Commerce of Sunnyvale to construct an electric railway from Sunnyvale to San Francisco. The plan also includes a steamship and ferry line between Port Sunnyvale and San Francisco.

Vallejo & Northern Railway, Vallejo, Cal.—This company has awarded a contract to Guy McMurty, Yuba City, for the construction of 3 miles of the roadbed of the Woodland-Sacramento branch just outside of Sacramento on the Yolo side of the Sacramento River.

Jacksonville (Fla.) Electric Company.—This company will double track its Riverside line on St. Johns Avenue in Jacksonville. The extension of the Hogan Street line to Enterprise Street is contemplated.

Springfield & Northwestern Railway, Springfield, Ill.—The directors at a recent meeting of the Springfield Commercial Association indorsed the construction of an electric railway to connect Mason City, Petersburg, Athens and Greenview. Ralph N. Baker, Springfield, president. [E. R. J., Oct. 7, '11.]

Evansville & Southern Indiana Traction Company, Evansville, Ind.—Plans are being made by this company to construct a line on Bell Street from Eighth Street to Kentucky Avenue in Evansville.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind.—It is reported that this company plans to build an extension between Milton and Connersville.

Vincennes, Washington & Eastern Traction Company, Vincennes, Ind.—It is reported that this company has secured the necessary capital and that construction will soon be begun on its projected 33-mile electric railway between Vincennes, Washington and Loogootee. [E. R. J., Oct. 21, '11.]

Iowa City, Ottumwa & Southwestern Electric Railway, Iowa City, Ia.—It is reported that this company has secured the necessary capital to begin the construction in the spring on its 70-mile railway to connect Iowa City, Ottumwa, Sharon Center and Keota. Frank Tanner, Iowa City, general manager. [E. R. J., Jan. 14, '11.]

Keokuk (Ia.) Electric Company.—The Keokuk Electric Company, the incorporation of which was noted in the Electric Railway Journal of Dec. 16, 1911, was organized by Stone & Webster, Boston, Mass., and has taken over all the local utilities at Keokuk, including the Keokuk Gas & Electric Company, the Keokuk Electric Railway & Power Company and the Keokuk & Western Illinois Electric Company.

Southwestern Traction & Power Company, New Orleans, La.—This company has awarded the contract to build its line from Berwick via Jeanerette and New Iberia to Lafayette, a distance of about 60 miles, to the Chapman Construction Company.

Aroostook Valley Railroad, Presque Isle, Me.—This company has placed in operation its 11¾-mile extension to New Sweden.

Springfield (Mass.) Street Railway.—This company has completed its extension from the Ludlow bridge into Ludlow.

***Manistee, Mich.**—Plans are being made to organize a company to build an electric railway from Muskegon to Manistee via Fremont, Hesperion and Ludington. Herman O'Connor, Holton, is chairman of the organizing committee.

Missoula (Mont.) Street Railway.—Surveys are being made by this company for a line from Missoula to Polson and from Kalispell to Polson across the Flathead Indian Reservation.

Yonkers (N. Y.) Railroad.—This company plans to double track its Mount Vernon line. It has recently extended its Nepperhan Avenue line north from Lake Avenue to Nepera Park and plans an amusement resort in Nepera Park or along McLean Avenue, east of Jerome Avenue.

Goldsboro (N. C.) Traction Company.—This company has filed a mortgage with the Mercantile Trust & Deposit Company, Baltimore, Md., to secure the issue of $100,000 of the company's first mortgage bonds for improvements and extensions. The company expects to extend its railway to Seven Springs provided the people along the line will furnish right-of-way.

***Lorain, Ohio.**—The Boards of Commerce of Lorain, Amherst and Oberlin are considering plans to build an electric railway to connect Lorain, Amherst and Oberlin.

***Youngstown, Ohio.**—John Ruhlman, Youngstown, and associates plan to build an electric railway from Conneaut to Youngstown. It is expected to begin work in the spring.

Oklahoma & Northwestern Railway, Oklahoma City, Okla.—This company has completed the final survey for its 74-mile electric railway from Woodward to Watonga. E. A. Wagener, Oklahoma City, president. [E. R. J., Oct. 7, '11.]

Berlin & Waterloo Street Railway, Berlin, Ont.—During the next eight weeks this company will award contracts to build ½ mile of new track and two switches in Berlin.

Lehigh Valley Transit Company, Allentown, Pa.—This company has placed in operation its new cut-off through Perkasie to Sellersville.

Bloomsburg, Millville & Northern Railway, Bloomsburg, Pa.—During the next few weeks this company will place contracts to build several bridges, lay 9 miles of track and equip its line ready for operation.

Irwin-Herminie Traction Company, Herminie, Pa.—Plans are being made by this company to build an extension in Irwin.

***Hagerstown, State Line, Greencastle & Mercersburg Railway, Middlesburg, Pa.**—This company has been formed to build an electric railway to connect Hagerstown, Mercersburg, Middleburg and Greencastle. Surveys have been begun, right-of-way is being secured and considerable work has been begun on the line from Hagerstown in the direction of Maugansville.

***Beaver, Koppel & New Castle Railway, New Castle, Pa.**—The Beaver & New Castle Street Railway, with a capital of $54,000; the Beaver, Koppel & New Castle Railway, with a capital of $2,400, and the New Castle Connecting Railway, capital $3,000, have consolidated under the name of the Beaver, Koppel & New Castle Railway, with a capital of $59,400. The officers are: C. E. Glenn, president, Evans City; W. A. Ghoering, vice-president, Zelienople, and H. S. Glenn, secretary and treasurer, Oakmont.

Phoenixville, Valley Forge & Strafford Street Railway, Phoenixville, Pa.—This company will build to Gay Street and Strafford Street in Phoenixville next spring.

West Penn Railways, Pittsburgh, Pa.—This company plans to build extensions in Washington County and a line in Greene County, from Waynesburg to Masontown in Fayette County.

York (Pa.) Railways.—Plans are being made by this company to eliminate the grade crossings on the York and Hanover line at Graybill station, where an overhead bridge will be erected.

Spartanburg Railway, Gas & Electric Company, Spartanburg, S. C.—Surveys are being made by this company for an extension in Spartanburg.

Chattanooga, Rome & Atlanta Railway, Chattanooga, Tenn.—As soon as this company secures the necessary franchises it will secure right-of-way and begin construction of its 135-mile electric railway to connect Chattanooga, Tenn., and Atlanta, Ga., and other towns in Georgia. The company has recently organized and elected the following officers: Charles Reif, president; M. O'Grady, first vice-president; John H. Hill, second vice-president; W. Divine, secretary; S. A. Hunt, treasurer; John H. Hill, general manager. [E. R. J., Dec. 16, '11.]

Texas Traction Company, Dallas, Tex.—This company will build an extension over Gray's Hill in Sherman.

Oregon & Southern Railway, Seattle, Wash.—This company has secured franchises and right-of-way and made surveys for its 155-mile electric railway to connect Sama Valley, Gold Ray, Rock Point, Ruch, Talent, Medford, Jacksonville, Grant's Pass, Port Orchard, Wash., and Ashland, Ore. It is planned to issue bonds in a sum not exceeding $10,000,000 for the construction and equipment of the railway. J. Arnold Doyle, Medford, president. [E. R. J., Nov. 18, '11.]

Seattle (Wash.) Electric Company.—Plans are being considered by this company to double track its Alki Point line in Seattle.

***Bluefield, W. Va.**—B. M. Cohen and associates plan to build an electric railway between Bluefield and Princeton. It is said that financial backing has been secured.

Parkersburg & Ohio Valley Electric Railway, Parkersburg, W. Va.—It is reported that this company will build an extension to North Parkersburg in the near future if a free right-of-way is furnished by the citizens.

Pan Handle Traction Company, Wheeling, W. Va.—This company has placed in operation its double-track line between Glennova and Gilchrist Park. It is the intention of this company to continue the double tracking of this line to Wheeling.

SHOPS AND BUILDINGS

Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind.—Preliminary plans are in progress by this company for the construction of a new terminal station on

Main, Pearl and Ewing Streets in Ft. Wayne. The structure will be two stories high and of brick construction.

Tri-City Railway, Davenport, Ia.—Plans are being considered by this company to construct a new carhouse on Fifth Avenue, Rock Island, in the spring. The structure will be of steel and reinforced-concrete construction. The first floor will be used for the storage of cars and as the repair shop of the company. The second floor will be used as a storage room.

Louisville (Ky.) Railway.—This company will soon build a new carhouse in Louisville. The structure will be one-story and will cost about $5,400.

Maysville (Ky.) Street Railway.—This company has nearly completed its new carhouse and yards in Maysville.

United Traction Company, Albany, N. Y.—This company will build stations at the intersection of certain streets in Albany.

Syracuse, Lake Shore & Northern Railroad, Syracuse, N. Y.—Plans are being made by this company to build a new carhouse in Oswego about 100 ft. north of the substation at Ellen Street. The structure will be about 150 ft x 150 ft., and of concrete construction.

Muskogee (Okla.) Electric Traction Company.—Work will be begun at once by this company on a new carhouse in Muskogee. The structure will be of steel construction and will have eight tracks. The cost will be about $45,000.

Berlin & Waterloo Street Railway, Berlin, Ont.—During the next two months this company will award contracts to build a new addition to its carhouse in Berlin. The structure will be 40 ft. x 80 ft.

Altoona & Logan Valley Electric Railway, Altoona, Pa.—Extensive improvements are being planned by this company at its plant at Fifth Avenue and Thirty-second Street in Altoona. They will include the construction of a large addition to the carhouse, paint shop, machine shop and the installation of new machinery for repair work. The addition will be 260 ft. x 70 ft. and of brick construction. It will have a capacity for 40 cars. The paint shop will be one-story, 150 ft. x 70 ft., and of brick construction.

Conestoga Traction Company, Lancaster, Pa.—It is reported that this company has bought the building in Centre Square, Lancaster, formerly used by this company for its ticket office and waiting room.

Phoenixville, Valley Forge & Stratford Street Railway, Phoenixville, Pa.—This company will build a new carhouse, repair shop and siding at Williams' Corner in West Chester.

Yazoo & Mississippi Valley Railroad, Memphis, Tenn.—It is reported that this company will double the capacity of its freight depot in Baton Rouge.

Puget Sound Electric Railway, Tacoma, Wash.—This company has completed its new depot in Puyallup. The structure is triangular in shape, the dimensions being 85 ft. x 70 ft. x 50 ft. [E. R. J., Oct. 28, '11.]

POWER HOUSES AND SUBSTATIONS

Ft. Wayne & Springfield Railway Company, Decatur, Ind.—This company is preparing plans and specifications for the construction of a new power house in Decatur.

St. Joseph Valley Traction Company, Elkhart, Ind.—It is reported that this company will soon build three dams in the St. Joseph River with the object of substituting electricity for gasoline motor cars.

Calais (Me.) Street Railway.—This company has bought the water-power site formerly occupied by the lumber mill of James Murchie's Sons & Company.

Tri-State Railway & Electric Company, East Liverpool, Ohio.—This company will make arrangements for extensive improvements to the main power plant and substations along the line. The capacity of its plants will be doubled at East Liverpool and Steubenville.

Southeastern Ohio Railway, Light & Power Company, Zanesville, Ohio.—Plans are being made by this company for the installation of a new turbine at its power plant in Zanesville.

Central Pennsylvania Traction Company, Harrisburg, Pa.—This company has installed a 1600-kw direct-connected engine and generator at its power plant in Harrisburg.

Manufactures & Supplies

ROLLING STOCK

Georgia Railway & Electric Company, Atlanta, Ga., has ordered fifty-four Brill 39-E trucks from The J. G. Brill Company.

Wheeling (W. Va.) Traction Company expects to be in the market next month for nineteen double-truck cars for 1912 delivery.

Wellsburg, Bethany & Washington Railroad, Wellsburg, W. Va., expects to purchase a passenger car, probably of the combination type.

San Diego (Cal.) Electric Railway has ordered twenty-four 43-ft. center-entrance pay-as-you-enter cars from the St. Louis Car Company.

Nashville Railway & Light Company, Nashville, Tenn., has ordered thirty-two Brill 21-E trucks and two Brill 27-GE-1 trucks from The J. G. Brill Company.

Beaumont (Tex.) Traction Company has ordered three 23-ft. 1-in. semi-convertible prepayment car bodies mounted on Brill 39-E trucks from the American Car Company.

Wilmington & Philadelphia Traction Company, Wilmington, Del., has ordered one 26-ft. semi-convertible motor car body mounted on Brill 39-E trucks without wheels and axles from The J. G. Brill Company.

Phoenixville, Valley Forge & Strafford Street Railway, Phoenixville, Pa., has ordered two fifteen-bench center-aisle open motor car bodies mounted on Brill 39-E trucks from The J. G. Brill Company.

Nashville-Gallatin Interurban Railway, Nashville, Tenn., is in the market for a second-hand steam hoist of about 3 tons capacity mounted on trucks for use in track laying. The boom is to be of sufficient length to handle rails. The company will also purchase a small grab bucket to be used for unloading gravel.

TRADE NOTES

Baldwin Locomotive Works, Philadelphia, Pa., will build a branch plant in Chicago as soon as plans can be prepared and a site for the plant secured.

General Electric Company, Schenectady, N. Y., has ordered seven 70-ft. gas-electric motor car bodies from the Wason Manufacturing Company for the St. Louis & San Francisco Railroad.

S. K. F. Ball Bearing Company, New York, N. Y., has opened an office at 1505 Heisen Building, Chicago, Ill., to facilitate the handling of Western business. The office will be in charge of C. A. Winn.

P. H. Ridgeway, Seattle, Wash., who was formerly associated with the Electrical Engineering Company, of Seattle, has opened offices as consulting and constructing engineer in the Central Building, Seattle.

Pyrene Fire Extinguisher Company, New York, N. Y., announces that Harry W. Frister, who was formerly associated with Rogers, Brown & Company, New York, has become connected with the firm.

Carborundum Company, Niagara Falls, N. Y., has been awarded the grand prize for the exhibit of abrasive materials at the Turin Exposition, Turin, Italy, which was held from April 15 to Oct. 31 of this year.

Kerr Turbine Company, Wellsville, N. Y., has appointed the following new agents: Walter L. Flower, 312 South Eighth Street, St. Louis, Mo., and C. E. Grevemberg, 1023 Maison Blanche Building, New Orleans, La.

Manning, Maxwell & Moore, New York, N. Y., have appointed William H. McIntyre first vice-president and general manager, a newly created position. Mr. McIntyre retains his position as president of the San Antonio & Aransas Pass Railroad.

C. W. Rhoades has resigned as special sales agent for the St. Louis Surfacer & Paint Company, St. Louis, Mo., and has taken an executive position with the Polar Bearing Company, which has just been organized in St. Louis for the manufacture of railway car bearings.

Johnson Fare Box Company, New York, N. Y., has received orders from the United Railroads, San Francisco,

Cal., for fifteen additional Johnson registering fare boxes and from the Omaha & Council Bluffs Street Railway, Omaha, Neb., for 170 additional equipments.

J. C. Ward, resident director and general manager of the Edgar-Allen American Manganese Steel Company, Ltd., Chicago, Ill., has just returned from a trip around the world taking about nine months, in the course of which he visited all of the agencies of the company.

The J. G. Brill Company, Philadelphia, Pa., has received export orders from M. E. Curwen, London, England, for one 21-ft. 4-in. semi-convertible steel underframe car body mounted on a Brill 21-E truck, and from Dick, Kerr & Company, London, for ten Brill 27-GE-2 trucks without wheels and axles. The J. G. Brill Company has also received an order from F. E. Huntress, New York, N. Y., for thirty-five Brill 21-E trucks, including axles but without wheels.

Henry Vogt Machine Company, Louisville, Ky., has erected a 300-hp water-tube boiler for the Delta Electric Light, Power & Manufacturing Company, Greenville, Miss., this boiler being the fourth ordered by this company. Other recent installations made by the Henry Vogt Machine Company include two 250-hp water-tube boilers for the Fayetteville Electric Light & Power Company, Fayetteville, Ark.; one 200-hp water-tube boiler for the Rome Railway & Light Company, Rome, Ga.; one 200-hp boiler for the Stanford Water & Light Company, Stanford, Ky., and a 260-hp unit for the Capital Gas & Electric Company, Frankfort, Ky.

Platt Iron Works Company, Dayton, Ohio, denies positively that there is any intention of shutting down that plant. On Aug. 5 receivers were appointed and on Nov. 20 trustees were elected at a meeting of a majority of the creditors. These trustees are now in charge of the property, with full authority to conduct and carry on the business, which has been in existence for a period of over thirty years. At the present time the quantity of work on hand requires upward of 750 employees. The organization, including the engineering, sales and mechanical departments, remains intact, and the trustees state that the property is and has been operated on a profitable basis.

Allis-Chalmers Company, Milwaukee, Wis., is proceeding with its reorganization. A committee has been formed for the protection of the interests of the common stockholders consisting of Alexander J. Hemphill, chairman, Frederick Strauss, J. Horace Harding and Albert H. Wiggin. Stockholders will be requested to deposit their stock with the Guaranty Trust Company of New York as depositary. At the request of holders of a large amount of the preferred stock a committee to look after the interests of the preferred shareholders also has been formed, consisting of Charles Allis, chairman, Gates W. McGarrah, W. Emlen Roosevelt, M. N. Buckner and Herman W. Falk. The New York Trust Company, New York, N. Y., has been named as depositary.

H. W. Johns-Manville Company, New York, N. Y., plans to move from its present plant at the foot of Thirty-ninth Street, Brooklyn, N. Y., and establish a general Eastern factory to meet all the requirements for its products in this part of the country with room for expansion, the present site having been condemned by the city authorities for sites for municipal ferries. The company is considering a tract of 290 acres at Finderne, N. J., which is about half way between Bound Brook and Somerville, N. J., on the Central Railroad of New Jersey. The number of buildings has not yet been decided upon, but each will be 150 ft. wide and 1000 ft. in length and they will be 150 ft. apart. They will be one-story, of saw-tooth construction, and either of tile and asbestos stucco or brick, with steel framing throughout. A 10,000-kw power plant will be installed by the company in the new factory. The number of employees of the new plant will be between 2500 and 3500. It will take about two years to construct the new plant. Work is progressing rapidly on the new office building for the H. W. Johns-Manville Company at the southwest corner of Madison Avenue and Forty-first Street, New York, which is to be used as an executive office by the company, and the company hopes to occupy the building shortly after the beginning of the new year.

ADVERTISING LITERATURE

Electric Service Supplies Company, Philadelphia, Pa., is mailing a circular which calls attention to the company's snow-fighting material, consisting of snow-sweeper rattan and track brooms.

W. N. Matthews & Brother, St. Louis, Mo., have issued a circular which is descriptive of their guy anchors. Two other circulars issued by the company describe their OK sleet cutter and the new No. 567 wrench.

Joseph T. Ryerson & Son, Chicago, Ill., have issued a 16-page catalog which describes and illustrates the various sizes of Rockford heavy-duty, variable-speed and motor-drive planers manufactured by the company.

Railway Supply & Curtain Company, Chicago, Ill., has issued a 66-page catalog which describes and illustrates the various types and styles of railway coach specialties and curtains which the company manufactures.

H. W. Johns-Manville Company, New York, N. Y., is mailing a folder in which J-M corrugated asbestos roofing is described and illustrated. Another folder issued by the company is descriptive of Keystone hair insulation.

Hess-Bright Manufacturing Company, Philadelphia, Pa., has published a folder prepared by Herbert L. Towle, entitled "The Requirements of a Ball-Bearing Grease." Attention is called at the end of the folder to the company's ball-bearing grease.

William S. Turner, Portland, Ore., consulting engineer, has printed a booklet which shows a list of engineering work carried out under his supervision as engineer for various electric railways, light and power companies and industrial plants in all parts of the country.

Boonton Rubber Company, Boonton, N. J., has issued a booklet which illustrates and describes a Bakelite insulator with an iron pin molded in. This insulator was photographed after four years' service on an 11,000-volt transmission line in Pennsylvania and the surface of the material is said to be as good as the day it was installed.

S. K. F. Ball Bearing Company, New York, N. Y., has issued a bulletin entitled "S K F Radial Bearings," which explains the construction peculiarities, particularly the provision for self-alignment, of S K F radial bearings, and gives dimensions, speeds and capacities of the principal types and sizes.

Trolley Supply Company, Canton, Ohio, has issued a 48-page catalog which describes and illustrates the company's products. Among these are the Knutson trolley retrievers Nos. 2 and 5, Ideal trolley catcher, Peerless roller-bearing trolley base, Star trolley base, Peerless check valve, Peerless Junior headlight and the semaphore incandescent headlight.

H. B. Camp Company, New York, N. Y., has issued a 42-page catalog entitled "Conduits" which contains complete data relative to underground construction and its cost. An account of vitrified salt-glazed conduit and a set of specifications for users of conduits are presented. The publication also contains numerous illustrations showing installations of the company's product in various parts of the country.

Locomotive Equipment Company, Detroit, Mich., has published catalog No. J-1, in which it describes the Newcomb journal box, which it manufactures. This box is designed to fit M. C. B. standard pedestals and arch bars and to use the standard bearings and wedge, also the same packing and oil, but differs from the journal boxes now in general use in the cover, dust guard and manner of controlling the lateral motion or slide of the car on its bearings. The front end of the box is made round and the cover screws in. The dust guard is designed to be changed or the center renewed without removing the truck from under the car or without using a jack. In addition to a description of the journal box, the publication contains a record of performances of the device covering 57,681 miles on the Spokane, Portland & Seattle Railway and a record of performances on engine No. 1844 of the Chicago, Burlington & Quincy Railroad. An interesting feature of the catalog to the electric railways is the sectional view of the Newcomb journal box No. 3 for the Aurora, Elgin & Chicago third-rail line.

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVIII NEW YORK, SATURDAY, DECEMBER 30, 1911 No. 27

PUBLISHED WEEKLY BY

McGraw Publishing Company

JAMES H. McGRAW, President; C. E. WHITTLESEY, Sec'y and Treas.

239 WEST THIRTY-NINTH STREET, NEW YORK

TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

CHICAGO OFFICE.....1570 Old Colony Building
CLEVELAND OFFICE.....1021 Schofield Building
PHILADELPHIA OFFICE.....Real Estate Trust Building
EUROPEAN OFFICE....Hastings House, Norfolk St., Strand, London, Eng.

TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

NOTICE TO ADVERTISERS.

Changes of advertising copy should reach this office ten days in advance of date of issue. New advertisements will be accepted up to Wednesday, 9 a. m., of the week of issue.

Copyright, 1911, by McGRAW PUBLISHING COMPANY.
Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL *8000 copies are printed.*

The Association of American Advertisers has examined and certified to the circulation of this publication. The figures of circulation contained in the Association's report only are guaranteed.

ASSOCIATION OF AMERICAN ADVERTISERS.
No. A—82. *Whitehall Bldg., N. Y. City.*

NEW YORK, SATURDAY, DECEMBER 30, 1911.

CONTENTS

The Volume Index..... 1303
Competition in a Chicago District..... 1303
Average Gains in Gross Earnings..... 1304
Alternating Current in Boston..... 1304
Collapse of Highway Bridge at Burlington, N. J..... 1305
Joliet Extension of the Chicago, Ottawa & Peoria Railway..... 1306
Strike at Texarkana..... 1312
Power Generation and Distribution System of the Boston Elevated Railway..... 1313
Detroit Franchise Situation..... 1319
Agents' List of Points Reached by Electric Package Agency..... 1320
Committees of the Accountants' Association..... 1320
Comparative Earnings of Properties..... 1320
Fare Collection and Registration in Providence, R. I..... 1321
Electric Railway Signaling Committee of Railway Signal Association 1321
Car Proposed by Brooklyn Rapd Transit System for Subway Service. 1322
Mid-Year Banquet on Jan. 26..... 1322
Coasting Clock Savings on the Third Avenue Railroad..... 1322
News of Electric Railways..... 1323
Financial and Corporate..... 1326
Traffic and Transportation..... 1328
Personal Mention..... 1330
Construction News..... 1331
Manufactures and Supplies..... 1334

The Volume Index

This issue completes Volume XXXVIII of the ELECTRIC RAILWAY JOURNAL, and, in accordance with our usual custom, we are binding with this issue the index for the volume. A great deal of time and expense is devoted to the compilation of this index, but we shall feel repaid if our readers make extended use of it. Those who have not in the past kept their copies of the paper, either in bound volumes or in some filing system, can hardly realize the value which will accrue through a system by which articles published on stated subjects may readily be found in previous volumes. In our trips through the field we have found that a number of companies have elaborate and very useful systems of indexing and cross-indexing the JOURNAL and of filing its pages, so that any official connected with the company can readily assemble all the data upon any subject which have been published during the previous five or ten years. While these systems are very useful to a company or individual who has much research work to do, the ordinary reader must necessarily depend for his references upon the semi-annual index, and this, we believe, will be all that is necessary for 99 per cent of our readers.

Competition in a Chicago District

A rather unusual condition of competition has developed in a residential district in Chicago which is served amply by a spur of the South Side Elevated Railroad, surface lines operated by the Chicago City Railway and the suburban service of the Illinois Central Railroad. In this district, located about 6 miles from the center of Chicago, only the two latter methods of transportation stated were available until 1907. The Chicago City Railway Company formerly operated crosstown lines from the Forty-third Street and Forty-seventh Street stations of the Illinois Central and gave transfers to through lines, so that the trip to the business center was made for 5 cents. This was less than either the commutation rate charged by the steam railroad or the single fare, which was 10 cents. For the higher steam railroad rates the trip was made in much less time than on the street railway lines by the use of transfers. The expansion of the South Side Elevated Railroad system included the construction of a spur from its main north and south line to a point on Forty-second Street, near the Illinois Central Railroad and operation, beginning in 1907, between there and the central business district for a rate of 5 cents. The condition of competition thus brought about was intensified by the introduction of through line service on the Chicago City Railway from the terminals at the Forty-third Street and Forty-seventh Street stations of the Illinois Central road to the downtown

district for a fare of 5 cents. It appears that the new service of the elevated and surface electric roads cut very materially into the traffic of the steam road from these points. That company has therefore announced recently lower commutation rates. Its fare for unlimited twenty-five-ride tickets now between the downtown district and Forty-third Street, where competition is met from both elevated and surface lines, is $1.25, or at the rate of 5 cents per ride. The single fare is not changed. The commutation rate from the Forty-seventh Street station, where there is competition only with the surface electric line, was also reduced, but not to the same extent as from Forty-third Street. Where the steam line was formerly contented to take part of the traffic at the higher rate of fare warranted as compensation for the saving of time made by passengers, it has now set out to meet the fare conditions of the competing lines. The advantage still remaining to the electrically operated roads is that they have downtown terminal facilities nearer the center of activity than their steam competitor.

Average Gains in Gross Earnings

A compilation of earnings of six properties under the management of Stone & Webster, published originally in the *Public Service Journal,* has been reprinted in circular form. It is intended to show the great increase in gross earnings, dividends paid, etc., during the period between the calendar years 1906 and 1910. The properties are fairly well scattered as to territorial location, except that three are situated in Texas. Half of the companies do a combined electric railway and lighting business, and the others are electric railways. All show a large percentage of increase in gross earnings during the period for which the figures are given. The total gross earnings of the six companies in the calendar year 1906 were $5,809,376, and in the year 1910 the aggregate was $9,872,195. This is a gain of 69.9 per cent. In order to show a little more in detail what the increase in gross earnings of the six properties selected was from year to year, we have compiled the totals from the *McGraw Electric Railway Manual.* The properties showed a gain in 1907 as compared with 1906 of 24.1 per cent; in 1908 over 1907 of 9.8 per cent; in 1909 over 1908 of 22.8 per cent, and in 1910 over 1909 of 1.5 per cent. These fluctuations are, we believe, more extreme than the average experience of all properties, but the chief point of importance which is emphasized is that taking the period as a whole the gross earning power is well sustained notwithstanding the industrial conditions which have existed. The percentage of dividends paid is increased very largely because of the fact that all but one company have begun payment of common stock dividends since the panic of 1907. No data are given regarding the trackage operated during the period, but some large capital expenditures were made which increased the capacity of the properties to produce revenue. The outstanding capitalization, stock and bonds combined, was $36,866,000 in 1906 and $53,002,400 in 1910, and most of the increase was in bonds, the outstanding amount of which was nearly doubled. Well-maintained gross earning capacity is a striking characteristic of street railway properties through a period of years.

ALTERNATING CURRENT IN BOSTON

Ever since the opening of the first electric street railway line in Boston the management of the Boston Elevated Railway and of its predecessor company has retained the practice of direct-current generation of electricity and its distribution from stations of relatively small size. The development of alternating-current generators of large capacity and high efficiency and the improvement in steam turbines, resulting in the almost universal adoption of alternating-current apparatus in all large central stations, had not changed the attitude of the company in any way up to two years ago. Seven direct-current power stations, none of them exceeding 14,000 kw in capacity, were being operated regularly, and one small steam station and two gas-engine stations were being operated intermittently to relieve the peaks. These stations, through skilful management, were producing electrical energy at a cost equal to if not lower than most of the large central stations in other cities. The average cost of power at the station switchboards for the entire system averaged less than 0.75 cent per kw-hour throughout the year and in some months was less than 0.70 cent. This cost included coal, labor repairs, supplies and superintendence, but no overhead charges on the plant investment.

With such a low producing cost there would probably have been no saving from alternating-current generation, transmission and conversion, so long as the load centers were not too far removed from the existing stations and the feeder losses were not too great. But the need of more power station capacity was imperative at the end of 1909, and a decision had to be made as to the type and location of additional generating equipment to be installed. The choice lay between the erection of several new direct-current stations in the outlying residential districts, where the load was increasing most rapidly, or of one central station on tidewater and to generate and transmit alternating current from this station to a number of converter substations. Under these conditions, which had not applied heretofore, the advantages of the alternating-current system were paramount, and plans accordingly were made for a single new station of the most modern type to have an ultimate capacity of 125,000 kw, or more than twice the present maximum load on the system.

The extensive transmission system, the new substations and the changes which will be made in the operation of the existing direct-current generating plants are described at length elsewhere in this issue. The cost of the alternating-current system which has been installed was remarkably low for the high-class construction employed throughout. The generating station, underground transmission line and substations complete cost about $112 per kilowatt capacity of the initial equipment. This is little if any more than the probable unit cost of four or five isolated direct-current stations of from 5000 kw to 10,000 kw capacity each, which would have been necessary in the near future to handle the increasing load on the system. Additional alternating-current apparatus can be installed in the future as required at a much lower unit cost.

It would have been difficult to look forward far in the future and forecast the probable load centers in the out-

lying districts with a view to locating the stations exactly where they would be needed. This was one important reason for installing comparatively inexpensive substations, which could be enlarged if necessary or others could be built as required in new locations. Another reason was the desire to limit the output, and hence the return current, of each center of distribution.

For the present, at least, the five largest and most modern direct-current generating stations, with a total capacity of 41,700 kw, will be continued in operation. Probably it is only a question of time, however, when they will be superseded by additional substations supplied from the new alternating-current generating substation in South Boston. To operate the new power station at its maximum efficiency it will have to carry a large average load during all of the twenty-four hours of each day, and under the existing load conditions this cannot be done unless most of the direct-current plants are shut down during the off-peak hours. But until the load increases by a considerable amount during the middle of the day and late at night the most efficient method of operation for the system as a whole will be to operate one of the 15,000-kw units at South Boston on a moderate load for twelve or sixteen hours a day and to run the second unit, if necessary, during the morning and evening peaks while the five direct-current stations are being operated with good average load factors for from twenty to twenty-four hours a day. The load factors of the direct-current stations are relatively more important than in the case of the South Boston power station and converter substations, and as long as they can be kept high without incurring excessive distribution losses in long-distance transmission of direct current, it will be economical to operate the old stations. As these stations become more and more obsolete or conditions affecting their economical production of energy change, they can be abandoned without seriously affecting the remainder of the company's generating and distributing system.

COLLAPSE OF HIGHWAY BRIDGE AT BURLINGTON, N. J.

The accounts thus far received of the collapse of the highway bridge at Burlington, N. J., and the causes leading thereto, are meager and contradictory, but the important and principal fact standing out above all others is that the bridge fell down. That the ten passengers aboard the electric car which had entered upon the bridge when it fell were not seriously injured is indeed fortunate, and if this bridge were in a class by itself its collapse would call for little or no comment. But there are hundreds of highway bridges carrying electric cars which, although not of the same style as this structure, must be placed in the same class so far as ownership, supervision and maintenance are concerned. It is unnecessary to discuss here the details of construction of the Burlington bridge, even though such a discussion would prove interesting to many engineers. Electrolysis from stray current, diminution of sizes of truss and floor members due to thirty years' rusting, weakness due to increased weight of rolling stock—these are interesting points which should be settled by a careful examination.

This much is known, however: That the bridge was built in 1881 for ordinary highway traffic, that about the year 1900 it was strengthened by the addition of new stringers to support the street railway track which was laid at that time, that the bridge is owned and was supposed to have been maintained by the county, and that the railway company was presumed to be paying one-half the cost of maintenance. It is reported on good authority that one engineer who was asked in 1900 to suggest a plan for strengthening the floor system advised against the use of the structure as a railway bridge, and that the case was then referred to another engineer. If this be true it is important as showing that even eleven years ago the advisability of running electric cars over the structure was very questionable. It is also reported that the ironwork was painted only a few weeks ago, and that at the time of the collapse some webs of I-beam roadway stringers were found to have holes in them caused by long-continued rusting. Are these webs any indication of the physical condition of the rest of the ironwork?

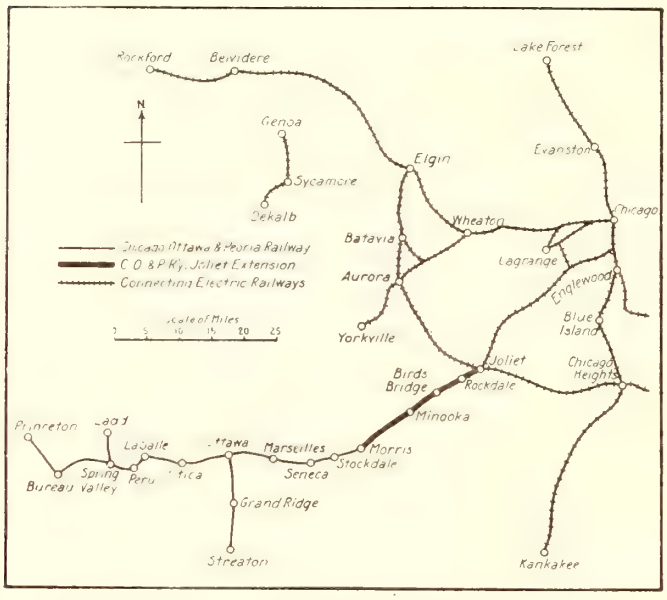
The Burlington bridge had been in service thirty years, and during this time it had been strengthened once. But during the same time the weights of ordinary highway traffic as well as of cars have greatly increased. Whether such increase has taken place in the weights of cars operated over the structure under consideration is not at present known, but it is fair to assume that a bridge built in 1881 is not adequate for service thirty years later unless more than ordinary care has been exercised in its maintenance and provisions have been made from time to time for increased weight in rolling stock.

This deduction does not apply to the case under consideration only. The fact is that the problem of highway bridges is a serious one to almost all street railway companies. As a rule, these bridges are owned by the cities or the counties in which the bridges are located, and electric cars operate over them under a franchise which sometimes requires a special payment for maintenance, as in this instance, and sometimes not. But in practically every case the duty of maintenance devolves upon the owner—that is, the city or the county. Sometimes the state authorities also have jurisdiction over such structures. But street railway companies will always have to face the question as to the extent to which they should go to check up any dereliction on the part of the owners of the highway bridges which they use in the maintenance of such bridges. In the case of a manifestly unsafe bridge undoubtedly a company would be justified in stopping its cars at each end of the bridge and requiring passengers to cross on foot. This would certainly call public attention to the danger and would stir the authorities to action. But should a railway company go further and employ bridge engineers to make periodical examinations of all structures which carry its cars, regardless of who are the owners of such structures? This would be the safest plan, but the railway company is simply one user of the highway bridge, and it would be imposing a large burden upon it to conduct such an inspection. Nevertheless, in localities where politics enter largely into the appointment of those legally responsible for this work, it might often be the most desirable plan to follow.

Joliet Extension of the Chicago, Ottawa & Peoria Railway

Construction Details and Costs of a Well-Built Interurban Extension of the McKinley System in Northern Illinois—The Transmission Line and Substation Installations

The Chicago, Ottawa & Peoria Railway, one of the McKinley System properties, opened its Joliet extension on Dec. 17, 1911. This extension adds another 22-mile link to a line already 100 miles long and gives this company its first terminal in a city of large size. It also completes a



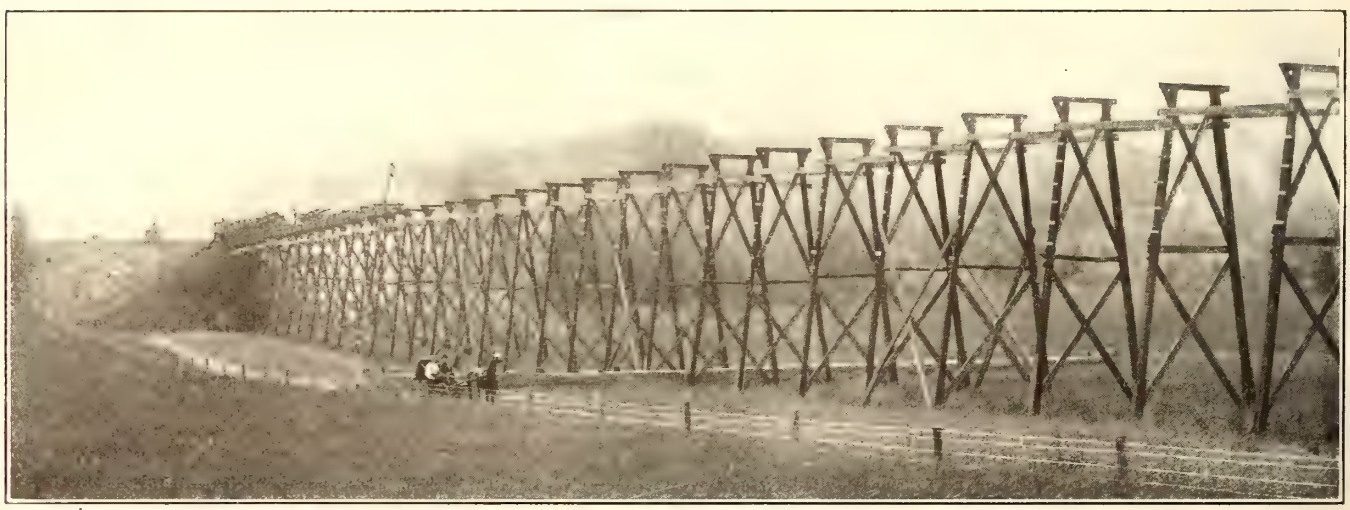
Joliet Extension—Map Showing Connecting Lines

through electric route from Chicago to Bureau and Streator, Ill., and leaves a gap of only 45 miles between Bureau and Peoria. When this gap is closed a through electric railway route from Chicago to St. Louis will be furnished, as well as a connection with the 500-mile network of electric lines which the Illinois Traction System has built in the central part of the State. The extension and the existing line of the Chicago, Ottawa & Peoria Railway, or "Illini Trail," as it is called, serves a thickly populated district and is built at the foot of the picturesque sandstone bluffs which lie to the north of the Illinois River. An excellent view is obtained from the cars of the famous "Starved Rock," which the State of Illinois has just purchased for a public park, and of the high wooded slopes and sandstone cliffs which rise from the water's edge on the south of the river.

Some very interesting engineering problems were worked out along the old line when the roadbed was constructed upon a shelf cut out of solid sandstone, and a number of long, high bridges were necessary to carry the line over the deep valleys between La Salle and Springfield, where it runs along the tops of the bluffs. The territory served has numerous large coal mines and manufacturing industries, such as the plants of the Marquette Cement Company, the Mathewson-Hegler Zinc Company, the Chicago Portland Cement Company, the Owl Cement Company, the Mineral Point Zinc Company, the American Steel & Wire Company's wire fence factory and the large steel plants at Joliet. These factories are located some distance out from the cities and towns, and special cars are run in order to take the laborers to and from their work.

ROADWAY CONSTRUCTION

The new extension practically parallels the Chicago, Rock Island & Pacific Railway main line from Morris to Joliet, and is one of the best constructed sections of interurban line in the Central West. About two years ago the line was completed through Morris; therefore it was not necessary to obtain additional rights there. The company obtained very liberal fifty-year franchises at Minooka, Rockdale and Joliet. In these cities and towns the traffic is not limited as to character or quantity, and there are no restrictions as to the class of equipment to be used or the length of trains. The franchises contain the usual paving and speed clauses, and in Joliet the company was required to replace an old highway bridge with a bridge which would not only carry its own traffic, but would furnish a roadway and sidewalks for street traffic. It was not necessary to draft an original franchise at Joliet, as satisfactory arrangements were made whereby a franchise originally granted to the Joliet & Southern Traction Company was transferred to the Chicago, Ottawa & Peoria Railway.



Joliet Extension—Trestle for High Embankment Near Minooka

The new line is constructed on private right-of-way in the rural districts and on streets in the cities. The average width of the right-of-way is 60 ft., and it cost approximately $170 per acre, not including the damages paid

to the property owners. These damages, however, were small, as the line parallels a steam road practically its whole length, and only eight condemnation suits were necessary. Had ordinary interurban construction practice been followed this road would have been built with some very sharp curves and heavy grades, but the experience



Joliet Extension—Plate Girder Deck Bridge Over Small Stream

which this company has had on its other lines in the rapid development of heavy freight business showed the desirability of reducing the curvature and gradients not only to meet present traffic conditions, but also to provide for future heavy freight movements. The grades and curves are practically the same as those on the Rock Island main line, which the electric line parallels. The maximum curve is 2 deg., except for three 150-ft. radius curves at street corners in Joliet. To obtain this curvature the railway company was obliged to purchase some very high-priced corner property at two street intersections. There is only 8000 ft. of 1 per cent grade, which is the maximum on the entire line. This grade occurs where the line leaves the Dupage River bottom near Minooka. To keep within this maximum limit of grade some very heavy earthwork was necessary. The larger portion of this heavy construction was centered at one very heavy cut at Minooka, consisting of 100,000 cu. yd. of earth, and another cut at Rockdale, where 40,000 cu. yd. of loose rock was taken out.



Joliet Extension—Span Wire Catenary Construction

The excavation for the entire line totaled 240,000 yd. and was contracted for at 19½ cents per cubic yard. Classification was necessary so that prices for loose rock or hard pan and solid rock were furnished. There were 60,000 cu. yd. of solid rock at 79 cents. It was also necessary to pay 1 cent per 100 ft. per cubic yard for 1,200,000 cu. yd. of overhaul beyond 500 ft. In general the materials handled were black loam and yellow clay in the shallow cuts and borrow pits. In the heavy work at Minooka and Rockdale it was necessary to classify for hard pan and loose rock. The roadbed is 16 ft. wide, with a one and one-half to one side slope on fills under 10 ft., 18 ft. wide on

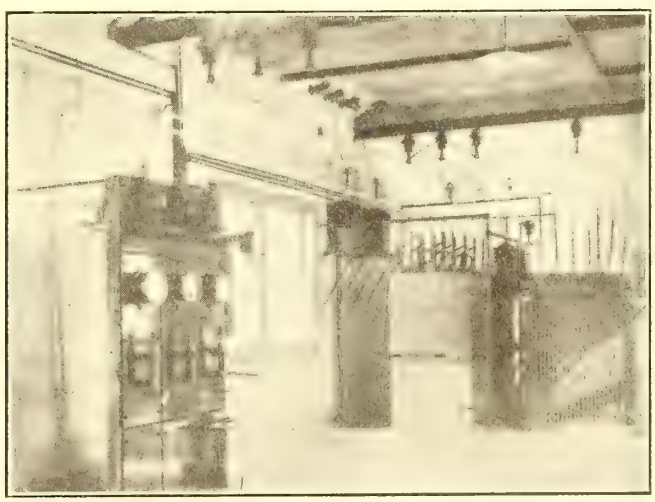


Joliet Extension—Combination Passenger, Freight and Substation

fills from 10 ft. to 20 ft. and 20 ft. wide on all fills over 20 ft. high. The width of the subgrade in all cuts is 28 ft., which allows for a 16-ft. roadbed and two 6-ft. ditches 18 in. deep. The sides of cuts are sloped one to one. The additional width of roadbed was used on the high fills in order to take care of slides and shrinkage and to assure a final width of 16 ft. after settlement had taken place.

MASONRY AND BRIDGES

All the waterways were taken care of with permanent bridges consisting of I-beams or through girders for openings of more than 4 ft. in span. The most expensive piece of bridge construction was the bridge built over the Des Plaines River and the Illinois and Michigan Canal at McDonough Street in Joliet. This consisted of three 120-ft. through truss spans of the Pratt type. It provides a 24-ft. roadway, which is also occupied by two tracks at 12-ft. centers and two 6-ft. sidewalks supported on cantilever beams riveted to the outer ends of the floor beams. It contained 700 tons of open-hearth steel and cost approxi-

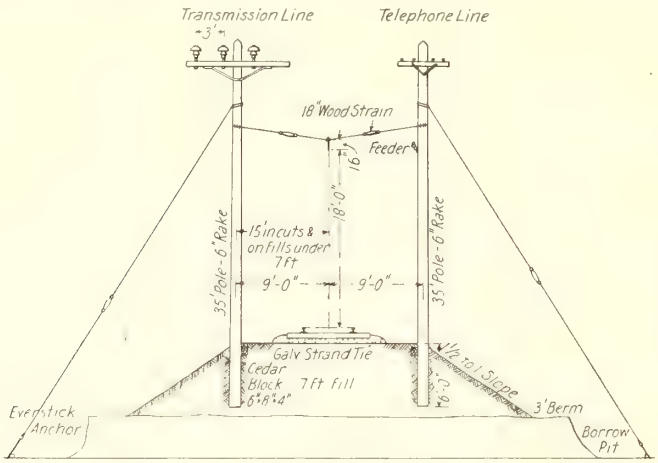


Joliet Extension—High-Tension Apparatus in Substation

mately $35,000 erected complete on the old highway bridge masonry and painted with two coats of graphite paint.

The specifications for concrete structures along the line called for washed crushed gravel and sand, mixed with Portland cement in proportions of 1:3:6, and the work was paid for in detail at the following approximate prices:

Concrete, $5.80 per yard, plus 35 cents per yard of concrete hauled per mile; dry excavation, 50 cents per cubic yard; wet excavation, 90 cents per cubic yard; water work, force account plus 15 per cent. The price for concrete was low, but this was due to the low cost of materials and the

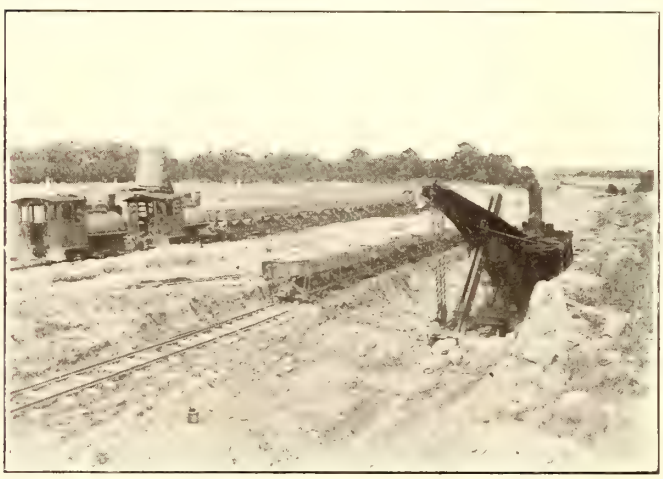


Joliet Extension—Standard Cross-Section of Track

short haul to the various sites. The total concrete yardage was distributed at nineteen openings, where the amount deposited varied from 40 cu. yd. to 700 cu. yd. There were only five openings, however, that contained over 150 cu. yd.

Waterways requiring less than 4-ft. openings were made with American ingot iron corrugated pipe, varying in diameter from 12 in. to 36 in. With but one exception the pipe was laid in a prepared trench, so as to give an even bearing and proper grade, and the earth was filled in over it. The exceptional case was where a 36-in. pipe came under a 33-ft. fill. While the engineers had every reason to believe the pipe would sustain the heavy earth loading, it was reinforced with an 8-in. casing of concrete as an extra precaution. The trenching, necessary hauling and laying of this pipe were contracted for at 25 cents per lineal foot. This is exceptionally low for pipe culverts, but proved profitable to the contractor.

The right-of-way is fenced on both sides with 42-in. American Steel & Wire high-tight fence with a single barbed wire strung along the top. Illinois Traction standard wing fences were used at all highway crossings. The average cost of this type of fence, including 5-in. round cedar posts spaced 16½ ft. apart, wing fences, cattle guards



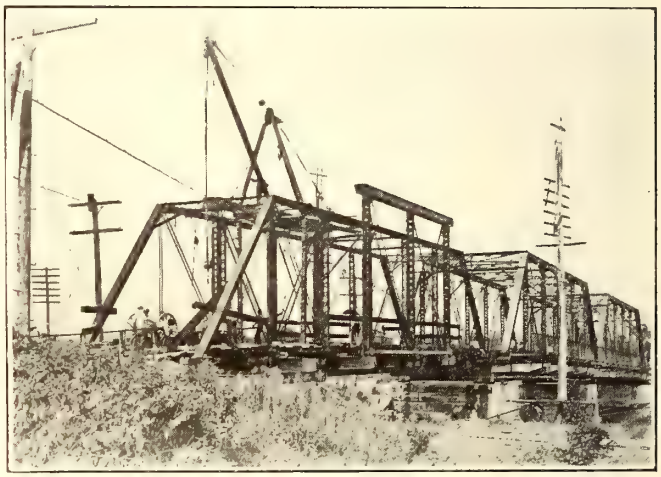
Joliet Extension—Deep Cut Near Minooka

and necessary farm gates, was $475 per mile. Some of the fence was constructed through sections where there was an outcrop of limestone. To reduce the cost of digging postholes in this material for 6-in. wooden posts, 5000 steel posts were purchased from the American Steel & Wire Company. These are of the tubular type which this company has recently put on the market and are made from 99 per cent pure iron, galvanized. Some of these posts have been under test in the ground for twelve years and show no indication of corrosion. To set these posts it was necessary to drill holes only 2½ in. in diameter and 2 ft. deep. The posts were afterward grouted in with cement and sand.

TRACK CONSTRUCTION

The main line and sidings, except 8000 ft. in Joliet, were laid with 70-lb. A. S. C. E. rail on 6-in. x 8-in. x 8-ft. creosoted oak ties, spaced eighteen to a 33-ft. rail. The turnouts and railroad crossings are Illinois Traction System standard construction. The former consist of No. 9 frogs, 15-ft. split switchpoints and lead 72 ft. long over all. The switchstands are Buda No. 16, of the column type, with special target blades. The company laid 8000 ft. of track with 90-lb. A. S. C. E. rail in streets in Joliet. The special track work used with this heavy rail, including frogs and switchpoints, is of hard-center construction. The special work included not only frogs and switchpoints, but all the curved running and guard rails necessary in the 150-ft. radius curves and the turnouts.

The entire roadbed, with the exception of that portion in the Joliet streets, was ballasted with 6 in. of crushed gravel under the ties, and sufficient gravel was deposited at



Joliet Extension—McDonnaugh Street Bridge

the ends of the ties to form a 2-ft. shoulder. The track work in the streets of Joliet was laid on 6 in. of crushed stone and filled up to the top of the rail with crushed stone and screenings.

The rails were bonded with American Steel & Wire Company's compressed terminal bonds, and long-laced bonds with plastic terminals were used to carry the return circuit around all special work. Five laced cross bonds were installed to every mile of track. The average cost per bond for installation was 13½ cents. This was high but not excessive, considering the conditions under which the work was done. Small Paulus track drills were used, and there were frequent delays due to interference by construction trains. It was also necessary to ship the bonding gangs to different points along the line in order to keep the men busy, as the tracklaying was delayed by the grading at certain points and it was necessary to shift the bonding gangs around the graders.

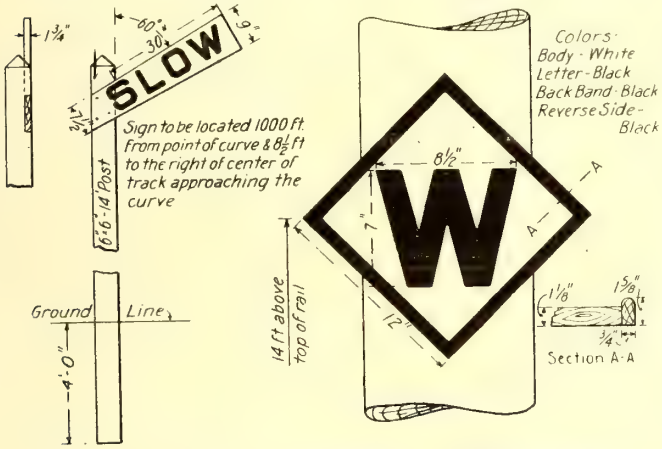
OVERHEAD CONSTRUCTION

The overhead lines, which were constructed under the supervision of K. J. Keith, consist of a three-phase, 33,000-volt transmission line, a 600-volt catenary-supported trolley line, two telephone circuits and feed wires. One pole line supports the transmission wires, and the other carries the trolley, telephone and feed wires. The transmission line is built of No. 2 B. & S. copper line wire and is sup-

ported on 35-ft. poles by No. 312 Locke insulators mounted on 10-ft. four-pin fir cross-arms. The engineers required that the thimbles should be cemented in the insulators at the factory, and the truss pins, which were furnished by the Electric Service Supplies Company, are that company's special style No. 120 with ¾-in. x 13-in. stud bolts.

The feed wire is No. 0000 bare copper and is supported 2 ft. below the mast arm on Chubbuck brackets. Feeder taps are made every 2000 ft., and Westinghouse A M P type lightning arresters are installed every 1000 ft. The trolley construction is the ordinary five-point suspension catenary type, supported on 9-ft. I-beam mast arms. It consists of a No. 000 grooved copper trolley wire with a 7/16-in. seven-strand galvanized messenger. Special feeder-tap insulators were used on all mast arms where feeder taps were made. The selection of the overhead line material received special attention. Practically all the supply houses were represented, and their various supplies were carefully investigated. The quotations made were all based on sherardized material, and the selection depended largely on the question of design, the simplest design in general being chosen.

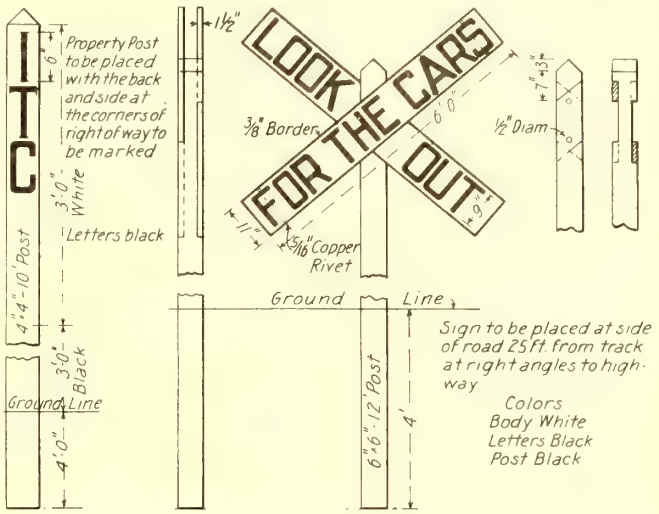
The trolley is carried on mast arms except on curves, at sidings and on fills over 7 ft., where span-wire construction is used. The poles are spaced at 140-ft. intervals throughout the entire line, and are given a 6-in. backward rake if they support the trolley. The methods used in stiffening and protecting the trolley line against severe operating conditions are interesting. Steady braces of the long wood strain and goose-neck trolley-ear type were applied on every



Joliet Extension—Standard Slow and Whistle Signs

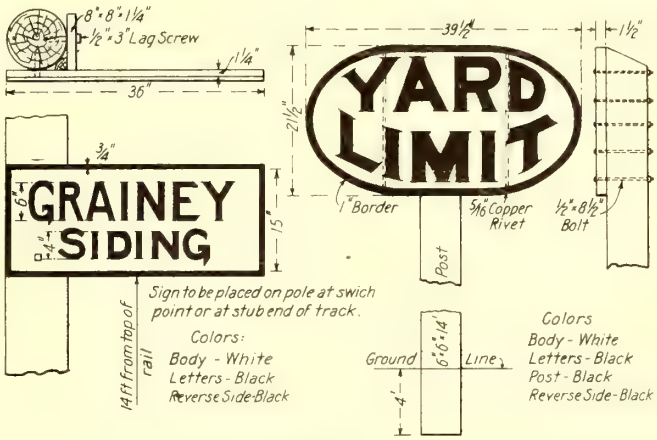
sixth pole on tangent track and on every pole on curves. The line is strain-guyed every mile, using special anchor eyes and trolley ears. Considerable care was exercised in this work, particularly on high fills where slides and settlement might be expected. Here not only was span-wire construction used, but the poles were tied together at the subgrade elevation with a double-line of 7/16-in. galvanized strand wire. All poles supporting the trolley are breasted just below the roadbed level with cedar blocks 6 in. x 8 in. x 4 in., and the line was strain-guyed and tied in from all directions at all summits.

On the tops of the poles carrying the trolley brackets are two complete metallic return telephone circuits, built of No. 10 hard-drawn copper wire. The wires are supported

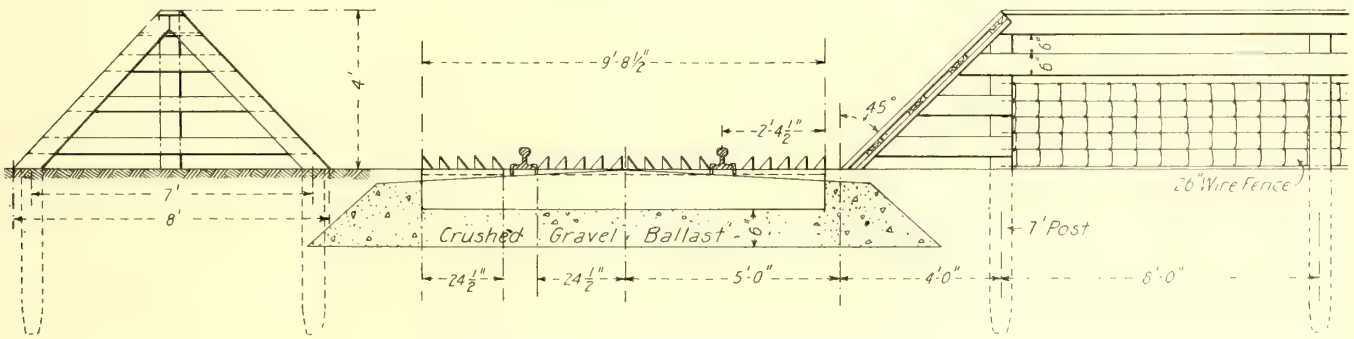


Joliet Extension—Standard Right-of-Way and Crossing Signs

on 5-ft. four-pin fir cross-arms with Western Union pins and porcelain pony insulators. Pierce transposition brackets were installed every fifth pole. In order properly to protect all the lines of other companies which the transmission line intersected it was decided that the American Telephone & Telegraph Company's specification for overhead crossings would give the best results. The overhead line, including



Joliet Extension—Standard Siding and Yard Limit Signs



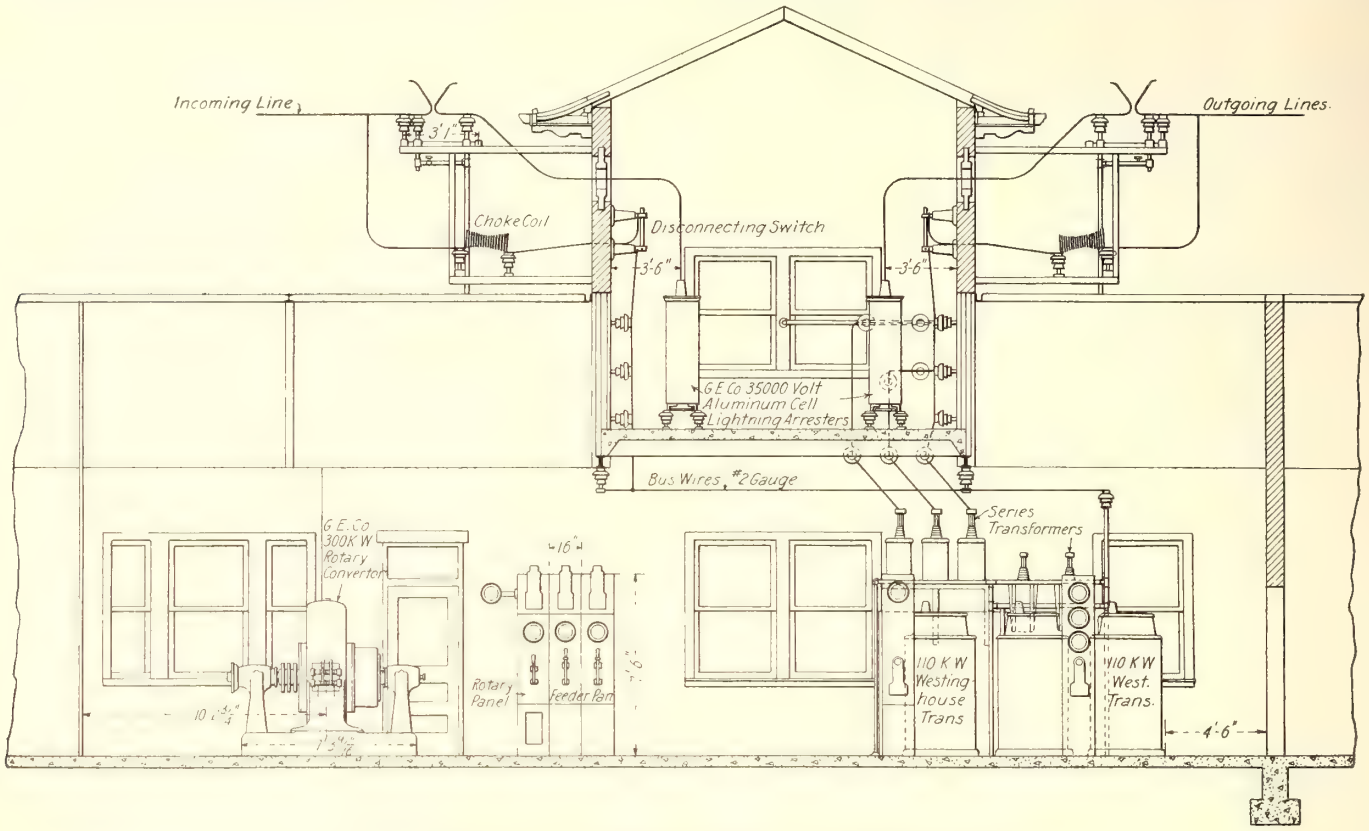
Joliet Extension—Standard Cattle Guard

both the trolley and transmission lines, is not completed at this date, but the estimated cost of $4,500 per mile will not be exceeded.

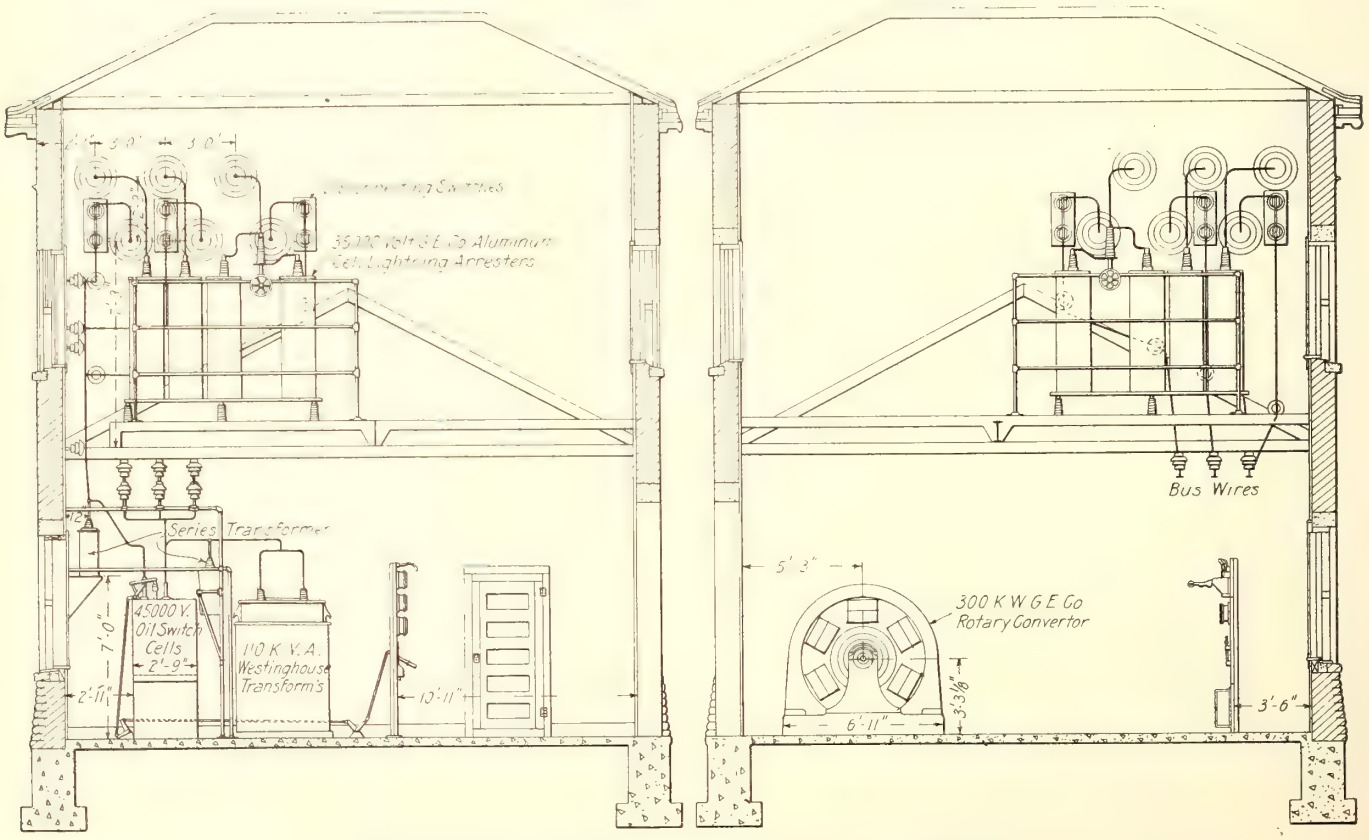
SUBSTATIONS

Illinois Traction System standard substations were built

at Morris, Minooka and Rockdale. These locations give the usual 10-mile interval between substations. The substation at Seneca was enlarged to take care of the outgoing lines, as it was formerly the northern terminus of the transmission line before the extension was constructed. These standard substations are of the same type of architecture as those described in the ELECTRIC RAILWAY JOURNAL for April 17, 1909, page 720, and cost $26,000 complete, including concrete platforms, brick coal-house and frame water-closet. The general character of these buildings is shown in the illustrations. They are combination substation, passenger and freight stations, built with a rock-faced dark red paver base, buff face brick and a red French "A" tile roof. The exposed woodwork in the buildings is painted with the Illinois Traction standard colors, buff and olive green.

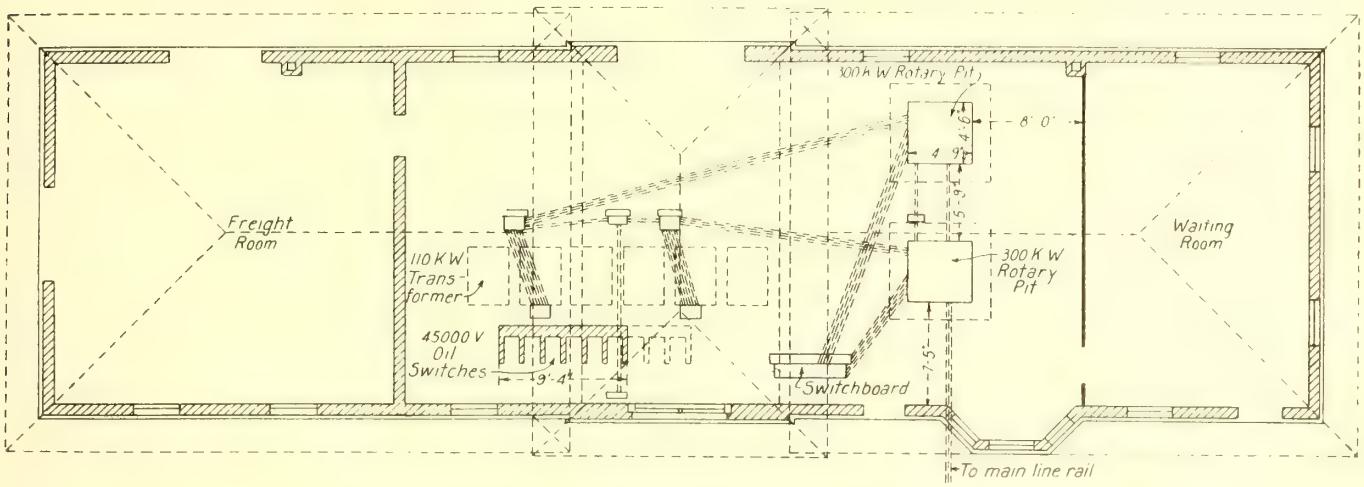


Joliet Extension—Longitudinal Section Through Substation



Joliet Extension—Cross-Sections Through Standard Substations

The buildings are one story high with a tower for the incoming and outgoing transmission lines and are 93 ft. long by 26 ft. 8 in. wide. The passenger waiting room is 16 ft. 4 in. x 25 ft. 2 in. and is separated from the machinery room by a wooden partition built of beaded ceiling with a slat grille running the full width of the building. The freight room is located in the opposite end of the building from the waiting room and is 25 ft. x 25 ft. 2 in. The machinery room or substation proper takes up the central portion of the building and includes the tower, which is 16 ft. x 25 ft. and 15 ft. high.

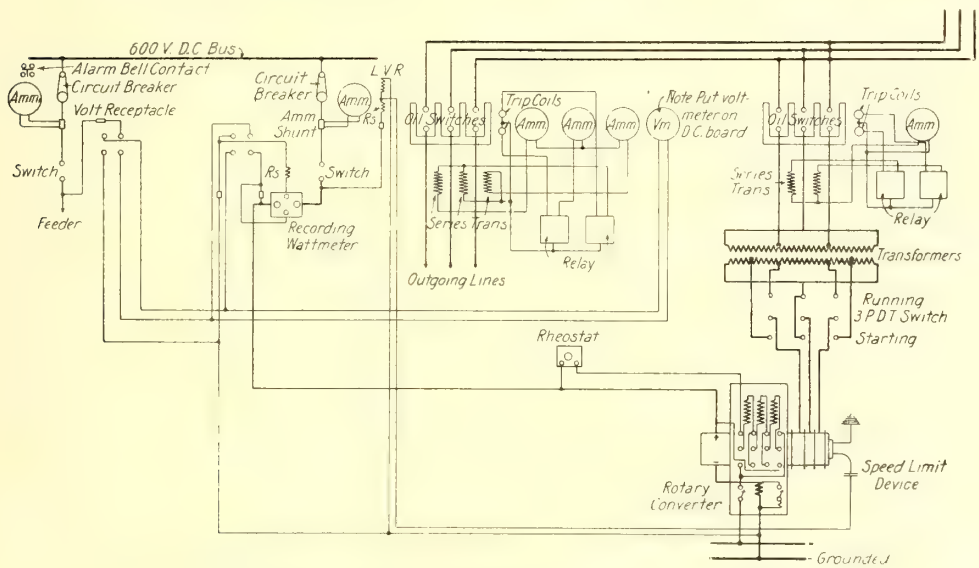


Joliet Extension—Plan of Combination Passenger, Freight and Substation

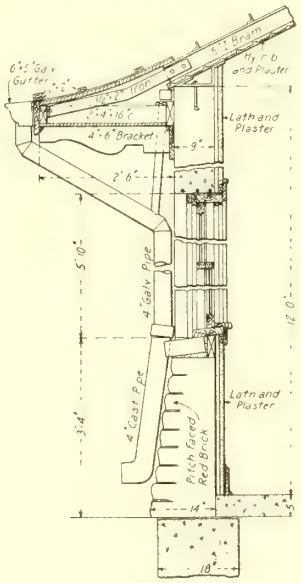
The machinery is so arranged that the kilowatt capacity can be doubled. Two rotary pits have been built and sufficient area provided to take care of the additional transformers and other electrical equipment necessary.

The apparatus installed at this time is located as shown in the accompanying illustrations and consists of three oil-insulated, self-cooled transformers; one oil-insulated circuit breaker with automatic overload and remote mechanical control for the 33,000-volt line and bell alarm contacts; one 300-kw, 600-volt, 25-cycle rotary converter and one three-cell lightning arrester complete with horn gaps located on the tower floor. The equipment is controlled from three panel switchboards provided with the necessary knife switches, voltmeters, ammeter and wattmeter, which are located near the agent's desk in the bay window. All wiring where possible was carried under the concrete floors in fiber conduit. The plans were furnished by the electrical department of the Illinois Traction System, and particular care was exercised in locating equipment so as to reduce the copper and allow for ventilation and free access to the machinery. The apparatus was installed by common labor with the assistance of one expert. It required about ten days to make a complete installation, and the cost, which was $300 per station, was very low, as the labor was cheap. Up to the present time the existing line has received its energy from a central power station located at La Salle. Extensions to this plant are difficult owing to property restrictions and the fact that it is located on Illinois River bottom land where it is almost impossible to construct first-class heavy foundations. A new hydroelectric plant is being completed at Marseilles, Ill., which will furnish energy for the entire line and serve some small city lighting properties along the road. The present La Salle plant will be used as an auxiliary when anchor and slush ice prevent the operation of the hydroelectric station at Marseilles.

In connection with this Joliet extension the transmission system for the entire line has been rebuilt so as to carry 33,000-volt current instead of 15,000-volt current, which is now used on the old part of the line. A new copper telephone line has been built from Ottawa to Joliet, so as to put the general superintendent's office, which has been moved from Ottawa, in close touch with the shops and offices at Ottawa and to replace the old iron-wire dispatching lines which were formerly used.

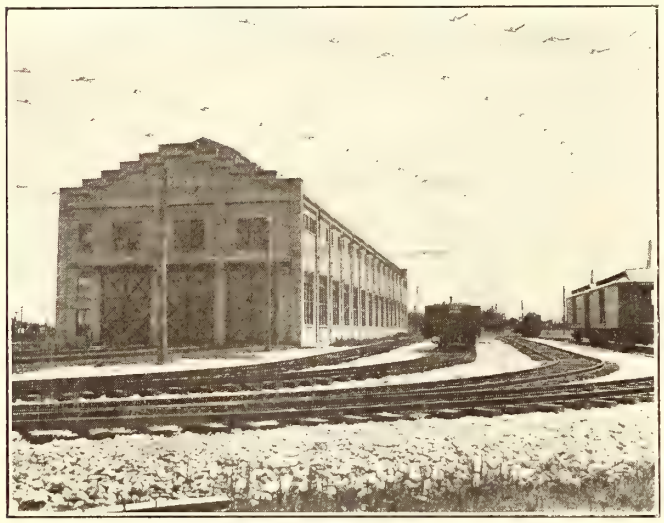


Joliet Extension—Wiring Diagram of Standard Substation Containing One Rotary Converter



Section Through Substation Wall

About the time the new extension was built extensive improvements were made at Utica, Ill. Some very sharp curves were eliminated, and the main line was moved from the street to a private right-of-way. This necessitated the purchase of about one mile of right-of-way 60 ft. wide along the north edge of the town and the removal of the overhead lines, which included trolley, telephone and three-phase transmission wires. Extensive improvements also



Joliet Extension—Repair Shop Yard

were made in the streets of La Salle and Peru, where the tracks and special work were laid with heavier rails, and a number of side tracks in the streets were extended.

SHOPS AT OTTAWA

A large building which will contain the car repair shop, storeroom and offices has been erected at Ottawa, Ill. The building is of practically fireproof construction. It is brick and steel with a high monitor type roof. The building is provided with large and closely spaced windows, so that it is well lighted in the daytime. In plan the building is 60 ft. wide by 300 ft. long. The side walls are 35 ft. high. A runway for a 60-ft., 15-ton crane and steel wall brackets for supporting the shafting and motors necessary to drive



Joliet Extension—Interior of Repair Shop

the repair shop tools are provided. The building contains three repair tracks, with full-length pits under two of them. In one end of the building a paint shop is partitioned off with corrugated iron, and a small storeroom for repair parts is provided on the ground-floor level. Above the storeroom are two floors of large well-lighted offices. These are occupied by the heads of the maintenance and transportation departments.

The ultimate scheme is to connect the Chicago, Ottawa & Peoria division with the Illinois Traction System proper, either by way of Mackinaw Junction or Peoria, and to make the Ottawa shops the point for general repairs on the northern division. About two years ago a line was constructed from Ottawa to Streator, 18 miles south, and the connection with the Illinois Traction System will probably be made from this point.

F. E. Fisher was superintendent in charge of construction of the Joliet extension and is now general superintendent of the entire line. H. E. Chubbuck is vice-president executive of the road.

STRIKE AT TEXARKANA

Texarkana is a city on the border line of Arkansas and Texas, and its electric lighting and gas service is supplied by the Texarkana Gas & Electric Company. This company is owned largely in Chicago and operates some fifteen cars. The manager is W. L. Wood, Jr., who is also president of the Board of Trade. Up to last October no attempt had been made to unionize the line. The men were seemingly content, and their wages had been increased twice during 1911. The last increase went into effect Oct. 1 and amounted to 10 per cent. On Oct. 14, however, a delegation of employees called on Mr. Wood and submitted for his signature a proposed agreement, consisting of six articles, the gist of which was that a branch of the Amalgamated Association should be recognized. Mr. Wood declined to sign, and a strike was immediately called.

During the first day or two there was little hostility, but as the railway company gradually increased its working force and the number of cars in operation attempts at violence began. On the whole, these were not serious, as the police protection provided by the city was good and the cars were well manned with guards. But on several occasions the strikers attempted to pull the new men from the cars, and one attempt was made to dynamite the carhouse. This, however, was discovered and frustrated. On another occasion, as a car was returning from the carhouse to a downtown hotel one night, loaded with strikebreakers, it was fired into from ambush, but no one was hurt, although all the sashes on one side of the car were broken. Several rioters were arrested during the strike, but no conviction was secured.

In addition to this open violence, a very strong attempt was made to subject the line to a boycott and to extend this boycott to merchants and others who patronized the cars. "Walking badges" were issued, and there was the usual attempt on the part of the strikers to establish a competing stage line. One or two mass meetings were held by the strikers to create a sentiment against the company. But at these meetings the lawlessness advocated by the speakers went very far to alienate the best public sentiment in the city, as the company had always possessed a good reputation for enterprise and public spirit. Letters were published in the daily press from prominent citizens in support of the company, the editorials became more favorable to it, and on Nov. 28 the strike collapsed.

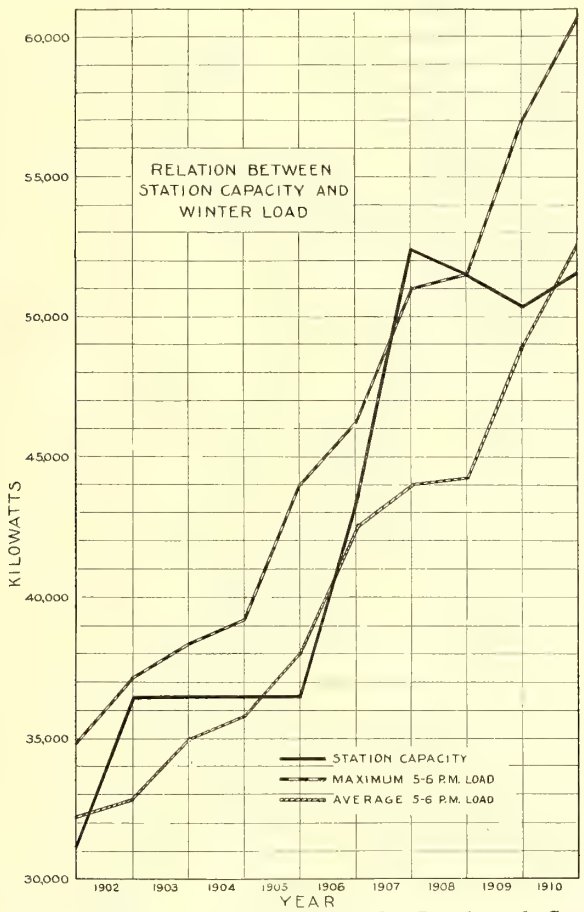
During the first ten days or two weeks the traffic on the lines showed a considerable loss, but before the strike was declared off business had gone back to about 70 per cent of normal, and soon after the conclusion of the strike the company was enjoying a considerable increase over that of the previous year. The confession of the McNamara brothers in Los Angeles undoubtedly had considerable to do in strengthening the company in public opinion.

The officials of the company upon whom the burden of conducting the fight against the strike principally rested were W. L. Wood, Jr., manager; H. L. Harris, superintendent of the railway department, and W. M. Dunn, superintendent of transportation.

Power Generation and Distribution System of the Boston Elevated Railway

Analysis of Load Conditions—Reasons for Adopting Alternating-Current Generation and Transmission for Future Power Requirements—Six New Substations of Large Size Have Been Built

The Boston Elevated Railway, serving a metropolitan district of over 100 square miles and a population of approximately 1,500,000 people with nearly 500 miles of track, has long afforded a notable example of the economical use of direct-current power generation and distribution. With the exception of two converter substations in the southwestern section of the territory served, all power for the elevated, subway and surface lines has been generated in eight widely separated steam stations and two small gas-engine stations in the northern district. Owing to the configuration of Boston and its suburbs it has been possible to locate all but one of the steam stations on tidewater,



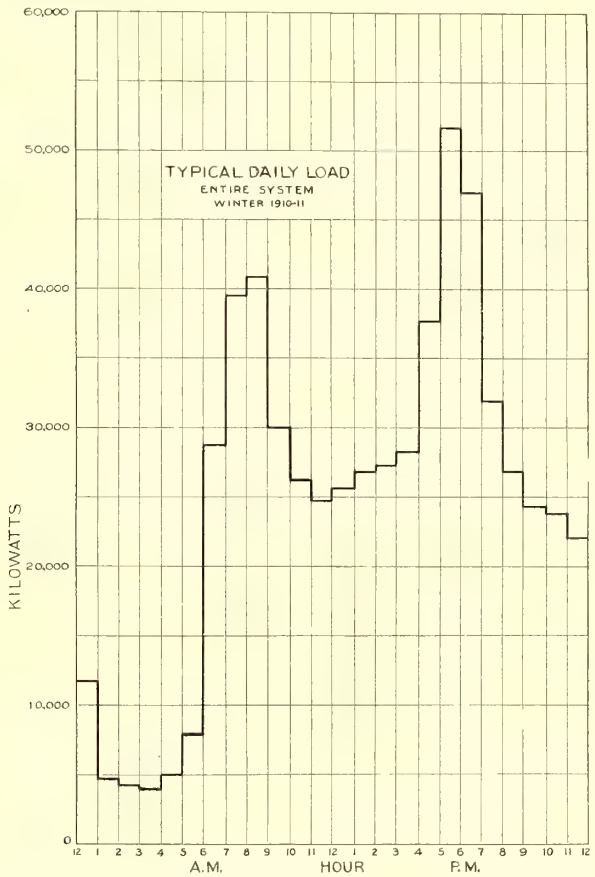
Boston Elevated Power—Increase in Load and Station Capacity in Eight Years

and this, together with favorable load factors and skilful management of all stations, has contributed to an exceptionally low cost of producing direct current.

During the last five years the demand for power has increased rapidly owing to the extension of elevated and surface lines into the suburban districts and the use of larger and heavier rolling stock. The company therefore faced the problem of building several new direct-current stations of moderate size near the new load centers on the outskirts of the system or building one large alternating-current generating station at a favorable location on tidewater and distributing high-tension current in underground cables to several converter substations from which energy could be fed to the trolley wires.

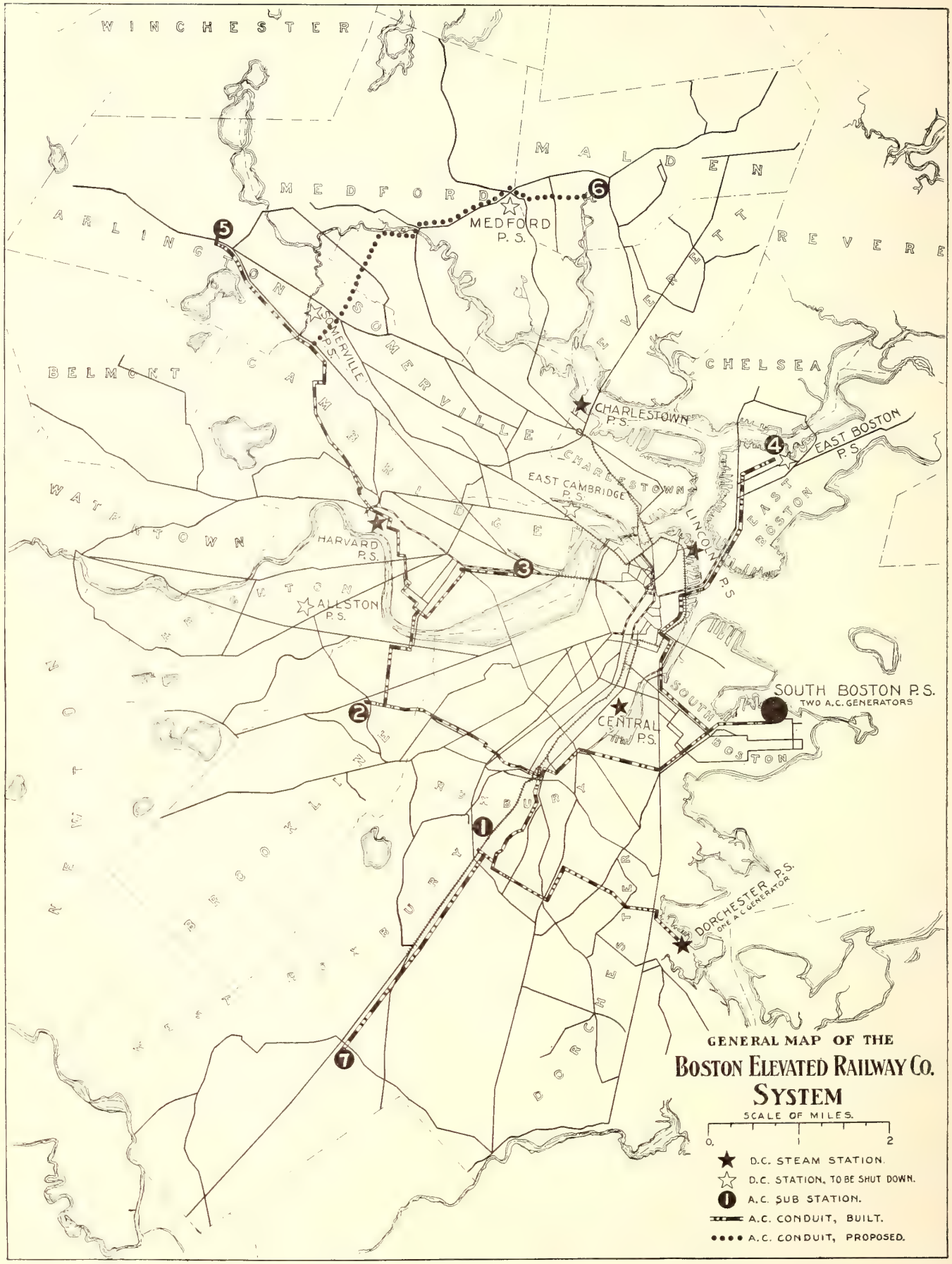
STUDY OF THE POWER SITUATION

In 1908 the Stone & Webster Engineering Corporation was engaged to investigate and report on the whole power situation. A careful analysis of the first cost and producing cost of both systems of generation and distribution was made by these engineers. The metropolitan district is, roughly, in the form of two-thirds of a circle with the business district and area of maximum load in the center. A map was made on which the existing and proposed direct-current steam stations were located, and the costs of power delivered at the cars at varying distances from the several stations were drawn on the map as concentric circles surrounding each station. A similar map was prepared for an alternating-current generating station and substations, and



Boston Elevated Power—Typical Daily Winter Load Curve for the Entire System

by superimposing one map on the other the economic limits of direct-current generation and distribution were obtained as the loci of the points of intersection of the circles representing equal costs for alternating current and direct current. This method showed that alternating-current distribution was more economical for the rapidly developing districts lying beyond an approximate circle having a radius of 3 miles, with its center in the business district. The engineers therefore recommended the construction of a complete new alternating-current generating station of large size located on tidewater in South Boston; building an underground transmission line in the form of a loop about 8 miles in diameter, and installing for immediate needs six new substations connected through the trans-

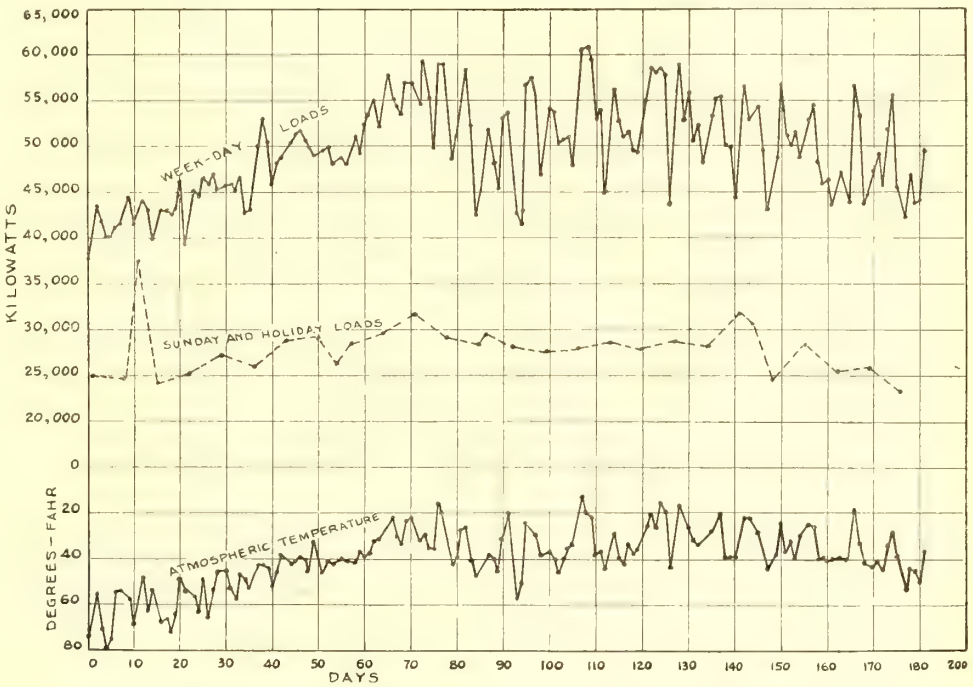


Boston Elevated Power—Map of System, Showing Power Stations, Substations, High-Tension Transmission Lines and Trolley Distribution

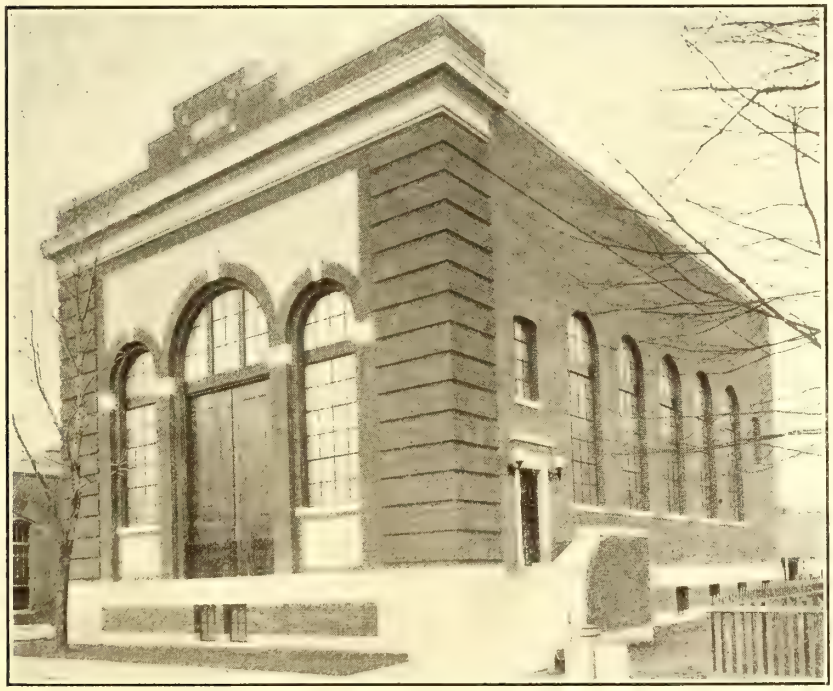
mission line with the new station. Late in 1910 the directors of the Boston Elevated Railway authorized the expenditure of nearly $3,750,000 to carry out these recommendations. The Stone & Webster Engineering Corporation was retained as designing and constructing engineer, and on Jan. 26, 1911, ground was broken for the new power station in South Boston. This station, which contains two 15,000-kw Curtis turbo-generators, has been completed, five of the six new substations have been built, and 85 per cent of the transmission-line ducts and cables have been installed during the present year.

DIRECT-CURRENT POWER GENERATION

The oldest power station of the company is the Allston station in the town of Brighton, which was built in 1888 to supply current for the first electric line in the Boston district, opened between Brookline and Boston in January, 1889. This station has been enlarged and remodeled from time to time, but has never been modernized. At the present time it contains eight 80-kw generators and four 62-kw generators belt-driven by high-speed, compound, non-condensing engines. For several years it has been operated only in the winter, when the heaviest loads are carried. Since the substation at Coolidge Corner, Brookline, has been started up, this old station will be shut down and entirely dismantled.



Boston Elevated Power—Effect of Temperature on Power Station Load



Boston Elevated Power—Exterior of Coolidge Corner Substation

The East Cambridge power station, which is situated on the river front, is the next oldest station. It contains six generators, each of 467 kw capacity, belt-driven from a jack shaft, which in turn is belt-driven from three horizontal, triple-expansion condensing engines. It will be shut down at once.

The East Boston power station supplies power for the lines in East Boston and Chelsea which use the tunnel under the harbor. It contains three 200-kw generators direct-connected to horizontal, cross-compound, condensing engines. A new substation has been built on adjoining property, and the steam station will also be shut down at once.

The Charlestown power station is situated near the Sullivan Square terminal of the elevated division. It has been enlarged several times and now contains two 800-kw generators direct-connected to horizontal, cross-compound, condensing engines and two 2700-kw generators direct-connected to vertical cross-compound condensing engines. The second of these units was installed three years ago.

The Central power station is located on Albany Street, south of Dover Street and close to the South Basin, from which its supply of condensing water is drawn. It is one of the older stations, but on account of its central location it has been enlarged and remodeled a number of times and to-day is the second largest direct-current generating station of the system. It contains two triple-expansion condensing engines direct-connected to generators of 1200 kw capacity each; six horizontal cross-compound condensing engine units of 1200 kw and 1500 kw capacity each, and one vertical cross-compound condensing engine direct-connected to a 2700-kw generator, making a total rated capacity of 12,900 kw.

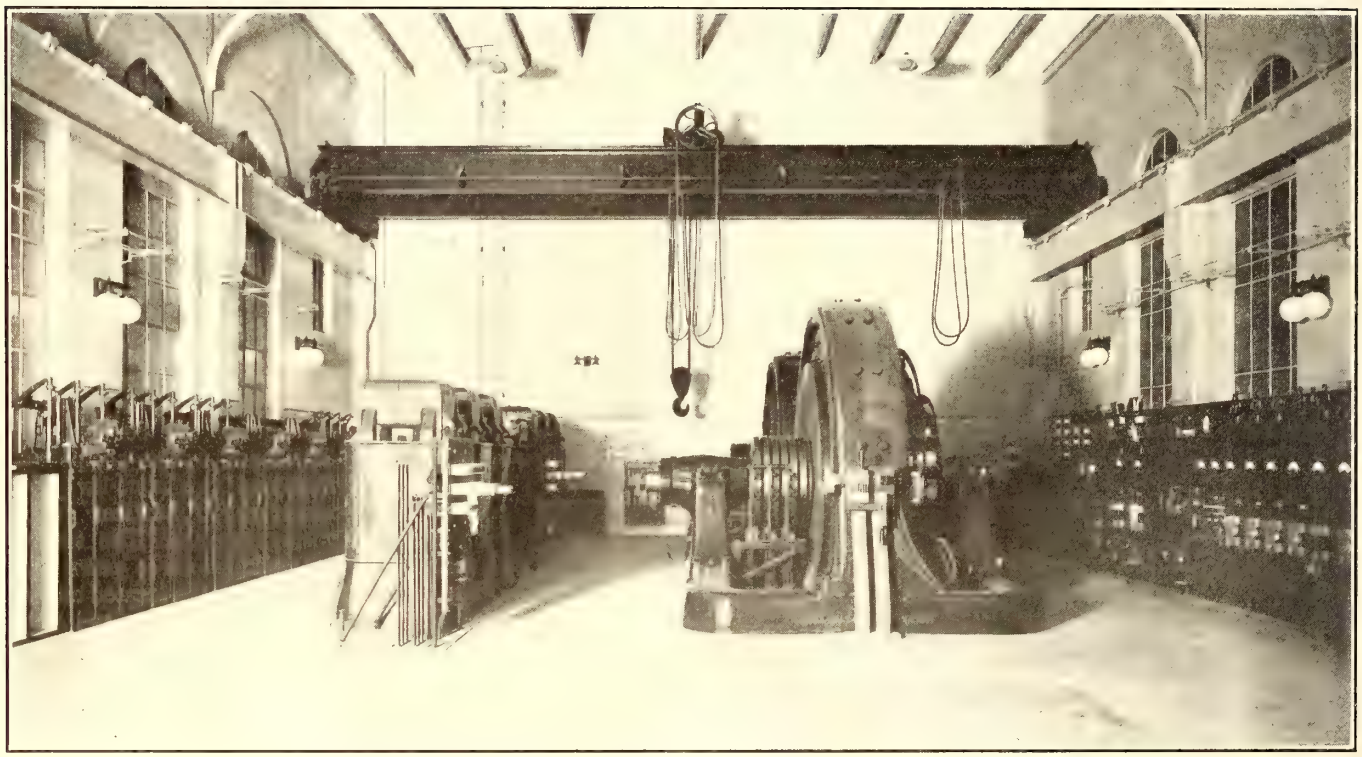
The Harvard station in Cambridge is located on the north bank of the Charles River, and is a modern station of its kind in every respect. It originally contained three 1200-kw horizontal cross-compound engine units and three years ago was enlarged by the addition of one 2700-kw vertical cross-compound engine unit.

The Dorchester station, which is on the harbor, supplies current to the southeastern part of the system. Its original equipment consisted of two 1000-kw engine-driven units, but about five years ago a direct-current turbine unit was installed. The operation of this machine was not satisfactory, and in 1910 the generator was removed and

replaced by an alternating-current machine of 3500 kw rated capacity. The output of this alternating-current generator was transmitted a distance of about 2½ miles to a converter substation at Egleston Square, where three 1000-kw rotary converters were installed to supply the Forest Hills extension of the elevated road and surface lines in the surrounding territory.

The Lincoln power station is the largest and newest of the direct-current steam stations. It is situated on the harbor front, near the center of the business district of Boston, and was built in 1901 to supply current for the operation of trains on the elevated structure. Three 2700-kw vertical cross-compound, engine-driven units were first installed, and in 1908 two more units of the same size were added.

In 1906 the railway company built two small producer gas-engine plants in the northern district. The Somerville station contains two 350-kw units and the Medford station contains two 325-kw units. These two stations were built to relieve the Charlestown and Harvard steam stations during peak-load periods in the morning and evening, and they have been operated intermittently as required. Both stations are located in residential districts and the unavoidable noise of the exhaust has proved very objectionable to residents in the vicinity. For this reason and because of the small size of the gas-engine units both stations will be shut down as soon as the Arlington and Malden substations can be put in service. These two substations will have an initial equipment of two 1000-kw and two 2000-kw rotaries respectively, or a total of 6000 kw as compared with 1350 kw for the two gas-engine stations.



Boston Elevated Power—Interior of Coolidge Corner Substation

LOAD CONDITIONS

As will be seen from the diagram on page 1313 of loads and generating capacity of the entire system for the years 1902-1911, the generating capacity, although increased from 31,000 kw to 51,138 kw, or nearly 70 per cent, in ten years, has barely kept pace with the average hourly maximum load and has always been below the maximum hourly loads. An increase of 5400 kw in capacity in 1902 sufficed for only three years, when a further increase of 16,000 kw, or 45 per cent, was found necessary, being spread over a two-year period. In another three years at the end of 1910 the average hourly peak load had again risen in excess of the station capacity, while the maximum hourly load had increased to over 60,000 kw. The need of large additions to the power supply at the present time is apparent from the diagram.

The company now has a rated direct-current generating capacity in all stations, including the Egleston Square and Forest Hill substations, of 51.138 kw. By next spring the direct-current power station capacity will be reduced 5638 kw by reason of shutting down the Allston, East Boston, East Cambridge, Somerville and Medford stations, and another 800 kw of capacity will be taken off by shutting down the Forest Hills substation, where alternating current purchased from the Boston Edison Company is converted to direct current. The increase in substation capacity will be 20,000 kw, making the total rated direct-current capacity 64,700 kw. The total alternating-current generating capacity will be 33,500 kw, or 9500 kw in excess of the total connected rotary capacity. The new South Boston power station contains space for a third 15,000-kw generator, so that without building any other new power stations the generating capacity of the system can be raised to 90,200 kw. An additional 80,000 kw could be added by enlarging the South Boston station to the ultimate size for which it is designed, so that the power requirements of the future have now been provided for far in advance.

PEAK LOADS

The peak load on the system occurs between 5 p. m. and 6 p. m. during the winter months. Last winter the average load for the evening rush hour was from 5 per cent to 10 per cent in excess of the total station rated capacity, while on certain days the load exceeded the rated capacity of the stations by 20 per cent. The morning rush-hour peak load is normally about 90 per cent of the evening load.

The summer peak loads are between 70 per cent and 75 per cent of the winter peaks. This is accounted for largely by the use of light open cars on many lines and the fact that there is no demand for heat, and also by the fact that the car resistance in warm weather is less than in cold weather. The last two factors produce a striking relation between the load of the system and the atmospheric temperature, which is well illustrated by the diagram on

page 1315. An increase of approximately 400 kw in the total load on the system results from a decrease of 1 deg. in the atmospheric temperature.

The night load between 1 a. m. and 5:30 a. m. averages about 3000 kw in the summer months and 5000 kw in the winter months. This load normally is carried by two of four favorably located stations, the other stations being shut down during this period.

DIRECT-CURRENT DISTRIBUTION

The network of overhead trolley wires, consisting of more than 465 miles, at the present time is divided into seventy-six feeder sections, of which thirty-eight are fed from a single generating station or substation. The remaining sections are fed jointly by two or more generating stations. These jointly fed sections permit all the direct-current power stations to be operated in parallel. If any station is overloaded, the generator voltage at that station is lowered, the result being that the other stations take more of the load of the tie sections, thus relieving the load on the station previously overloaded. In this way the load is fairly evenly distributed over all the stations and a high load factor is obtained for each station. All feeders are controlled by switches and circuit breakers at the stations from which they emerge.

In general the direct-current transmission distances are short. The following table shows the maximum distances power is normally transmitted from each station and also the average distances from the stations to the electrical centers of gravity of the feeder sections supplied from each station.

Feeder and return cables are led out underground from all stations except East Cambridge, Allston, East Boston, Somerville and Medford. In the outlying districts they are carried on the poles above ground. The total length of feeder and return cable now installed (in 500,000 circ. mil equivalent) is 1187.03 miles, of which 719.12 miles is overhead and 467.91 miles is underground.

Station.	Maximum Distance, Miles.	Average Distance, Miles.
Central	3.98	1.28
Lincoln	3.67	1.38
Charlestown	5.02	1.38
Harvard	4.84	2.05
East Cambridge	2.75	1.19
Dorchester	5.00	1.66
Allston	2.58	0.97
East Boston	1.70	1.06
Somerville (gas engine)	3.31	1.13
Medford (gas engine)	3.30	1.47
Egleston square (substation)	1.91	0.84
Forest Hills (substation)	4.61	2.23

Now that the new substations are placed in operation and the Allston, East Boston, East Cambridge, Somerville and Medford power stations are shut down, an extensive rearrangement of the distribution system in the sections affected will be necessary and is in progress. The same general plan of operating the substations and direct-current power stations in parallel through tie sections of trolley will be followed. The feeder copper released by shutting down the five small generating stations is being used at the new substations.

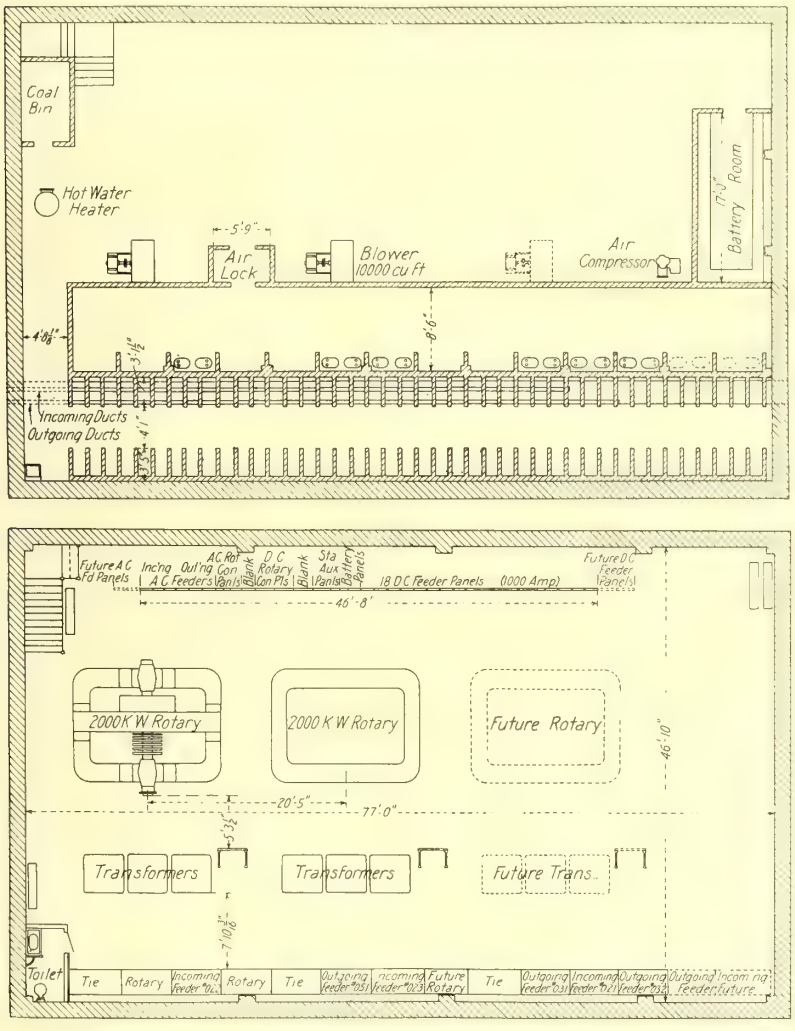
NEW SUBSTATIONS

The six new substations which will be supplied from the South Boston power station are located respectively at Coolidge Corner in Brookline, Kendall Square in Cambridge, Arlington, Malden, East Boston and Roslindale. The capacity of the present substation at Egleston Square has been increased and the substation utilizing Boston Edison energy at Forest Hills will be abandoned.

The Coolidge Corner substation will have an initial equipment of two 2000-kw rotaries and feeds the lines in the Brookline and Brighton districts at present supplied from the Central, Harvard and Allston power stations.

The Kendall Square substation is located on the route of the new Cambridge subway and will supply the subway in addition to the surface lines formerly fed from the East Cambridge power station. It also will contain two 2000-kw rotaries.

The Arlington substation is the farthest from the South Boston power station. It will replace the Somerville gas-engine station and relieve the Harvard station of a part of its load which is now being transmitted long distances. The initial capacity of this station will be two 1000-kw rotaries.



Boston Elevated Power—Plans and Cross-Section of Coolidge Corner Substation

The Malden substation, which is the only one of the new substations not yet completed, is designed to feed the lines in Malden, Medford and Everett and will replace the gas-engine station in Medford. It will relieve the Charlestown station of a heavy load which is being transmitted for distances up to 5 miles. The initial equipment will be two 2000-kw machines with room for two additional units of the same size.

The East Boston substation is located on property adjoining the East Boston power station which has been shut down. It has an initial equipment of two 1000-kw rotaries.

On the south side of the city only one new substation has been built, at Roslindale, about 1¼ miles beyond the Forest Hills terminal of the elevated road. This station will have the longest average distributing distance of any of the new plants. It will be equipped with two 1000-kw rotaries.

SUBSTATION BUILDINGS

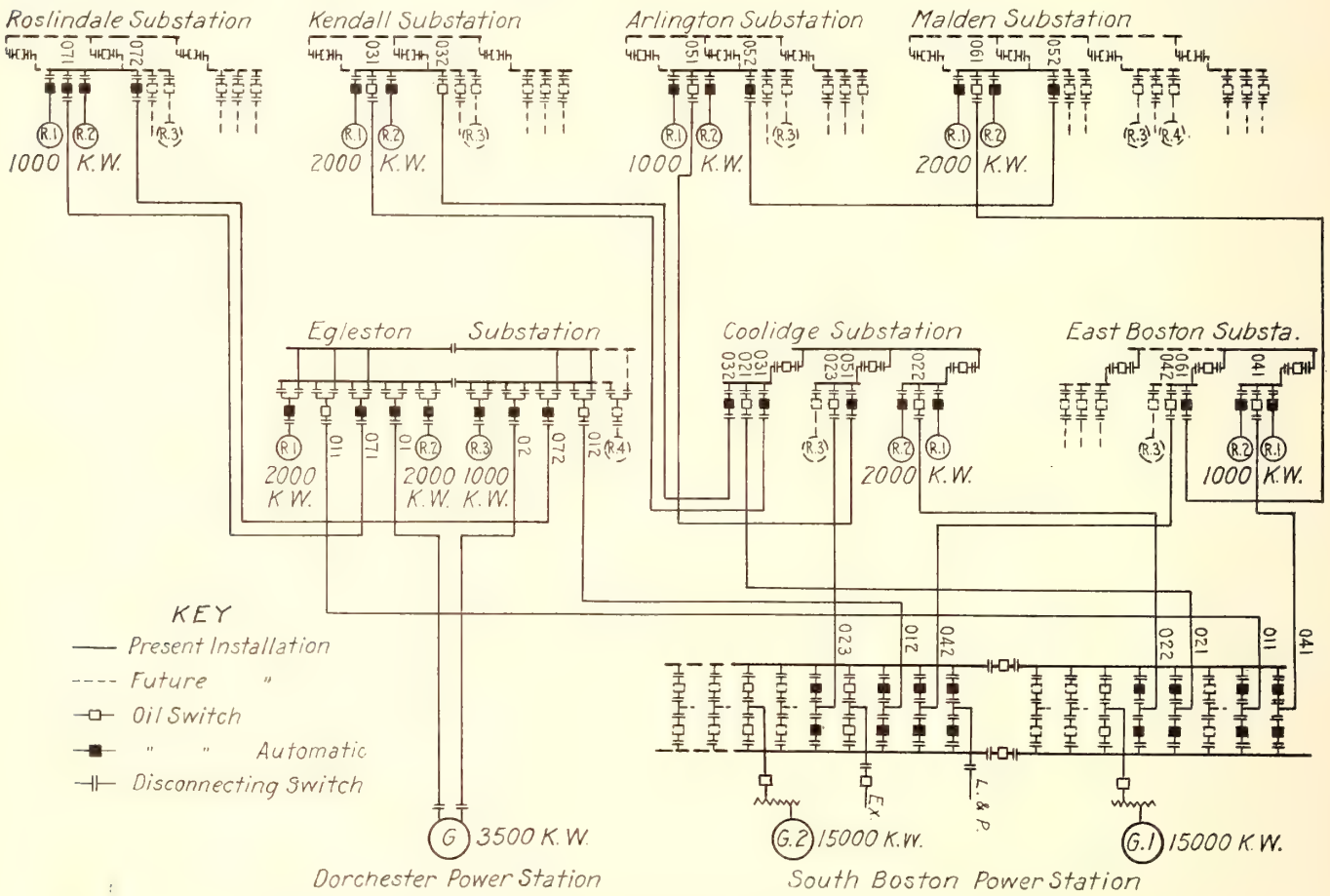
The new substation buildings are of substantially similar design and arrangement, although there are slight variations in the exterior architectural treatment. They are designed to accommodate three rotaries each with the exception of the Malden station, which will have an ultimate capacity for four rotaries. The rotary foundations in all cases are built to take either a 1000-kw or a 2000-kw machine, so that wherever 1000-kw rotaries have been installed for initial service they can be replaced when required by 2000-kw rotaries.

Illustrations are presented of the Coolidge Corner substation in Brookline, which is typical of the others. The building is 46 ft. 10 in. x 77 ft. long inside and is constructed with brick walls on concrete foundations. The roof is formed of reinforced-concrete slabs supported by latticed steel trusses. The side and rear walls are built of plain bricks with stone sills, but the front wall is made of rough-faced bricks with troweled joints. A large doorway for taking machinery in and out and two high windows surmounted by a stucco panel and a wide stone coping relieve the plainness of the front wall. The interior walls have a wainscot of tile-glazed bricks and above the wainscot the walls are faced with buff pressed bricks.

The rotaries, transformers, oil switches and the operating switchboard are mounted on the same floor, while the high-tension bus compartments are in the basement. An interesting detail of the building design is the use of four structural steel columns set on large concrete footings for the rotary foundations. This leaves the basement floor clear and free and is less expensive than heavy concrete foundations. The operating room is spanned by a 25-ton hand-operated traveling crane.

ALTERNATING-CURRENT TRANSMISSION

Three-phase, 25-cycle alternating current will be generated at 6600 volts at the South Boston power station and stepped up to 13,200 volts through compensators. The 3500-kw alternating-current generator in the Dorchester station generates 25-cycle, three-phase current at 13,200 volts direct and when necessary it may be operated in parallel with the South Boston generators through the busbars of the Egleston Square substation, to which it is already connected by a duplicate cable underground transmission line.



Boston Elevated Power—Diagram of Distribution and Switching System

The high-tension cables leave the South Boston power station in underground conduits composed of 3½-in. square vitrified-clay ducts and continue west under East Second Street to the corner of Broadway and Dorchester Street. One line of ducts branches north under Broadway at this point and continues under Fort Point Channel, which is crossed by submarine cables. The transmission line then runs in ducts under Atlantic Avenue to the East Boston tunnel, through which it is carried in vitrified ducts. From the east portal of the tunnel it continues in underground ducts to the East Boston substation. In the near future it will be extended under the river to Chelsea and thence in underground ducts to the Malden substation. This line

consists of two cables from South Boston to East Boston and one cable from East Boston to Malden.

The other line continues under Dorchester Avenue, Southampton Street and Albany Street to Dudley Street. Here it branches to the south and to the west. The south branch runs under Warren Street and Walnut Avenue parallel with Washington Street to Egleston Square substation. It then continues under Washington Street a distance of about 3 miles to Roslindale substation. The west branch runs under Roxbury Street and Longwood Avenue to the Coolidge Corner substation in Brookline. From this substation the line turns north and crosses the Charles River into Cambridge over the Essex Street bridge. A branch then turns north to the new Cambridge subway, where it enters ducts in the subway walls and runs east to the Kendall Square substation. The main transmission line continues northwest past the Harvard power station to Arlington substation. In the near future a branch from the Arlington substation will be built north and west to the Malden substation, thus completing the loop.

Three cables are run from South Boston direct to the Coolidge Corner substation and two to the Egleston Square substation, from which they are continued on to the Roslindale substation. From the buses at Coolidge Corner one cable runs direct to Arlington and two to Kendall Square. A single cable will connect the Arlington line with the Malden substation.

The complete transmission system has a total length of about 25 miles and 60 miles of high-tension cable has been installed. The length of high-tension duct constructed for present and future use is 142.7 miles. All cables in ducts are three-conductor, No. 0000, paper-insulated and lead-covered, and were furnished by the American Steel & Wire Company. The cables were installed in the ducts by the maker. The armored submarine cables required for crossings under water were furnished by the Waterbury Company.

SWITCHING ARRANGEMENTS

The incoming and outgoing high-tension feeders and the switching and busbar arrangements at the South Boston power station and each substation are shown in the diagram on page 1318. It will be seen that the duplicate buses in the South Boston power station are sectionalized into two parts, each pair of half buses being connected to one generator. The transmission lines from South Boston to each side of the main loop and to the Egleston Square substation are in duplicate, one cable of each line being connected to one half bus at the power station and the other cable to the other half of the bus. Either or both generators can feed any or all substations from either or both halves of the station buses.

Provision has been made in all substations for installing a common bus in addition to sectionalizing buses for the rotaries. In general the bus and switching arrangements in all substations are the same. One incoming feeder is connected to a sectionalized rotary bus supplying two machines. Where two feeders enter a station the second incoming feeder is connected to a second sectional bus and the outgoing feeder is connected to the same bus. Each sectional bus is connected to the common bus through suitable disconnecting and oil switches.

The 3500-kw generator at the Dorchester station is connected with the Egleston Square substation by two cables which are tied in to the two halves of the substation buses.

LOAD DISPATCHING

Up to the present time the load dispatching of the system has been directed from the central power station by a chief dispatcher and two assistants, who receive hourly reports from all stations. In emergencies the dispatcher on duty gives the necessary instructions to all the power stations to regulate the voltage so as to equalize the loads. These dispatchers will be moved to the South Boston station and from there they will order the direct-current generating station and substation operation as well as the alternating-current generation.

The new substations and the South Boston power station will be run in two eight-hour shifts and will be shut down at night. As will be seen from the daily load curve, on page 1313, the maximum load from 9 p. m. to 5 a. m. does not exceed 25,000 kw and between 3 a. m. and 4 a. m. is less than 5000 kw. Such light loads cannot be handled as economically by one of the 15,000-kw units at South Boston, including substation conversion, as by operating a few smaller direct-current generators in two or three of the older power stations.

SOUTH BOSTON POWER STATION

A description of the new South Boston power station will be published in an early issue of this paper.

DETROIT FRANCHISE SITUATION

In view of the rumors in reference to the proposed Detroit United Railway franchise, J. C. Hutchins, president of the company, has written the following letter to stockholders:

"There is now pending before the people of the city of Detroit an ordinance which is intended to settle all existing differences between the company and the city. This ordinance, if adopted, will very considerably reduce the income of the company, but the company's resources outside and inside of Detroit will still be sufficient to protect your holdings. The probabilities are that the people will ultimately adopt this ordinance, because it gives to them the rates of fare for which they have long contended and which the company, by reason of the extension of its operations, is only now able to give; but whether the ordinance is adopted or not, or whether or not the city acquires the part of your property which lies within its limits, as the ordinance provides it may do, you need not worry, for the reason that the property your stock represents, covering, as it does, equities in more than 750 miles of well-appointed electric railways, is worth more than the face of the stock.

"My purpose in issuing this circular is to warn you not to be misled by sensational newspapers or designing persons into any needless sacrifice of your holdings."

STATEMENT OF A. B. DU PONT

A. B. du Pont, who was consulted by the city officials of Detroit in reference to the franchise before the general terms of the settlement were announced publicly, has made the following statement in reference to the proposed ordinance requirements at the request of Mayor Thompson of Detroit:

"Viewed from either the standpoint providing a plan to facilitate municipal ownership or as an ordinance providing for private ownership, I consider it the best settlement in the interest of the public that has as yet been proposed in Detroit and better than any that has been adopted by any other city.

"First: From the standpoint of municipal ownership this ordinance binds the railway company effectively to sell and deliver all of its property within the city limits at a just price to the city in as short a time as is practicable after the city determines to buy the same.

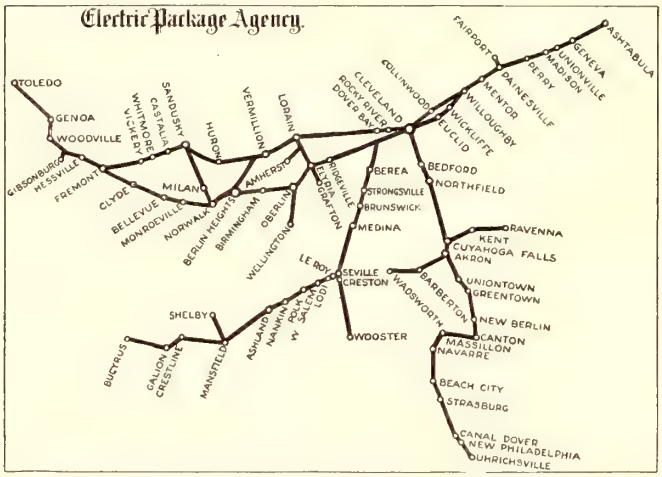
"Second: Viewed as an operating ordinance it provides for the lowest rate of fare that any street railway has contracted to operate in the United States and in addition provides for the regulation of the service as the traffic demands.

"It also is the only ordinance that I know of anywhere that binds the railway company properly to provide for additional tracks to be constructed and operated where the city designates.

"I believe that the limitation of 5 per cent of the then existing tracks that must be built at the city's election each year is ample to secure for the city the full length of the proposed adequate street railway facilities."

AGENTS' LIST OF POINTS REACHED BY ELECTRIC PACKAGE AGENCY

For the information of agents in billing shipments Edgar H. Hyman, general manager of the Electric Package Agency, Cleveland, has issued a list of offices and other points. This list was filed with the regulating commission of Ohio. The agency is agent for the Lake Shore Electric



Map Showing Stations Reached by the Electric Package Agency

Railway, the Cleveland, Southwestern & Columbus Traction Company, the Northern Ohio Traction & Light Company, the Cleveland, Painesville & Eastern Railroad and the Cleveland, Painesville & Ashtabula Railroad.

The list shows on one page the graduated charges for packages weighing less than 100 lb. The list of offices is given alphabetically. It shows the name of the office, the stop number, the name of the railroad, the division of the railroad on which the office is located and spaces for the rates.

Another alphabetical list is given of points (cross-roads and stops) where no regular agencies are maintained. All shipments made to these points must be prepaid and receipted for at the risk of the owner. This alphabetical list shows the name of the point, the stop number, the name of the railroad, the name of the division of the railroad and spaces for the rates. The names of the points on which the agents are to make the waybills are also published. The accompanying illustration is a reproduction of a map which is published on one page in order to give agents a clear understanding as to the point on which the waybills are to be made out. For instance, if a shipment is made to Beach Park, located on the Lake Shore Electric Railway between Dover Bay and Lorain, the waybill would be made on Lorain on a westbound shipment or on Dover Bay on an eastbound shipment.

COMMITTEES OF THE ACCOUNTANTS' ASSOCIATION

President P. S. Young, of the American Electric Railway Accountants' Association, has made the following appointments of committees for the current year:

Committee on a statistical unit for car operation: C. H. Lahr, chairman; E. L. Kasemeier and C. S. Mitchell.

Committee on prepayment car operation: M. R. Boylan, chairman; H. J. Davies and C. D. Huggins.

Committee on physical valuation: R. N. Wallis, chairman; A. R. Patterson and H. E. Weeks.

Joint committee on engineering accounting: F. B. Lasher, co-chairman; C. E. Thompson, A. F. Elkins, J. C. Collins and H. M. Grafton.

Committee on destruction of records: H. S. Swift, chairman; R. Morrison and J. M. Kee.

COMPARATIVE EARNINGS OF PROPERTIES

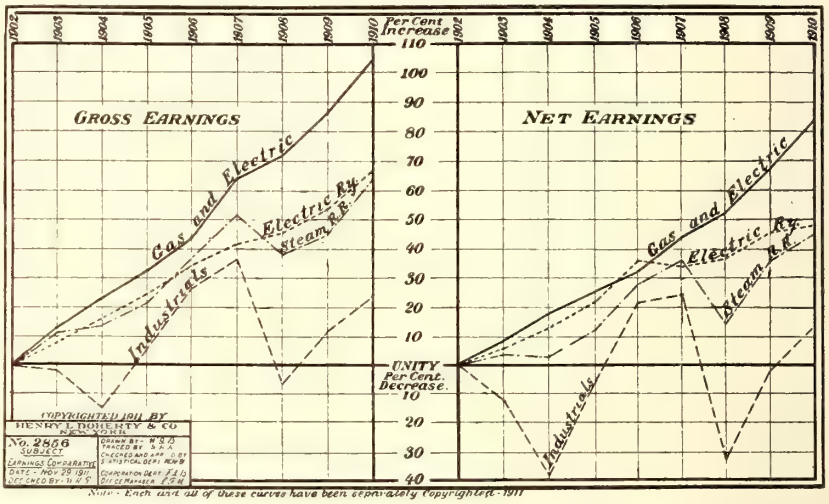
Henry L. Doherty & Company, of New York, have compiled charts showing the relative increases and decreases in gross and net earnings of steam railroads, electric railways, gas and electric companies and industrials for the years from 1902 to 1910. The charts are reproduced herewith.

In the compilation of these charts the gross and net earnings of all steam railroads in the United States were used. For the electric railways the gross and net earnings in most of the larger cities of the country, exclusive of New York City, were taken. The gas and electric lighting returns were based on a similar selection of properties and New York City was also excluded in this case. The industrial figures are of operating companies whose securities are listed on the New York Stock Exchange and whose records could be traced back to 1902. The gross earnings of the latter group of properties in 1902 amounted to about $1,250,000,000.

In making the charts public Doherty & Company call attention to the fact that the gross and net earnings from the gas and electric business increased the most rapidly and that they were practically unaffected in their rate of increase even by such panic conditions as those of 1907 and 1908. The gas and electric properties alone experienced no decrease for any year in net earnings; while the gas and electric and street railway properties are the only classes of properties which showed no decrease in gross earnings.

The rate of increase in gas and electric companies declined in 1908. Mr. Doherty states that this decline in the rate of increase of gas and electric company gross earnings in 1908, while net earnings were unaffected, was due to the fact that many managers of lighting plants made the mistake of curtailing their business-getting expenditures during the period of panic conditions.

The electric railway earnings, both gross and net, are much steadier than are those of the steam railroads.



Comparative Gross and Net Earnings of Different Classes of Properties

The Railroad Commission of Nevada has sent to the representatives of that State in Congress a petition for the abolition of the Commerce Court and the enactment of a law designed to expedite the passage of all public service commission cases in the federal courts.

FARE COLLECTION AND REGISTRATION IN PROVIDENCE, R. I.

The Rhode Island Company, which operates all the street car service in Providence, Pawtucket and Woonsocket, has been using the Rooke system of fare collection and registration for more than four years. Beginning with the cars on one line, the company gradually introduced the system on all lines, and all fares, amounting to between $4,000,000 and $5,000,000 annually, are now collected by this method. About 425 cars are regularly operated by the company. From the standpoint of the company and the public the system has been entirely satisfactory. It undoubtedly has saved the company many nickels and also simplified the accounting for conductors' receipts, has not delayed the collection of fares on cars or caused any inconvenience to passengers and has reduced the amount of inspection required.

The company has a sufficient supply of registers to assign one to each regular and extra conductor, with four or five extra registers in each carhouse for replacements and emergency use. The same register is given out to the same conductor each day, so that he is personally responsible for its condition, and any tampering with the mechanism can be traced directly to the person responsible. The rules of

THE RHODE ISLAND COMPANY

Inoperative Register Report

Date ..... 191 Time ..... A. M. ..... P. M.

Line ..... Going .....

Cond. ..... No. .....

Point where reg. became inoperative .....

Cause of reg. becoming inoperative .....

Total No. Fares (cash and ticket) on half trip .....

" " " " " collected by hand .....

" " Cash fares " " .....

WITNESSES

Name ..... Address .....

" ..... "

" ..... "

Inoperative Register Report Card

the company require the registers to be turned in each night, and in the case of conductors having more than three hours' lay-off in the middle of the day the registers must be turned in at the completion of the morning work. The registers are kept in a locked wall cabinet in the carhouse receiver's office when not in use. The receiver reads and records the registers when issued and returned and checks the difference between the ending and beginning numbers against the conductor's cash receipts as shown on the day card. No matter how many cars a conductor has had to work on during the day, his complete register readings are all together and the auditor does not have to check a number of car register readings to compare with the total shown on the conductor's day card.

Transfers, complimentary, school and other forms of special tickets are not registered, but regular 5-cent coupon tickets when presented are exchanged for a 5-cent piece, which the passenger must insert in the register in the usual manner. Very few of these tickets are used. If many were used, metal disks could be substituted and these could be inserted in the registers in the same manner as nickels. When conductors turn in their receipts, cash is placed in a white envelope, transfers in a yellow envelope and all other forms of tickets in a blue envelope. These three envelopes are put in a canvas sack, which is deposited in the receiver's safe, and the time of depositing is entered on the back of the day card. The money and tickets are counted in the auditor's office on the following day. Conductors are held to account for all shortages and any overage is returned to the auditor.

To guard against false reports of inoperative registers, conductors are required to fill out an inoperative register report slip whenever the registers fail to operate properly and it is necessary to collect fares by hand. These slips must be signed by three witnesses on the car and are turned in with the defective register. If there are any suspicious circumstances connected with the failure of the register, the witnesses are communicated with and requested to state as accurately as possible where the register failed, how many passengers were on the car and how many fares the conductor collected by hand.

Little trouble has been experienced from passengers refusing to insert a coin in the register. The company's rule covering this point is as follows: "Should passenger refuse to insert fare, conductor will refer passenger to printed rules posted in car and insist on compliance with same. If proper payment is still resisted, conductor will take passenger's name and address, if possible, and request another passenger to insert fare for the objecting passenger. Do not allow passengers to ride without payment of fare. Report of the occurrence must be made to the superintendent of transportation. If passenger wishes to pay more than one fare he must pay each fare in identically the same manner as he would his own. If passenger refuses, conductor will proceed to collect single fare from each of the party."

The reasonableness of the rule requiring a passenger to insert a coin in the register in the act of paying fare has been passed on by the Supreme Court of Rhode Island, which decided in favor of the company. This decision was commented on in an editorial in the ELECTRIC RAILWAY JOURNAL of Jan. 21, 1911, page 102. The court upheld the action of a conductor who ejected a passenger who refused to insert a nickel in the register in payment of his fare and at another time tendered five pennies in payment, which he refused to exchange for a nickel to be inserted in the register.

ELECTRIC RAILWAY SIGNALING COMMITTEE OF RAILWAY SIGNAL ASSOCIATION

The board of direction of the Railway Signal Association, which was elected in October, 1911, has recently completed selecting its committee on electric railway and alternating-current signaling, and after carefully reviewing the work as presented by the 1911 committee, which consisted of a thorough historical report of a.c. signal installations, has assigned the following outline of work to the 1912 committee:

(a) Continue investigation of systems in operation. (b) Prepare requisites of apparatus and material for an a.c. automatic block signal system. (c) Prepare specifications for material and workmanship for a complete a.c. automatic block signal system. The committee is particularly strong this year, as it is composed of engineers from electrified steam roads and large interurban systems who have had a wide a.c. signaling experience. They will cooperate with the joint committee on block signals of the American Electric Railway Engineering and Transportation & Traffic Associations.

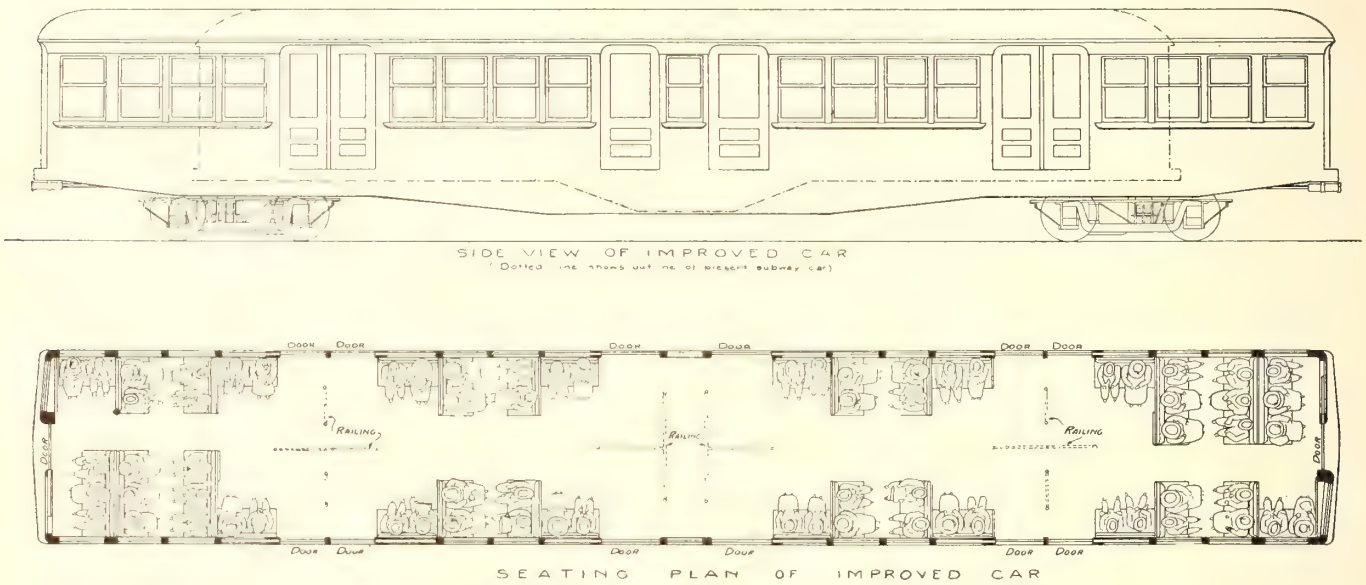
The 1912 committee of the Railway Signal Association is composed of the following members:

Committee VIII—H. S. Balliet (N. Y. C.), chairman; C. H. Morrison (N. Y., N. H. & H.), vice-chairman; W. P. Allen (Penn.); W. F. Follett (N. Y., N. H. & H.); E. C. Grant (U. P.); W. F. Hudson (N. Y. C.); John Leisenring (Ill. Traction); H. A. Logue (Cumb. Valley); W. W. Morrison (N. Y. C.); C. R. Peddle (Interborough R. T.); B. H. Richards (C., R. I. & P.); John Roberts (New York, Westchester & B.); J. E. Saunders (A., T. & S. F.); E. B. Smith (N. Y. C.); W. N. Spangler (Penn.); F. S. Starratt (S. P.); F. E. Wass (N. Y. C.); J. R. Wills (O. S. L.); J. A. Beoddy (N. & W.).

CAR PROPOSED BY BROOKLYN RAPID TRANSIT SYSTEM FOR SUBWAY SERVICE

The Brooklyn Rapid Transit System is preparing to submit to the Public Service Commission of the First District, New York, a new type of car which is proposed as the standard rolling stock equipment for the rapid transit lines which were allotted to the Brooklyn Rapid Transit System in July, 1911, by the Public Service Commission and by the New York City Board of Estimate.

The car is somewhat like the new Cambridge subway car of the Boston Elevated Railway, and its two most striking features, as compared with the present type of subway car operated in New York, are its greater length and its greater facility of entrance and exit by means of six doors on each side. The present subway car in New York is 51 ft. long and when used in express service has a door at each end and one in the middle. The proposed



Plan and Side Elevation of Brooklyn Rapid Transit Company's Proposed Subway Car

car will be 67 ft. long, and, as shown in the accompanying side elevation and plan, it will have a pair of doors in the center and a pair midway between the center and each end of the car. End doors will also be provided to permit access from one car to another.

The increased length and the partial use of cross seats and of folding seats alongside the doors will give a seating capacity of seventy as compared with the forty-two to forty-four of the present subway cars. An increase in seating capacity up to eighty-four will be possible during the non-rush hours, when only part of the doors will be required. It is proposed to have the guard stand on a platform opposite the center panel to watch and control all doors. The standing load of this car is estimated at 102 persons. The aggregate capacity of the car with all doors in use would be 60 per cent greater than that of the New York cars. A train of eight cars constructed according to the new design would be only 26 ft. longer than the present ten-car trains, but would carry 30 per cent more passengers. Railings will be provided opposite the doors as shown to separate the opposing streams of passengers and also to give standing passengers a better support than would be afforded by straps.

The design described has not yet been worked out fully in its mechanical and electrical details. It is intended, however, that trains should consist only of motor cars which are to carry one motor per truck. This arrangement will give sufficient tractive effort, despite the fact that the truck bolsters will be offset to secure the equalization of weight on all axles.

MID-YEAR BANQUET ON JANUARY 26

The executive committee of the American Electric Railway Manufacturers' Association has issued a circular letter to its members calling attention to the mid-year meeting of the American Electric Railway Association on Jan. 25-26, 1912. Following an established custom, the executive committee of the Manufacturers' Association has extended an invitation to the street railway delegates in attendance at the mid-winter meeting to dine on Jan. 26, 1912. This invitation has been accepted by President McCarter on behalf of the delegates. Arrangements have been made to have speakers of national prominence talk on live, interesting subjects. The circular continues: "Owing to the unusually large attendance last January, which will in all probability be greatly exceeded at the coming dinner, the committee on arrangements has reported that the dinner will be held in the grand ballroom of the Hotel Astor at 7 o'clock sharp Jan. 26, 1912, and the price per plate has been fixed at $10. The committee also wishes to announce that any member, upon procuring the necessary tickets, may invite other guests, including any representatives of any railway company, who are not delegates to the mid-winter meeting. All applications for tickets must be made to the secretary-treasurer on or before Jan. 19, 1912, on the application blank inclosed and must be accompanied by check for the full amount."

COASTING CLOCK SAVINGS ON THE THIRD AVENUE RAILROAD, NEW YORK

During the month of October, 1911, the Third Avenue Railroad, New York, operated seventy-five out of about 125 cars on its Forty-second Street and Broadway line with coasting clocks furnished by the Railway Improvement Company, New York. According to an investigation made by Thomas F. Mullaney, chief engineer of the railway company, the apparent saving effected by installing these clocks was equivalent to $568.50. The brakeshoe cost was also lowered appreciably. To obtain the figures quoted, the railway company compared the energy consumption and mileage for October with the average energy requirements per car mile for May, June and July.

The Pensacola (Fla.) Electric Company has decided to adopt green as the standard color for its cars, instead of yellow.

News of Electric Railways

Transfer Order of New Jersey Board Upheld

The Supreme Court of New Jersey on Dec. 26, 1911, sustained the State Board of Public Utility Commissioners in ordering the Public Service Railway to issue transfers upon all lines operating in Newark. The court held that the order, which was attacked in certiorari proceedings brought by the company, does not violate any of its contract rights. Justice Bergen, by whom the decision was rendered, stated briefly the ruling of the court in the syllabus of his opinion, which follows:

"An ordinance granting to a company the right to construct and operate a street railway along the public streets of a city which provides for a system of transferring passengers, subject to any future regulations of the board, does not stop the municipality from subsequently requiring that a transfer ticket be given upon request to any passenger who has paid his fare, entitling him to a continuous ride in either direction on any railway intersecting or connecting with the line upon which such transfer is to be given."

Justice Bergen reviewed briefly the substance of the complaint lodged with the Utility Board by William Mungle, through his counsel, Joseph G. Wolber, together with the subsequent order of the board, which among other things directed the Public Service Railway to "desist from refusing to give transfers upon any street railway line intersecting or connecting with the line upon which such transfer was originally given."

The court says: "The precise question argued was, Must a passenger wait for a particular car which will carry him to his destination without change, or can he take any of prosecutor's cars with the right to a transfer at any connecting or intersecting points to another of prosecutor's cars which will carry him to the same point he would have reached by taking a car not requiring him to transfer?

"The first point made by the prosecutor is that the questions relating to transfers had been dealt with by previous ordinances, which became contracts not subject to future regulations relating to transfers, although such ordinances contained the condition 'subject, however, to any future regulations of the board.'

"The first ordinance relating to transfers was adopted on Dec. 29, 1892, and required the predecessors of the prosecutor to establish and maintain a system of transfers for a continuous ride within the city limits for a single fare and to give and receive like transfers from the lines of other railways, and also provided that the ordinance should not be construed to require transfers to be given to or from lines running in the same direction and substantially parallel.

"If we assume that the ordinances are contracts between the city and the prosecutor, the company is nevertheless subject to any future regulation of the board, and the point is made by the prosecutor that such reservation is not broad enough to cover any change in the transfer requirements.

"I am of opinion that the requirement relating to transfers is a regulation which appertains to the sale of tickets and the operation of the railway concerning its method of carrying passengers to their destination for a single fare of 5 cents. What the prosecutor claims the right to do in such operation is to compel passengers to enter only such cars as would carry them to their destination without change, and this order requires it to so operate its railway as to allow passengers to take any car going in the required direction with the privilege of transferring at intersecting points, and this is not invasion of any contract right, but a further regulation of the system of transfers.

"The objection that the stopping of the cars at intersecting points to permit these transfers results in unnecessary cost and waste of power is more fanciful than real, for in practice these cars usually stop at intersecting points. The order under review does not violate any contract right of the prosecutor, because the giving of transfers and the efficiency to be given them were within the reservation 'subject to any future regulation of the board.'"

Study of Traffic Congestion Urged by Mayor of Boston

Mayor Fitzgerald of Boston, Mass., has sent the following letter to the Boston Transit Commission asking the commission to study the question of lessening the congestion of traffic in the business section of Boston and particularly the feasibility of constructing sidewalks under Washington Street and Tremont Street, between Boylston Street and School Street, and under West, Winter, Bromfield and School Streets and Temple Place:

"The congestion of traffic in the business section of Boston has brought about a condition which in the crowded hours of the day amounts virtually to a blockade. With the holiday season upon us, when pedestrians are forced into the middle of the streets and over the car tracks, and even then are able to make little headway through the intermingling throngs, it has seemed to me that responsible officials should put their wits together in an effort to find a solution for conditions that are rapidly becoming intolerable. I would ask the Rapid Transit Commission, therefore, to interpret broadly its power under the acts of the Legislature and to utilize its admirable resources for the study of this question. In particular, I would ask your commission to consider the suggestion of sub-sidewalks in the main arteries of travel downtown. The congestion here is a sidewalk congestion, as the heavy teaming does not take these routes and a considerable portion of the car service has been diverted to the subway and the tunnel. Unless there are engineering obstacles the sub-sidewalk would seem to be the cheapest and most effective remedy that has been proposed. It consists of a passageway from 8 ft. to 10 ft. below the surface walk, with entrances leading from it into the stores at one side and stairways to the surface at moderate intervals. The plan does not involve any legal difficulty, as the use of this space for cellars or areaways is merely a revocable easement, subject to the right of the city to enter and resume control of the space for public purposes. Nor, as I understand it, is the city obliged to award compensation to the owners dispossessed. I suggest that your commission confer with the street commissioners, and, in so far as it may properly do so, apply itself to this problem, which is as pressing as any that has engaged the attention of the municipal authorities and civic organizations in recent years."

Decision in New Jersey Franchise Tax Case

The Supreme Court of New Jersey has rendered a decision upholding the constitutionality of the Voorhees franchise tax levied upon the basis of gross receipts as applied to street railways engaged in interstate commerce. The decision was announced by Justice Trenchard in the suit brought by the Phillipsburg Horse Car Railroad against the State Board of Assessors to set aside the franchise tax levied for the year 1910. The road owned by the company is located in Hopatcong Township and Phillipsburg in New Jersey. Two divisions of the line meet at Union Square in Phillipsburg, and cars from both divisions cross the Delaware bridge on tracks owned by the bridge company and then proceed on tracks owned by the Easton Transit Company to Centre Square in Easton, Pa. The company is a New Jersey corporation having no franchises of any kind in Pennsylvania, but operating in that State upon tracks owned by the Easton Transit Company. Each corporation accepts transfers of the other, so that the question of gross receipts is not affected by this exchange. In making its return to the State Board, the Phillipsburg Horse Car Railroad sought to apportion the receipts between intrastate and interstate traffic and insisted that the franchise tax should be ascertained by taking 4 per cent of the receipts derived from intrastate traffic only. In deciding against this view Justice Trenchard said:

"The laws of 1906 require the State Board of Assessors to levy an annual franchise tax upon such proportion of the

annual gross receipts of a street railway as the length of its line in this State upon any street, highway, road, lane or other public place bears to the length of its whole line. The annual franchise tax which the laws of 1906 require the Board of Assessors to levy upon such proportion of the annual gross receipts of a street railway as the length of its line in this State upon any street, highway, road, lane or other public place bears to the length of its whole line is not levied on the gross receipts of the corporation nor on the business of the corporation, but is merely an excise tax on the franchise of the corporation, namely, the franchise to exist and the franchise to occupy the streets, which is measured in part by the gross receipts. Therefore such franchise tax is not a regulation of interstate commerce, and the act under which it is levied is not in conflict with the clause of the Constitution of the United States giving to Congress power to regulate commerce among the several states."

Progress of Negotiations in Toledo

Pending the meeting of the directors of the Toledo Railways & Light Company on Dec. 28, 1911, the people of Toledo have been discussing the new proposition for a settlement of the franchise question which has been made by the company.

F. R. Coates, president of the Toledo Railways & Light Company, returned to Toledo on Dec. 22, after conferring in New York with the bondholders on the request of the city that a rate of seven tickets for 25 cents be made pending the settlement. Mr. Coates gave no information as to what transpired at the conference, but reports have gained circulation that the bondholders and creditors' committee feels that the rate should start at six tickets for 25 cents and universal transfers.

Progress of Plans for Terminating Receiverships in New York

The reorganization committee of the Third Avenue Railroad, New York, N. Y., filed a petition with Judge Lacombe of the United States Circuit Court on Dec. 26, 1911, asking that F. W. Whitridge be discharged as receiver and the property be turned over to the Third Avenue Railway on Jan. 1, 1912. James N. Wallace, Adrian Iselin, Harry Bronner, James Timpson, Frederick H. Shipman, W. E. Roosevelt, John W. Platten, Joseph H. Seaman, George W. Davison, Edward A. Maher, Franklin L. Babcock and Milton Ferguson are directors of the Third Avenue Railway. On Dec. 27, 1911, the following announcement was made: "Mr. Whitridge has been elected president of the Third Avenue Railway by the sub-committee of directors appointed to effect a permanent organization. Mr. Whitridge will be formally elected president by the full board at a later date; he will be elected a director of the company at the same time."

It was announced on Dec. 26, 1911, that practically all of the $37,560,000 consolidated 4 per cent bonds of the Third Avenue Railroad had been deposited with the Central Trust Company for participation in the reorganization. The exact percentage of deposited bonds is 99¾, while 95 per cent of the $15,995,800 of stock has been placed with the Central Trust Company, New York. The period for depositing the securities ended on Dec. 23, 1911. The owners of stock were required to pay an assessment of $15 per share at the time of depositing their holdings, while further assessments of the same amount are required on Jan. 15 and Feb. 15, 1912. The Central Trust Company has agreed to take the place of stockholders who do not assent to the terms of reorganization and to guarantee the difference between the funds raised by the assessment and the $7,200,000 necessary to carry out the plans.

Announcement was made on Dec. 27 that the bondholders' committee of the Metropolitan Street Railway, which will be sold under foreclosure on Dec. 29, 1911, had appointed E. S. Marston, of Blair & Company, A. J. Hemphill, president of the Guaranty Trust Company, and G. E. Tripp, of Stone & Webster, as a committee to bid in the property. It was also announced that the board of directors of the new company will consist of nine members. At present six of these will be elected by the bondholders' committee and three by the stockholders, but when final reorganization is effected the bondholders will elect four of the directors and the stockholders five.

Theodore P. Shonts, president of the Interborough Rapid Transit Company and the Interborough-Metropolitan Company, will, it is said, be elected executive head of the surface system, as soon as the property is turned over to the shareholders, which probably will be immediately after the foreclosure sale. As the holder of 90 per cent of the Metropolitan Street Railway's $52,000,000 stock, the Interborough-Metropolitan Company will be called upon to pay an assessment of $5,500,000, or $12.90 per share, for which $14.13 will be received in new bonds and $30.91 in new stock.

On Dec. 27 A. J. Hemphill, president of the Guaranty Trust Company, issued the following statement: "Holders of Metropolitan Street Railway general and collateral trust 5 per cent gold bonds who have not up to this date deposited their bonds under the bondholders' agreement, and the plan and agreement for the reorganization, may deposit such bonds, without penalty, with the Guaranty Trust Company, as depositary, provided their bonds, with all coupons maturing after Aug. 1, 1907, are deposited with the depositary on or before Dec. 29, 1911. After that date no further extensions can be promised by the reorganization committee, and if the time is extended after that date, in any event, a penalty will be imposed. This is the last call for the few bondholders who have failed to take advantage of the opportunity of deposit."

California Utility Bill Passed.—The public utility bill introduced into the Legislature of California was passed by the Senate on Dec. 16, 1911, and is before the Governor for his signature. The principal provisions of the measure were referred to briefly in the Electric Railway Journal of Dec. 16, 1911, page 1253.

Meeting of Canadian Society of Civil Engineers.—On Dec. 14, 1911, Guy M. Gest, New York, N. Y., addressed the members of the Canadian Society of Civil Engineers on underground conduit construction. The speaker described conduit systems in use in the United States and in England and in Montreal, Can.

Municipal Railway Proposed in Pasadena.—Petitions are being circulated for an initiative ordinance providing for the construction of a municipal street railway in Pasadena, Cal., to be 1½ miles long and to be operated with power from the municipal light plant. The petition requests the City Council to submit the question to the voters of Pasadena at the election to be held in that city early in 1912.

Appraisal of Twenty-eighth and Twenty-ninth Streets Crosstown Railroad.—Henry Floy, New York, N. Y., consulting engineer, has been engaged by J. B. Mayer, receiver of the Twenty-eighth and Twenty-ninth Streets Crosstown Railroad, New York, N. Y., to appraise the property of that company for use in connection with the reorganization of the company and at the hearings before the Public Service Commission, First District.

Columbus Rioter Guilty.—George W. Brady, alias Gerald O'Leary, was found guilty in the Common Pleas Court at Columbus, Ohio, recently on the charge of assault and battery after having been on trial for shooting Mrs. Catherine Kelley. Mrs. Kelley was wounded during the strike of the employees of the Columbus Railway & Light Company. Brady left Columbus during the strike, but was brought back for trial. The court fined him $1,742, the amount of the costs, and he was liberated under his old bond so that he could arrange to pay the fine.

Public Be Pleased Policy.—E. M. Mills, who was recently elected president of the Seattle, Renton & Southern Railway, Seattle, Wash., has announced the policy of the company under his direction as follows: "The policy of the new management will be to improve the service, rehabilitate the property and in every way possible co-operate fully with the residents and property owners of Rainier Valley in promoting the welfare of that section of the city. New equipment has already been ordered and many betterments will be undertaken to assure the patrons of the line effective service. It will be the policy of the company to meet the views of its patrons so far as can be done in the way of frequent and satisfactory service."

Electrolysis Danger Slight in Chicago.—Addressing the Chicago Real Estate Board at a recent luncheon, Ray Palmer, the consulting engineer who reported to the commissioner of public works of Chicago on the subject of dangers to underground metallic structures from corrosion due to the electrolytic action of stray electric currents, said that there was no cause for apprehension as to the result of electrolysis in Chicago. The city authorities were taking the necessary steps to meet the condition by requiring the electric railways to improve their return-circuit conditions to such an extent that the drop in the return circuit would not exceed a maximum allowable drop of 12 volts. Mr. Palmer explained the electric "drainage" system which he recommended.

Another Public Utility Bill for Washington, D. C.—Representative Oldfield of Arkansas, a member of the House committee on the District of Columbia, has introduced into the House a bill to create a public utilities commission to supervise the affairs of the public service corporations which operate in the District of Columbia. This is the second bill of the kind to be introduced. The other measure was put before the Senate by Senator Gallinger, chairman of the District committee of the Senate, and was referred to in the ELECTRIC RAILWAY JOURNAL of Dec. 23, 1911, page 1289. The principal difference between the measures introduced by Representative Oldfield and Senator Gallinger is in the method proposed for appraising the value of the physical property of the public service corporations.

Mr. Mitten's Work in Chicago.—In commenting editorially on the resignation of T. E. Mitten as president of the Chicago (Ill.) City Railway, the Chicago *News* said: "T. E. Mitten belongs to the new type of public utility manager. He believes the public utility corporation official best serves the company whose policy he directs when he cultivates cordial relations with the public at large. Mr Mitten came to Chicago when traction matters were in a critical stage. Throughout his career in this city Mr. Mitten has been noticeably fair in his dealings with public questions affecting his corporation. Mr. Mitten believes in good service. He has been progressive in introducing improvements. It has been most fortunate for Chicago that he was in direct charge of one of the principal companies during an important period in the development of the transportation policy of the city. His retirement from the local traction field at this time is a loss to the community."

Seattle's Proposed Municipal Railway.—More than a year ago the citizens of Seattle, Wash., voted to issue $800,000 of bonds to purchase the Seattle, Renton & Southern Railway or build a new system. As the Seattle, Renton & Southern Railway was worth much more than the total of bonds which had been voted, it seemed to be necessary to build a new system. When the city tried to sell the bonds in the Eastern market the lawyers for the bond houses refused to pass them. Notwithstanding this, the Council decided to sell $300,000 of the bonds to the citizens of Seattle. The bonds bear interest at the rate of 4½ per cent, and, as the citizens of Seattle are accustomed to a return of from 8 per cent to 12 per cent on their money, even this scheme seemed likely to move slowly. Desirous of building the road at once, the Council then proposed to borrow $300,000 temporarily from the general funds. This has met with considerable opposition and it may prove to be legally impossible.

Valuing the Chicago Elevated Railways.—The work on the valuation of the elevated railways in Chicago will be taken up at once. The valuation commission received its instructions on Dec. 26, 1911, from Alderman Reinberg, chairman of the committee on local transportation. The commission is to value only tangible property. At a conference held in the Mayor's office on Dec. 26 it was decided to send a communication to John Ericson, chairman of the valuating committee, informing him that all questions of overhead charges will be dealt with by a sub-committee of aldermen. The sub-committee already is on record as opposing any values being placed on franchises and other intangible assets. Alderman Reinberg in a recent letter to the companies said that the valuating commission would be instructed to place a value on the intangible property without committing the city in any way to recognize such a valuation.

Report of Annual Dinner of Railway Business Association.—The Railway Business Association has just published in pamphlet form the speeches made at the third annual dinner of that association, held in New York on Nov. 22, 1911. The speakers at that dinner were Hon. Emmet O'Neal, Governor of Alabama; Walker D. Hines, chairman executive committee Atchison, Topeka & Santa Fé Railway; A. C. Rulofson, president California Home Industry League, and H. J. Pettengill, Texas Commercial Secretaries and Business Men's Association. George A. Post, president of the association, was toastmaster. The general subject discussed by all of the speakers was "Government Responsibility for Railway Progress." Many of the invited guests were officials from the chambers of commerce or other prominent civic bodies from some twenty of the larger cities of the country. The addresses at the meeting should form very interesting reading for those who were unable to be present at the dinner.

Contract Signed for Building St. John Valley Railroad.—The contract for building the St. John Valley Railroad has been signed by H. F. McLeod, provincial secretary, representing the Province of New Brunswick, and A. R. Gould, president of the St. John & Quebec Railway, representing the company. The contract provides for a steam railroad from St. John, N. B., to Grand Falls, N. B., 208 miles, the Province guaranteeing bonds to the amount of $25,000 per mile. The undertaking is to be financed by F. J. Lisman & Company, New York, N. Y. The promoter, A. R. Gould, Presque Isle, Me., is general manager of the Maine & New Brunswick Electric Power Company, Ltd., and president and general manager of the Aroostook Valley Railroad, a freight-carrying electric railroad which runs into the country from Presque Isle. The Aroostook Valley Railroad has a charter for an extension westward across northern Maine to the border of Canada, in Casgraine Township, L'Islet County, Quebec. Mr. Gould also procured from the Maine Legislature last March a special permit to purchase and electrify the Presque Isle branch of the Canadian Pacific Railway. Charter rights would be needed from the Aroostook Valley Railroad to the proposed St. John Valley Railroad, a distance of 12 miles to 30 miles, according to the route selected, in order to connect the roads.

PROGRAMS OF ASSOCIATION MEETINGS

American Society of Civil Engineers

The fifty-ninth annual meeting of the American Society of Civil Engineers will be held at the house of the society, 220 West Fifty-seventh Street, New York, N. Y., Jan. 17 to 20, 1912. The business meeting will be held at 10 a. m. on Jan. 17. On Jan. 19 and 20 three technical meetings will be held at which the general subject for discussion will be "Road Construction and Maintenance." An elaborate program of entertainment and excursions to points of engineering interest has been arranged.

Wisconsin Electrical Association

The annual meeting of the Wisconsin Electrical Association will be held in the clubroom of the Pfister Hotel, Milwaukee, Wis., on Jan. 18 and 19, 1912. An unusually attractive program has been arranged for this meeting. It will include papers and discussions on twelve or more subjects connected with the electric lighting and railway business.

The association dinner will be held on Thursday evening at 7 o'clock. The principal speaker will be the Hon. J. Adam Bede, of Minnesota, who is said to be one of the best entertainers on the platform to-day.

The preliminary announcement of the meeting, issued by President Wheeler, says that every electric utility in the State, whether a member of the association or not, is cordially invited to send its representatives to this meeting. Those who come for the first time will be so impressed with the value of the meetings and the need of the work that they will permanently ally themselves to the association.

The officers of the association expect to issue a formal program about Jan. 1. Information in regard to hotel reservations and rates, etc., should be addressed to the secretary, George Allison, Stephenson Building, Milwaukee, Wis.

Financial and Corporate

New York Stock and Money Markets

Dec. 27, 1911.

The New York market was practically inert on Wednesday until the closing hour, when trading became brisk. Disappointing earnings of Western railways for November and favorable reports on the steel trade were the items of import in financial circles during the day. The money market is exceedingly easy for the period of the year. Quotations for loans to-day were: Call, 3½@4 per cent; ninety days, 4 per cent.

Other Markets

Chicago Railway Series 2 certificates made a fractional gain in to-day's market, and were the only traction issues attracting any interest. Prices in general showed an upward tendency.

The Philadelphia market to-day was almost without feature, and many of the usually active issues were not traded in.

Copper shares advanced in the Boston market to-day, and many less important issues shared in the forward movement.

Baltimore prices were fairly well maintained to-day, but the market was very quiet.

Quotations of traction and manufacturing securities as compared with last week follow:

	Dec. 19.	Dec. 26.
American Brake Shoe & Foundry (common)	a90¼	a90¼
American Brake Shoe & Foundry (preferred)	a129¾	a131
American Cities Company (common)	a25	a25
American Cities Company (preferred)	a81	a78
American Light & Traction Company (common)	a295	a295
American Light & Traction Company (preferred)	a108	a108
American Railways Company	a45¼	a45
Aurora, Elgin & Chicago Railroad (common)	a40¼	a39½
Aurora, Elgin & Chicago Railroad (preferred)	a83¼	a86¼
Boston Elevated Railway	a130¼	a130¼
Boston Suburban Electric Companies (common)	a14	a15
Boston Suburban Electric Companies (preferred)	a76	a74
Boston & Worcester Electric Companies (common)	*12	*12
Boston & Worcester Electric Companies (prefeired)	a56	a55
Brooklyn Rapid Transit Company	a77¼	76¾
Capital Traction Company, Washington	a124½	124½
Chicago City Railway	a180	a190
Chicago Elevated Railways (common)	a31	a31
Chicago Elevated Railways (preferred)	a92¼	a93
Chicago Railways, ptcptg., ctf. 1	a99	a100⅛
Chicago Railways, ptcptg., ctf. 2	a37¾	37¾
Chicago Railways, ptcptg., ctf. 3	a11½	a11½
Chicago Railways, ptcptg., ctf. 4	a6½	a6½
Cincinnati Street Railway	130½	*130½
Cleveland Railway	a103⅞	*103⅞
Cleveland, Southwestern & Columbus Ry. (common)	*4⅞	*4⅞
Cleveland, Southwestern & Columbus Ry. (preferred)	a33¾	*33¾
Columbus Railway & Light Company	*37½	*37½
Columbus Railway (common)	*83	*83
Columbus Railway (preferred)	*90	*90
Dayton Street Railway (common)	a25	*25
Dayton Street Railway (preferred)	a101	a101
Denver & Northwestern Railway	*145	*145
Detroit United Railway	*85	*85
General Electric Company	155	154
Georgia Railway & Electric Company (common)	a150	a148
Georgia Railway & Electric Company (preferred)	a90½	*90½
Interborough Metropolitan Company (common)	15⅜	15¼
Interborough Metropolitan Company (preferred)	48¾	48⅝
International Traction Company, 4% notes, rcts	69½	*69½
Indiana Union Traction Company	12	*12
Kansas City Railway & Light Company (common)	*20½	*21
Kansas City Railway & Light Company (preferred)	*52	*52
Lake Shore Electric Railway (common)	*7	*7
Lake Shore Electric Railway (1st preferred)	*83	*83
Lake Shore Electric Railway (2d preferred)	*25	*25
Manhattan Railway	134	a137
Massachusetts Electric Companies (common)	a22⅞	a22¼
Massachusetts Electric Companies (preferred)	a96	a95¼
Metropolitan Street Railway, New York	*8	*8
Milwaukee Electric Railway & Light (preferred)	*105	*105
Norfolk Railway & Light Company	26	26
North American Company	a73⅞	a74⅛
Northern Ohio Light & Traction Company (common)	*57½	*57½
Northern Ohio Light & Traction Company (preferred)	a105	a105
Philadelphia Company, Pittsburgh (common)	a52¼	a52½
Philadelphia Company, Pittsburgh (preferred)	a43¾	a43¾
Philadelphia Rapid Transit Company	a23½	a23½
Portland Railway, Light & Power Company	*99½	*99½
Public Service Corporation	a110	a110
Seattle Electric Company (common)	a115	a115
Seattle Electric Company (preferred)	a101	a101¾
Third Avenue Railroad, New York	5⅞	*5⅞
Toledo Railway & Light Company	a4	*4
Twin City Rapid Transit, Minneapolis (common)	a108	*108
United Ry. & Electric Company (Baltimore)	18½	18½
United Rys. Inv. Co. (common)	32½	32⅛
United Rys. Inv. Co. (preferred)	60	60¼
Virginia Railway & Power Company (common)	a39½	*39½
Virginia Railway & Power Company (preferred)	82	82
Washington Ry. & Electric Company (common)	a49½	a50¼
Washington Ry. & Electric Company (preferred)	a89	a89
West End Street Railway, Boston (common)	a87½	*87½
West End Street Railway, Boston (preferred)	a103½	a103⅛
Westinghouse Elec. & Mfg. Co.	a68¾	a66½
Westinghouse Elec. & Mfg. Co. (1st pref.)	a117½	a117½

aAsked. *Last sale.

Earnings of Philadelphia Rapid Transit Company for November and Five Months

The report of the Philadelphia (Pa.) Rapid Transit Company for November, 1911, and for the five months of the fiscal year to Nov. 30, 1911, follows:

	November, 1911	Five Months Ended November
Earnings:		
Gross passenger earnings	$1,804.353	$8,971,466
Receipts from other sources	77,622	408,670
	$1,881,975	$9,380,136
Expenses:		
Operating expenses	1,136,721	5,690,194
Net earnings from operation	$745,254	$3,689,942
Fixed charges	740,631	3,688,821
Surplus	$4,623	$1,121

Massachusetts Companies with Bonds Eligible for Savings Bank Investments

The Railroad Commission of Massachusetts has transmitted to Bank Commissioner Chapin the following list of street railways which have annually earned and properly paid without impairment of assets or capital stock an amount in dividends equal to at least 5 per cent on their outstanding capital stock in each of the past five fiscal years, with the exception of 1910, when under a ruling of the Railroad Commission street railways reported for the nine months only, in view of the change in the fiscal years from Sept. 30 to June 30. The list follows: Boston Elevated Railway, Boston & Northern Street Railway, Boston & Revere Electric Street Railway, Citizens' Electric Street Railway, East Middlesex Street Railway, Fitchburg & Leominster Street Railway, Holyoke Street Railway, Springfield Street Railway, Union Street Railway, West End Street Railway and Worcester Consolidated Street Railway. The Dartmouth & Westport Street Railway has been withdrawn from the list on account of consolidation with the Union Street Railway, approved by the Railroad Commission in October, 1910. The list is submitted to the bank commissioner to aid him in preparing the list of Massachusetts street railway bonds eligible for Massachusetts savings bank investment.

American Railways, Philadelphia, Pa.—Bioren & Company and Newburger, Henderson & Loeb, Philadelphia, Pa., offer for public subscription the unsold balance of $3,000,000 of American Railways refunding convertible 5 per cent gold bonds, due 1931, at 96½ and interest.

Augusta-Aiken Railway & Electric Corporation, Augusta, Ga.—An initial quarterly dividend of 1½ per cent has been declared on the $1,500,000 of 6 per cent preferred stock of the Augusta-Aiken Railway & Electric Company, cumulative after Jan. 1, 1912. The dividend is payable on Jan. 1. 1912, to holders of record on Dec. 23, 1911.

Bangor Railway & Electric Company, Bangor, Me.—An initial quarterly dividend of 1¾ per cent has been declared on the new issue of $1,500,000 of 7 per cent cumulative preferred stock of the Bangor Railway & Electric Company, payable on Jan. 1, 1912.

Bay State Street Railway, Boston, Mass.—A syndicate composed of Perry, Coffin & Burr, Boston, Mass.; N. W. Harris & Company, Boston, Mass., and Merrill, Oldham & Company, Boston, Mass., has purchased $1,235,000 of refunding first mortgage 4 per cent bonds of the Boston & Northern Street Railway and $1,315,000 of refunding first mortgage 4 per cent bonds of the Old Colony Street Railway due in 1954.

Birmingham Railway, Light & Power Company, Birmingham, Ala.—A dividend of 4 per cent, payable on Dec. 30. 1911, has been declared on the $3,500,000 of common stock of the Birmingham Railway, Light & Power Company, in addition to the semi-annual distribution of 3 per cent on the $3,500,000 of preferred stock.

Brunswick & Yarmouth Street Railway, Brunswick, Me.—The Railroad Commissioners of Maine have approved the plan to incorporate the Brunswick & Yarmouth Street Railway, as the successor to the Portland & Brunswick

Street Railway. The new company is to be organized by Harry B. Ivers, Lewiston, general superintendent of the Lewiston, Augusta & Waterville Electric Railway, who bought the Portland & Brunswick Street Railway at the receiver's sale on Sept. 25, 1911. The other incorporators of the new company will be Edward M. Graham, Freeport, Me., and three officials of the Lewiston, Augusta & Waterville Electric Railway, Alfred Sweeney, Lewiston, assistant general superintendent; Sherman W. Dunn, Augusta, superintendent of the Augusta division, and Charles L. Andrews of Heath & Andrews, Augusta, general counsel. The Brunswick & Yarmouth Street Railway will be capitalized at $300,000.

Chicago City & Connecting Railways, Chicago, Ill.—The payment of the fourth dividend on the Chicago City & Connecting Railways participation shares has been ordered for Jan. 1, 1912. These are the regular semi-annual disbursements of $1 on the 150,000 of common shares and $2.25 on the 250,000 of cumulative $4.50 preferred shares. The initial payments on these participation shares were made on July 1, 1910, and similar payments have been made on Jan. 1 and July 1, 1911.

Chicago (Ill.) Railways.—The Chicago Railways will pay off on Feb. 1, 1912, at the office of the Union Trust Company, Chicago, Ill., the $4,776,000 of five-year 6 per cent collateral trust notes dated Feb. 1, 1908, secured by $6,767,200 of 5 per cent consolidated mortgage series "A" bonds, and the $1,200,000 of five-year 6 per cent cumulative collateral trust notes of the same date secured by $1,666,000 consolidated mortgage series "A" bonds.

International Traction Company, Buffalo, N. Y.—The semi-annual interest on the fifty-year 4 per cent collateral trust bonds of the International Traction Company which matured Jan. 1, 1911, will be paid at the office of J. P. Morgan & Company, New York, N. Y., on or after Jan. 2, 1912, together with 5 per cent interest on the coupons from Jan. 1, 1911, to Jan. 1, 1912. Payment of interest will also be made by the Manufacturers and Traders' National Bank, Buffalo, and the United States Trust Company, Louisville, Ky., sub-depositaries, under the reorganization plan. It is announced that more than 98½ per cent of the bonds have been deposited under the modified plan of reorganization.

Knoxville Railway & Light Company, Knoxville, Tenn.—The directors of the Knoxville Railway & Light Company have recalled $500,000 preferred stock. It is to be replaced with common stock. The change was authorized by a charter amendment passed on Dec. 11, 1911, by the stockholders.

Little Rock Railway & Electric Company, Little Rock, Ark.—A semi-annual dividend of 5 per cent and an extra dividend of 10 per cent have been declared on the $1,500,000 of common stock of the Little Rock Railway & Electric Company, payable on Jan. 1, 1912. These dividends compare with 4 per cent and 1 per cent extra declared in July, 1911.

Middlesex & Boston Street Railway, Newtonville, Mass.—The Board of Railroad Commissioners has rescinded the authority given the Newton Street Railway to issue $185,000 of new capital stock under date of July 9, 1903, or at the time the Newton Street Railway was consolidated with the Middlesex & Boston Street Railway. Authority was, however, given to the Middlesex & Boston Street Railway to issue $1,483,000 of coupon or registered bonds, payable twenty years from date and bearing interest at the rate of 5 per cent.

Mississippi Valley Interurban Railway, Springfield, Ill.—Stockholders of the Mississippi Valley Interurban Railway appointed Judge John Dryer, H. R. Crawford and George Watson as members of a committee to confer with John E. Melick, president of the company, regarding the four properties of which he is president. The Springfield, Clear Lake & Rochester Railway ceased operations temporarily recently because of an unpaid bill for power due the Springfield Light & Power Company. The Pekin & Petersburg Interurban Railway operates about a mile of track in Pekin, Ill., the Sangamon Valley Traction Company operates from the Hillsboro Court House to the depot of the Big Four Railroad, and the Mississippi Valley Interurban Railway runs northeast from Hillsboro. It is said that it was proposed to consolidate the companies.

New York State Railways, Rochester, N. Y.—The stockholders of the New York State Railways have authorized the issuance of $1,502,300 additional common stock, the proceeds of which will be used to reimburse the company for money expended.

Quebec Railway, Light, Heat & Power Company, Quebec, Que.—Subscriptions are being received in Paris for approximately $5,000,000 of 5 per cent mortgage bonds of the Quebec Railway, Light, Heat & Power Company, payable in thirty years from 1912. The bonds were created by the company to provide funds for extensions and additions, more especially the construction of the Quebec Eastern Railway, the development of the Quebec-Saguenay line and the construction of a power house on the Saguenay River.

Rome Railway & Light Company, Rome Ga.—A yearly dividend of 6 per cent per annum has been declared on the $500,000 of stock of the Rome Railway & Light Company, payable in four quarterly instalments.

St. Johns Light & Power Company, St. Augustine, Fla.—The property of the St. Johns Light & Power Company, sold under foreclosure recently to the Inter-City Securities Company, has been transferred to the St. Johns Electric Company, of which W. D. Barnett is president.

Scranton (Pa.) Railway.—Bioren & Company and Newburger, Henderson & Loeb, Philadelphia, Pa., have purchased the remainder of a closed mortgage of $800,000 of the Carbondale Railway general mortgage 5 per cent bonds, due Jan. 1, 1933. This is now a direct obligation of the Scranton Railway. A large part of those bonds has been sold privately.

Springfield (Vt.) Electric Railway.—H. H. Blanchard has been elected a director of the Springfield Electric Railway to fill a vacancy.

Susquehanna Railway, Light & Power Company, New York, N. Y.—A dividend of 1 per cent has been declared on the $4,198,000 of common stock of the Susquehanna Railway, Light & Power Company, payable on Jan. 2, 1912, to holders of record on Dec. 21, 1911. An initial dividend of the same amount was paid in July, 1911.

Union Traction Company of Kansas, Independence, Kan.—The Union Traction Company of Kansas has called for payment at 105 and interest for the sinking fund $6,000 of its first mortgage 5 per cent bonds.

Utica & Mohawk Valley Railway, Utica, N. Y.—A quarterly dividend of 2 per cent has been declared on the $5,000,000 of common stock of the Utica & Mohawk Valley Railway, payable on Dec. 30, 1911. This dividend compares with 1 per cent paid in September, 1911, one-half of 1 per cent paid in June, 1911, and one-half of 1 per cent paid in March, 1911, making the total payments for 1911 4 per cent, as compared with 2 per cent in 1910, 8 per cent in 1908 and 4 per cent in 1907.

Wheeling (W. Va.) Traction Company.—A quarterly dividend of 1¼ per cent has been declared on the stock of the Wheeling Traction Company, payable on Jan. 15, 1912. The quarterly dividends declared in 1911 were of 1 per cent each.

Dividends Declared

Cincinnati & Hamilton Traction Company, Cincinnati, Ohio, 1¼ per cent, preferred; ⅞ of 1 per cent, common.

Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., quarterly, 1½ per cent, preferred.

Consolidated Traction Company of New Jersey, Newark, N. J., 2 per cent.

El Paso (Tex.) Electric Company, 3 per cent, preferred.

Halifax (N. S.) Electric Tramway, quarterly, 2 per cent

Holyoke (Mass.) Street Railway, 4 per cent.

Honolulu Rapid Transit & Land Company, Honolulu, H. I., 3 per cent, preferred; quarterly, 1½ per cent. common.

Illinois Traction System, Peoria, Ill., quarterly, 1½ per cent, preferred.

Interstate Railways, Philadelphia, Pa., 3 per cent, preferred.

Louisville & Northern Railway & Lighting Company, New Albany, Ind., quarterly, ¾ of 1 per cent.

Manchester Traction Light & Power Company, Manchester, N. H., quarterly, 2 per cent.

Nashville Railway & Light Company, Nashville, Tenn., quarterly, 1¼ per cent, preferred; quarterly, 1 per cent, common.

New England Investment & Security Company, Springfield, Mass., 2 per cent, preferred.

New Orleans Railway & Light Company, New Orleans, La., quarterly, 1¼ per cent, preferred.

Ottawa (Ont.) Electric Railway, quarterly, 2½ per cent; 2 per cent extra.

Public Service Corporation of New Jersey, Newark, N. J., quarterly, 1½ per cent.

Reading (Pa.) Traction Company, 75 cents.

Republic Railway & Light Company, New York, N. Y., quarterly, 1½ per cent, preferred.

Seattle (Wash.) Electric Company, quarterly, 1¾ per cent, common.

Syracuse (N. Y.) Rapid Transit Company, quarterly, 1½ per cent, preferred; 1 per cent, common.

Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind., quarterly, 1¼ per cent, preferred.

Union Railway, Gas & Electric Company, Rockford, Ill., quarterly, 1½ per cent, preferred.

Union Utilities Company, Morgantown, W. Va., quarterly, ½ of 1 per cent, common.

Washington Water Power Company, Spokane, Wash., quarterly, 2 per cent.

Winnipeg (Man.) Electric Railway, quarterly, 3 per cent.

ELECTRIC RAILWAY MONTHLY EARNINGS

BATON ROUGE ELECTRIC COMPANY.

Period.	Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income
1 m., Oct., '11	$10,593	$6,582	$4,011	$2,042	$1,969
1 " " '10	9,597	5,827	3,770	1,945	1,826
12 " " '11	117,065	71,950	45,116	24,095	21,021
12 " " '10	109,494	71,362	38,132	22,881	15,252

BROCKTON & PLYMOUTH STREET RAILWAY.

1 m., Oct., '11	$9,336	$7,355	$1,981	$1,488	$493
1 " " '10	9,797	7,337	2,461	1,578	883
12 " " '11	118,743	85,139	33,604	18,463	15,140
12 " " '10	120,557	84,930	35,626	20,579	15,047

CAPE BRETON ELECTRIC COMPANY.

1 m., Oct., '11	$31,650	$15,246	$16,404	$6,176	$10,228
1 " " '10	30,496	13,447	17,049	6,160	10,888
12 " " '11	334,626	174,201	160,425	73,809	86,616
12 " " '10	320,975	170,322	150,654	73,933	76,720

DALLAS ELECTRIC CORPORATION.

1 m., Oct., '11	$182,459	$100,849	$81,611	$29,546	$52,064
1 " " '10	165,372	89,153	76,219	23,748	52,471
12 " " '11	1,599,684	996,569	603.115	319,559	283,556
12 " " '10	1,443,966	943,991	499,975	316,410	183,565

EL PASO ELECTRIC COMPANY.

1 m., Oct., '11	$62,011	$34,111	$27,900	$8,427	$19,473
1 " " '10	55,172	32,919	22,253	8,224	14,029
12 " " '10	680,583	388,414	292,169	98.845	193,324
12 " " '10	631,241	362,528	268,713	101,090	167,623

GALVESTON-HOUSTON ELECTRIC COMPANY.

1 m., Oct., '11	$132,645	$76,728	$55,917	$25,547	$30,370
1 " " '10	113,476	65,937	47,539	25,565	21,974
12 " " '11	1,487,435	871,168	616,267	301,585	314,682
12 " " '10	1,289,537	777.563	511,975	284,599	227,376

JACKSONVILLE TRACTION COMPANY.

1 m., Oct., '11	$49,743	$25,691	$24,052	$12,488	$11,564
1 " " '10	48,366	27,088	21,279	9,346	11,933
12 " " '11	576,832	312,822	264,010	132,399	131,611
12 " " '10	566,403	302,028	264,375	112,295	152,080

MONTREAL STREET RAILWAY.

1 m., Nov., '11	$409,397	$260,576	$159,900	$35,318	$124,582
1 " " '10	355,586	227,442	138,656	32,013	106,643
2 " " '11	835,513	492,778	370.091	71,015	299,077
2 " " '10	728,073	433,192	319,594	54,011	255,583

NORTHERN TEXAS ELECTRIC COMPANY.

1 m., Oct., '11	$168,512	$78,517	$89,995	$25,010	$64,985
1 " " '10	154,007	71,123	82,884	20,290	62,594
12 " " '11	1,593,749	826,774	766,975	293,042	473,933
12 " " '10	1,409,311	753,871	655,440	228,011	427,429

PENSACOLA ELECTRIC COMPANY.

1 m., Oct., '11	$24,415	$14,832	$9,583	$5,592	$3,991
1 " " '10	23,650	13,578	10,072	5,106	4,966
12 " " '11	286,793	168,807	117,986	68,966	49,021
12 " " '10	264,701	155,488	109,213	59,452	49,762

SEATTLE ELECTRIC COMPANY.

1 m., Oct., '11	$461,501	$260,383	$201,118	$115,935	$85,184
1 " " '10	469,033	239,639	229,393	109,914	119,480
12 " " '11	5,484,662	3,059,143	2,425,519	1,355,886	1,069,634
12 " " '10	5,558,439	3,249,493	2,308,946	1,301,744	1,007,201

TAMPA ELECTRIC COMPANY.

1 m., Oct. '11	$59,328	$31,747	$27,582	$5,582	$21,600
1 " " '10	43,254	23,999	19,255	6,130	13,125
12 " " '11	655,117	.....	308,428	77,690	230,739
12 " " '10	611,749	.....	271,903	61,583	210,320

*Includes taxes.

Traffic and Transportation

Accidents in Indiana for Quarter

The Railroad Commission of Indiana has issued Accident Bulletin No. 17, covering the quarter ended Sept. 30, 1911. The summary of casualties on the interurban railways follows:

PASSENGERS

Where:	1910	1911
On passenger trains	100	24
On station grounds	9	0
Causes:		
Collisions	96	10
Derailments	0	5
Getting on and off moving trains	4	5
Getting on and off trains after stops are made	0	0
Miscellaneous	9	4
Results:		
Deaths	50	0
Fractures or dislocations	4	3
Sprains	6	1
Cuts and bruises	47	20
Miscellaneous	2	0

TRAVELERS ON HIGHWAYS

Where:	1910	1911
Travelers on highways in vehicles	14	22
On foot	2	1
Cause:		
Struck on crossings	16	21
Teams frightened	0	0
Miscellaneous	0	2
Results:		
Deaths	5	5
Sprains	1	1
Cuts and bruises	9	11
Miscellaneous	0	5
Loss of limb	1	0
Loss of finger or toe	0	1

EMPLOYEES

Employment:	1910	1911
Conductors	4	3
Motormen	9	4
Laborers	3	4
Brakemen	0	3
Causes:		
Collisions	13	5
Miscellaneous	5	6
Derailments	0	1
Use of tools and machinery	0	2
Results:		
Deaths	4	2
Fractures or dislocations	0	1
Sprains	5	1
Cuts and bruises	9	7
Miscellaneous	0	1
Loss of limb	0	2

TRESPASSERS

Where:	1910	1911
Trespassers on tracks	17	12
Miscellaneous	0	0
Results:		
Deaths	12	7
Fractures or dislocations, and cuts and bruises	5	5

Collisions, 1. Damage, $1,100,000.

Fare Question in Edwardsville, Ill.

The question of the local fare in Edwardsville, Ill., is before the State Railroad & Warehouse Commission as a result of a letter addressed to the commission by the Alton, Granite City & St. Louis Traction Company and the East St. Louis & Suburban Railway. The Alton, Granite City & St. Louis Traction Company owns a railway between East St. Louis, Mitchell, Edwardsville and Granite City, and the East St. Louis & Suburban Railway owns a railway via Collinsville and Maryville to Edwardsville. The two roads connect at Court House Square, Edwardsville. The companies have arranged what is known as a "loop service," the cars of the East St. Louis & Suburban Railway being operated via Collinsville to Court House Square, Edwardsville, where its cars are taken by the Alton, Granite City & St. Louis Traction Company and operated to East St. Louis via Granite City, and the cars of the Alton, Granite City & St. Louis Traction company are operated from East St. Louis via Granite City and Mitchell to Court House Square, Edwardsville, where said cars are taken by the St. Louis & Suburban Railway and operated via Collinsville to East St. Louis. This affords continuous service without change of cars. Each company charges fare to and from the point of junction of the lines, which results in a 10-cent fare in Edwardsville, although each company carries passengers a considerable distance beyond the city limits for a 5-cent fare from Court House Square.

The city of Edwardsville desires some arrangement whereby passengers can travel on the cars of the Alton,

Granite City & St. Louis Traction Company from East St. Louis or Alton into Edwardsville without paying additional fare in Edwardsville to any point on the lines of the East St. Louis & Suburban Railway within Edwardsville; also that through passengers from East St. Louis to Edwardsville on the East St. Louis & Suburban Railway be carried to any point in Edwardsville on the Alton, Granite City & St. Louis Traction Company's line without additional charge. The companies are willing to arrange matters so as to carry passengers as requested by Edwardsville, provided the arrangement shall apply only to through passengers who board cars at intermediate stations, for the reason that the haul from the station on either side of Edwardsville, on both lines, including the haul to any point in Edwardsville, would be too long for a 5-cent fare. This arrangement is satisfactory to Edwardsville and the companies, and the companies have written the commission that they will comply with the request of Edwardsville if the commission does not consider that such an arrangement would be unjust discrimination against intermediate points.

Accident on Kansas Line.—In a head-on collision between two cars on the Kansas City-Western Railway in a fog, near Wolcott, Kan., on Dec. 18, 1911, a motorman and a dispatcher of the company were killed and nine persons were injured.

Improvements Recommended in Ithaca.—The Public Service Commission of the Second District of New York has completed an investigation of street railway conditions in Ithaca and has recommended betterments to the tracks, overhead construction and equipment of the Ithaca Street Railway.

Decision in Reading Ticket Case.—Judge Endlich has handed down an opinion in favor of the city of Reading in the action to compel the Reading (Pa.) Transit Company to sell strip tickets at the rate of six for 25 cents on the system known as the "Loop." It is said that the company will appeal the case.

Accident at Pottsville.—On Dec. 25, 1911, one of the double-truck cars of the Eastern Pennsylvania Railways, Pottsville, Pa., ran off the track at a curve near Cape Horn, Mount Carbon, and fell into a creek. The cause of the accident is unknown. Of thirty-five people on the car twenty-five were not injured in any way and only three were seriously hurt.

Re-routing Approved in Los Angeles.—The Board of Public Works of Los Angeles, Cal., has granted the Los Angeles Railway Corporation permission to re-route its cars in the downtown district as a means of relieving congestion. The plan was suggested by C. A. Henderson, assistant general manager of the company, and was referred to in the ELECTRIC RAILWAY JOURNAL of Dec. 23, 1911, page 1296.

Agreement Between New York State Railways and Employees.—The New York State Railways has made an agreement with its employees to run until May 1, 1914. It provides that in places where agreements with the local companies are in force they shall remain in operation until the date of their expiration unless changed by mutual agreement. Boards of arbitration are provided for and wage disputes will be arbitrated when the local agreements expire.

Progress at Ft. Smith, Ark.—The Ft. Smith Light & Traction Company, Ft. Smith, Ark., increased the wages of its employees approximately 11 per cent on Dec. 1, 1911. The company has fitted up part of a building on South Sixth Street as a club room for its 300 employees. The total amount of floor space to be devoted to club rooms is 2500 sq ft. In October the company handled 563,000 persons without an accident to passengers or equipment. During Fair Week the equipment was taxed to its utmost. Trains consisting of a construction car and trailer carried as many as 310 passengers to the fair grounds on a single trip.

Service Order in Toronto.—The Ontario Railway Board has approved an interim order directing the Toronto (Ont.) Railway to issue transfers from the Yonge Street, Carlton Street and College Street cars to Avenue Road, Dupont Street and Dundas Street cars and vice versa; an interim order directing the company to run the regular Queen Street cars up Roncesvalles Avenue to the "Y" at Dundas Street, and returning down Roncesvalles Avenue to Queen Street, and an order directing the company to operate the regular Dundas Street service along Dundas Street as far west as the western limit of Keele Street, according to the contract with the city.

Soliciting Traffic of Shoppers at Christmas.—The Louisville & Northern Railway & Light Company and the Louisville & Southern Indiana Traction Company, New Albany, Ind., controlled by the same interests, inserted a full-page advertisement in the Louisville *Herald* of Dec. 16, 1911, calling the attention of the public to Christmas bargains offered by New Albany merchants. The companies included in the advertisement notices calling attention to the rapid, safe and cheap transportation afforded by their lines between the neighboring cities. "Take the big red car" was suggested, as the rolling stock of the two companies is painted a uniform color.

Increase in Wages in Philadelphia.—Following the meeting of the executive committee of the board of directors of the Philadelphia (Pa.) Rapid Transit Company, Dec. 21, 1911, the following statement was issued: "Under the terms of the co-operative plan of August, 1911, which was established as the policy of the Stotesbury management, the wages of conductors and motormen, it was promised, would be increased on Jan. 1, 1912, as follows: First year men, 22 cents per hour; second year men, 23 cents per hour; third year men, 23½ cents per hour; fourth year men, 24 cents per hour. At the meeting to-day the executive committee took the necessary action to put into effect this promised increase of wages."

Extension of Line Asked in Rochester.—The Public Service Commission of the Second District of New York has received a complaint from manufacturers and land owners of the Lincoln Park district, west of Rochester, against the service afforded that district by the West Avenue line of the New York State Railways. The complaint states that the present terminal of this line is located at a considerable distance from the factories and business places, and that the officials of the company have declined to remedy the existing conditions except by proposing to build extensions which it is claimed will not afford satisfactory relief. The petition asks that the company be required to make such extensions and improvements as will give the people of the locality which is concerned suitable and convenient service.

Regulating Cars at Crossings in Washington.—Following a recommendation made by the Chamber of Commerce of Washington, D. C., about two months ago, the District Electric Railway Commission has issued the following order: "For the purpose of bringing under control of the members of the metropolitan police force the movement of street cars at street crossings, subjecting the cars to the same direction as all other vehicles using the streets, for the purpose of avoiding congestion and insuring the safety of passengers, it is ordered that the several street railways of the District of Columbia be, and they are hereby, required to give such directions to their motormen in charge of street cars as will conform to the requirements of the Commissioners of the District of Columbia as to the movement of street cars at street crossings."

Changes in Operation in Philadelphia.—E. T. Stotesbury, chairman of the board of directors of the Philadelphia (Pa.) Rapid Transit Company, in his communication of April 10, 1911, addressed to the chairman of the financial committee of the Councils of Philadelphia, bearing upon the consent of the city to the proposed $10,000,000 loan, promised that certain extensions would be undertaken at once. These extensions have all been practically completed and, as a result of the work which has been completed, certain changes in operation which were made public in detail by the company will go into effect on Jan. 1, 1912. The lines which have been completed on Twenty-second Street, from Montgomery Avenue to Ridge Avenue; Twenty-first Street, from Ridge Avenue to Montgomery Avenue, and Twenty-second Street, from Susquehanna Avenue to York Street, will not be put into operation for the present, as it is deemed unwise to make any temporary changes pending further progress in the company's plans for general re-routing in that section of the city.

Personal Mention

Mr. Edwin Henderson has resigned as general manager of the Saginaw & Flint Railway, which operates 39 miles of line between Saginaw, Bridgeport, Frankenmuth, Clio, Mt. Morris and Flint, Mich.

Mr. James M. Ambler, chairman of the Maryland Public Service Commission, has been appointed to the Supreme Bench of Baltimore City by Governor Crothers to succeed Judge Niles.

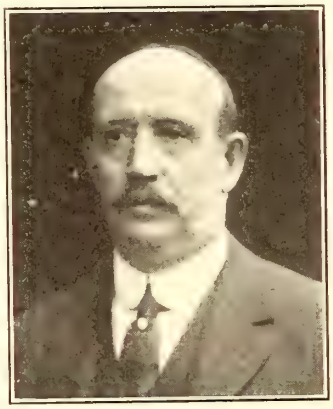
Mr. W. H. Fledderjohann has been appointed general manager of the Ft. Wayne & Springfield Railway, with headquarters at Decatur, Ind., to succeed Mr. John H. Koenig, resigned.

Mr. Newton D. Baker, Mayor-elect of Cleveland, Ohio, is the subject of a biographical sketch in the "Who's Who—And Why" page of the *Saturday Evening Post* of Dec. 23, 1911. The title of the article is "Tom Johnson's Heir."

Mr. John H. Fisher, Redlands, Cal., has been appointed general manager of the Santa Barbara (Cal.) Consolidated Railroad and the Santa Barbara Gas & Electric Company, to succeed Mr. George W. Wilder, whose resignation is announced elsewhere in this column.

Mr. George W. Wilder has resigned as manager of the Edison interests for Santa Barbara, Cal., which include the Santa Barbara Consolidated Railroad. Mr. Wilder has been with the company two and one-half years. During this time he effected the consolidation of the Edison Electric Company and the Merchants' Mutual Light & Power Company, as the Santa Barbara Gas & Electric Company. The entire distributing systems of the two companies which were consolidated have been rebuilt, the power house of one of the companies has been enlarged, and the other plant has been dismantled. The gas plant has been rebuilt and the gas distributing system has been extended into the Montecito Valley. Negotiations are to be entered into with the city of Santa Barbara for an extension of the franchise of the Santa Barbara Consolidated Railroad, with the expectation that the system, which comprises 8 miles of line, will be rehabilitated.

Mr. E. C. Foster, associated with Sanderson & Porter, engineers, New York and San Francisco, has been elected president and director of the Manchester Traction, Light & Power Company, Manchester, N. H. Mr. Foster has been prominently identified with electric traction interests in the United States for many years. In 1903 he resigned as vice-president of the Old Colony Street Railway and the Boston & Northwestern Street Railway, the operating companies of the Massachusetts Electric Companies, to accept the position of president of the New Orleans Railways Company which, under his direction, was reorganized as the New Orleans Railway & Light Company. In January, 1909, he resigned as vice-president of the New Orleans Railway & Light Company to become associated with Sanderson & Porter, and since that time he has been actively engaged in consulting and advisory work and in making physical examinations and appraisals of public service properties for bankers.



E. C. Foster

Mr. Leonard A. Busby, general counsel for the Chicago (Ill.) City Railway, has been elected president of the company to succeed Mr. T. E. Mitten, whose resignation will take effect on Dec. 31, as previously noted in the Electric Railway Journal. Mr. Busby is a member of the law firm of Shope, Zane, Busby & Weber. He was appointed counsel for the Calumet & South Chicago Railway in 1905, and when that property was taken over by the Chicago City Railway he was made counsel for the Chicago City Railway. If the negotiations which are in progress for the consolidation of the surface and elevated railways in Chicago are consummated a successor to Mr. Busby, who is not an operating man, as president of the company, may be elected at that time.

Mr. William F. Ham, who has been connected with the Washington Railway & Electric Company, Washington, D. C., for eleven years, first as comptroller and later as comptroller and treasurer, has been elected first vice-president and a director of the company to succeed Gen. George H. Harries, who became connected recently with H. M. Byllesby & Company, Chicago, Ill. Mr. Ham's first connection with electric railroad work was from 1892 to 1895 in the New York office of the Lorain Steel Company, with Major H. C. Evans. In 1895 he became associated with Tom L. Johnson and Albert M. Johnson as secretary of the Nassau Electric Railroad, Brooklyn, N. Y., and continued in this position until the Nassau Electric Railroad was acquired by the Brooklyn Rapid Transit Company early in 1899. Mr. Ham was then appointed auditor of the Brooklyn Rapid Transit Company and served until December, 1899, when he accepted the position of comptroller of the Washington Railway & Electric Company. In the following year he was also elected treasurer of the company, and has since occupied both positions. Mr. Ham was one of the organizers of the American Electric Railway Accountants' Association and at the first meeting of the association was appointed a member of the standard classification committee and has served on that committee continuously. When Mr. C. N. Duffy resigned as chairman of the committee in 1905, Mr. Ham succeeded him and is still serving in that capacity.



W. F. Ham

Mr. George Best, who has been assistant secretary of the Boulder Electric Light & Power Company, Boulder, Col., has been elected secretary and treasurer of the company to succeed Mr. A. S. Brooks.

Mr. W. A. Buttrick has resigned as local manager and claim agent of the Baton Rouge (La.) Electric Company to become identified with a group of properties known as the Hudson River Companies, Glens Falls, N. Y., which have recently come under the management of the Stone & Webster Management Association. On Dec. 27, 1911, the reorganization of these companies was effected and the companies are now known as the Adirondack Electric Power Corporation. For the present Mr. Buttrick will be connected with the company as contract agent. Previous to becoming manager of the Baton Rouge Electric Company he was superintendent of the Pawtucket (R. I.) Electric Company, and superintendent of the Columbia (Ga.) Railroad Company. The properties at Baton Rouge, Pawtucket and Columbia are all under the management of Stone & Webster, Boston, Mass.

Mr. C. E. Brown, who has been cashier and paymaster of the Washington Railway & Electric Company, Washington, D. C., for ten years, has been elected treasurer of the company to succeed Mr. W. F. Ham, whose election as vice-president and a director of the company is noted elsewhere in this column. Mr. Brown entered business with the Nassau Electric Railroad, Brooklyn, N. Y., as track timekeeper in June, 1898, and was promoted to cashier in January, 1899. He continued as cashier of the company until the Nassau Electric Railroad was taken over by the Brooklyn Rapid Transit Company, when he was made payroll accountant. Mr. Brown resigned from the Brooklyn Rapid Transit Company to accept a similar position with the Washington Railway & Electric Company in April, 1900. He was made paymaster and cashier of the company on July 1, 1911. This position he has held ever since and still retains.

Mr. J. Brodie Smith has resigned as vice-president, general manager and a director of the Manchester Traction, Light & Power Company, Manchester, N. H., to open an office in Manchester as an expert in matters pertaining to electric lighting and electric railways. Mr. Smith was born at Richville, N. Y., on April 6, 1861. He was educated in the Union Free School of his native village and subsequently pursued special studies to become an expert electrician. In 1878 he constructed a telegraph line between two small villages in New York. In 1880, Mr. Smith removed to Manchester, where he has since resided. At first he engaged in the drug business with his eldest brother, but in 1885 he was appointed superintendent of the municipal fire alarm telegraph service, a position which he held for about two years. The Manchester Electric Light Company was the pioneer in the electric light and power business in Manchester, but the Ben Franklin Electric Light Company was organized as a competitor, and Mr. Smith was its first superintendent. When the consolidation of the two companies was effected he became superintendent of the company. The property of this company was afterward sold to the Manchester Traction, Light & Power Company. Mr. Smith was superintendent of the Manchester Electric Light Company until 1896, when he resigned and spent several months in Europe. On his return he was chosen general manager of the company, and in 1901, when the Manchester Traction, Light & Power Company acquired control of the Manchester Electric Light Company, he was elected a director and general manager. In 1905 he was elected vice-president of the company in addition to general manager, and has since occupied these positions. Mr. Smith has also resigned as general manager, assistant treasurer and director of the Manchester Street Railway, Manchester & Derry Street Railway and the Manchester & Nashua Street Railway, all owned by the Manchester Traction, Light & Power Company.

Mr. C. M. Witt, who was elected secretary of the Central Electric Accounting Conference at the annual meeting of the conference on Dec. 16, 1911, is auditor of the Indianapolis, New Castle & Toledo Electric Railway, Indianapolis, Ind. Mr. Witt was born on a farm in Indiana thirty years ago, and was educated in the common schools and at high school. He began his railroad career twelve years ago as baggage and freight checker and ticket agent on a steam railroad in the Central West. Mr. Witt next became connected with the Lake Erie & Western Railroad as bill clerk and assistant cashier, and resigned from this company to enter the service of the Vandalia Railroad as clerk to the division freight agent. He entered electric railway work as chief clerk to the traffic manager of the Indiana Union Traction Company, and after serving the company four years in the traffic, transportation and mechanical departments he was appointed chief dispatcher of the Muncie & Portland Traction Company in charge of traffic and transportation matters. When the Indianapolis, New Castle & Toledo Electric Railway was placed in operation Mr. Witt was appointed auditor of the company. Mr. Witt has supplemented his public and high school work and the practical knowledge which he obtained while serving as electrician and car inspector for the Indiana Union Traction Company by recently completing the course of the International Correspondence Schools in electric railways and lighting.



C. M. Witt

OBITUARY

Arnold Tanzer, treasurer of the International Steam Pump Company, New York, N. Y., died at his home in New York on Dec. 21, 1911.

F. M. McKeon, traveling freight and passenger agent of the Spokane & Inland Empire Railroad, Spokane, Wash., died in San Francisco, Cal., on Dec. 11, 1911.

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Meridian & Deepwater Railway, Meridian, Miss**—Application for a charter has been made in Mississippi by this company to build an electric railway between Meridian and Winona. Grading has been begun. Headquarters: Meridian. Capital stock, $600,000. Common stock, $400,000; preferred stock, $200,000. Directors: S. A. Neville, C. F. Schofield and W. C. Stowell.

***Northeast Railroad, El Reno, Okla.**—Application for a charter has been made in Oklahoma by this company to build an electric or steam railway between El Reno, Woodward and Oklahoma City. Surveys have been begun.

***Kirkland-Redmond Railway, Light & Power Company, Seattle, Wash.**—Application for a charter has been made in Washington by this company to build an electric railway between Kirkland and Redmond and other points in Kings County. Headquarters: Seattle. Capital stock, $200,000. Incorporators and first board of trustees are: C. A. Eaton, B. F. Gordon, William Perigo, Samuel G. Hepler and W. D. Gillis.

***Rupert & Northeastern Railway, Rupert, W. Va.**—Chartered in West Virginia to build an electric railway between Rupert in Greenbriar County to Fenwick in Nicholas County. Headquarters: Boston, Mass. Capital stock, $5,000. Incorporators: H. L. Higginson, Josiah Hill, Seth T. Gano, H. L. Shattuck and C. A. Ellis, all of Boston.

FRANCHISES

Phoenix, Ariz.—The Salt River Valley Electric Railway has received a franchise from the City Council in Phoenix. This is part of a plan to build an interurban railway to connect Phoenix with all the principal towns of the Salt River valley. [E. R. J., Dec. 1, '11.]

Calistoga, Cal.—The San Francisco, Napa & Calistoga Railway, San Francisco, has asked the Board of Trustees for a franchise in Calistoga.

Los Angeles, Cal.—The Los Angeles Railway has received franchises from the Council to build two cross-town lines in Los Angeles.

Sacramento, Cal.—The Oakland, Antioch & Eastern Railway has asked the City Trustees for franchises to operate an interurban electric line into Sacramento across the Sacramento River and through a number of streets in Sacramento.

Willows, Cal.—The Sacramento Valley West Side Electric Railway has received a franchise from the Supervisors of Glenn County to build its lines through Glenn County. Yolo County has granted the company a franchise, and it is expected that franchises will be asked in Colusa County and Tehama County. This railway will connect Woodland, Colusa, Willows, Orland, Corning, Redding and Red Bluff. C. L. Donohue, Willows, president. [E. R. J., Nov. 25, '11.]

Pueblo, Col.—The Arkansas Valley Interurban Railway, Little Rock, has asked the County Commissioners for a twenty-year franchise on Santa Fe Avenue in Pueblo.

Forest Park, Ill.—The County Traction Company, Chicago, has asked the Village Board for a franchise in Forest Park.

Kewanee, Ill.—The Kewanee, Bradford & Henry Interurban Railway, Henry, will ask for franchises in the various towns through which the proposed line is to pass. The line will connect Bradford, Henry and Kewanee. John P. Code, Bradford, is interested. [E. R. J., Sept. 2, '11.]

Quincy, Ill.—The Quincy & Western Interurban Railway has received a fifty-year franchise from the Mayor to build over eleven streets in Quincy. This is part of a plan to build a 75-mile electric railway between Niota and Quincy. Henry Dayton, Quincy, president. [E. R. J., Dec. 16, '11.]

Miller, Ind.—The Indianapolis, Chicago & Meridian Railway, Indianapolis, has received a franchise from the Commissioners of Parker County to use the streets of Miller

This completes the franchises for the entire railway's right-of-way to connect Indianapolis, Sheridan, Gary, Valparaiso, Hammond, Monticello and Warsaw. Contracts will be let and construction will be begun within a short time. M. J. Mooreland, secretary. [E. R. J., Dec. 16, '11.]

Terre Haute, Ind.—J. W. Ratcliff, Sugar Creek, has asked the County Commissioners for a franchise to build an electric railway from West Terre Haute to Clifton.

***Louisville, Ky.**—The cross-town car ordinance passed a few days ago by the lower board of the General Council of Louisville, Ky., has been approved by Mayor Head, and in the very near future the city franchise for operation of service through the southern residential section of the city will be offered for sale at an upset price of $15,000. It is presumed that the privilege will be purchased by the Louisville Railway.

Longmeadow, Mass.—The Springfield Street Railway has asked the Selectmen for a franchise in Longmeadow.

Marlboro, Mass.—The Boston & Western Electric Railway, Boston, has asked the City Council for a franchise in Marlboro. [E. R. J., Mar. 18, '11.]

***Chihuahua, Mex.**—Carlos Lanches, Aldana, and associates have asked the City Council for a franchise to build a second electric railway in Chihuahua.

Jersey City, N. J.—The Public Service Railway has received permission from the Public Utilities Commission to construct connections between its tracks on several streets in Jersey City.

Johnstown, N. Y.—The Little Falls & Johnstown Electric Railway, Little Falls, has received a franchise from the Common Council to build a line on West Clinton Avenue in Johnstown to connect Little Falls, St. Johnsville, Ephratah and Johnstown. J. L. Hees, 103 Park Avenue, New York, N. Y., is president. [E. R. J., Dec. 9, '11.]

***Albemarle, N. C.**—James R. Moss, Albemarle, and associates have asked the City Council for a franchise to build a 2-mile electric railway from the Winston-Salem Station and extending over many streets in Albemarle and thence out Main Street to Crowell Mineral Springs.

Akron, Ohio.—The Akron, Canton & Youngstown Electric Railway, Canton, has received a franchise from the City Council in Akron. This line will connect Akron, Canton, Britain and Youngstown. F. E. Bissell, Canton, chief engineer. [E. R. J., Dec. 9, '11.]

Coitsville, Ohio.—The Pittsburgh, Harmony, Butler & New Castle Railway, Pittsburgh, asked the Council for a franchise in Coitsville.

Grants Pass, Ore.—The Grants Pass & Rogue River Railway has asked the City Council for a fifty-year franchise in Grants Pass. It will connect Grants Pass, Medford and Ashland. J. Arnold Doyle, president. [E. R. J., Dec. 9, '11.]

San Antonio, Tex.—The San Antonio Traction Company has asked the City Council for a franchise to build an extension in San Antonio to Los Angeles Heights.

Richmond, Va.—The Richmond & Henrico Railway has asked the City Council for a franchise to build a 2½-mile extension in Richmond.

Bellingham, Wash.—The Nooksack Valley Traction Company has received from the City Council an extension of its franchise until Oct. 1, 1914, in which to begin the construction of its line in Bellingham. This is part of a plan to build an electric railway to connect Bellingham, Sumas, Ferndale, Lyden and Blaine. [E. R. J., Nov. 25, '11.]

Tacoma, Wash.—The Seattle-Tacoma Short Line Railway has received a two-year extension of its franchise from the City Council in Tacoma on condition that the company expend $20,000 on its line in Pierce County within six months.

Wenatchee, Wash.—The Wenatchee Valley Railway & Power Company, Wenatchee, has received a franchise from the Council to build through the Wenatchee Valley. This is part of a plan to build a 50-mile electric railway between Wenatchee and Leavenworth, via Cashmere. A. J. Linville, Wenatchee, president. [E. R. J., Aug. 26, '11.]

Morgantown, W. Va.—The South Morgantown Traction Company has received a franchise from the City Council over certain streets in Greenmont and South Park.

TRACK AND ROADWAY

Fresno, Hanford & Summit Lake Interurban Railway, Fresno, Cal.—Work has been begun by this company on its line in Fresno. A branch line will be extended to Sanger.

***Hacienda (Cal.) Railroad.**—Grading has been begun by this company at the Hacienda end of its 14-mile electric railway between San José and Hacienda. This line is being built for the Almaden Quicksilver Mining Company. Two bridges will be built. Herman Brothers, San José, are the engineers.

***Redding & Red Bluff Railway, Redding, Cal.**—This company's plans call for a line from Redding to Red Bluff, about 35 miles. It is said that the line is to be built as an extension of the Northern Electric Company and the Vallejo & Northern Railway.

East Shore & Suburban Railway, Richmond, Cal.—Plans are being considered by this company to extend its Sixth Street line through the Santa Fe tract to Point Richmond.

Peninsular Railway, San José, Cal.—Work has been begun by this company on an extension of its line on University Avenue through Woodland Place and Ravenswood. The company is rebuilding its bridge across the San Francisquito Creek which leads into Woodland Place.

San José (Cal.) Railways.—This company plans to build an extension from San José to Hollister. Another branch will be built from San José to Alviso.

Tidewater & Southern Railroad, Stockton, Cal.—The present plans of this company include an extension of its line to Fresno and Bakersfield via Madera.

Canon City, Col.—Plans are being made and construction will be begun in the spring on the projected electric line from Canon City to the top of Royal Gorge. Frederick B. Street, New York, N. Y., is the holder of the franchise. [E. R. J., Sept. 23, '11.]

Uncompahgre & Gunnison Valley Railway, Montrose, Col.—Plans are being considered by this company to begin soon the construction of its 45-mile electric railway from Montrose to Delta and Cedaredge. J. M. Pepper, Montrose, is interested. [E. R. J., Jan. 14, '11.]

Pueblo & Suburban Traction & Lighting Company, Pueblo, Col.—Work has been begun by this company on the extension of its Main Street line in Pueblo.

Shore Line Electric Railway, New Haven, Conn.—This company is being urged to build an extension to Middletown.

Elberton & Eastern Railway, Augusta, Ga.—This company has secured the right-of-way and has awarded the contract for the construction work of its 21-mile electric railway from Elberton to Tignall to Ira L. McCord, New York, N. Y. The company announces that the bonds for $300,000 authorized recently by the State Railroad Commission have been sold. W. O. Jones, president. [E R. J., Oct. 28, '11.]

Chicago (Ill.) Railways.—During 1912 this company will construct 13.27 miles of track within the city limits.

***Freeport & Cedarville Traction Company, Freeport, Ill.**—This company has been formed to build an interurban railway from Freeport to Cedarville. Gasoline motor or storage battery cars will be operated.

Hillsboro Electric Light & Power Company, Hillsboro, Ill.—Plans are being made by this company for the construction of a 2-mile line between Hillsboro and Taylor Springs. J. J. Frey, Hillsboro, president. [E. R. J., Oct. 21, '11.]

La Salle County Electric Railroad, Ottawa, Ill.—This company is securing frontage permits for certain streets in Ottawa for its proposed electric railway from Mendota to Ottawa, a distance of 26 miles. G. H. Dodge, Chicago, president. [E. R. J., Sept. 16, '11.]

Louisville & Southern Indiana Traction Company, New Albany, Ind.—Plans are being made by this company to extend its Ekin Avenue line out Cherry Street to the old Vincennes Road in Louisville.

South Bend & Logansport Traction Company, South Bend, Ind.—This company will build the first section between South Bend and Lakeville in the spring.

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia.—Plans are being made by this company for an extension from Waterloo to Elk Run.

Henderson (Ky.) Interurban Railway.—It is reported that this company has secured financial backing for the construction of its line between Henderson and Owensboro. Malcolm Henderson, president. [E. R. J., Sept. 9, '11.]

Louisville (Ky.) Railway.—Construction of the South Louisville extension of the Sixth Street line in Louisville, so that it will connect with the plant of B. F. Avery & Sons, has been begun by the Henry Bickel Company, general contractors.

Paducah (Ky.) Traction Company.—This company has placed in operation its Tyler extension, which extends a little beyond the city limits.

Hagerstown & Clear Spring Railway, Hagerstown, Md.—This company has awarded contracts for all overhead equipment to the General Electric Company for its electric railway between Hagerstown, Middleburg, Greencastle and Mercersburg. L. N. Downs, Hagerstown, president. [E. R. J., Oct. 7, '11.]

Massachusetts Northern Railways, Boston, Mass.—This company, which was recently organized to control the present lines of the Connecticut Valley Street Railway, the proposed Miller's Street Railway, the Athol & Orange Street Railway, the Gardner, Westminster & Fitchburg Street Railway and the Templeton Street Railway, plans to build a line from Baldwinsville to Winchendon. F. E. Marsh will superintend the construction of the proposed new line.

Public Service Railway, Newark, N. J.—This company's new line from Orange Road, Montclair, to Dodd Street, East Orange, has been placed in operation.

Asheville (N. C.) Electric Company.—Surveys will be made at once and grading soon be begun by this company on the extension of its Charlotte Street line to the site of the proposed Grove Hotel.

Goldsboro, Seven Springs & Swansboro Railroad, Goldsboro, N. C.—This company, recently chartered, has purchased the property and franchises of the Goldsboro Street Railway, and is planning for an immediate extension of the line from Goldsboro to Seven Springs, a resort 10 miles from Goldsboro. William A. Robertson, Goldsboro, is interested. [E. R. J., Dec. 23, '11.]

Devil's Lake & Chautauqua Transfer Company, Devil's Lake, N. D.—Plans are being made and contracts awarded by this company for reconstructing and equipping with electricity its 5-mile electric railway between Devil's Lake, Greenwood, Chautauqua grounds and the State Military Grounds. [E. R. J., Nov. 11, '11.]

Columbus, Urbana & Western Electric Railway, Columbus, Ohio.—S. H. Bracey, of S. H. Bracey & Company, Chicago, was in Columbus recently in connection with the proposed extension of this company's line from Fishingers to Findlay. Mr. Bracey stated that if the Public Service Commission approves the issue of $5,500,000 bonds requested the line will be completed within one year and in operation if the equipment for the power house can be completed within that time. It was further stated that arrangements had been completed for new interests to enter the company if the bond issue is authorized by the State. The proposed extension would make an almost direct route between Columbus and Toledo and would also give Columbus a more direct outlet to the West.

Johnstown (Pa.) Traction Company.—Plans are being considered by this company to build an extension in Moxham.

South Bethlehem & Saucon Street Railway, South Bethlehem, Pa.—During the next eight weeks this company will award contracts to build about 7 miles of new track in South Bethlehem.

Seattle, Wash.—Bids will be received until Jan. 12, 1912, for the construction of the track of Division A of the municipal electric railway from Stewart Street and Third Avenue to Salmon Bay. Plans may be obtained from H. R. Dimock, Seattle, city engineer of Seattle. [E. R. J., Dec. 16, '11.]

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—It is reported that this company will remove its repair shops, now located at Seventh Street and Central Street, in Los Angeles, to a site in the new town to be built between Los Angeles and San Pedro. It is also reported that the company will soon build new stations at San Dimas and at Irwindale.

Aurora, Elgin & Chicago Railway, Chicago, Ill.—This company has awarded the contract for the construction of its new passenger station at Wheaton to H. A. Wilson & Company, Chicago. The structure will be 35 ft. x 100 ft. The cost will be about $25,000.

Indiana Union Traction Company, Anderson, Ind.—Plans are being considered by this company for the construction of a new station in Anderson. Until this new building is constructed the company will use the Princess Theater for its interurban station.

Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind.—This company plans to build a new fireproof freight depot in Bluffton. The structure will be one-story and of brick, steel and concrete construction.

Berkshire Street Railway, Pittsfield, Mass.—This company plans to build a new freight station on New West Street, Springfield.

Springfield Railway & Light Company, Springfield, Mo.—It is reported that this company has completed its new carhouse in Springfield.

Piedmont & Northern Railway, Charlotte, N. C.—This company has secured the necessary property on Franklin Street between Broad Street and Main Street in Gastonia to build its new passenger and freight depots. Material has been ordered and construction will be begun at once.

Ohio Electric Railway, Cincinnati, Ohio.—This company will build a new carhouse the coming spring on the site of the old one at Lindenwald, near Hamilton, Ohio.

Lehigh Valley Transit Company, Allentown, Pa.—Plans are being considered by this company to build a new carhouse in Lansdale.

Parkersburg, Marietta & Interurban Railway, Parkersburg, W. Va.—This company has purchased land back of its carhouse in Marietta, Ohio. It is thought the company will build new repair shops on this site. On the completion of this improvement it will use the present carhouse of the company on Nineteenth Street for storage purposes.

Pan-Handle Traction Company, Wheeling, W. Va.—Plans are being made by this company for the construction of a new carhouse in North Warwood.

POWER HOUSES AND SUBSTATIONS

Uncompahgre & Gunnison Valley Railway, Montrose, Col.—Plans are being considered by this company to build a new power house in the coal fields near Delta. J. M. Pepper, Montrose, is interested. [E. R. J., Jan. 14, '11.]

Georgia Railway & Electric Company, Atlanta, Ga.—This company has purchased water rights and four acres of land in the northern part of Lagrange. It is expected that the company will soon build a new power house on this site.

Hillsboro Electric Railway & Power Company, Hillsboro, Ill.—It is reported that this company has completed its new power plant in Hillsboro. J. J. Frey, Hillsboro, president.

Brunswick & Yarmouth Street Railway, Freeport, Maine.—This company expects to purchase one 300-kw motor generator set from the General Electric Company to be installed by Jan. 15, 1912.

Portland & Brunswick Street Railway, Freeport, Maine.—The new motor generator set for this company's power station at Freeport is expected to be installed in January. The old power station equipment is to be kept for emergency use.

Hagerstown & Clearspring Railway, Hagerstown, Md.—This company has awarded a contract for the equipment of its power house to the General Electric Company.

Lake Erie, Bowling Green & Napoleon Railway Company, Bowling Green, Ohio.—At a meeting of bondholders and stockholders of this company in Bowling Green on Dec. 20 plans for building a power plant in that place from the proceeds of receivers' certificates were discussed.

Manufactures & Supplies

ROLLING STOCK

Ogden (Utah) Rapid Transit Company has ordered eight Brill 27-MCB-1 trucks without wheels from the American Car Company.

Brunswick & Yarmouth Street Railway, Freeport, Maine, expects to purchase from the Laconia Car Works three cars equipped with Taylor long wheel-base trucks and GE-203 motors.

Omaha, Lincoln & Beatrice Railroad, Lincoln, Neb., has ordered one quadruple equipment of 101-B motors with HL control from the Westinghouse Electric & Manufacturing Company.

Northern Ohio Traction & Lighting Company, Akron, Ohio, has ordered five suburban car bodies and seven 35-ft. 6-in. convertible car bodies from the G. C. Kuhlman Car Company.

Interurban Railway & Terminal Company, Cincinnati, Ohio, has ordered three 50-ft. combination, three 50-ft. freight and three 50-ft. excursion cars from the Cincinnati Car Company.

Lehigh Valley Transit Company, Allentown, Pa., has ordered one quadruple equipment of No. 307 direct-current interpole motors with HL unit-switch control from the Westinghouse Electric & Manufacturing Company.

New York, New Haven & Hartford Railroad, New Haven, Conn., has ordered twelve 113-ton articulated truck-type locomotives equipped with eight 409-C motors with type USB control from the Westinghouse Electric & Manufacturing Company.

Spokane & Inland Empire Railroad, Spokane, Wash., has ordered from the Westinghouse Electric & Manufacturing Company one double equipment consisting of 301-B-2 motors, equipped with a 337-B master controller, for use on a 50-ton locomotive.

TRADE NOTES

Imperial Wire & Cable Company, Ltd., Montreal, Que., has acquired the business and undertakings of the Wire & Cable Company, Montreal, Que. The new company will continue to operate in Montreal without change in management.

Electrose Manufacturing Company, Brooklyn, N. Y., has opened a temporary office at 109 Broadway, Brooklyn, until permanent quarters can be secured to replace the company's plant in Brooklyn which was destroyed by fire recently. The company expects to resume operation by Feb. 15, 1912, or possibly earlier. It is expected that the new plant will be nearly 50 per cent larger than the old one.

John F. Stevens Company, New York, N. Y., has been organized by John F. Stevens and others with a capital stock of $2,000,000 to engage in general railroad construction work. Mr. Stevens was formerly president of the United Railways and the Oregon Electric Railway, Portland, Ore., also president of the Astoria & Columbia River Railroad, Oregon Trunk Railway, Pacific & Eastern Railway and Spokane, Portland & Seattle Railway. Previous to his connection with these railways Mr. Stevens was vice-president of the New York, New Haven & Hartford Railroad.

Federal Storage Battery Car Company, Silver Lake, N. J., has made a number of extensive improvements to the plant which it recently acquired at Silver Lake for the manufacturing of the Edison-Beach battery car. A spur track has been built into the works from the Erie Railroad; a turntable and switching conveniences have been installed; a new blacksmith and forge shop has been erected, and the buildings have been improved and changed to conform to modern car-building conditions. The company owns thirty-five acres of ground adjacent to the plant. The trucks and car bodies are constructed entirely in the company's shops. The motors and controllers are built from the company's own design and specification by other manufacturers. The batteries, of course, are furnished by the Edison Storage Battery Company at West Orange, N. J. The company has at the present time twenty-three cars, with trucks complete, going through its shops—three for the United Railways, Havana, Cuba; two for Melbourne, Australia; two (repeat order) for the People's Electric Railway, Muskogee, Okla.; one for the Municipal Railway, Kioto, Japan; one for the Ephrata & Lebanon Street Railway, Ephrata, Pa.; two for the Billings (Mont.) Traction Company: two (repeat order) for the Charlotte (N. C.) Rapid Transit Company; two for the Washington, Spa Spring & Greta Railroad, Washington, D. C.; one for the New Castle & Delaware City Traction Company, New Castle, Pa.; one for the Lovgren Lumber Company, Portland, Ore.; one for the Towson & Cockeysville Railroad, Bel Air, Md., and two for Rockhill, N. C. Besides the cars now going through the shops, sixteen Edison-Beach battery cars are in daily service in different parts of the country and are reported to be giving entire satisfaction to the operators. Ralph Beach, of this company, reports a marked change in sentiment among electric railway officials and operators toward storage battery cars. They now consider them a practical, feasible and economic fact—no longer an experiment—and sales depend more on price and delivery than any other factor.

Ohio Brass Company, Mansfield, Ohio, has made the following announcement: On Jan. 1, 1912, the agency agreement for the sale of O-B overhead materials, rail bonds and car equipment specialties which has been in force between the Ohio Brass Company, Mansfield, Ohio, and the Pierson-Roeding Company, San Francisco, for a number of years terminates and will not be renewed, as it was mutually agreed that separate agency agreements for O-B "hi-tension" insulators and O-B electric railway equipment would eventually prove unsatisfactory and that the interests of all concerned would be better served by a single agency for the entire O-B line. On and after Jan. 1, 1912, the Holabird-Reynolds Company, San Francisco, which for some time past has been acting as exclusive agent for O-B "hi-tension" insulators only, will become the exclusive agent for the Ohio Brass Company for the sale of its entire line in the State of California. The Holabird-Reynolds Company will carry an adequate stock of O-B railway materials and "hi-tension" insulators at San Francisco, and business in Los Angeles and the southern part of the State will be handled by H. C. McCutchan, of its Los Angeles office, under the personal direction of R. D. Holabird. The business in the States of Washington, Oregon and Idaho and in British Columbia will be in charge of the Ohio Brass Company's own personal representative, F. V. Cook, who will make his headquarters in Seattle, at the office of the Holabird Electric Company. An intimate and friendly business connection between that company and the Ohio Brass Company will be maintained because of its California agency for O-B materials. Arrangements are being made to carry an emergency stock for quick delivery in Seattle. Every effort will be made to handle all orders and inquiries in such a way as to merit a continuance of patronage and to render O-B service eminently satisfactory to Pacific Coast customers from every standpoint of price, delivery and quality of materials furnished.

ADVERTISING LITERATURE

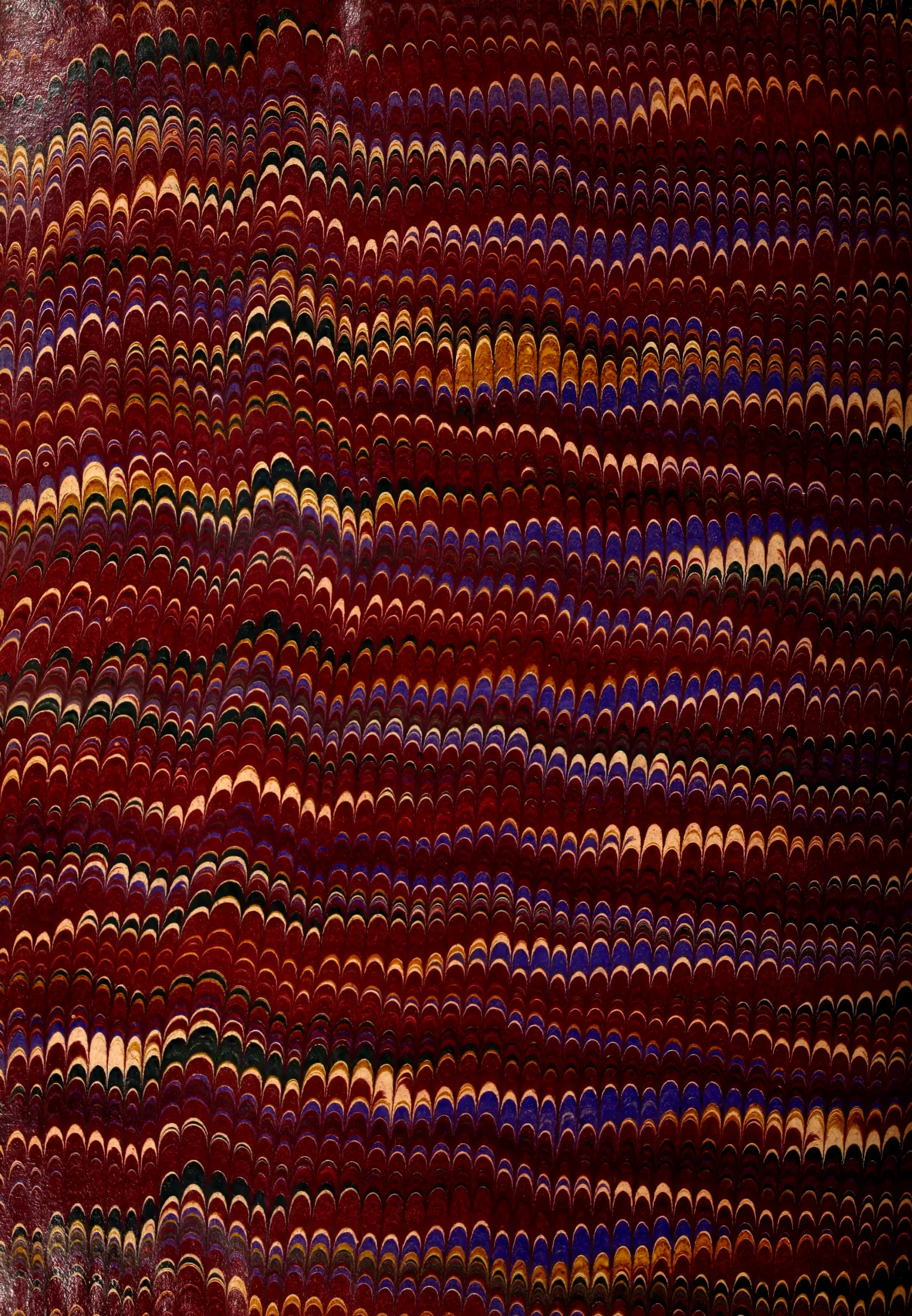
Flood Concrete Tie Company, Bridgeport, Conn., has printed a booklet in which the Flood reinforced-concrete tie and improved rail fastening are described and illustrated.

Barrett Manufacturing Company, New York, N. Y., has issued a folder which calls attention to the fact that 95 per cent of the entire roof area of the important modern concrete buildings erected by the Turner Construction Company during the past nine years is covered with the Barrett specification type of roofs.

Goldschmidt Thermit Company, New York, N. Y., in its publication, *Reactions*, for the fourth quarter of 1911, prints among other illustrated articles "Toronto Meeting of the American Electrochemical Society," "Welding a Fourteen-Inch Rock Crusher Shaft," "Welding a Heavy Plate Shear," and "The Goldschmidt Reaction: Its Theory and Applications in Practice."

General Electric Company, Schenectady, N. Y., has issued Bulletin No. 4902, in which are listed direct-current switchboards of 125 and 250 volts for controlling three-wire generators up to 200-kw capacity and two-wire or three-wire feeder circuits up to 1200 amp. The bulletin contains connection and dimension diagrams of various panels. Bulletin No. 4897 illustrates and describes GE Edison Mazda lamps for standard train-lighting service.

Bound FEB - 4 1915





SMITHSONIAN INSTITUTION LIBRARIES
3 9088 01629 2096